# RESEARCH PAPER
# On
# *Analysis of Determinants of*
# *Income Inequality*

By **Group-3**

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# Analysis of Determinants of Income Inequality

(Group-3: Soumyadeep Paul, Shreya Biswas and Moyentika Mondal)

## Abstract:

Income inequality is a rising problem faced by most of the counties. To study the how income inequality is affected by its determinants is the main objective of our research. *Gini coefficient* is taken as the indicator for income inequality. Also, we take *GDP, Education*, *Urbanization, Unemployment* as the factors of *Income Inequality*. For the analysis we have used a cross-sectional data for some 40 countries for the year 2020. For the purpose we use Stata and analyze the data by regression to obtain the results. We also check for linearity, multicollinearity and heteroskedasticity for the given data. In support of the analyzed results, we also add scatter plots for a better clarification. Finally, the results thus obtained were in favour of the literature and evidences from the past. In addition, we have also analyzed the relationship between income and the social choice variables to better explain the results.

## Keywords:

## Introduction:

Income inequality refers to the unequal distribution of income within the society. In other words, it is the extent to which income is unevenly distributed among the individuals or households. It can be measured in many ways, including the Gini coefficient, which is a statistical measure of income distribution. It is the ratio of the area between the Lorenz curve and the perfect equality line, and it is obtained from the Lorenz curve. The Lorenz curve shows the relationship between the population's cumulative percentage and the percentage of total income that each cumulative percentage earns. The GINI coefficient, which ranges from 0 to 1, represents perfect equality at 0 and perfect inequality at 1, is the dependent variable in this study. According to (Duro, 2004), "the GINI coefficient treats symmetrically the lower and upper tails of the incomes ranking, treating the income changes happening near the middle of the income distribution." The long-term effects of income distribution suggest that policymakers should consider the distributional consequences of government programs (Barro, 1991)



*Source: ResearchGate*
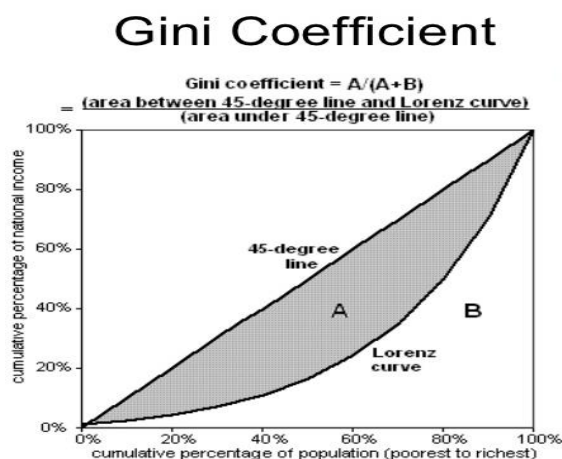
There are several determinants of Income Inequality, to name a few:

*Education:* Higher levels of education are often associated with higher incomes, so individuals with less education tend to have less income.

*Unemployment:* When unemployment rates are high, there may be downward pressure on wages, as workers compete for a limited number of available jobs. This can result in a widening of income disparities between those who are employed and those who are not. At the same time, unemployment can also lead to a reduction in tax revenues, which can make it more difficult for governments to fund social programs aimed at reducing income inequality.

*Globalization:* Increased trade and competition can create winners and losers in the global economy, and can lead to increased inequality both within and between countries.

*Gross domestic product:* The gross domestic product (GDP) is a metric used to calculate the monetary value of goods and services produced within a country in a given time, typically a year. It serves as a measure of a country's economic growth and development. Generally, there is a positive correlation between higher GDP and increased economic prosperity, as evidenced by empirical studies.

*Technology:* Advances in technology can increase productivity and create new industries, but can also lead to job displacement and con centration of wealth in the hands of those in control of the technology.

*Urbanization*: Urbanization, which refers to the increasing proportion of a population that lives in urban areas, can have an impact on income inequality as measured by the Gini index. Studies have shown that urban areas tend to have higher levels of income inequality than rural areas. This is due in part to the fact that urban areas are often characterized by a greater concentration of wealth, as well as a wider range of income levels.

*Tax policies:* Tax systems can either reduce or exacerbate income inequality, depending on their design. Progressive tax systems, which tax higher earners at a higher rate, can reduce income inequality.

*Labor market institutions:* The strength of labor unions, minimum wage laws, and other labor market institutions can affect the bargaining power of workers and the distribution of income.

*Discrimination:* Discrimination on the basis of race, gender, or other factors can result in lower incomes for certain groups, contributing to income inequality.

*Inheritance:* Wealth and income can be passed down from generation to generation, leading to a concentration of resources in the hands of a few families.

In lieu of the above explanation, here we analyze the effect of *GDP, Education*, *Urbanization, Unemployment* as the factors of *Income Inequality* and determine the relationship between using cross sectional data from certain developing countries. However, some researchers also suggested that inequality in some countries can bring an incentive to innovate and start entrepreneurship, which in turn can lead to economic growth. Overall, the relationship between income inequality and its factor is a complex issue and requires careful consideration of a number of studies and analysis. (Md A. Omar & K. Inaba, 2020), (Barro, 1991). Although, there is ongoing debate about

the nature of these relationships, it is important to address inequality as a component of promoting sustainable economic growth and social well-being.

## Literature Review:

A research paper in the Quarterly Journal of Economics titled as "Economic Growth in a Cross Section of Countries" (Barro, 1991). He examines some of the macroeconomic consequences of income inequality, which includes things like the political economy, credit-market imperfections, and savings rate. He draws upon a panel of roughly 100 countries between the years 1960 and 1990 and uses the regression models such as investments, terms of trade, democracy index, government consumption, among other variables for determining the growth within these very countries. Using this data, he finds that there is a negative relationship between income inequality and economic growth. One of the most important conclusions made by Barro was that after conducting his research, the income inequality tends to slow down the growth in developing countries whereas it has an inverse effect on the developed countries thus reduces investment and human capital accumulation, increasing social and political instability, and creating economic inefficiencies. Barro's findings have been influential in the debate over the role of inequality in economic development and have been cited in numerous subsequent studies. However, his methodology and conclusions have also been subject to criticism and debate within the academic community.

Another study worth stating is that of Kuznets (1995), where the same relationship was studied over time, using data of various countries. This study suggested that income inequality first increases as a country experiences economic growth, but then gradually decreases as the country becomes more developed. This study resulted to the Kuznets curve. Though subject to a lot of criticism, this study still is influential in understanding the relationship between economic growth and inequality.

A research paper in the American Journal of Sociology titled as "Inequalities in the World Polity: Gender, race, and national identity shape global patterns of inequality" (Beckfield, 2009). Beckfield's research, based on data from the World Values Survey and the United Nations Development Program, indicates that gender, race, and national identity are crucial factors in global inequality. His research suggests that societies that prioritize gender equality, have high ethnic diversity, and are receptive to international influence have lower levels of economic inequality. Beckfield's findings challenge conventional views that industrialization and modernization are the sole determinants of economic inequality. Instead, he argues that social and cultural factors play a vital role in shaping global inequality patterns. The research has had a significant impact on the field of sociology, stimulating discussions on the link between globalization, identity, and inequality. It has also been used to inform public policy and promote social justice, highlighting the need to address structural inequalities beyond the economic sphere.

A research paper in the Journal of Economic Structures titled as "Does financial inclusion reduce poverty and income inequality in developing countries?" (Md A. Omar & K. Inaba, 2020). This study employs a panel data analysis to investigate the impact of financial inclusion on reducing poverty and income inequality in 116 developing countries. The research examines the determinants and conditional effects of financial inclusion using an econometric model. The key

findings of this study suggest that financial institutions need to provide innovative and tailored formal financial services to the financially excluded segments of the population. Additionally, governments, central banks, financial institutions, and development partners should collaborate to develop financial services infrastructure and expand networks in rural and urban areas. Increasing financial literacy in remote areas is also important to promote financial awareness and change financial behavior among low-income people. Transfer of government subsidy to account holders is also suggested as a supportive policy for effective use of dormant accounts. Efforts should be made to improve per capita income and access to information to minimize involuntary financial exclusion. Lastly, policies need to be implemented to address socio-economic constraints, macroeconomic volatility, institutional inefficiencies, and financial system inefficiencies at the country level to promote a more inclusive financial system.

A research paper published in the Journal of Regional Science, "Regional Systems of Innovation: Conceptualizations, Typologies and Policy Implications" (Azzoni C. R., 2001). Azzoni's paper explores the potential of regional systems of innovations (RSIs) in driving economic growth. RSIs refer to a network of institutions, firms, and other actors involved in generating, sharing, and using knowledge and technology within a particular region. These systems are characterized by specialized knowledge and skills, strong linkages between actors, and a supportive policy environment. Azzoni uses case studies from Brazil and Italy to create a typology of RSIs that includes localized, specialized, and diversified systems. He also discusses policy implications, such as the need for targeted investments in human capital, infrastructure, and research and development. Azzoni's work has contributed to the ongoing discourse on innovation and knowledge creation in regional economic development. His typology of RSIs has been highly cited in subsequent studies and has played a critical role in shaping policy discussions around the world.

"Unemployment and Income Inequality: Time Series Evidence from OECD Countries" (Driffield & K. Taylor, 2004). This paper uses time series data from OECD countries to examine the relationship between unemployment and income inequality in OECD countries using time-series data. They find that higher levels of unemployment are associated with higher levels of income inequality as in there is a positive relationship between unemployment and income inequality in the short run but not in the long run.

"A theory of financial inclusion and income inequality" (G. Kling, V. P. Cela, L. Tian & D. Luo, 2022). The theory explored in this paper connects financial inclusion, which refers to access to formal loans and financial assets, with income inequality. The study models the initial inequality of households using a random variable that determines their initial endowments, which can be used to invest in human capital and financial assets. Although education leads to higher income, the benefits of obtaining higher levels of education diminish over time. Moreover, females and those living in rural areas earn less, reducing their returns on education investments. This, in turn, leads to suboptimal levels of investment in education. The study finds that certain segments of the population would benefit from investing more in education, as their marginal benefits outweigh the marginal costs in terms of interest rates on formal and informal loans. While financial inclusion does help reduce the investment gap in education, the effect is mainly driven by access to savings accounts rather than formal bank loans. Informal loans also have a positive but smaller impact on closing the education gap. Finally, the study shows that having access to bank accounts can help households move to higher income deciles, but having formal and informal loans reduces their

prospects. Thus, the impact of financial inclusion on inequality is mixed, and increasing access to loans may not necessarily result in better outcomes.

"Unemployment and Income Inequality: A Comparative Analysis of Latin American Countries" (R. A. García & M. Rodríguez, 2018). This paper analyses the relationship between unemployment and income inequality in Latin American countries, and finds that higher levels of unemployment are associated with higher levels of income inequality.

"Unemployment and Income Inequality in Advanced Economies: An Empirical Investigation" (C. Michelacci & F. Schivardi , 2016). This paper uses cross-country panel data to examine the relationship between unemployment and income inequality in advanced economies (Latin American countries). It analyses the data from 18 countries over a period of 20 years (1990 – 2010) and finds that higher levels of unemployment are associated with higher levels of income inequality.

"The Impact of Unemployment on Income Inequality: Evidence from European Regions" (A. Brandolini & P. Casadio, 2019). This paper uses regional data from Europe to examine the impact of unemployment on income inequality, and found that unemployment has a positive impact on income inequality, meaning that higher levels of unemployment are associated with higher levels of income inequality.

"Finance, talent and income inequality: Cross country evidence" (Unal Seven, 2021). The objective of this study is to explore the connection between financial development and income inequality, with a focus on the influence of individual talent. The research results indicate that higher levels of financial development, which are measured by the legal origin of each country, lead to a reduction in the net Gini coefficient. Furthermore, the study supports the theory of a linear relationship between financial development and income inequality. In addition, the findings suggest that government consumption and trade openness can reduce income inequality, while taxation may have a negative impact on it, although this effect is not significant.

"Education and Income Inequality: New Evidence from Cross-Country Data" (Nuno Martins & Ernesto Villanueva, 2008). In this study, the authors examine the relationship between education and income distribution in a large sample of countries from 1960 to 1990. The analysis reveals that education has a substantial impact on reducing income inequality, with both higher levels of education and more equitable distribution of education contributing to greater income equality. The findings also support the Kuznets inverted-U hypothesis, which suggests that as economies develop, income inequality initially rises before eventually decreasing. Overall, this research highlights the importance of education in promoting more equitable income distribution.

"The Impact of Education on Income Inequality in Asia" (W. H. Chen & Q. Chen, 2019). This paper examines the relationship between education and income inequality in 16 Asian countries. It uses data from the World Bank and the United Nations Development Program to analyze the impact of education on income inequality in these countries. The authors find that education has a significant impact on income inequality in Asia, and that increasing access to education can help reduce income inequality in the region.

 "Urbanization and Income Inequality in Developing Countries" (B. Milanovic & L. Squire, 2005). This paper examines the relationship between urbanization and income inequality in developing countries, and finds that urbanization is associated with higher levels of income inequality. It

argues that urbanization can lead to increased income inequality due to the concentration of economic activity in large cities. The authors suggest that policies aimed at reducing income inequality should focus on improving access to education and health care, as well as promoting rural development.

"The Effect of Urbanization on Income Inequality: Evidence from Developing Countries" (C. Huang & H. Li, 2018). The study examines the relationship between urbanization and income inequality in developing nations using panel data. The results reveal a positive correlation between urbanization and income inequality in developing countries. Hence, the study recommends that policymakers should implement policies that promote inclusive growth and reduce income inequality in urban areas to mitigate this effect.

"Sustainable Utilization of Financial and Institutional Resources in Reducing Income Inequality and Poverty" (A. Ullah, Z. Kui, S. Ullah, C. Pinglu & S. Khan, 2021). The purpose of this study is to examine the impact of globalization, electronic government, and financial development in mitigating income inequality and poverty in the One Belt One Road (OBOR) countries, considering the role of institutional quality. The research methodology involves Descriptive Statistics & Inferential statistics, PCA (Principal Component Analysis), and exploring the relationship between financial development and income inequality. The study's findings reveal that globalization and e-government development can enhance economic growth and reduce poverty and income inequality by fostering digitalization, investments, job creation, and wage increases for the semi-skilled and unskilled labor-intensive workforce in the Belt and Road countries.

## Objectives:

- To study the relationship between Income Inequality and its important factors.
- Correlate the factors (independent variables) of Income Inequality and determine their effects.
- To show the significance of social choice variables among the low-income level.

## Data & Variables

We have taken 40 countries and their data, for the year 2020 on Gini, GDP Per-capita, Unemployment, Urbanization and Education, from World Bank Databank. Here, we have taken Gini as the dependent variable and the other four variables as independent variables. The following table is the data, which was analyzed in our paper. We have taken log values of GDP Per capita and education, as their original values are too high to be analysed along with other variables.

| Country | Gini Index | GDP Per-capita | Unemployment | Urbanization | Education |
|---|---|---|---|---|---|
| Argentina | 42.3 | 8496.424142 | 11.46000004 | 92.111 | 106.057752 |
| Armenia | 25.2 | 4505.867364 | 12.18000031 | 63.313 | 76.43413671 |
| Australia | 34.7 | 51720.3708 | 6.460000038 | 86.241 | 115.8873367 |
| Austria | 32.94 | 48809.2269 | 5.360000134 | 58.748 | 96.69473012 |
| Bangladesh | 32.6 | 2233.30552 | 5.209000111 | 38.177 | 72.62731997 |
| Belarus | 24.4 | 6542.797491 | 4.050000191 | 79.483 | 95.13712056 |
| Bhutan | 37.42 | 3009.92417 | 5.03000021 | 42.316 | 61.16241264 |
| Bolivia | 43.6 | 3068.812555 | 7.900000095 | 70.123 | 94.5307045 |

| | | | | |
|---|---|---|---|---|
| Brazil | 48.9 | 6794.489159 | 13.93000031 | 87.073 | 88.0656662 |
| Canada | 33.34 | 43258.2639 | 9.460000038 | 81.562 | 98.74389903 |
| Chile | 44.9 | 13094.45953 | 11.14000034 | 87.727 | 98.93148804 |
| Colombia | 54.2 | 5307.215228 | 15.03999996 | 81.425 | 89.57027435 |
| Costa Rica | 49.3 | 12132.87688 | 16.43000031 | 80.771 | 128.5114021 |
| Dominican Republic | 39.6 | 7167.919159 | 6.130000114 | 82.54 | 92.74739456 |
| Ecuador | 47.3 | 5645.19929 | 6.110000134 | 64.166 | 84.05727005 |
| Georgia | 34.5 | 4255.742993 | 11.72999954 | 59.453 | 89.55241903 |
| India | 35.91 | 1910.42147 | 10.19499969 | 34.926 | 68.27432632 |
| Indonesia | 37.6 | 3894.272202 | 4.25 | 56.641 | 90.1439209 |
| Japan | 30.77 | 39918.1676 | 2.799999952 | 91.782 | N/A |
| Kyrgyz Republic | 29 | 1182.5217 | 4.630000114 | 36.856 | 82.39033127 |
| Mexico | 45.4 | 8655.000682 | 4.449999809 | 80.731 | 83.44531123 |
| Mozambique | 53.87 | 449.95521 | 3.776000023 | 37.074 | 78.72005463 |
| Myanmar | 30.85 | 1477.45287 | 1.480000019 | 31.141 | N/A |
| Nepal | 34.62 | 1139.19028 | 13.07800007 | 20.576 | 75.5585893 |
| Pakistan | 31.69 | 1322.31504 | 6.550000191 | 37.165 | N/A |
| Paraguay | 43.5 | 5353.348065 | 7.550000191 | 62.183 | N/A |
| Peru | 43.8 | 6056.343903 | 7.179999828 | 78.297 | 115.7847672 |
| Portugal | 33.29 | 22242.4064 | 6.800000191 | 66.31 | 99.28513082 |
| Russian Federation | 36 | 10169.08691 | 5.590000153 | 74.754 | N/A |
| South Africa | 62.73 | 5741.64313 | 24.34000015 | 67.354 | 74.58242861 |
| Spain | 34.84 | 26959.6754 | 15.52999973 | 80.81 | 108.0606028 |
| Sudan | 34.03 | 608.33252 | 19.29199982 | 35.253 | N/A |
| Switzerland | 33.07 | 85656.3227 | 4.820000172 | 73.915 | 91.35033417 |
| Thailand | 35 | 6990.935503 | 1.100000024 | 51.43 | 82.01046244 |
| UK | 35.04 | 40318.5576 | 9.479999542 | 69.608 | N/A |
| Ukraine | 25.6 | 3751.740723 | 4.289999962 | 87.048 | 90.81293233 |
| United Arab Emirates | 26.02 | 37629.1742 | 4.472000122 | 83.903 | 95.33963776 |
| Uruguay | 40.2 | 15619.54266 | 8.050000191 | 82.664 | 96.12775675 |
| US | 41.95 | 63530.6335 | 10.32999992 | 95.515 | 97.33715312 |
| Zambia | 58.09 | 956.831364 | 6.03000021 | 44.629 | N/A |

*Data Table 1 (source: World Bank & Author)*

## Methodology

A sample collected consisting of 22 OECD countries, 8 African countries, 6 Asian countries, 4 Latin American countries in a sample size of 40. Our motive is to analyse the effects of determinants of income inequality and show the significance of social choice variables among the low-income level.

*Kuznets (1955) argued that as countries develop income inequality first increases in the early stage of economic growth and decreases when the economy reached the mature stage.*

The equation which we are going to consider for the regression in our data analysis can be given as

$$\text{GINI} = \beta_0 + \beta_1 \log(\text{per capita GDP}) + \beta_2(\text{unemployment}) + \beta_3(\text{urbanization}) + \beta_4 \log(\text{education}) + u$$

The Gini coefficient, or Gini index, is a statistical measure used to represent income or wealth inequality in a society. It is named after the Italian statistician Corrado Gini, who developed the coefficient in 1912.

The Gini coefficient ranges from 0 to 1, where 0 represents perfect equality (i.e., everyone has the same income or wealth), and 1 represents perfect inequality (i.e., one person has all the income or wealth, while everyone else has none). The Gini coefficient is calculated based on the Lorenz

curve, which is a graph that plots the cumulative share of income or wealth held by the bottom x% of the population against the cumulative share of the population.

The Gini coefficient is widely used as a measure of income or wealth inequality in economics and sociology, and can be used to compare levels of inequality between different countries or over time within a country.

In our analysis, *Gini* is the dependent variable and the independent variables are:

*GDP Per capita, Unemployment, Urbanization, and Education.* (Beckfield, 2009)

## Empirical Testing

Before going into the results, we are here to look into the assumptions of Gauss Markov Theorem based on the classical linear regression model, which will be the base of our data analysis.

**Linearity:**

Lets check if there is a linear relationship between the dependent variable and the independent variables. And to check the same, we plot *regression fits* and see if most of the observations are around the *lfit*, or are outliers. We will perform these tasks using **Stata**.

*1. Gini & log GDP Per capita*

```
twoway (lfitci GiniIndex logGDPPercapita) scatter (GiniIndex
                        logGDPPercapita)
```

The output shows a linear relationship between these two. Also, Gini is negatively related to GDP Per capita
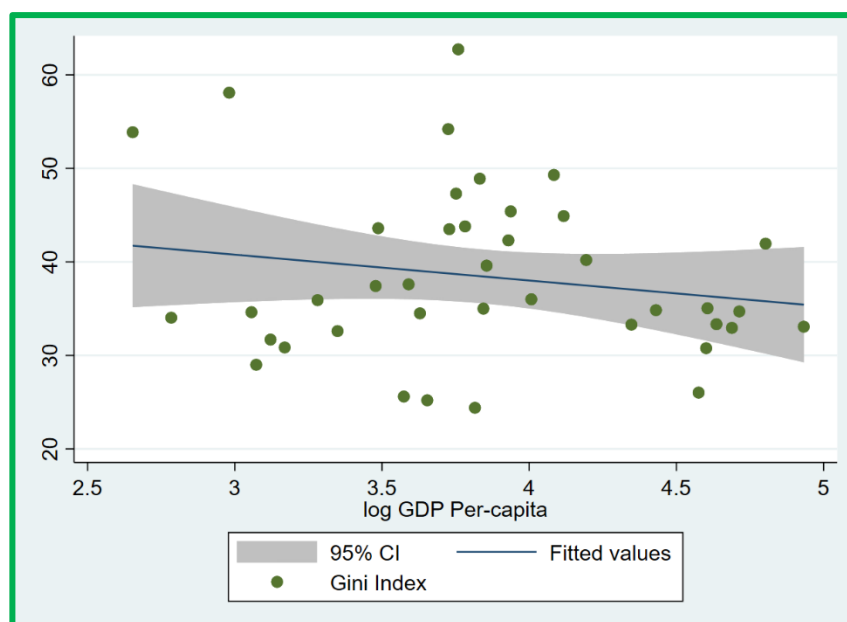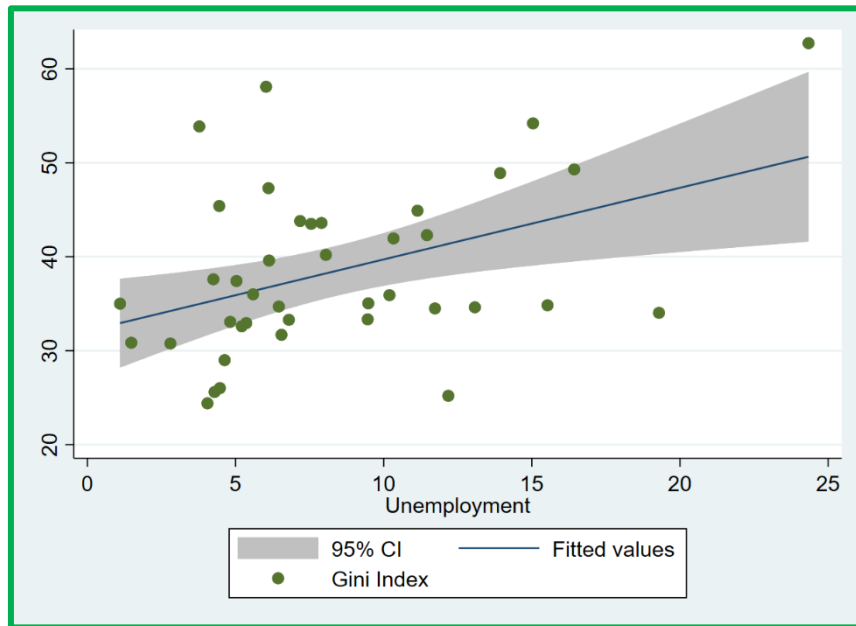


*Source: Author*

*2. Gini & Unemployment*

```
twoway (lfitci GiniIndex Unemployment) scatter (GiniIndex Unemployment)
```

**8**

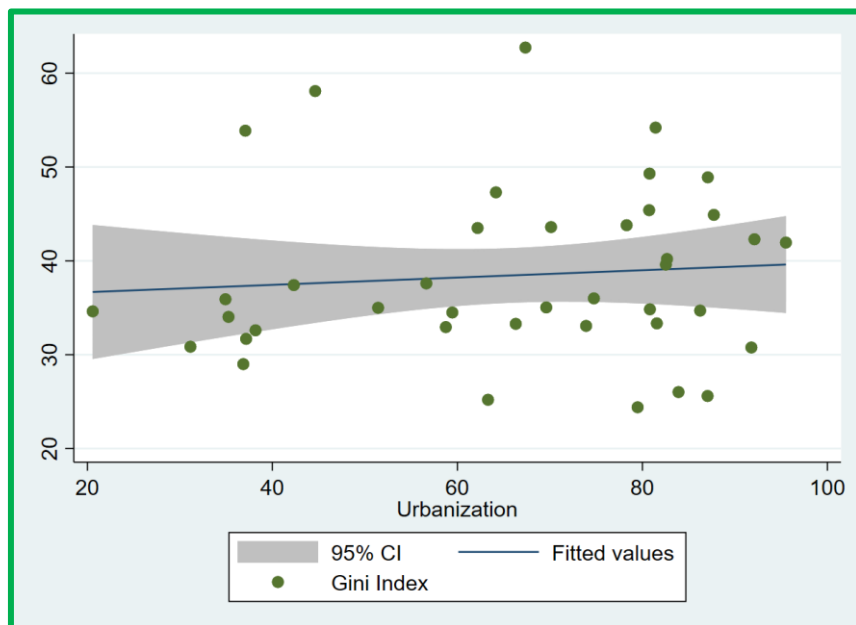The output shows a linear relationship between these two. Also, Gini is positively related to Unemployment

### 3. Gini & Urbanization

```
twoway (lfitci GiniIndex Urbanization) scatter (GiniIndex Urbanization)
```

The output shows a linear relationship between these two. Also, Gini is positively related to Urbanization.
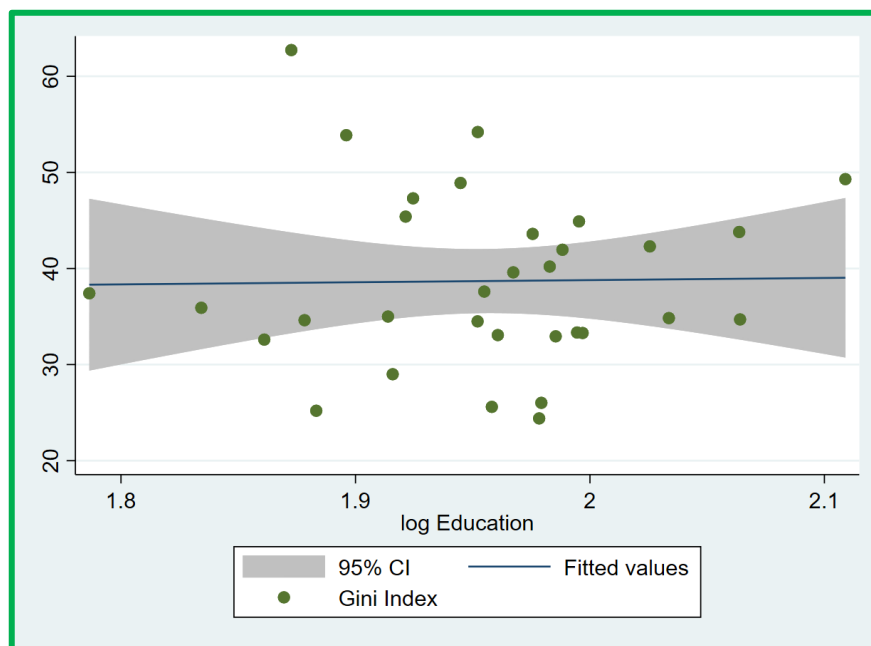
### 4. Gini & log Education

```
twoway (lfitci GiniIndex logEducation) scatter (GiniIndex logEducation)
```

The output shows a linear relationship between these two. Also, Education is negatively related to Gini.

**No perfect multicollinearity:**

Lets check if there is any multicollinearity among the independent variable and the independent variables. And to check the same, we run the *vce* (variance-covariance estimator), *corr* (correlation matrix) test after performing a regression on the model and look if there is any significant collinearity among the independent variables. We will perform the task using ***Stata***.

The output shows no significant collinearity among the independent variables.

**Strict exogeneity:**

Lets check if we have the error terms to be uncorrelated with any of the independent variables. And to check the same, we run the normal *regress* test and look for any significant correlation between the independent variables and the error terms (p-values). We will perform the task using **Stata**.

The output (*p-values*) shows no significant correlation between the independent variables and the error terms.

| GiniIndex | Coefficient | Std. err. | t | P>|t| | [95% conf. interval] | |
|---|---|---|---|---|---|---|
| logGDPPercapita | -6.281288 | 3.597963 | -1.75 | 0.092 | -13.6637 | 1.101122 |
| Unemployment | .8886297 | .2931503 | 3.03 | 0.005 | .2871349 | 1.490125 |
| Urbanization | .1433978 | .1148458 | 1.25 | 0.223 | -.0922463 | .3790419 |
| logEducation | -3.368159 | 29.40435 | -0.11 | 0.910 | -63.7009 | 56.96458 |
| _cons | 52.28344 | 51.73144 | 1.01 | 0.321 | -53.8607 | 158.4276 |

*Source: Author*

**Heteroskedasticity:**

Lets check if we have the variance of the error term constant across all levels of the independent variables. And to check the same, we run the *estat hettest* (heteroskedasticity) test after performing a regression on the model. We will perform the task using **Stata**.

The output shows that the variance of the error term is constant across all levels of the independent variables.

```
. estat hettest

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity
Assumption: Normal error terms
Variable: Fitted values of GiniIndex

H0: Constant variance

    chi2(1) =    0.90
Prob > chi2 = 0.3420

.
```

*Source: Author*

After performing all the tests, we are sure that our data, after empirically testing, follows all the assumptions of the Gauss-Markov Theorem, based on the Classical Linear Regression Model.

Next, we perform a regression of the model. And on the basis of the regression and the empirical testing, we come to our findings from the data analysis.

```
. reg GiniIndex logGDPPercapita Unemployment Urbanization logEducation

    Source |       SS           df       MS      Number of obs   =        32
-------------+----------------------------------   F(4, 27)        =      3.68
       Model |  903.057584         4  225.764396   Prob > F        =    0.0163
    Residual |   1657.865         27  61.4024076   R-squared       =    0.3526
-------------+----------------------------------   Adj R-squared   =    0.2567
       Total |  2560.92259        31   82.610406   Root MSE        =     7.836

-------------+----------------------------------------------------------------
    GiniIndex | Coefficient  Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
logGDPPercapita |  -6.281288   3.597963    -1.75   0.092    -13.6637    1.101122
  Unemployment |   .8886297   .2931503     3.03   0.005    .2871349    1.490125
   Urbanization |   .1433978   .1148458     1.25   0.223   -.0922463    .3790419
   logEducation |  -3.368159   29.40435    -0.11   0.910    -63.7009    56.96458
          _cons |   52.28344   51.73144     1.01   0.321    -53.8607    158.4276
-------------+----------------------------------------------------------------
```

*Source: Author*

Next, to analyse the relationship between income and the social choice variables, we consider income in the scenario and form a new equation to perform the regression and correlation, consider Income as the dependent variable and other four factors as independent variable.

**Income= $\beta_0$+ $\beta_1$log(per capita GDP)+ $\beta_2$(unemployment)+ $\beta_3$(urbanization)+ $\beta_4$log(education) + u**

Below is the data for the same (collected from World Bank Databank). Again, we have taken log values of GDP Per capita and education, as their original values are too high to be analysed along with other variables.
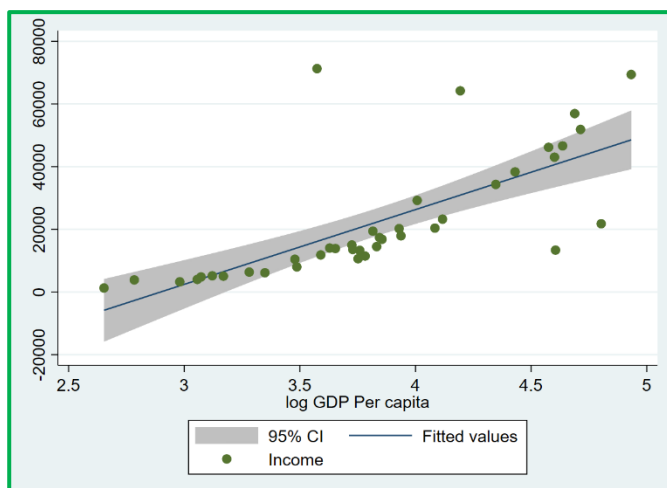
| Country | Income | GDP Per-capita | Unemployment | Urbanization | Education |
|---|---|---|---|---|---|
| Argentina | 20220 | 8496.424142 | 11.46000004 | 92.111 | 106.057752 |
| Armenia | 13870 | 4505.867364 | 12.18000031 | 63.313 | 76.43413671 |
| Australia | 51870 | 51720.3708 | 6.460000038 | 86.241 | 115.8873367 |
| Austria | 56930 | 48809.2269 | 5.360000134 | 58.748 | 96.69473012 |
| Bangladesh | 6140 | 2233.30552 | 5.209000111 | 38.177 | 72.62731997 |
| Belarus | 19420 | 6542.797491 | 4.050000191 | 79.483 | 95.13712056 |
| Bhutan | 10440 | 3009.92417 | 5.03000021 | 42.316 | 61.16241264 |
| Bolivia | 8010 | 3068.812555 | 7.900000095 | 70.123 | 94.5307045 |
| Brazil | 14480 | 6794.489159 | 13.93000031 | 87.073 | 88.0656662 |
| Canada | 46640 | 43258.2639 | 9.460000038 | 81.562 | 98.74389903 |
| Chile | 23250 | 13094.45953 | 11.14000034 | 87.727 | 98.93148804 |
| Colombia | 15000 | 5307.215228 | 15.03999996 | 81.425 | 89.57027435 |
| Costa Rica | 20400 | 12132.87688 | 16.43000031 | 80.771 | 128.5114021 |
| Dominican Republic | 16830 | 7167.919159 | 6.130000114 | 82.54 | 92.74739456 |
| Ecuador | 10610 | 5645.19929 | 6.110000134 | 64.166 | 84.05727005 |
| Georgia | 14040 | 4255.742993 | 11.72999954 | 59.453 | 89.55241903 |
| India | 6360 | 1910.42147 | 10.19499969 | 34.926 | 68.27432632 |
| Indonesia | 11820 | 3894.272202 | 4.25 | 56.641 | 90.1439209 |
| Japan | 43020 | 39918.1676 | 2.799999952 | 91.782 | N/A |
| Kyrgyz Republic | 4820 | 1182.5217 | 4.630000114 | 36.856 | 82.39033127 |
| Mexico | 17920 | 8655.000682 | 4.449999809 | 80.731 | 83.44531123 |
| Mozambique | 1270 | 449.95521 | 3.776000023 | 37.074 | 78.72005463 |
| Myanmar | 5050 | 1477.45287 | 1.480000019 | 31.141 | N/A |
| Nepal | 4010 | 1139.19028 | 13.07800007 | 20.576 | 75.5585893 |

| | | | | | |
|---|---|---|---|---|---|
| Pakistan | 5180 | 1322.31504 | 6.550000191 | 37.165 | N/A |
| Paraguay | 13590 | 5353.348065 | 7.550000191 | 62.183 | N/A |
| Peru | 11480 | 6056.343903 | 7.179999828 | 78.297 | 115.7847672 |
| Portugal | 34330 | 22242.4064 | 6.800000191 | 66.31 | 99.28513082 |
| Russian Federation | 29230 | 10169.08691 | 5.590000153 | 74.754 | N/A |
| South Africa | 13290 | 5741.64313 | 24.34000015 | 67.354 | 74.58242861 |
| Spain | 38340 | 26959.6754 | 15.52999973 | 80.81 | 108.0606028 |
| Sudan | 3860 | 608.33252 | 19.29199982 | 35.253 | N/A |
| Switzerland | 69400 | 85656.3227 | 4.820000172 | 73.915 | 91.35033417 |
| Thailand | 17360 | 6990.935503 | 1.100000024 | 51.43 | 82.01046244 |
| UK | 13370 | 40318.5576 | 9.479999542 | 69.608 | N/A |
| Ukraine | 71280 | 3751.740723 | 4.289999962 | 87.048 | 90.81293233 |
| United Arab Emirates | 46180 | 37629.1742 | 4.472000122 | 83.903 | 95.33963776 |
| Uruguay | 64210 | 15619.54266 | 8.050000191 | 82.664 | 96.12775675 |
| US | 21780 | 63530.6335 | 10.32999992 | 95.515 | 97.33715312 |
| Zambia | 3260 | 956.831364 | 6.03000021 | 44.629 | N/A |

*Data Table 2 (source: World Bank & Author)*
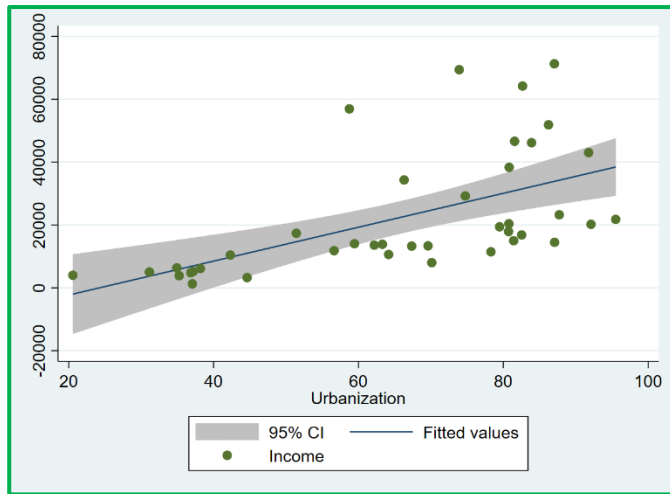


*Source: Author*



*Source: Author*

*Positive relation between Income and GDP Per capita. The countries with lowest income are below the 95% C.I.*
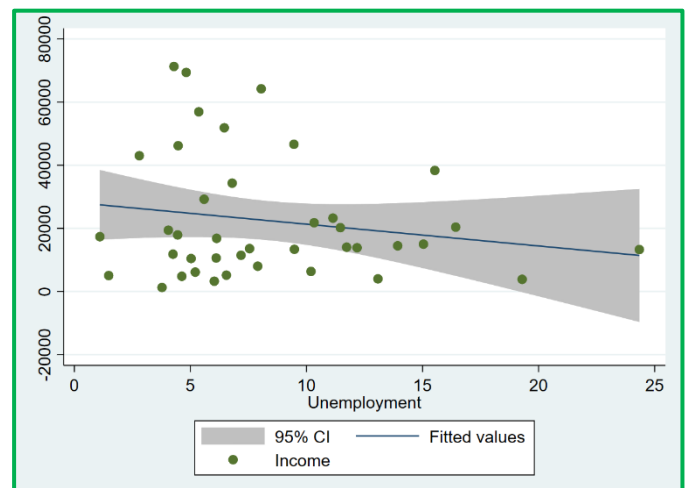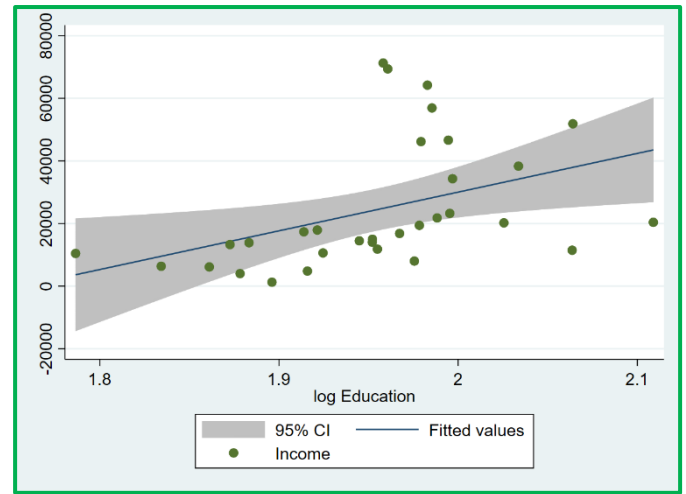


*Source: Author*

*Negative relation between Income and Unemployment. The countries with lowest income are below the 95% C.I.*

Source: Author

*Positive relation between Income and Urbanization. The countries with lowest income are below the 95% C.I.*



Source: Author

*Positive relation between Income and Education. The countries with lowest income are below the 95% C.I.*

## **Findings:**

From the above output tables, empirical testing and scatterplots, we find the following results:

1.  A strong negative relationship between GDP Per capita and Gini. As GDP Per capita increases, Gini decreases. This truly follows the real-world scenario
    From theory, we know that, GDP per capita is a measure of the average economic output per person in a country. It is calculated by dividing the total GDP of a country by its population. GDP per capita is often used as an indicator of the standard of living of a country's citizens, as it provides a rough estimate of the average income per person. So, as output per person increases, the income disparity decreases and hence the income inequality decreases.

2.  A positive relationship between Unemployment and Gini. As Unemployment increases, Gini also increases. This also truly follows the real-world scenario.
    When unemployment rates are high, there may be downward pressure on wages, as workers compete for a limited number of available jobs. This can result in a widening of income disparities between those who are employed and those who are not. This leads to a lower GDP Per capita, as the output per person decreases. And we know that GDP Per capita and Gini have negative relationship. So as Unemployment rises, GDP Per capita also rises and Gini Increases. Hence Gini and Unemployment have positive relationship.

3.  A positive relationship between Urbanization and Gini. As Urbanization rises, the Gini index also rises.
    Studies have shown that urban areas tend to have higher levels of income inequality than rural areas. This is due in part to the fact that urban areas are often characterized by a greater concentration of wealth, as well as a wider range of income levels. This causes income inequality which increases the Gini Index.

4.  A strong negative relationship between Gini and Education. As the level of education rises, the Gini falls. This truly follows the real-world scenario.
    If there is a wide gap between the education levels of the population then there can be high Gini. For example, in USA (2010), Just 8 percent of those at the lowest income level have a

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college degree while 78 percent of those earning \$250,000 or more have a college degree or advanced degree.

At the other end of the income scale, 69 percent of low-income people have a high school degree or less, while just 9 percent of those earning over \$250,000 have just a high school degree. This wide gap between the income levels is due to the gap in the education levels of the population. Hence, Gini and Education have negative relationship, as high education increases the income levels and high income rises the GDP Per capita.

5. Also, one independent variable being in its limits does not mean that it can maintain a nominal Gini. For example, US has a high value of GDP Per capita, but its Unemployment level is also very high, so its Gini is also very high in spite of having a high GDP Per capita.

Also, we can see that Ukraine has a very high level of GNI Per capita (income level) but a very low level of Education, indicating a disparity in the income earned by the population. And hence it has a low value of GDP Per capita and a high value of Gini.

We also observe that the countries Brazil, Columbia, Mexico and South Africa have a very high level of Urbanization, in an attempt to increase their GDP and attract foreign investment, but they also have very low levels of Education, and that is why they have high levels of Gini, and hence income levels are also below average.

## Conclusion:

The growing importance of income distribution in the overall development process, and thus economic, social, and political stability, we set out a study of the income inequality and its determinants in light of international experience. This study has contributed to identifying the nature of the relationship between income inequality and its determinants. The rationale behind this study was that income inequality continues to be the most controversial and unsettled issues in the literature of the economic development. However, our study is focused on the effects of the determinants of income in equality throughout the selected countries.

For planners and policy makers, besides the level of and direction of changing inequality, additional information on factors responsible for rising inequalities and resultant consequences from the same is very crucial to design the most appropriate policy options to mitigate the rising inequalities and ward-off its potential adverse fallouts on the individuals, society and nation. Throughout the world, researchers have been attracted carry out research work in income inequality issues. In this context, this present study brings out the effects of the factors on income inequality. In this study, first we observe that our study variable, Gini index, which shows income inequality, is linear with the its factors. Secondly, we observe that there is no significant collinearity among the independent variables (factors determining income inequality). From the tests run, we also check for exogeneity and heteroskedascity. After performing all the tests, we are sure that our data, after empirically testing, follows all the assumptions of the Gauss-Markov Theorem, based on the Classical Linear Regression Model. Finally, we run the regression test to empirically check the effects of the factors and conclude. The results thus obtained were in support of the past literatures. All the findings and results are clearly supported by appropriate reviews and methodology.

Ultimately, the effects of determinants of income inequality are complex and interrelated. To address income inequality, policymakers must consider a range of factors, from education and skills to labour market institutions, taxation, and social welfare policies. By taking a comprehensive approach to addressing inequality, policymakers can help ensure that the benefits of economic growth are shared more broadly across society. Overall, the determinants of income inequality are complex and multifaceted, and a combination of economic, political, social, and technological factors can all contribute to the level of income inequality within a given society.

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