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Research Paper

Does The Distribution of Income Respond to the Development of Institutions?

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Abstract

The study aims to measure the impact of institutional factors on income distribution. Panel data for the period (2002-2018) were collected for 12 countries characterized by low levels of institutions, namely Argentina, Bolivia, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, Honduras, Kazakhstan, Peru, El Salvador, and Turkey. The fixed effects model (FEM) was adopted. The model used took into account the impact of institutional quality indicators issued by the World Bank (control of corruption, government effectiveness, political stability, quality of regulation, rule of law, and voice and accountability). The model took the effect of other variables, such as the government spending ratio, unemployment rate, and trade openness, on the income shares held by (the poorest 40%, middle 40%, and richest 10%). The results showed the response of the income distribution to institutional variables was weak, as all the calculated elasticities were less than one. However, it was found that the most dominant institutional variables in the distribution of income in favor of the richer class are (control of corruption, Regulatory quality, and the rule of law). While it was found that the institutional variables whose distributional impact is in favor of the poor are (government effectiveness, Regulatory quality, and rule of law). The effective variables in the distribution of income in favor of the middle class were (government effectiveness, and rule of law). On the other hand, we found that the unemployment rate and trade openness have a negative effect, and government expenditure has a positive effect, on the share of income held by the poor and middle class. While trade openness has a positive effect, and government spending has a negative effect, on the share of income held by the rich.

Keywords
Development of Institutions, Income Distribution, Inequality, Panel Data.

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تنمية الرافدين

(TANRA): **مجلة علمية، فصلية، دولية، مفتوحة الوصول، محكمة.**

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ورقة بحثية

هل يستجيب توزيع الدخل لتطوير المؤسسات؟

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المستخلص

تهدف الدراسة إلى قياس أثر العوامل المؤسسية على توزيع الدخل. تم جمع بيانات طولية للمدة (٢٠٠٢-٢٠١٨) لعينة شملت ١٢ دولة تتسم بتدني المؤسسات، وهي الأرجنتين، وبوليفيا، والوزيل، وكولومبيا، وكوستاريكا، والجمهورية الدومنيكية، والإكوادور، والهندوراس، وكازاخستان، وبيرو، والسلفادور، وتركيا. تم اعتماد نموذج التأثيرات الثابتة (FEM). أخذ النموذج في الاعتبار تأثير مؤشرات الجودة المؤسسية الصادرة عن البنك الدولي (مكافحة الفساد، وفعالية الحكومة، والاستقرار السياسي، وجودة اللوائح التنظيمية، وسيادة القانون، والصوت والمساءلة). أخذ النموذج تأثير المتغيرات الأخرى، مثل نسبة الإنفاق الحكومي من الناتج المحلي الاجمالي، ومعدل البطالة، والانفتاح التجاري، على حصص دخل (أفقر ٤٠٪، متوسط ٤٠٪، أغنى ١٠٪). أظهرت النتائج أن استجابة توزيع الدخل للمتغيرات المؤسسية كانت ضعيفة، حيث كانت جميع المرونات المحسوبة أقل من واحد. ومع ذلك، فقد وجد أن أكثر المتغيرات المؤسسية المؤثرة في توزيع الدخل لصالح الاغنياء هي (السيطرة على الفساد، وجودة اللوائح التنظيمية، وسيادة القانون). بينما وجد أن المتغيرات المؤسسية التي يكون تأثرها التوزيعي لصالح الفقراء هي (فعالية الحكومة، جودة اللوائح التنظيمية، وسيادة القانون). اما المتغيرات المؤثرة في توزيع الدخل لصالح الطبقة المتوسطة كانت (فعالية الحكومة، وسيادة القانون). من ناحية أخرى، وجدنا أن معدل البطالة، والانفتاح التجاري لها تأثير سلبي على حصة دخل الفقراء والطبقة المتوسطة، بينما كان تأثير الانفاق الحكومي ايجابيا على حصتهم. في حين أن الانفتاح التجاري له تأثير إيجابي على حصة الأغنياء، في حين كان للإنفاق الحكومي تأثرا سالبا في حصتهم من الدخل.

الكلمات المفتاحية

تطوير المؤسسات، توزيع الدخل، عدم المساواة، بيانات طولية.

1. Introduction:

Income inequality is an important issue in all countries and over time, due to its economic, political, and social effects on people. This is due to its close connection with the living standards of the low-income groups in particular, which constitute a large proportion of society. Reducing income inequality is one of the important duties and goals of governments to ensure peace and social tranquility and maintain the political and economic stability of countries. Taking care of adopting economic, political, and social reforms, is a fundamental way to curb income inequality.

Developments in economic theory during the twentieth century led to a focus on reforming institutions, in both developed and developing countries, through political stability, rule of law, protection of property rights, and control of corruption. A sound institution is a goal that all countries, regardless of their economic and political systems, seek to reform their economies. Recent studies related to institutions have focused on the relationship between the development of institutions and the distribution of income. Economists have varied arguments about the possibility and ability of institutional development to bring about an improvement in income distribution. This divergence of arguments is due to the type of ruling political system, the extent of the country's development, its ability to provide the appropriate institutional structure, and the degree of inequality. Therefore, it is not possible to prejudge the nature of the relationship between institutional development and income distribution.

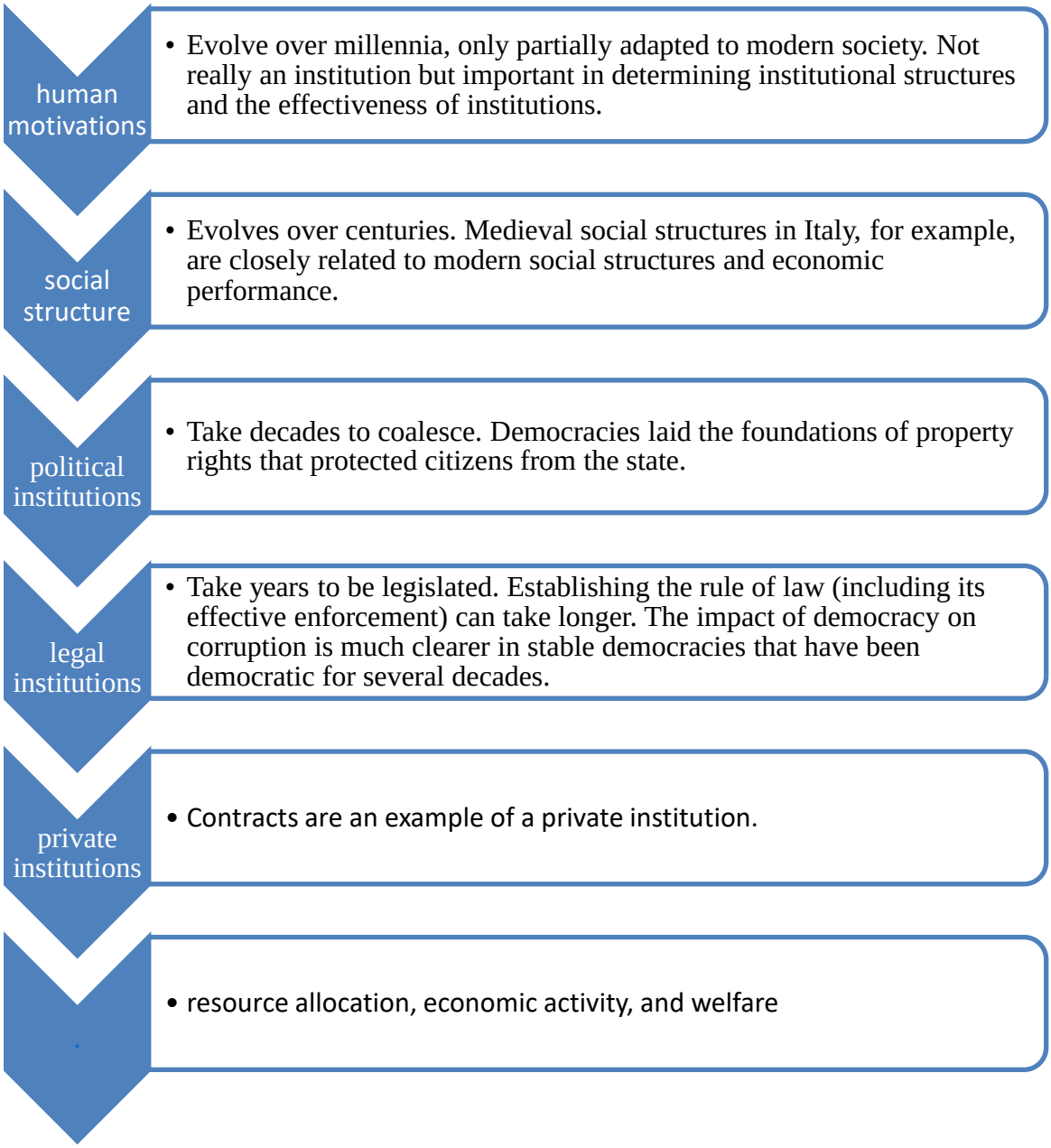
Most empirical research links institutional development with economic growth and development, but only a few have linked institutional development to income distribution. So, the importance of this research is that the economic policies aimed at reducing inequality may not pay attention to the role that institutional development can play in favor of the redistribution of income. The research aims to measure the impact of institutional development on income distribution in a group of institutionally backward countries. The addition presented by the research is its attempt to shed light on the potential provided by institutional development on income distribution in countries characterized by the backwardness of their institutions. As well as adopting a different measure of income distribution represented in the relative shares of income that belong to the rich, middle and poor classes. This criterion provides a better possibility to show the impact of institutional development not only on the share of the poor but also on the share of the middle class, for which economic policies in some countries may seek to redistribute in their favor. On the other hand, the use of the Gini scale, which was adopted by previous research, is subject to many doubts about its validity, because every single value of the Gini scale may give different distributions of income. The research hypothesis is that institutional variables contribute to reducing income inequality and that their importance outweighs the importance of other economic variables.

After this introduction, the research presents the concept of institutions in Part 2, Part 3 is devoted to presenting the relevant literature, Part 4 is concerned with describing data and methodology, and Part 5 will present the conclusions and policy implications**.**

2. The Concept of Institutions:

The interest in issues of institutional development goes back to the post-1980s economic policymakers. Those interested in issues of economic development, and international institutions calling for the activation of institutional factors in the economy. Institutions are defined as: the rules of the game in society and the mechanism of political, economic, and social interaction, and it consists of informal rules such as customs, traditions, social norms, and others, and official rules such as laws, constitution, property rights, etc... Over the past decades, institutions have been adopted by people to create order, reduce Uncertainty in economic transactions, and the guarantee of property rights (North, 1991, 97). Institutions are the formal and informal laws (rules) and standards that govern economic, social, and political relations. Institutions operate a broad spectrum that includes laws, actual regulatory entities, procedural and legal bodies, or regulatory frameworks (Nallari, 2011, 201). Figure (1) illustrates the Williamson Hierarchy of Institutions:

Figure (1): The Williamson Hierarchy of Institutions



Source: Nallari R, B. Griffith, (2011), understanding growth and poverty theory, policy and empirics, World Bank, Washington. P202.

3. Literature Review:

Institutions affect how income and wealth are distributed in a society. The distribution of income, wealth, and inequality also helps shape political institutions and how a society can be democratic. Similarly, corruption increases income inequality, while higher levels of income inequality increase the potential for corruption. (Zhuang et al, 2010, 12)

Institutional quality affects income distribution through a range of channels, including market inefficiency and failure, misallocation of resources, and failure of pro-poor growth-promoting policies.

Weak institutions have a detrimental effect on income distribution When the wealthy and the powerful class evade taxes and take advantage of tax breaks (as a result of corruption), the tax burden will fall entirely on the poor, leading to widening class disparities (Perera and Lee, 2013, 72).

On the other hand, in a weak institutional environment, where property rights are not protected, political stability is weak, and laws are not enforced, investors and businessmen fear state confiscation of their property, so they resort to reducing their investments. This reflects negatively on job creation, which affects the poor. (Persson and Tabellini, 2000, 18)

In countries with strong institutions, the ability of politicians to seize rent is greatly diminished. Hence, sustainable economic growth will be enhanced (growth for the benefit of the poor classes) and there will be more equality of income and wealth distribution, through the sustainability of institutions and the strengthening of an effective institutional structure. In contrast to countries with weak institutions, in which political and economic elites succeed in capturing resources and income. In such a situation the abundance of resources slows down or even reverses the development of institutions. This in turn leads to slow growth and creates a vicious circle of underdeveloped institutions and the lack of incentive to improve them, which will negatively affect income distribution. For example, corruption can alter the composition of social spending to benefit the rich at the expense of the poor, increasing inequality. (Chong and Calderon, 2000, 4)

Inequality, in turn, may shape institutions in a way that favors the rich. If political power is concentrated in society, elites will shape institutions and policies in their favor. The government will provide quality services that are in the interest of the elite. The skew in the distribution of wealth contributes to political inequality that produces institutions that favor a small segment of society. (Nigar, 2015, 779)

Empirically, researchers explore the relationship between institution development and inequality.

(Chong and Caldron, 2000, 9) found that institutional quality leads to an increase in the income share of the top quintiles of the population at the expense of other classes in the pre-institutional reform stages, and thus increases inequality. But with institutional reform, the poor's share of income has increased in the long run.

(Carmignani, 2004) found that the efficiency of institutions has an impact on investment decisions and the provision of the appropriate structure by providing legislation that supports the investment climate. Which is reflected positively on the income share of the poor class.

(Chong & Gradstein, 2004) examined the impact of institutional development and institutional quality on income distribution in Russia and Bolivia, they found that institutional reform leads to better income distribution.

(Savoia et al, 2010) found that weak institutions in developing countries exacerbate inequality because property rights are not protected. But with the strengthening of property rights, through the presence of democracy and political institutions that guarantee the participation of the poor, inequality will decrease. Hence, the absence of democracy and the lack of protection of property rights enhances the income of the richest class of society.

In their study (Josifidis et al, 2017) found that the improvement in institutions will be reflected in the distribution of income in favor of the poor, and the abolition of the privileges of the ruling elite. The institutional inertia, stemming from social norms, impedes the existing institutions from dealing with the problem of the income distribution. The political elites have a direct impact on the formation of the institutional structure, and the goal is to acquire the largest share of income.

(Siyakiya, 2017) examined the impact of institutional quality on income distribution and economic performance. he found that institutional development has positive effects on income distribution in developed countries. While the impact of institutional development on income distribution in developing and less developed countries has not been proven.

(Asgher et al, 2018) researched the effect of institutional quality on income distribution in selected Asian countries, and found that strengthening institutional quality promotes a more equitable income distribution.

(Madani, 2019) found that the decrease in inequality is related to the development of institutions. Weak institutions do not protect private property rights, foster acquisitions, and reinforce class differences. These factors ultimately lead to increased income inequality.

(Josifidis, et.al, 2020) discussed the role of institutions in a group of transitional countries. They showed that the development of institutions in the short run will reduce the incomes held by the poor due to job cuts and a reduction in public spending as a result of the transition. In the long run, the development of institutions will raise the incomes of the poor, through active political participation and freedom of voting that

allows the poor to choose who represents them and legislate laws to guarantee their rights.

(Kunawotor et al, 2020) found that institutional quality indicators such as control of corruption and rule of law reduce inequality. While they found no significant evidence that other variables (government effectiveness, political stability, voice and accountability, and regulatory quality) have to affect inequality of income distribution.

4. Data and Methodology:

Pooled data for the period (2002-2018) was collected for 12 countries characterized by weak institutions, namely Argentina, Bolivia, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, Honduras, Kazakhstan, Peru, El Salvador, and Turkey. These are the countries for which the data needed to analyze are available. Data was collected from World Bank publications (World Development Indicators) and (Worldwide Governance Indicators). That is meaning we have regularly pooled data equal to; (12*17=204) Row observation, and a total panel (unbalanced) observations equal to:192 observations.

Three measures of the income distribution were adopted, representing the share held by the poorest 40%, middle 40%, and richest 10%, as dependent variables within three models. As for the explanatory variables, they were represented by the institutional quality indicators issued by the World Bank (control of corruption, government effectiveness, political stability, regulation quality, rule of law, voice, and accountability). The data was modified, so, the scale adopted ranged from 1 to 5, to get rid of negative values, and to be able to take the logarithm of the data, the scale originally occurred between (-2.5 to +2.5). The effect of other variables, explaining income distribution, has been taken into consideration, such as government spending ratio, unemployment rate, and trade openness. The following logarithmic model has been estimated:

$$LnY_{it}=\beta_0+\beta_1 LnX_{1,it}+\beta_2 LnX_{2,it}+\beta_3 LnX_{3,it}+\beta_4 LnX_{4,it}+\beta_5 LnX_{5,it}+\beta_6 LnX_{6,it}+\beta_7 LnX_{7,it}$$
$$+\beta_8 LnX_{8,it}+\beta_9 LnX_{9,it}+U_{it} \qquad i=1,2,\ldots,12 \;;\; t=1,2,\ldots,17$$

Whereas:

- **Dependent variable**

Y: Income distribution, which is expressed as the income share held by the highest 10%, the middle 40%, and the lowest 40%.

- **Explanatory variables:**

X1: Control of Corruption Indicator.
X2: Government Effectiveness Indicator.
X3: Political stability indicator.
X4: Regulatory Quality Indicator.
X5: Rule of Law Indicator.
X6: Voice and Accountability Indicator.
X7: Government Expenditure as % of GDP.

X8: Unemployment rate.
X9: Trade openness.
β_0: Constant term.
βs: Elasticities.
U: The error term.

- **Unit Root Test:**

Table (1) shows the results of the stationary test for the model variables according to the Livn-Len & Chaw (LLC) test. The test results reflect that all the variables are stationary at level, thus we reject the null hypothesis and accept the alternative hypothesis which indicates that the variables are integrated of degree {I (0)}.

Table (1): Unit Root Test Results (LLC Test)

Variables	At level I(0)	
	Individual Intercept	Individual Intercept & Trend
LnY_1	-5.6778 (0.000)	-6.91902 (0.000)
LnY_2	-1.91975 (0.002)	-6.6975 (0.000)
LnY_3	-4.7646 (0.000)	-9.17611 (0.000)
LnX_1	-2.5263 (0.005)	-2.72019 (0.000)
LnX_2	-1.7744 (0.041)	-2.309 (0.011)
LnX_3	-2.1676 (0,015)	-6.5601 (0.000)
LnX_4	-1.94231 (0.036)	-7.7820 (0,000)
LnX_5	-2.3827 (0.008)	-3.39273 (0.000)
LnX_6	-1.3007 (0.009)	-4.2453 (0.000)
LnX_7	-4.5453 (0.000)	-3.17436 (0.000)
LnX_8	-4.8968 (0.000)	-3,1999 (0.000)
LnX_9	-2.1779 (0.014)	-3.4892 (0.000)

Source: authors' work/ EViews-10 program outputs

5. **Results of Regression Models:**

I. The first model: the effect of institutional factors on the income share held by the richest 10%

This model includes estimating the impact of institutional variables (control of corruption, government effectiveness, political stability, regulatory quality, rule of law, voice, and accountability).

The unit root test confirmed that all the variables are stationary at the level. So, the analysis is static. The best estimation method is unbalanced Panel Data with its three models (Pooled Regression Model (PRM), Fixed Effect Model (FEM), and Random Effect Model (REM)) as shown in Table (2).

Table (2): Models Estimation Results (Richest 10% share of income)

Panel Data									
Sample:2003-2018			cross-section included:12			total panel (unbalanced) observations:192			
Variables	Pooled Regression Model			Fixed Effects Model			Random Effects Model		
	Coefficient	t-statistic	Prob.	Coefficient	t-statistic	Prob.	Coefficient	t-statistic	Prob.
Constant	4.1961	10.04	0.00	3.5451	28.44	0.00	4.0327	6.3191	0.000
LnX1	0.0766	1.015	0.31	0.1604	7.959	0.00	0.2010	2.6043	0.010
LnX2	-0.6975	-6.98	0.00	-0.4373	-25.38	0.00	-0.4949	-6.7883	0.000
LnX3	0.0256	0.541	0.59	-0.007	-2.38	0.02	0.0090	0.3406	0.734
LnX4	0.0399	0.27	0.7٩	0.0882	4.637	0.00	0.0745	0.8723	0.384
LnX5	0.2841	4.091	0.00	0.1742	12.33	0.00	0.1801	3.1566	0.00٢
LnX6	0.3629	1.54٣	0.1٣	-0.063	-1.9٣	0.0٦	0.0569	0.4246	0.67٢
LnX7	-0.0563	-0.٦	0.55	-0.1075	-4.345	0.00	-0.1903	-1.5018	0.13٥

Panel Data									
Sample:2003-2018			**cross-section included:12**			**total panel (unbalanced) observations:192**			
LnX8	**-0.0261**	**-0.42**	**0.67**	**-0.0109**	**-1.250**	**0.23**	**-0.0148**	**-0.4094**	**0.68٣**
LnX9	**-0.0041**	**-0.٢**	**0.8٥**	**0.1684**	**19.3٢**	**0.00**	**0.1455**	**4.1171**	**0.000**
R^2	**0.2477**			**0.7812**			**0.3443**		
R^2-Adj	**0.2105**			**0.7040**			**0.3113**		
F-statistic	**159.037**			**72.333**			**10.618**		
Prob (F-stat.)	**0.0000**			**0.0000**			**0.0000**		
D.W	**0.2799**			**2.00627**			**0.8292**		

Source: authors' work/ EViews-10 program outputs

- **Differentiation Among the Three Models (Fisher and Hausman Tests):**

We will conduct differentiation tests among the three models shown in Table (2). Table (3) shows the results of the Fisher test for the trade-off between the pooled regression model and the (FEM). Test results show that the value of the F-test is significant at 1%, and this indicates that the (FEM) is better than the (PRM), table (3) shows this.

Table (3): Results of the Fisher (F) test for differentiation between (PRM) and (FEM) models

Redundant Fixed Effects Tests **Test cross-section fixed effects**			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	**323.4547**	**(11,171)**	**0.000**

Source: authors' work/ EViews-10 program outputs

To compare the (FEM) and the (PRM), we will use the Hausman test. Table (4) shows test results that indicate its significance at the (1%) level. It is also noted that all the differences between fixed effects and random effects were statistically significant, which means that the (FEM) is better than the (REM).

Table (4): Results of Hausman test for differentiation between (FEM) and (REM) models

Correlated Random Effects - Hausman Test				
Test cross-section random effects				
Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random		**177.2156**	**9**	**0.000**
Cross-section random effects test comparisons:				
Variable	**Fixed**	**Random**	**Var (Diff.)**	**Prob.**
$Ln(X_{1,t})$	0.1604	0.2010	0.0015	0.000
$Ln(X_{2,t})$	-0.4373	-0.4949	0.0004	0.000
$Ln(X_{3,t})$	-0.00٧٠	0.0090	0.0000	0.000
$Ln(X_{4,t})$	0.0882	0.0745	0.0001	0.000
$Ln(X_{5,t})$	0.1742	0.1801	0.0005	0.013
$Ln(X_{6,t})$	-0.0630	0.0569	0.0002	0.000
$Ln(X_{7,t})$	-0.1075	-0.1903	0.0051	0.000
$Ln(X_{8,t})$	-0.010٩	-0.0148	0.0000	0.000
$Ln(X_{9,t})$	0.1684	0.1455	0.0005	0.000

Source: authors' work/ EViews-10 program outputs

The results of the (FEM) indicate that the control of corruption has a significant positive impact on the share of the richest 10% at (1%) but with low elasticity, as the increase in the control of corruption indicator by (1%) leads to an increase in the income share of the richest 10% by (0.16%).

The government effectiveness indicator has a significant negative effect on the share of the richest 10% at (1%), with low elasticity, as an increase in the government effectiveness indicator by (1%) leads to a decrease in their share by (0.44%).

Political stability affects significantly and negatively the share of the richest 10% at (5%), with low elasticity. An increase in the political stability indicator by (1%), leads to a decrease in their share by (0.01%).

The regulatory quality has a significant positive impact on the share of the richest 10% at (1%), with low elasticity. An increase in regulatory quality indicator by 1% leads to an increase in the richest share by (0.09%).

The rule of law indicator has a significant positive effect on the share of the richest 10% at (1%), with low elasticity, as the increase in the rule of law indicator by (1%) leads to an increase in their share by (0.17%).

There was a significant negative effect of the voice and accountability indicator on the income share held by the richest 10% at (10%).

The ratio of government expenditure to GDP has a significant negative effect on the income share of the richest 10%, but with low elasticity. An increase in the government expenditure ratio by (1%) will lead to a decrease in their share by (0.11%). As the higher government expenditure ratio led to reducing the income share for this class because government plans and policies related to expenditure will target the poor class of society. On the other hand, government expenditure is financed through progressive taxes that fall on the wealthy class and prevent its income share from increasing.

Trade openness has a significant positive effect on the income share of the richest 10%, with low elasticity. An increase in trade openness by (1%) will lead to an increase in their share by (0.17%). This is because trade openness is in the interest of wealthy businessmen.

There is no significant effect of the unemployment rate on the income share of the richest 10%, which means that increasing or decreasing unemployment rates does not affect this class share, due to the diversity of income sources they receive.

The explanatory power of the model indicates that (78%) of the changes that occur in the income share of the top 10% of can be attributed to institutional and economic variables. The high significance of the model as a whole and its freedom from the econometrics problems confirm the efficiency and quality of the model to help in drawing the income distribution policy.

II. The second model: the effect of institutional factors on the income share held by the middle 40%

The model is concerned with estimating the impact of institutional variables (control of corruption, government effectiveness, political stability, Regulatory quality, rule of law, and voice and accountability), as well as the impact of economic variables (government expenditure ratio, unemployment rate, and trade openness) on the income share held by the middle 40%. Table (5) shows the results.

Table (5): Model Estimation Results (middle 40% share of income)

Panel Data			
Sample:2003-2018	**cross-section included:12**	**total panel (unbalanced) observations:192**	
Variables	**Pooled Regression Model**	**Fixed Effects Model**	**Random Effects Model**

	Coefficient	t-statistic	Prob.	Coefficient	t-statistic	Prob.	Coefficient	t-statistic	Prob.
Constant	5.1371	12.26	0.00	2.7430	23.41	0.000	3.9794	9.4796	0.000
LnX1	-0.5275	-6.979	0.00	-0.1526	-6.404	0.000	-0.3913	-6.492	0.000
LnX2	0.8977	8.952	0.00	0.3481	13.55	0.000	0.6237	9.0405	0.000
LnX3	-0.0333	-0.702	0.48	0.0020	0.490	0.625	-0.015	-0.561	0.576
LnX4	0.1142	0.771	0.44	-0.0209	-1.045	0.298	0.0569	0.6663	0.506
LnX5	-0.1098	-1.578	0.12	0.1612	12.08	0.000	-0.1149	-2.290	0.023
LnX6	-0.2678	-1.136	0.26	-0.0029	-0.078	0.938	-0.0915	-0.677	0.499
LnX7	-0.5618	-5.971	0.00	0.2068	7.353	0.000	-0.2029	-2.236	0.027
LnX8	0.0158	0.254	0.80	-0.0119	-1.294	0.007	0.0354	0.9875	0.325
LnX9	0.0762	3.573	0.00	-0.1705	-17.47	0.000	-0.0184	-0.820	0.413
R^2	0.4733			0.8418			0.2785		
R^2-Adj	0.4472			0.8340			0.2428		
F-statistic	18.1698			107.5057			7.8059		

Prob (F-stat.)	**0.000**	**0.000**	**0.000**
D.W	**0.3706**	**2.0318**	**0.5168**

Source: authors' work/ EViews-10 program outputs

- **Differentiation Among the Three Models (Fisher and Hausman Tests):**

We will conduct differentiation tests among the three models shown in Table (5). Table (6) shows the results of the Fisher test for the trade-off between the (PRM) and the (FEX). Test results show that the value of the F-test is significant at 1%, and this indicates that the (FEM) is better than (PRM).

Table (6): Results of the Fisher (F) test for differentiation between (PRM) and (FEM) models

Redundant Fixed Effects Tests **Test cross-section fixed effects**			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	**218.9797**	**(11,171)**	**0.000**

Source: authors' work/ EViews-10 program outputs

To compare the (FEM) and the (PRM), we use the Hausman test. Table (7) shows the test results that indicate its significance at the (1%). It is also noted that all the differences between (FEM) and (REM) were statistically significant, which means that the (FEM) is better than the (REM).

Table (7): Results of the Hausman test for differentiation between (FEM) and (REM) models

Correlated Random Effects - Hausman Test				
Test cross-section random effects				
Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random		**126.159**	**9**	**0.000**
Cross-section random effects test comparisons:				
Variable	**Fixed**	**Random**	**Var (Diff.)**	**Prob.**
$\mathrm{Ln}(X_{1,t})$	-0.2171	-0.3913	0.0038	0.002
$\mathrm{Ln}(X_{2,t})$	0.4262	0.6237	0.0008	0.000
$\mathrm{Ln}(X_{3,t})$	0.0031	-0.0150	0.0000	0.000

$Ln(X_{4,t})$	-0.0171	0.0569	0.0003	0.000
$Ln(X_{5,t})$	0.1875	-0.1149	0.0011	0.027
$Ln(X_{6,t})$	-0.0141	-0.0915	0.0004	0.000
$Ln(X_{7,t})$	0.2007	-0.2029	0.0107	0.000
$Ln(X_{8,t})$	-0.0098	0.0354	0.0001	0.006
$Ln(X_{9,t})$	-0.1784	-0.0184	0.0011	0.000

Source: authors' work/ EViews-10 program outputs

The results of the (FEM) indicate that the control of corruption has a significant negative impact on the share of the middle 40% at (1%), but with low elasticity, as the increase in the control of corruption indicator by (1%) leads to a decrease in the income share held by the middle 40% by (-0.15%).

Government effectiveness has a significant positive effect on the income share held by the middle 40% and at (1%), but with low elasticity. As the increase in government effectiveness indicator by (1%) leads to an increase in the income share held by the middle 40% by (0.39%).

Rule of law has a significant positive effect on the income share held by the middle 40% at (1%), with low elasticity, as the increase in the rule of law indicator by (1%) leads to a rise in the income share of the middle class by (0.16%).

The ratio of government expenditure of GDP has a significant positive effect on the income share held by the middle 40%, but at a low elasticity. A rise in government expenditure (1%) will lead to an increase in the income share of the middle class by (0.27%). This means that government expenditure directed to the poor and middle classes will increase their share of income.

The unemployment rate has a significant negative effect on the income share of the middle 40%, but with low elasticity. An increase in the unemployment rate by (1%) leads to a decrease in the income share of the middle class by (0.01%). It is more likely that individuals within the middle class are workers and employees, therefore their incomes are greatly affected by unemployment, so, it has a negative impact on their income share.

Trade openness has a significant negative effect on the income share of the middle class, but with low elasticity. An increase in trade openness by (1%) will lead to an increase in the income share of the middle class by (0.17%). This is because the fruits of trade openness often go to the rich class, and then the poor do not benefit from this openness, but rather openness is negatively reflected on them through the loss of job opportunities and the rise in prices.

There was no significant effect of political stability, regulatory quality, and voice and accountability on the income share of the middle 40%.

The explanatory power of the model indicates that (84%) of the changes that occur in the income share of the middle 40% can be attributed to institutional and economic

variables. The high significance of the model as a whole and its absence of problems confirm the efficiency of the model in describing the relationship between institutional and economic variables and the income share of the middle class. This means that the model is good and its results can be adopted in formulating income distribution policies.

III. The third model: the effect of institutional factors on the income share held by the Poorest 40%

The model is concerned with estimating the impact of institutional variables (control of corruption, government effectiveness, political stability, regulatory quality, rule of law, and voice and accountability), as well as the impact of economic variables (total government expenditure, unemployment rate, and trade openness) on the income share held by the poorest 40%. Table (8) shows the results.

Table (8): Model Estimation Results (Poorest 40% share of income)

Panel Data									
Sample:2003-2018			cross-section included:12			total panel (unbalanced) observations:192			
Variables	Pooled Regression Model			Fixed Effects Model			Random Effects Model		
	Coefficient	t-statistic	Prob.	Coefficient	t-statistic	Prob.	Coefficient	t-statistic	Prob.
Constant	4.7051	16.92	0.00	3.3886	33.40	0.000	3.6106	11.271	0.000
LnX1	-0.3671	-7.32	0.00	-0.0899	-6.698	0.000	-0.2191	-5.161	0.000
LnX2	0.6323	9.503	0.00	0.2617	21.95	0.000	0.3755	8.3208	0.000
LnX3	-0.0211	-0.67	0.50	0.0005	0.168	0.867	-0.0059	-0.352	0.726
LnX4	0.0761	0.774	0.44	0.0384	3.105	0.002	0.0039	0.0727	0.942
LnX5	-0.0787	-1.70	0.09	0.1146	12.26	0.000	-0.0967	-2.872	0.005

LnX6	-0.1828	-1.17	0.24	0.0321	1.317	0.190	-0.0505	-0.591	0.555
LnX7	-0.4191	-6.71	0.00	0.0367	1.817	0.071	-0.0715	-1.066	0.288
LnX8	0.0108	0.262	0.79	-0.0118	-2.13	0.035	0.0226	0.9910	0.323
LnX9	0.0700	4.945	0.00	-0.0982	-17.56	0.000	-0.0307	-1.764	0.079
R^2	0.5139			0.8682			0.2731		
R^2-Adj	0.4897			0.8617			0.2371		
F-statistic	21.369			133.2873			7.5962		
Prob (F-stat.)	0.000			0.000			0.000		
D.W	0.3994			1.9161			0.645		

Source: authors' work/ EViews-10 program outputs

- **Differentiation Among the Three Models (Fisher and Hausman Tests):**

We conducted differentiation tests among the three models shown in Table (8). Table (9) shows the results of the Fisher test for the trade-off between the (PRM) and (FEX). Test results show that the value of the F-test is significant at 1%, this indicates that the (FEM) is better than the (PRM).

Table (9): Results of the Fisher (F) test for differentiation between (PRM) and (FEM) models

Redundant Fixed Effects Tests **Test cross-section fixed effects**			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	**٤٠٠.٦٦٦٧**	**(11,171)**	**0.000**

Source: authors' work/ EViews-10 program outputs

To compare the (FEM) and (PRM), we will use the Hausman test. Table (10) shows the test results that indicate its significance at the (1%) level. It is also noted that

all the differences between (FEM) and (REM) were statistically significant, which means that (FEM) is better than (REM).

Table (10): Results of the Hausman test for differentiation between (FEM) and (REM) models

Correlated Random Effects - Hausman Test				
Test cross-section random effects				
Test Summary		**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random		82.4641	9	0.000
Cross-section random effects test comparisons:				
Variable	**Fixed**	**Random**	**Var(Diff.)**	**Prob.**
$Ln(X_{1,t})$	-0.1365	-0.2191	0.0009	0.007
$Ln(X_{2,t})$	0.2975	0.3755	0.0002	0.000
$Ln(X_{3,t})$	0.0005	-0.0059	0.0000	0.000
$Ln(X_{4,t})$	-0.0312	0.0040	0.0001	0.000
$Ln(X_{5,t})$	0.1296	-0.0967	0.0003	0.055
$Ln(X_{6,t})$	0.0250	-0.0505	0.0001	0.013
$Ln(X_{7,t})$	0.0779	-0.0715	0.0030	0.006
$Ln(X_{8,t})$	-0.0100	0.0226	0.0000	0.011
$Ln(X_{9,t})$	-0.1059	-0.0307	0.0003	0.000

Source: authors' work/ EViews-10 program outputs

The results of the (FEM) indicate that the Control of Corruption Indicator has a significant negative effect on the income share of the poor at (1%), with low elasticity. The increase in the Control of Corruption indicator by (1%) leads to a decrease in the income share of the poorest 40% by (0.09%).

Government effectiveness has a significant positive effect on the share of the poorest 40% at (1%), with low elasticity. The increase in government effectiveness indicator by (1%) leads to an increase in the income share of the poorest class by (0.26%).

The regulatory quality has a significant positive effect on the income share of the poorest income class at (1%), with low flexibility. An increase in the regulatory quality indicator by (1%) leads to an increase in the income share of the poorest 40% by (0.04%).

The rule of law has a significant positive effect on the share of the poorest 40% at (1%), with low elasticity. The rise in the rule of law indicator by (1%) leads to an increase in the share of the income of the poor by (0.11%).

Government expenditure has a significant positive impact on the poor's share of income at (10%). However, the response of income distribution to changes in government expenditure as a percent of GDP was weak, as the elasticity was 0.036.

The unemployment rate has a significant negative effect on the income share of the poorest 40%, with low elasticity. An increase in the unemployment rate by (1%) will lead to a decrease in the share of the income of the poor by (0.01%). The poorest class usually be of workers and employees; therefore, their incomes are greatly affected by the unemployment situation.

Trade openness has a significant negative effect on the income share of the poorest 40%. An increase in the level of trade openness by (1%) will lead to a decrease in the share of the income of the poor by (0.1%). It is known that the fruits of trade openness go to the rich, then the poor class does not benefit from this openness. Rather, it is negatively reflected on them through the loss of job opportunities and the rise in prices accompanying the trade openness.

Political stability, voice, and accountability have no significant effect on the income share held by the poor.

The explanatory power of the model indicates that (87%) of the changes that occur in the share of the poorest 40% can be attributed to institutional and economic variables. The high significance of the model as a whole and its absence of econometric problems confirm the efficiency and quality of the model in describing the relationship between institutional and economic variables and the income share of the poorest 40%, which means that the model is a good and its results can be adopted in formulating income distribution policies.

5. Conclusions and Policy Implications:

It was found that the elasticities of the impact of institutional variables on income distribution are low, which reflects the weak response of income distribution to institutional developments.

It was found that institutional variables (regulatory quality, the rule of law, and the government effectiveness) improved the income share of the poorest 40%, and the middle income 40%. So, they have a positive distributional effect.

The results showed that control of corruption positively affects the income share of the richest 10%. While its effect was negative in the poorest 40% and the middle 40% share. This result is strange, how can the efforts to fight corruption benefit the rich and work against the poor and middle-income classes? The possible interpretation is that fighting corruption will create a favorable investment environment that motivates the rich to expand investment and profits, but these additional investments do not create

new job opportunities and thus increase the share of the rich's income at the expense of the poor and middle-income. But the continuation of anti-corruption efforts will create the appropriate conditions for the redistribution of income in favor of the poor and middle-income in the long run.

Voice and accountability did not appear to have a significant effect on the income shares held by middle and poor classes, but negatively affect the share of the rich. This gives an impression of the fragility of democracy in institutionally underdeveloped countries.

We found no evidence indicating that political stability had a significant effect on the income share of the poor and middle class. But it was found that it had a negative impact on the share of the rich. The last result does not comply with the logic that says that political stability provides the appropriate environment for investment that benefits the rich class in particular. The explanation for this may lie in the fact that political instability is the appropriate environment for creating institutions that work for the benefit of the rich. Thus, political stability does not create the appropriate environment for restricting income and wealth to the wealthy minority in society.

High unemployment rates and trade openness have undesirable distributional effects, as increasing unemployment and trade openness reduces the share of middle-income and poor people in society. While government expenditure has desirable distributional effects, as the increase in government expenditure as a percent of GDP contributes to increasing the share of income held by middle-income and poor people in society.

Despite the small elasticity of the impact of institutional variables on income distribution, they are of greater importance compared to other economic variables. This confirms the importance of taking institutional improvement into consideration when deciding income redistribution policies. This result is consistent with the research hypothesis.

All three models (the income share of the richest 10%, the income share of the middle 40%, and the income share of the poorest 40% of the population) are good models and can be adopted in formulating income distribution policies.

According to the above results, the following recommendations can be made:

Paying attention to the development of institutions, as a priority within the framework of income redistribution policies.

Focusing the attention of policymakers on the effect on regulatory quality, rule of law, and government effectiveness indicators, given the effectiveness of these indicators in creating desirable effects on income distribution.

Introducing fundamental reforms in the democratic system to ensure that voice and accountability have a clear impact on economic conditions, including the unequal distribution of income.

Attention to addressing high unemployment, and neutralizing the negative effects of trade openness, are important political approaches to achieving the goal of reducing inequality. An increase in government spending directed to the poor and middle-income plays an important role in approaching a more equitable distribution of income.

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