Original Article

An Analysis Of The Relationship Between National Economic Productivity And Income Inequality

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Abstract

The objective of this inquiry is to determine how economic productivity and income disparity are related. Previous studies on the subject have produced mixed findings, with some studies finding a positive correlation and others finding a negative explanation for how income inequality affects economic performance. Both a single and numerous instances of linear regression analysis are employed in this study to ascertain the relationship between the two variables. Models 4 through 6 find a poor link between income inequality and economic growth, in contrast. Particular focus was given to the study's dummy variable, which represented a country's developmental stage.

Key words: GDP, Robustness, Multiple Regression**,** perfect collinearity. GINI Coefficient

Introduction

Since the end of World War II, international organisations have been more and more concerned with national development. The level of inequality in a nation may be used as a gauge of the quality of life and level of economic production in a place, as well as a sign of where improvements are needed to foster development and prosperity. More investigation will be required on how a country's income disparity influences its present level of economic output as the globe becomes more globalised and linked. Worldwide economies are now tied to one another because to globalization, and this connection will only grow in the coming years. A nation that experiences war frequently experiences increased wealth disparity and, as a result, experiences poorer rates of economic growth countries.

Gross domestic product (GDP), a common metric for assessing a country's productivity, has long been considered important in assessing a population's progress in terms of both society and technology. Higher levels of technical advancement and lower levels of warfare are frequently associated with countries having gross domestic output that is above average. As a result of the collapse of the India, there is now a greater disparity in wealth distribution among countries, which has a negative impact on income equality, reduced economic productivity, and stifled global economic growth in developing nations. In order to analyze the implications that income disparity has on advancement, this study will use cross-sectional data to build basic and numerous regression models. These models will be used to establish links between a country's degree of development and its economic growth. It is assumed that economies will function less well in nations with increasing income disparity. Conflict, it is further believed, will worsen the effects of income disparity and further reduce the corresponding economic production. The economic theory behind this is that a nation's capacity to use its people and physical capital to progress technologically and generate higher levels of GDP would decline if that nation encounters increasing income inequality.

LITERATURE REVIEW:

Previous studies that examined how income disparity affects economic development came up with a mixed bag of findings. Some draw the conclusion that economic growth is negatively correlated with income disparity while others argue the contrary. The data gathered across various explanatory factors and the analytic techniques can help to explain some of the variations between these outcomes. The negative correlation between income disparity and economic development has been emphasized through a number of approaches to the topic. Four parameters used to assess growth performance were examined in a cross-country investigation using a methodical approach to this subject (Mo 2003).

The factors were the proportion of GDP investment, the rate of population increase, the starting real GDP per capita level, and the GINI coefficient. In reaction to increased levels of inequality, it was anticipated that the coefficients on the variables for the GINI coefficient would have a negative effect on total factor productivity, which would therefore reduce economic growth. According to the study, a one percent rise in the GINI coefficient has a negative effect on GDP growth rate by 2.16 percent (Mo 2003). A decrease in economic growth is also likely to have negative impacts on investment, which will therefore have a negative impact on the stock of human capital, which depends on investment. The research revealed that around 55% of the influence Income inequality may be used to explain the GDP growth rate (Mo 2003). Additionally, the author draws the conclusion that, depending on a country's level of development, the effects of income disparity will vary.

Other research paid more attention to how violence and civil strife exacerbate economic disparity. Humphrey's (2003) analysis of how conflict affects GDP growth, along with wealth, poverty, government policy, economic structure, and trade, highlighted inequality as a determinant. He discovered that economic policies frequently result in economic, political, and financial inequality and that they provide policymakers the freedom to create conflict as a means of achieving their own financial objectives. The investigation looked at both overall inequality, which is defined as "inequality between people regardless of group membership," and horizontal disparity, which is inequality across groups or regions, as a gauge for economic output (Humphrey 2003). The disparities in income and inequality are worsened in less wealthy nations and

Humphrey (2003) finds that a country with a GDP per person of 250 U.S. Dollars is likely to experience war with a probability of 15 percent compared to a 4 percent probability of nations with a GDP per person of $1250. Since extreme income inequality often leads to civil conflict, then it follows that increases in wealth disparities will decrease GDP per capita. The unequal allocation of resources and wealth has contributed to the lack of development of some countries and further exacerbated income disparities as a deterrent of economic growth and productivity (Cramer 2003).

The distinctions between urban and rural areas within states were taken into account in additional literature that demonstrates the complex link between income disparity and economic growth. By regressing growth on income distribution factors such as starting per capita GDP level, 5-year population average annual growth rate, and percentage of consumer expenditure borne by the government, Odedokun and Round (2001) examined the direct impact of inequality on growth. Further study into urban and rural regions was undertaken in a few different nations because it was determined that these factors had a poor explanatory power. They discovered that the coefficient relating to the income share of the middle class was statistically significant and positive in rural regions, but statistically insignificant and negative elsewhere (Odedokun and Round 2001). This study's analysis covered fewer nations than did other research, which could help to explain the inconsistent effects of income inequality on growth.

There has been a lot of study on the impact of income disparity on productivity and economic growth, but our research will be slightly different. In this essay, I'll examine the relationship between rising income inequality and declining GDP. The natural logarithm of gross domestic product per capita will be the dependent variable in this cross-country study (log gddpc). The GINI coefficient, which measures the overall inequality in the nation, will be the main independent variable. To further clarify the statistics in terms of conflict or peace, military spending, foreign direct investment as a proportion of gdp, research and development, battle-related mortality (to indicate a loss of human capital), projected years of schooling, and the status of the nation as a developing or developed A developed country will be taken into account. To further expand the data, a single basic regression analysis will be followed by a number of multiple regressions.

III. Data

Cross-sectional information was obtained from the World Bank to determine the association between income inequality of nations exposed to war and economic development. The primary dependent variable used to represent the economic growth of a nation over a controlled year is the natural log of gross domestic product (GDP) per capita. The GINI coefficient, a gauge of a nation's total income inequality, is the main independent variable employed in this study. The independent variable was used to examine if transfer of wealth resources would raise living standards in a nation with higher income disparity. The World Bank provided information on economic growth and the GINI index (GiCo). This list includes the nations that were utilised. The list of nations utilised in this study is included in the appendix. The graph below displays the natural logarithm of GDP and the GINI. Notably, GINI values around zero lean toward perfect equality while those near 100 tend toward perfect inequality. A general correlation between the two variables may be seen in the data. The natural logarithm of GDP per capita decreases as the GINI coefficient moves closer to 100, demonstrating that income inequality has a detrimental impact on economic growth.

In addition to the primary variable, a number of other explanatory factors were included to reinforce and support the multiple regression models. This was done in order to determine the actual ceteris paribus impact of the growth of income inequality on GDP per capita. To shed light on the effects of conflict on income equality, the other independent variables were battle-related mortality, foreign direct investment as a proportion of GDP, and research and development (RD). In order to compare statistical differences between developed and developing nations, life expectancy (life), anticipated years of education (SchYrs), and a dummy variable for status labelled dev were also recorded as a % of GDP. These extra factors are anticipated to have an additional positive or negative influence about economic disparity. While foreign direct investment, life expectancy, and research & development are anticipated to have beneficial effects, battle-related mortality and military spending are likely to have a negative influence on the GINI coefficient and cause additional losses in economic output. To compare the impacts of income disparity in emerging nations with those observed in industrialized ones, the status of each nation was taken into account. To find out if countries experiencing conflict face larger economic disparity than those living in peace, battle-related fatalities were counted. Since there was a severe lack of data for this variable, it was recorded as the natural logarithm of battle deaths (log Bdeaths) in order to more precisely depict its effects. We measured MilExp, fdigdp, and RD as a proportion of GDP in order to take into consideration the disparities in economic size between different countries.

This is done to prevent statistics from being skewed and biased against poor countries since more developed countries would be able to allocate larger financial resources to the aforementioned fields. Military expenditures is examined to demonstrate the connection between military spending, whether for defense or attack, and the following misallocation of resources that leads to inequality and may ultimately lower GDP per capita. The variables employed in this investigation are described and summarised below.

Variable Description

Variable Name	**Description**	**Year**	**Units**	**Source**
log_gdppc	Natural logarithm of gross domestic product (GDP) per capital	2020	Constant 2010 USD	World Bank
Dev (dummy	Development	2020	Dummy:	United Nations
variable)	Status of Countries		0 = developing 1 = developed	

MilExp	Military expenditure as a percentage ofGDP per Capita.	2020	Percentage	World Bank
RD	Research and development as a percentage of GDP per Capita	2020	Percentage	World Bank
LifeExp	Life Expectancy	2020	Years	World Bank
fdigdp	Foreign Direct investment	2020	US Dollars	World Bank
log_Bdeaths	Natural Logarithm Battle Related Deaths	2015- 2020	No. of deaths	World Bank

Descriptive statistics for each variable can be found below.

Variable	Observations	Mean	Standard Deviation	Min	Max
log_gdppc	179	9.234	1.181	6.435	11.943
GiCo	89	36.028	7.204	24.6	56.3
dev	461	0.078	0.269	0	1
life	254	72.157	7.481	52.805	84.934
fdigdp	246	-2.519	81.314	-1268.174	31.921
RD	96	1.29	1.066	0.014	4.953
MilExp	202	1.845	1.34	0	9.518
log_Bdeaths	58	6.131	2.571	0	10.823

Outliers: A alternate measurement of foreign direct investment may be preferable to more correctly depict its link to the dependent variable, according to the minimum values and standard deviation associated with the fdigdp variable. The assumptions of the Classical Linear Model (CLM) were examined for bias, variance, and a normal distribution prior to running regression analysis for the aforementioned variables. The following are these presumptions:

1. The model's parameters must be linear, according to assumption 1. The model used in this study fulfils the condition that the equation y = B0 + B1X1 + B2X2 +...BkXk + u is linear in parameter.

2. Random Sampling is a second premise. The model is consistent with this assumption since all data from the World Bank are taken from global samples and populations selected at random.

No perfect collinearity

1. To test for perfect collinearity the model was placed in STATA software for the data collected for the variable in table 1. I initially performed regressions including a variable for ‘intensity level’ of conflict. However, this variable proved to have a perfect collinear relationship with the ‘status’ variable. For this reason, the variable, ‘intensity’ was removed to preserve the integrity of the model. Intensity level was not included in any of the following regressions and therefore, the model satisfies the assumption of no perfect collinearity. Correlation statistics performed in vy the STATA output can be found in the Appendix.
2. Assumption 4: Expected value of error term, u, is zero.
   The simple regression model for economic productivity and the Gini coefficient cannot fully explain the independent model since there are many factors that influence economic productivity. Multiple regression analyses are run in order to satisfy this requirement, but we cannot definitively say the assumption is satisfied. For this reason, the results of the model will be spelled out carefully.
3. Assumption 5: Homoscedasticity
   This assumption requires the expected variance of the error term, u, to be constant given any dependent variable. Given that there are variables within the error term not included in this analysis, this assumption also cannot be met with certainty. Due to these uncertainties, the model below will be interpreted accordingly and with caution.

4. Assumption 6: Standard Normal Distribution: The standard normal distribution is also assumed for this model in order to compute simple and multiple regression analysis.
5. No flawless collinearity: The model was applied to the data gathered for the variable in table 1 in STATA software to test for perfect collinearity. In the beginning, I ran regressions with a variable for the "intensity level" of disagreement. However, it turned out that this variable and the "status" variable had an exact collinear connection. In order to maintain the model's integrity, the variable "intensity" was eliminated. The model meets the requirement that there is no perfect collinearity because the intensity level was not taken into account in any of the subsequent regressions. The Appendix contains correlation statistics produced by the STATA output.
6. Premise 4: The error term, u, should have a value of zero. The Gini coefficient and the basic regression model for economic productivity since there are several variables that affect economic productivity, clearly describe the independent model. This need is met by doing multiple regression analyses, but we cannot state with certainty that the assumption is met. The model's outcomes will be clearly explained as a consequence.
7. Homoscedasticity, the fifth supposition: This presumption demands that, given any dependent variable, the anticipated variance of the error component, u, remain constant. This assumption can also not be verified, as there are factors inside the error term that were not taken into account in the study. These uncertainties will be taken into consideration when interpreting the model below. Standard Normal Distribution, Assumption: To calculate simple and multiple regression analysis for this model, the standard normal distribution is also assumed.

Results : Without using any extra explanatory variables, the basic regression model is used to determine whether there is a connection between GDP per capita and income inequality. This is done to determine what effect, if any, changing the GINI coefficient will have on GDP.

Model 1 of the Simple Regression: log gdppc = B0 + B1(GiCo) + u
The following equation results from regressing log gdppc on status:
Log gdppc = 11.865 - 0.058 in equation 1 (GiCo)
(0.440) (0.012) \sn = 75 R2 = 0.244

Note that the figures enclosed in parenthesis are the coefficients' standard errors. "n" stands for the sample size, while "R2" stands for the sum of squared residuals. This format will be used for the remainder of the multiple regressions, and the summary regression table below contains the adjusted R2 values (adj. R2). STATA was used to carry out every regression. This equation is based on an examination of 75 observations from 264 different nations. It demonstrates that log gdppc reduces by.058 for every unit rise in the GINI coefficient. This supports the idea that a nation's economic productivity and production decrease as its income disparity rises. This is consistent with the assumptions made before. The GINI's front coefficient, which is quite tiny t is important to take note of the relatively modest coefficient in front of the GINI variable since it may indicate that future research assessments should use a different measure of GDP per capita. While this provides the model with a useful baseline for econometric research, the data on GDP may be provided more correctly by including more variables through multiple regressions.

<u>Multiple Regression 1:</u> Model 2: log_gdppc = B_0 + B_1(GiCo) + B_2(fdigdp) +B_3(RD)
Regressing produces the equation:

Equation 2: log_gdppc = 10.142 - 0.013(GiCO) - 0.001(fdigdp) + 0.386(RD)
(0.416) (0.011) (0.005) (0.071)

n = 44 R^2 = 0.533

Data for this model are gathered from 44 observations spread over 264 nations. With an R2 value of 0.533, the results of this regression show that the variables it included account for 53.3% of the variance in GDP per capita.

Similar to the previous simple regression, the coefficient associated with the Gini is still negative, but it has drastically decreased. Log gdppc is increased by 0.386 percent for every percent increase in research and development, according to the positive coefficient on RD of 0.386. Unexpectedly, a negative coefficient on foreign direct investment showed that a percent rise will reduce log gdppc by 0.001% in fdigdp. The initial forecasts shown above assumed that foreign direct investment would have a favourable effect. The detrimental impacts of fdigdp could be a sign that investment resources aren't always deployed in the proper places.

Multiple Regression 2: Incorporates military expenditure

Model 3: $log\_gdppc = B_0 + B_1(GiCo) + B_2(MilExp) + B_3(fdigdp) + B_4(RD)$

Regressing produces the equation:

Equation3 : $log\_gdppc = 9.935 - 0.002(GiCo) - 0.107(MilExp) - 0.002(fdigdp) + 0.393(RD)$

(0.383) (0.011) (0.056) (0.005) (0.064)

n = 43 $R^2 = .609$

This regression has an R2 value of 0.609, meaning that the variables in this regression can account for 60.9% of the dependent variable. To demonstrate statistically that military spending will have a negative impact on economic development; the military expenditure variable was the sole addition to the prior regression. A percentage increase in MilExp causes a percentage drop in log gdppc, as indicated by the coefficient 0.107 in front of MilExp. Models 2 and 3 did not include the variable fdigdp because of the negligible coefficient that was associated with it. To determine how foreign direct investment relates to GDP per capita, future study may require a more accurate estimate of this phenomenon.

Multiple Regression 3:

Model 4: $log\_gdppc = B_0 + B_1(GiCo) + B_2(MilExp) + B_3(life) + B_4(log\_Bdeaths)$

Regressing produces the equation:

Equation: $log\_gdppc = 7.453 + 0.004(GiCo) - 0.047(MilExp) + 0.039(life) - 0.193(log\_Bdeaths)$

(1.498) (0.018) (0.072) (0.02) (0.092)

n = 16 $R^2 = .826$

This model records 16 observations which is significantly smaller than the previous regressions. This micronumerosity was dependent on lack of available information. The result of this regression produced suggests that in order to account for conflict, additional factors must be taken into consideration. After the logarithm of battle deaths was recorded the sample size of our regression decreased to 16 which cannot accurately represent the relationship between the dependent and independent variables. The coefficient attached to log_Bdeaths is worth noting given that a percent increase in battle deaths results in a 0.193 percent decrease in GDP per capita. Though our sample size is small, it suggests that battle-related deaths compared to the previous regressions, this model only records 16 observations. This micronumerosity was caused by a lack of knowledge. The outcome of this regression implies that more factors need to be taken into account in order to account for conflict. The sample size of our regression dropped to 16 once the logarithm of battle deaths was recorded, which is insufficient to correctly depict the connection between the dependent and independent variables. Given that a percentage increase in combat fatalities causes a 0.193 percent decline in GDP per capita, the coefficient associated with log Bdeaths is important to note. Despite the short sample size, research implies that deaths from combat and hence conflict, have a detrimental effect on the dependent variable, opening up possibilities for future research.

Multiple Regression 4:

Model 5: $log\_gdppc = B_0 + B_1(GiCo) + B_2(MilExp) + B_3(life) + B_4(RD) + B_5(SchYrs)$

Regressing produces the equation:

log_gdppc = 3.684 + 0.001(GiCo) - 0.054 (MilExp) + 0.061(life) + 0.206(RD) +0.119(SchYrs)

(1.665) (0.009) (0.048) (0.016) (0.068) (0.092)

n = 43 R^2 = .738

We can observe that the number of observations grows once again when we include predicted years of education to our regression. A per unit increase in the number of years spent in school results in a 0.119 percent rise in log gdppc according to the coefficient 0.119 associated with the SchYrs variable. The dependent variable is 73.8 percent explained by the independent variables in the model, according to the R2 value of 0.738.

<u>Multiple Regression 5:</u>

Model 6: log_gdppc = B_0 + B_1(GiCo) + B_2(MilExp) +B_3(life) + B_4(RD) + B_5(SchYrs) + B_6(dev)

Regressing produces the equation:

log_gdppc = 4.983 + 0.003(GiCo) - 0.056(MilExp) + 0.039(life) + 0.175(RD) + 0.126(SchYrs) +

(1.729) (0.009) (0.046) (0.018) (0.068) (0.088)

0.294(dev)

(0.148)

n = 43 R^2 = .764

This data's final regression accurately represents the state of the dummy variable. In the sample, developing nations were assigned a value of 0, whereas developed nations were assigned a value of 1. This was done to find out how income disparity impacts a country's economic productivity and production and how it differs between developing and developed nations. It is intriguing to see that virtually all of the independent variables' coefficients have a favourable impact on log gdppc. The only factor that still has a negative correlation is military spending. The economic theory that more developed nations would often spend more on military resources, which may have a detrimental effect on economic progress, can be used to explain this.

Regression statistics for the basic and multiple regressions described above are shown in Table 3 below. Each variable's coefficients, standard errors, significance levels, R2 values, and modified R2 values are displayed.

Dependent Variable: log_gdppc						
Independent variable	**SLR**	**MLR1**	**MLR2**	**MLR3**	**MLR4**	**MLR5**
GiCo	-0.058***	-0.013	-0.002	0.004	0.001	0.003*
	-0.012	-0.011	-0.11	-0.018	-0.009	-0.009
fdigdp		-0.001	-0.002			
		-0.005	-0.005			
RD		0.386***	0.393***		0.206***	0.175**
		-0.071	-0.064		-0.068	-0.068
MilExp			-0.107*	-0.047	0.054	-0.056
			-0.056	-0.072	-0.048	-0.046
log_Bdeaths				-0.193*		
				-0.092		
life				0.039*	0.061***	0.039**
				-0.02	-0.016	-0.018

SchYrs					0.119	0.126
					-0.092	-0.088
dev						0.294*
						-0.148
Intercept	11.865	10.142	9.935	7.453	3.684	4.983
	-0.44	-0.416	-0.383	-1.498	-1.665	(1.729
No. of obs.	75	44	43	16	43	43
R^2	0.244	0.533	0.609	0.826	0.738	0.764
Adj. R^2	0.234	0.4982	0.567	0.757	0.703	0.725
Significance levels: 10%*, 5%**, 1%***						

Statistical Inference

The statistical significance of these variables can be proven using t-test, p-values, and confidence intervals. For this section, the results of the t-values, p-values, and 95% confidence intervals are recorded for model 6, MLR5, in table 4 below.

MLR5

Variable	**Coefficient**	**t-value**	**p-value**	**95% Confidence intervals**
GiCo	**0.003**	**0.37**	**0.71**	**(-0.015 , 0.022)**
MilExp	**-0.056**	**-1.22**	**0.23**	**(-0.149 , 0.037)**
life	**0.039**	**2.15****	**0.038**	**(0.002 , 0.077)**
RD	**0.175**	**2.59****	**0.014**	**(0.038 , 0.313)**
SchYrs	**0.126**	**1.42**	**0.164**	**(-0.054 , 0.305)**
dev	**0.293**	**1.99***	**0.054**	**(-0.005 , 0.593)**

The hypothesis below is used for this study to test each variable in MLR5.

$$H_0 : B_k = 0$$

$$H_1 : B_k \neq 0$$

Note: B_k represents any of the independent variables B_1 - B_6

H_0 represents the null hypothesis, and H_1 represents the alternate hypothesis.

A two-tailed t-test can be used to evaluate if the aforementioned variables are statistically significant or different from zero. The crucial value is compared to the t-value in the t-distribution using a two-tailed test. 43 observations were made using MLR5. The model has 38 degrees of freedom, which may be calculated using the formula n-k+1. Therefore, for all carried out t-tests, the model has 38 degrees of freedom. At a 1% significance level, the critical value for 38 degrees of freedom is 2.72. The t-value absolute value is used for two-tailed testing. The null hypothesis can be disregarded if the absolute value of the t-value exceeds the critical value at the designated significance level.It may be claimed that a variable is statistically significant and distinct from zero if the null hypothesis is rejected.

The model is unable to reject the null at the 1% level since none of the t-values mentioned above are higher than 2.72. 2.03 is the key number at the 5% threshold. The null hypothesis may be rejected at the 5% level of significance for the variables life and RD since they both have t-values over 2.03, which indicates that they are statistically significant and different from 0. The critical value of 1.69 is utilised for 38 degrees of freedom for the 10% level significance. The null may be rejected at the 10% significance level for the development variable, dev, because its t-value of 1.99 is higher than the critical value. There is no evidence of statistical significance for the GINI coefficient, military spending, or predicted years of education.

Viewing the p-values for the aforementioned factors will allow you to verify these findings. The minimal probability with which the null hypothesis may be accepted is the p-value. The p-value for life is 0.038, or 3.8 percent, and it is within the 1% to 5% range of significance. This verifies the findings of the t-test since the coefficient on life is statistically significant at the 5% level but not at the 1% level. The same is true for RD. The p-value for RD is 0.014, which indicates that 1.4 percent is the lowest number at which the null may be accepted. The coefficient is significant at the 5% level but not at the 1% level since 1.4 percent lies between the 1% and 5% significance levels. The coefficient on development is significant at the 10% level but not at the 1% or 5% levels since the p-value for development is 0.054, or 5.4 percent. As previously shown by the t-tests, the p-values for military spending, the GINI coefficient, and predicted years of schooling are outside that 10% significance level, making it impossible to reject the null and making these variables statistically unimportant.

Analyzing the confidence intervals is the last test that may be run to establish the significance of the coefficients associated with the independent variables. By examining the confidence intervals in Table 4, it can be determined with 95% certainty that the null hypothesis cannot be rejected and that the coefficient on the variable is not statistically different from 0 if 0 is within the confidence interval. The null cannot be rejected since the 95% confidence intervals for the military spending, GINI, and projected years of education all include 0. This backs up the findings from the p-values and t-test sections. It is important to note that the interval in which the coefficient on development contains 0 can be explained. However, this can be explained by the fact that this variable has a significance threshold of 10% rather than 5%.

Robustness

An F-test was carried out in order to more precisely explain the natural logarithm of GDP per capita in terms of the main independent variable, the GINI coefficient. This was done to find the impact of income inequality on economic performance and to see if the GINI coefficient was jointly significant when coupled with another dependent variable. The association between a country's level of development and its income inequality and its GDP per capita was demonstrated using the F-test and the development dummy variable. Using the unconstrained model MLR5, which included all of the variables in this study, and the limited model, which excluded the GINI coefficient, the F-test for joint significance between the variables was carried out. The GiCo variable is eliminated, and the coefficient for development at the 1%, 5%, and 10% significance levels, the data became statistically inconsequential (this regression can be found in the appendix). This implies that there may be joint significance for the two variables. F = [(SSRr - SSRur)/q] / [SSRur/(n-k-1)], where SSRur is the sum of squared residuals from the unconstrained model, SSRr is the sum from the restricted model, q is the number of limitations in the restricted model, and n-k-1 is the degrees of freedom in the unrestricted model. The alternative hypothesis is that H0 is not true, and the null hypothesis is H0: B1 = B6.

$$F = [(8.56450541 - 2.65984835)/1] / (2.65984835/36)$$
$$F = 79.917$$

The null hypothesis may be rejected at the 10% level since this F-statistic is higher than the F-stat for the unconstrained model F [6, 36] = 19.45. Although the coefficient on GiCo is not individually significant from 0, it is when paired with the development variable that it becomes jointly significant.

Conclusion

In conclusion, the regression shows that an increase in the natural logarithm of GDP per capita would be accompanied by a fall in the Gini coefficient. The results of the multiple regressions MLR1 and MLR2 were comparable, disproving the basic premise that rising income disparity would slow economic development. The GINI coefficient was first determined to be statistically insignificant, but after doing a combined significance f-test with the dummy variable for a nation's degree of development, it was discovered to be statistically significant at the 10% level. The MLR3 through MLR5 regressions provide evidence in favour of the idea that income inequality lowers economic performance. Across all the models they were included in, research and development (RD) and life turned out to be statistically significant. This means that the developmental stage In order to determine whether income inequality has a positive or negative impact on economic performance as measured by gross domestic product per capita, further research is necessary. The mixed results from this analysis regarding the primary dependent variable highlight the issues related to cross-country data availability.

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