

Impact of population cycle on income sharing pattern of a capitalistic society

Bishal ROUTH

Balarampur College, India
bishalrouth94@gmail.com

Joy SARKAR

University of North Bengal, India
jscnbu@nbu.ac.in

Abstract. *In this paper, we have tried to explore how the fundamental structure of a capitalistic society affects income sharing within the society and widens the vertical disparity in income distribution. We argue that a capitalist in a free market uses various elements of an economy to continuously improve their profitability. Initial rising population is used as a tool to enhance profit and once the population starts declining, international trade is used as a substitute for population growth to further enhance their profit. Our empirical analysis was divided into two parts; (i) the correlation between income inequality (Gini coefficient) and population (total population & population growth rate) was investigated for closed economies namely Brazil, Moldova, Morocco, & Ukraine (ii) a multivariate OLS was run with Gini coefficient as the dependent variable while the ratio of CPI (Consumer Price Index) and Wage Rate, Export as a percentage of GDP (Gross Domestic Product), and population growth rate was used as regressors to understand how income sharing evolves in an open economy and subject of the study was U.S. The result was confirmatory to the theoretical framework and alternative hypothesis represented in the paper that income inequality is positively associated with population for a closed economy while two variables negatively correlated for an open economy. Further, a positive association was found between income inequality and the ratio of CPI and Wage Rate, and Export for an open economy.*

Keywords: income inequality, inflation, wage rate, international trade, population.

JEL Classification: D31, F1, J23, J3, E31.

1. Introduction

The mode of production is a very debatable concept among economists, while some consider the free market as the way for economic development others are skeptical about it as it ushers the exploitation of weaker and working sections. According, to Marx the mode of production can be of six types which are hunting and gathering, slavery, feudalism, capitalism, socialism, and Asia. The current era is defined by the struggle between capitalism and socialism, lately, it seems that capitalism has already won on the global stage. As big as the rift between the ideology of the two societies, ultimate suffering belongs to the weaker and labor sections of the two societal structures. Though socialism is charged with corruption and instability within the economy, capitalism is not also unimpeachable. The sole motive of making a continuous incremental profit has resulted in various global crises (The housing bubble of 2008) and the exploitation of the labor class is eternally associated with it.

The capitalism as successor of feudalism in England was a silver line as it was considered as a cure for anomalies of the existing system. It took nearly five hundred years for capitalism to disperse around every corner of Europe. The first industrial revolution (1780-1850) plays a crucial role in letting free market ideology strangle the economics of Great Britain. The period is marked by the outstanding work of various economists from Adam Smith to Malthus. While Adam Smith is considered the father of capitalism, we would like to focus on the contribution of Malthus, who propagated a theory that the population grows at geometrical progression whereas the food production growth rate follows arithmetical progression. This theory might not hold weightage alone, but incorporating the theory with technological change brought in by the Industrial Revolution gives us insight into how capitalism can flourish. The basic nourishment for the free market is a growing consumption rate which is a result of a growing population. As the population grows the availability of labor at low cost acts as a second stimulus, and the economy starts growing.

According to Kuznets Hypothesis (1955), economic growth and income inequality have a nonlinear relationship that is inequalities increase as economic growth takes place till a certain point and then declines again. The successive studies provided no conclusive evidence as the results obtained were mixed. Paukert (1973) & Ahluwalia (1976) found evidence of an inverted U-shape relationship between income inequality and economic growth, whereas no such association was established by other scholars (Deininger and Squire, 1998: pp. 259-287; Bruno, 1999; and Ram, 1997). The disparity of results continued in the twenty-first century among researchers because of the statistical irregularity of the Kuznets hypothesis (Thornton, 2001: pp. 449-465). A U-shaped relationship was discovered by Gallup (2012) and a similar conclusion was derived by Kiatrungwilaikun & Suriya (2015), Castells-Quintana et al. (2015), and Raitano (2016).

Over the years many methodologies have been developed to measure income inequality out of which two are most common in use; (a) Percentile ratio, and (b) Gini Coefficient.

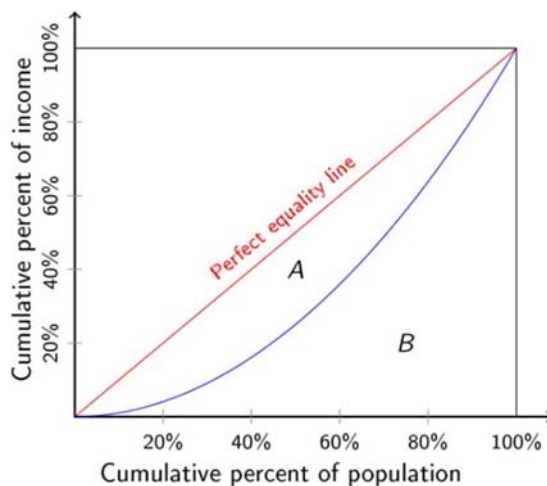
a) Percentile Ratio: The basic classification of income inequality is constructed on the basic ratio. The ratio measures the income of one section of the population against another

section. It gives near about perfect understanding of the rift between the two sections. The basic implied ratio that is used in literature is as follows:

- 50/10 ratio – used for measuring disparity between the middle and the bottom level of earnings.
- 90/10 – used for measuring disparity between the top and the bottom.
- 90/50 – used for measuring disparity between the top and the middle.
- 99/90 – used for measuring disparity between the very top and the top.

b) Gini coefficient: It is a mathematical derivation of income inequality within an economy developed by statistician Corrado Gini (Gini, 1912: pp. 1-30). The basic notion is that it calculates the area between 45° degrees (perfect equality of income distribution) and the Lorenz curve which indicates the actual distribution of income across the population that is area of A. And calculated area of A is divided by the total (A+B). A graphical presentation of the Gini coefficient is shown in Figure 1 below:

Figure 1. Gini index graphical presentation



For our study, we tried to distinguish between income inequalities based on direction and cause. We have divided inequality under three heads which are; Horizontal Inequality, Diagonal Inequality, and Vertical Inequality.

Horizontal income inequalities: This kind of inequality persists when the market is inefficient. The market is not well equipped with the transmission of information, thus unequal pay exists for similar kinds of jobs. For example, unskilled workers having different pay slips for similar jobs may be unaware. This is also true for skilled workers. This kind of inequality will get eluded as development takes place flow of information will get smooth and transmission will get even across the economy. Thus, the unskilled worker will shift to a higher-paying employer, forcing other employers to increase their pay. In case of skilled workers this horizontal disparity can occur because of misinformation or superior skills. Development within the economy will solve the problem of misinformation but superior skill will be a differentiator among the skilled worker. Even opting for the most sort-out education course will not be able to nullify this differentiator completely, as

the skill is a mixture of inherent and learned skills. Though some skills can be learned to some extent inherent will be an obvious divider. Entrepreneur-level horizontal inequality is surely because of the skill possessed by one entrepreneur over the other.

Diagonal income inequalities: When the difference in income is a measure between two sections of the working population say skilled worker and unskilled worker or skilled worker and employer such inequalities fall in diagonal inequalities.

Vertical Income inequalities: This kind of inequality measures the straight-up difference between employee and employer (entrepreneur). We will build a broad understanding of vertical inequalities in the coming section, how an employer used various elements of the economy to widen this gap.

The recent studies on income disparities are mainly concerned with horizontal or diagonal income inequalities. The stepping stone was the Stolper-Samuelson (Heckscher-Ohlin) mechanism which argues that two countries with educated and uneducated labor will result in a widening wage gap in the country with educated labor whereas narrowing gap in the country with less educated labor as they start trading. Bonvin (1996), Harrison and Hanson (1999), Wood (1997) & Goldberg and Pavcnik (2007) observed an increase in wage dispersion developing against the prediction of Stolper-Samuelson (1941). Further, the model predicted that the demand for skilled labor would increase across the industries, whereas subsequent studies found contrary results, the increase in demand was mainly from within industries (Lawrence & Slaughter, 1993; Katz & Autor, 1999; Berman et al., 1998). Krugman (2008) proposed that the increased wage disparity is attributed to international trade because of low-cost imports from China, as opposed by Irwin et al. (2008) & Katz (2008). Owing to the contradicting results a counterargument of skilled-based technology changes (SBTC) was made by Berman et al. (1998) & Katz and Autor (1999).

The majority of the research in the twenty-first century has focused on how exogenous variables of economy affect the income inequality such as technology change, automation, education, globalization, and to a certain extent environmental degradation etc. Thus, the pivot has shifted from society structure to the class of labor (skilled and unskilled) and replacement employment generated by technology change and automation. While some of the research has also used the geographical location of the nation to decipher the level of income inequalities (see Frankel & Romer, 1999: pp. 379-399; Aradhyula et al., 2007). In this article, we tried to divert attention toward the fundamental structure of the society and the process of production for increasing trends in income inequality. We build a narrative of how a capitalistic society with the motive of profit maximization uses various elements of the domestic economy and the global economy to exploit their way to reach the top tier of income distribution.

2. Literature Review

The profit-making motive of a capitalist society is backed by the ideology of having private ownership of the income-generating asset and it was reported in 2010 huge disparity in investment assets was observed in the U.S. where 1% of the population held ownership

over 50.4% of assets and 90% population possessed just 12% (Wolff, 2012; Thalassinos, et al., 2012: pp. 449-465; Thalassinos & Politis, 2012: pp. 137-146; Miller & Choi, 2014). Ravallion (2014) reported rising income inequality since the first century but at a slower rate as compared to the twentieth century. Countries with abundant capital resources (land & money) are supposed to have dispersion in income distribution as compared to countries with large reservoirs of skilled labor (Spilimbergo et al., 1999: pp. 77-101). The openness of an economy has added a new dimension to the study of income inequalities, where Duncan (2000) claimed that the level of poverty and trade liberalization are negatively correlated for small and poor countries. It was found that globalization might have an inverse relationship with inter-country inequality but a positive association with intra-country & regional inequality (Cornia, 2003; Wan, 2004: pp.348-363). According to Kahai and Simmon (2001), trade openness resulted in inequalities except for countries that are in their developing phase. Poor countries (low GDP per capita) experience less income inequality as compared to countries with high GDP per capita and skilled labor (Gourdon et al., 2008: pp. 343-378). The technological-driven economy is more susceptible to disparity than liberal trade policies (Richardson, 1995: pp. 33-55). The rising demand for goods from foreign countries positively impacts the income from exporting while the rising demand for foreign goods has a negative impact (Zhang & Ordreich, 2004). Importing low-wage goods is the main culprit for rising inequality in an economy with a high GDP per capita (Ebenstein et al., 2015; Roser & Cuaresma 2016: pp. 1-27). The covet of earning higher expected returns not only ushered the way for export and import but financial liberalization, for some researcher capital openness can be a connection knot in explaining rising dispersion in income distribution in the recent past, the outcome of such study showed that trade globalization results in reduction income inequality where financial openness is the main culprit for rising disparity (Jaumotte et al., 2013: pp. 271-309; Asteriou et al., 2014: pp. 592-599; Munir & Bukhari, 2019: pp. 44-57). A distinctive result of previous literature by Celik and Basdas (2010) is that trade in goods resulted in income inequality however, financial integration (FDI inflow & outflow) is positively correlated with income inequality for Miracle countries while improving the income inequality in developed and developing countries. A certain section of research also focused on the "equality hypothesis" by Boyce (1994) according to which inequality is associated with environmental degradation. Grunewald (2017) reported that an economy with a higher GDP per capita had a positive association between carbon dioxide and income inequality and an economy with low GDP per capita had a negative association between those variables. In a similar context, Muhammad et al., (2022) found that the replacement of nonrenewable with renewable energy causes a rise in in income inequality.

3. Theoretical Framework

3.1. Marginal Cost, Inflation & Wage Rate

The driving force for the business class in a capitalistic society is to continue the production process till $MR=MC$ beyond this point production is not feasible as they will incur a loss. Therefore, we can understand the importance of inflation and wage rates for the business classes. Many economists have bestowed their view on the impact of inflation on business

which is nothing but an inflated rate of marginal revenue (future price level) about cash flows (Alchain & Kessel, 1959: pp. 535-539). Marginal cost, which is synonymous with labor cost (wage rate) plays a crucial role in executing the production process, not lately concept of the global village has taken center positioning in the global economy because of uneven growth in wage rates at different parts of the globe due to differences in population. The success story of China is attributed to this global phenomenon.

Figure 2. Graphical presentation of how the disparity between inflation and wage rate affects income sharing of a society



Source: Author(s).

The revenue is constituted of two components cost incurred and profit. While cost can be split into various headings and subheadings, for the theme of our study we will ponder around labor cost or more precisely wage rate. Now considering that with inflation the revenue of an organization will also increase thus, the hike in marginal revenue must be offset by an increment in wage rate to maintain the existing pattern within the economy. If by any mean rate of change in inflation and wage is not proportionate income sharing will take a toll.

3.2. Population Cycle, Inflation and Wage Rate

The past has been filled with enormous studies of the population and how it affected the economy. Malthus was the first person to put stress on the growing population, more certainly he focused on the growth of food and population. According, to him, the growth rate of food follows an arithmetic progression whereas the human population grows at a geometric progression. The major implication of the theory was that it helped to build an understanding of the condition and socio-structure of society of that era. The gap between the growth rate of food and population would have led to an enormous rise in price while at the same time cutting down the wage rate to the minimalistic level. Thus, the population cycle must have a certain affiliation with inflation and wage rates. The population has a positive and negative relationship with inflation and wage rate respectively.

3.3. Closed Economy

An economy with no trade relationship with other economies will depend on home consumption for economic growth. The population cycle plays a major role in such an economy as its direct relationship to consumption, with a rising population demand for consumption also increases, and with rising demand price levels also hit new heights, at the same time availability of an enormous workforce causes a downward fluctuation in wage rate.

The effect of the declining phase of population is contrary, with a shrinking population the contraction of the demand function is obvious which will create a deflation effect in an economy. And wage rate will also go up with a declining workforce.

3.4. Open Economy

The behavior of income-sharing patterns in an open economy is complex as compared to a closed economy. A capitalistic economy with a trade relationship with another global economy may create an illusion of economic growth in hindsight income sharing patterns also get distorted. In comparison to a closed economy, an open economy keeps on finding new stimuli for the expansion of production. We have already discussed the episode of a closed economy, so with a declining population the wage rate will increase and deflation will hit the economy. In this situation, an economy has two options, either let the economy shrink with a declining population or search new markets for surplus production. Once a new market is identified dumping of goods starts, and these new markets act as a perfect substitution for population growth. As we know population growth will result in more demand, and the price level start increasing again. Capitalistic societies with the ultimate goal of profit maximization still suffer from increasing wage rates, that is income sharing pattern is still shaping in favor of the labor class. The concluding solution to this problem is import or outsourcing thus, hiring low-cost labor from the world economy. This income-sharing pattern again starts tilting toward business class. Thus, we can say that “Export and Import is a perfect substitution for Population Growth”.

4. Objective

Keeping in mind the theoretical framework that we had provided in section 3, the objectives of our study are as follows.

- a) *To analyze the association between population and income inequality in a closed economy.*
- b) *To identify the variable those, have a significant association with income inequality in an open economy.*

5. Hypothesis

- a) *H_{A1}: Income inequality and population are positively correlated in a closed economy.*
- b) *H_{A2}: Income inequality and the ratio of the price level and wage rate are positively correlated in an open economy.*
- c) *H_{A3}: Income inequality and export are positively correlated in an open economy.*
- d) *H_{A4}: Income inequality and population are negatively correlated in an open economy.*

6. Methodology

The purpose of the study was to identify the macroeconomic variables that affect the income-sharing pattern over the year so, the causal research with a multivariate time-series methodology was been embraced. The empirical testing was conducted in two parts. The first part was dedicated to identifying the association between income inequality and population for the closed economy. In the later part, the analysis was focused on an open economy and the variables that cause income inequality.

6.1. Closed Economy

Four countries were used as subjects of our study which were Ukraine, Morocco, Brazil, and Moldova (Shakti, 2022). The selection of the countries was done based on the availability of data and how close is the economy. It is needless to say that in today's world, no country is detached from the global economy. However, these countries fulfill the maximum criteria of being called a closed economy with a limited amount of oil import or export. There were more qualified countries for the title mainly from East Africa but the availability of data was a major issue for these countries. We have used the Gini coefficient as a proxy for income inequality whereas we have used two proxies for population variables which are total population and population growth rate per year. The Karl Pearson coefficient of correlation was used to establish an association between two variables. Again, the availability of data plays an important role in the selection of statistical tools. Since data on all the variables were unavailable, we have shifted from multivariate regression to correlation. The dataset of all the variables was collected from the World Bank database and the range of the dataset varies from country to country. For Brazil dataset ranges from 1981 to 2020; Moldova from 1997 to 2019; Morocco from 1984 to 2013; and Ukraine from 1993 to 2020. Further linear interpolation was used for missing data since all countries were in under developed category at some point in time accessibility of economic variables was not that rigorous.

6.2. Open Economy

In the case of open economy, we have used multivariate OLS (Ordinary Least Square) regression to test the hypothesis. The test consists of one dependent variable which is the Gini coefficient and three independent variables which are the ratio of CPI (Consumer Price Index) and Wage Rate, Export as a percentage of GDP (Gross Domestic Product), and population growth rate. We initiated the empirical analysis with four independent variables, the fourth one being import but due to collinearity (with export) we have to eliminate it as the fourth variable. The subject of the study is the U.S. and data were collected from 1960 to 2020. There are three main reasons for selecting the U.S. for analysis which are (i) the availability of data about the concerned study, almost all the country's information on such variables is missing, (ii) accessibility of well-constructed longitudinal data for research, and (iii) finally the U.S. is the flag bearer of global economy. The various pre- and post-regression tests were conducted to see the feasibility of using regression as a statistical tool for understanding the association between dependent and explanatory variables. The Jarque Bera was used to test the normality of variables and residual series. The Elliot Rothenberg Stock (ERS) point optimal was used to test the stationarity of variable series. The ARCH (Autoregressive Conditional Heteroskedasticity) was used to test the homoskedasticity of residual series while Breusch Godfrey was used to test the Serial correlation of residual series. Lastly, to test whether the coefficient of the variable is collinear or not we have used VIF (Variance Inflation Factor).

Thus, the regression model used is presented below,

$$Gini = \alpha + \beta_1 CPI/Wage + \beta_2 Export + \beta_3 Pop + u_t$$

Where, CPI/Wage, Export, & Pop represent the ratio of CPI (Consumer Price Index) and Wage Rate, Export as a percentage of GDP (Gross Domestic Product), and population growth rate respectively. The u_t in the equation is an error term while α is intercept or drift. Finally, the Gini on the left-hand side represents the Gini coefficient.

7. Result & Discussion

7.1. Closed Economy

The correlation was majorly in favor of the theory that we have proposed in the early section, positive associations of 0.82, 0.66, & 0.81 were found between the Gini coefficient and population for Moldova, Morocco, and Ukraine and in the case of Brazil to variable were negatively correlated (-0.73). When the population growth rate was taken into consideration positive correlations of 0.73, & 0.61 were found for Brazil, and Moldova, and negative correlations of -0.82, & -0.50 for Morocco, and Ukraine. It was astounding to find such varied results for two proxies of the same variable but, we also have to understand that the true characteristic of the population of these countries are not being able to be explained by either one of the proxies. In the case of Brazil, the population is increasing at a decreasing rate which means the total population will still show an upward trend while the growth rate will exhibit a downward trend, thus true characteristic of population is disguised in the number game, therefore even though population is declining different

result was obtained. The opposite can be observed for Morocco, and Ukraine where the population is decreasing at an increasing rate thus, the total population is showing in downward trend while the population growth rate is showing an upward trend. Moldova is a unique case where both the proxy present true attributes of the population of the country. This is the primary reason that we have used two proxies for the population. Consequently, we can claim that H_{A1} is accepted. The result of the correlation test is presented below in Table 1.

Table 1. *Correlation between Income Inequality and Population and Population Growth Rate*

Variables	Population	Population Growth Rate	Country
Gini Coefficient	-0.73	0.73	Brazil
	0.82	0.61	Moldova
	0.66	-0.82	Morocco
	0.81	-0.5	Ukraine

Source: Author(s).

7.2. Open Economy

7.2.1. Normality of Variable

A normally distributed series must possess the basic properties that are mean, & standard deviation must be 0, & 1 respectively. A linear combination of normally distributed variables itself is normally distributed and it also provides minimum variance property thus, impetus us to continue with regression analysis and test hypothesis. The result of Jarque Bera is tabulated below in Table 2.

Table 2. *Jarque Bera test of Variables*

Variables	Calculate Value	Prob
Gini Coefficient	3.86	0.144
CPI/Wage Rate	3.78	0.15
Export	2.37	0.3
Population Growth Rate	8.1	0.02

Source: Author(s)

The H_0 of Jarque Bera test is that the series is normally distributed thus, conferring P value Gini coefficient, CPI/Wage Rate, & Export as a percentage of GDP are insignificant at the level of 10% with P value of 0.14, 0.15, and 0.3 respectively. The result for the population growth rate was a little skeptical as it qualifies with a rear margin of 0.02 P value.

7.2.2. Unit Root Test

The stationarity of the variable was tested using Elliot Rothenberg Stock (ERS) Point-Optimal methodology as it provides an advantage against the anomalies of Augmented Dicky Fuller (ADF) regarding power of test and size distortion (see Elliot et al., 1996: p. 813). The test was conducted with drift, drift, and trend. In the first scenario, all the variables were significant at levels of 1%, 5%, & 10% with P statistics of 207.24, 8.48, 18.07, & 45.03 for Gini coefficient, CPI/Wage rate, Export as a percentage of GDP, and Population growth rate respectively. Table 3 represents the result of the unit root test with drift.

Table 3. *Unit Root Test with drift*

Test	Level of significant	Critical Value	Gini Coefficient	CPI/Wage Rate	Export	POP_G
ERS Point Optimal	1%	1.88	207.24	8.48	18.07	45.03
	5%	3				
	10%	3.96				

Source: Author(s).

When trend along with drift was used to understand the stochastic process of variables except for Export (significant at the level of 1%) all other variables were stationary at the level of 1%, 5%, & 10%. The P statistic of the Gini coefficient, CPI/Wage rate, Export as a percentage of GDP, and Population growth rate were 8.49, 9.90, 4.34, & 22.35.

Table 4. *Unit Root Test with drift & trend*

Test	Level of significant	Critical Value	Gini Coefficient	CPI/Wage Rate	Export	POP_G
ERS Point Optimal	1%	4.22	8.49	9.9	4.34	22.35
	5%	5.7				
	10%	6.77				

Source: Author(s).

Thus, all the variables used for time series regression analysis were stationary at level or integrated at zero order. So simple OLS (Ordinary Least Square) can be used for our regression analysis.

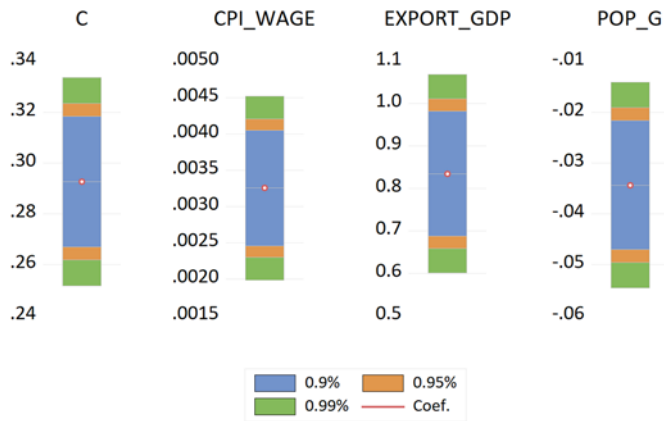
7.2.3. Regression Analysis

In Table 5 below; the outcome of regression is presented where three explanatory variables which are CPI/Wage rate, export as a percentage of GDP, and population growth are regressed on the GINI coefficient. The regression model was significant at the level of 0.1% (F statistic of 198.74) with R squared of 0.91 and adjusted R squared of 0.90 indicating a highly significant model. The estimators including intercept were also significant at the level of 0.1%. CPI/ Wage brings about 0.0032 unit change in the GINI coefficient while the estimation error was 0.000475 with a t statistic of 6.85. Export brings about 0.83 units of change in the GINI coefficient with an estimation error was 0.087 and a t statistic was 9.48. Population growth was negatively correlated with a coefficient of -0.034 and the estimation error was 0.007 with a t statistic of -4.52. Thus, H_{A2} , H_{A3} , & H_{A4} accepted that an open economy population cycle has a negative relation with income inequality while the ratio of inflation and wage rate and export have a positive relation as it was explained through the theoretical framework in section 3. In Figure 3 a graphical presentation of the coefficient is given along with the confidence interval, while the detailed outcome of OLS is presented in Table 5 given below.

Table 5. *Result of regression analysis*

Variables	Constant (α)	CPI/Wage Rate (β_1)	Export as Percentage of GDP (β_2)	Population Growth Rate (β_3)
Coefficient	0.29	0.0032	0.83	-0.034
Standard Error	0.015	0.000475	0.087	0.007
t statistic	19.07	6.85	9.48	-4.52
P (value)	0.000	0.000	0.000	0.000
R-squared				0.91
Adjusted R-squared				0.9
F statistic				198.74
P (F-statistic)				0.000

Source: Author(s).

Figure 3. Graphical presentation coefficient and confidence interval

Source: Author(s).

7.2.4. Post-Regression Test

The validation of OLS regression analysis mainly depends on four conditions which are no collinearity among the regressors, no correlation among the successive value of residual series, no correlation among residual and regressors, no heteroskedasticity in residual series, and residual series should normally distributed.

In Table 6 two measures of collinearity have been presented Variance Inflation Factor (VIF) & tolerance. In this case, the VIF value should not be more than 5 (Hair, 2010), for the tolerance value should not be less than 0.20 (Menard, 1995: p. 192).

Table 6. The measure of collinearity among regressors

Variables	VIF	Tolerance
CPI/Wage	1.71	0.58
Export	2.26	0.44
Population growth rate	1.46	0.68

Source: Author(s).

In Table 7; results of three residual diagnostic tests have been shown, where Jarque Bera, Autoregressive conditional Heteroskedasticity (ARCH), and Breusch Godfrey were conducted for testing normality, homoskedasticity, and autocorrelation & serial correlation of residual series respectively. The outcome of the test confirmed that the series is normally distributed and has no presence of heteroskedasticity, autocorrelation & serial correlation. Thus, it can be concluded that the result of OLS regression is robust and free from any anomalies.

Table 7. Residual Diagnostic

Test	Calculated value	Prob
Jarque Bera	0.34	0.84
ARCH	0.83	0.61
Breusch Godfrey	1.44	0.18

Source: Author(s).

8. Conclusion

The investigation plethora of literature concomitant to income inequality discovered that literature can be divided into two sections; one tries to expand the literature by studying the disparity between skilled and unskilled labor using education and technological change as an explaining factor and other focuses on elements of economic growth and globalization more in the line of Kuznets. In contrast, we avoided commenting income disparity of labor and tried to build a narrative rather than just using certain elements of the economy as an explanatory variable of income inequality. We through our theoretical framework elucidated how the motive of continuously improving profit is impetus by the societal structure of a capitalistic economy to the point that they used various elements of the domestic economy and after that world economy to achieve their motive. Initially, they capitalized on the growing population for the creation of wealth by using low labor costs against rising prices. Once the population starts declining, they use international trade as a perfect substitute for population growth. We also show that a closed economy with a capitalistic ideology will experience a decline in income inequality within the declining population which is very much similar Kuznet hypothesis. Thus, the framework has the potential to explain the irregularity of the Kuznets curve.

The economist might have found a way to stimulate the growth rate, but morally might not be good for everyone. The pity is that, being a failed system capitalism will keep on flourishing as there is no better alternative in the present era.

References

- Ahluwalia, M.S., 1976. Inequality, poverty and development. *Journal of Development Economics*, [online] 3(4), pp. 307-342. <[https://doi.org/10.1016/0304-3878\(76\)90027-4](https://doi.org/10.1016/0304-3878(76)90027-4)>
- Alchian, A.A. and Kessel, R.A., 1959. Redistribution of Wealth through Inflation: Contrary to the generally accepted view, business firms do not necessarily gain through inflation. [online] 130(3375), pp. 535-539
- Aradhyula, S.V., Rahman, T. and Seenivasan, K., 2007. Impact of international trade on income and income inequality. *2007 Annual Meeting, July 29-August 1, 2007, Portland, Oregon TN*. [online] <<https://doi.org/10.22004/ag.econ.9999>>
- Asteriou, D., Dimelis, S. and Moudatsou, A., 2014. Globalization and income inequality: A panel data econometric approach for the EU27 countries. *Economic Modelling*, [online] 36, pp. 592-599. <<https://doi.org/10.1016/j.econmod.2013.09.051>>
- Autor, D., 2010. The polarization of job opportunities in the US labor market: Implications for employment and earnings. *Center for American Progress and The Hamilton Project*. [online] 6, pp. 11-19.
- Autor, D.H., Katz, L.F. and Kearney, M.S., 2008. Trends in US wage inequality: Revising the revisionists. *The Review of economics and statistics*, 90(2), pp. 300-323.

- Berman, E., Bound, J. and Machin, S., 1998. Implications of Skill-Biased Technological Change: International Evidence*. *The Quarterly Journal of Economics*, [online] 113(4), pp. 1245-1279. <<https://doi.org/10.1162/003355398555892>>
- Bonvin, J., 1996. *Evidence on trade and wages in the developing world*. [online] *OECD Development Centre Working Papers*. <<https://doi.org/10.1787/113347174747>>
- Boyce, J.K., 1994. Inequality as a cause of environmental degradation. *Ecological Economics*, [online] 11(3), pp. 169-178. <[https://doi.org/10.1016/0921-8009\(94\)90198-8](https://doi.org/10.1016/0921-8009(94)90198-8)>
- Bruno, M.R.M.S., Lyn, 1999. *Equity and growth in developing Countries: old and new perspectives on the policy issues*. [online] *World Bank policy research working paper*. <<https://doi.org/10.1596/1813-9450-1563>>
- Castells-Quintana, D., Ramos, R. and Royuela, V., 2015. Income inequality in European Regions: Recent trends and determinants. *Review of Regional Research*, [online] 35(2), pp. 123-146. <<https://doi.org/10.1007/s10037-015-0098-4>>
- Çelik, S. and Basdas, U., 2010. How does globalization affect income inequality? A panel data analysis. *International Advances in Economic Research*, [online] 16(4), pp. 358-370. <<https://doi.org/10.1007/s11294-010-9281-0>>
- Cornia, G.A., 2003. The impact of liberalisation and globalisation on income inequality in developing and transitional economies. *SSRN Electronic Journal*. [online] <<https://doi.org/10.2139/ssrn.380347>>
- Deininger, K. and Squire, L., 1998. New ways of looking at old issues: inequality and growth. *Journal of Development Economics*, [online] 57(2), pp. 259-287. <[https://doi.org/10.1016/s0304-3878\(98\)00099-6](https://doi.org/10.1016/s0304-3878(98)00099-6)>
- Duncan, R., 2000. Globalisation and income inequality: an international perspective. *In Conference on International Trade Education and Research*. [online] 5, pp. 1-10.
- Ebenstein, A., Harrison, A. and McMillan, M., 2015. *Why are American Workers getting Poorer? China, Trade and Offshoring*. [online] <<https://doi.org/10.3386/w21027>>
- Elliott, G., Rothenberg, T.J. and Stock, J.H., 1996. Efficient tests for an autoregressive unit root. *Econometrica*, [online] 64(4), p. 813. <<https://doi.org/10.2307/2171846>>
- Frankel, J.A. and Romer, D., 1999. Does trade cause growth? *American Economic Review*, [online] 89(3), pp. 379-399. <<https://doi.org/10.1257/aer.89.3.379>>
- Gallup, J.L., 2012. Is there a Kuznets curve. *Portland State University*, 1, pp. 1-28.
- Gini, C., 1912. Variabilitae mutabilita; Pizetti E, Salvemini T, editors. *Rome: Libreria Eredi Virgilio Veschi*, 156.
- Goldberg, P.K. and Pavcnik, N., 2007. Distributional effects of globalization in developing countries. *Journal of Economic Literature*, [online] 45(1), pp. 39-82. <<https://doi.org/10.1257/jel.45.1.39>>
- Gourdon, J., Maystre, N. and De Melo, J., 2008. Openness, inequality and poverty: Endowments matter. *Journal of International Trade & Economic Development*, [online] 17(3), pp. 343-378. <<https://doi.org/10.1080/09638190802136978>>
- Grunewald, N., Klasen, S., Martínez-Zarzoso, I. and Muris, C., 2017. The trade-off between income inequality and carbon dioxide emissions. *Ecological Economics*, [online] 142, pp. 249-256. <<https://doi.org/10.1016/j.ecolecon.2017.06.034>>
- Hair, J.F., 2010. *Multivariate data analysis: a global perspective*. [online] *Pearson eBooks*. Available at: <<https://ci.nii.ac.jp/ncid/BB03463866>>>

- Harrison, A. and Hanson, G., 1999. Who gains from trade reform? Some remaining puzzles. *Journal of Development Economics*, [online] 59(1), pp. 125-154. <[https://doi.org/10.1016/s0304-3878\(99\)00008-5](https://doi.org/10.1016/s0304-3878(99)00008-5)>
- Harrison, A., McLaren, J. and McMillan, M., 2011. Recent perspectives on trade and inequality. *Annual Review of Economics*, [online] 3(1), pp. 261-289. <<https://doi.org/10.1146/annurev.economics.102308.124451>>
- Irwin, D. A., Katz, L. F., & Lawrence, R. Z., 2008. Trade and Wages, Reconsidered. Comments and Discussion. *Brookings Papers on Economic Activity*, [online] pp. 138-154.
- Jaumotte, F., Lall, S. and Papageorgiou, C., 2013. Rising income inequality: technology, or trade and financial globalization? *IMF Economic Review*, [online] 61(2), pp. 271-309. <<https://doi.org/10.1057/imfer.2013.7>>
- Kahai, S.K. and Simmons, W., 2005. The impact of globalisation on income inequality. *Global Business and Economics Review*, [online] 7(1), p. 1. <<https://doi.org/10.1504/gber.2005.006915>>
- Katz, L. (2008). Trade and wages, reconsidered: comments and discussion. *Brookings Papers on Economic Activity*, [online] 38(1), pp. 143-149.
- Katz, L.F. and Autor, D.H., 1999. Changes in the wage structure and earnings inequality. In: *Handbook of labour economics*. [online] pp. 1463-1555. <[https://doi.org/10.1016/s1573-4463\(99\)03007-2](https://doi.org/10.1016/s1573-4463(99)03007-2)>
- Kiatrungwilaikun, N. and Suriya, K., 2015. Rethinking Inequality and Growth: The Kuznets Curve after the Millennium. *International Journal of Intelligence Technologies and Applied Statistics*, [online] 8(2), pp. 159-169. <<https://doi.org/10.6148/ijitas.2015.0802.08>>
- Krugman, P.R., 2008. Trade and wages, reconsidered. *Brookings Papers on Economic Activity*, [online] 2008(1), pp. 103-154. <<https://doi.org/10.1353/eca.0.0006>>
- Kuznets, S., 1955. Economic growth and income inequality. *The American Economic Review*, XLV(1), pp. 1-30.
- Lawrence, R.Z., Slaughter, M.J., Hall, R.E., Davis, S.J. and Topel, R.H., 1993. International trade and American wages in the 1980s: giant sucking sound or small hiccup? *Brookings Papers on Economic Activity Microeconomics*, [online] 1993(2), p. 161. <<https://doi.org/10.2307/2534739>>
- Menard, S.W., 1996. Applied Logistic Regression analysis. *Technometrics*, [online] 38(2), p. 192. <<https://doi.org/10.1080/00401706.1996.10484485>>
- Miller, M.S. and Choi, J.W., 2014. The effectiveness of the federal funds rate as the US monetary policy tool before, during and after the great recession.
- Muhammad, I., Ozcan, R., Jain, V., Sharma, P. and Shabbir, M.S., 2022. Does environmental sustainability affect the renewable energy consumption? Nexus among trade openness, CO₂ emissions, income inequality, renewable energy, and economic growth in OECD countries. *Environmental Science and Pollution Research*, [online] 29(60), pp. 90147-90157. <<https://doi.org/10.1007/s11356-022-22011-1>>
- Munir, K. and Bukhari, M., 2019. Impact of globalization on income inequality in Asian emerging economies. *International Journal of Sociology and Social Policy*, [online] 40(1/2), pp. 44-57. <<https://doi.org/10.1108/ijssp-08-2019-0167>>
- Paukert, F., 1973. Income distribution at different levels of development: A survey of evidence. *Int'l Lab. Rev.*, 108, p. 97.

- Raitano, M., 2016. Income inequality in Europe since the crisis. *Intereconomics*, [online] 51(2), pp. 67-72. <<https://doi.org/10.1007/s10272-016-0579-x>>
- Ram, R., 1997. Level of Economic Development and Income Inequality: Evidence from the Postwar Developed World. *Southern Economic Journal*, [online] 64(2), p. 576. <<https://doi.org/10.2307/1060869>>
- Ravallion, M., 2014. Income inequality in the developing world. *Science*, [online] 344(6186), pp. 851-855.
- Richardson, J.D., 1995. Income Inequality and Trade: how to think, what to conclude. *The Journal of Economic Perspectives*, [online] 9(3), pp. 33-55. <<https://doi.org/10.1257/jep.9.3.33>>
- Roser, M. and Cuaresma, J.C., 2014. Why is Income Inequality Increasing in the Developed World? *Review of Income and Wealth*, [online] 62(1), pp. 1-27. <<https://doi.org/10.1111/roiw.12153>>
- Shakti, 2022. *Closed economy*. Wall Street Mojo.
- Spilimbergo, A., Londoño, J.L. and Székely, M., 1999. Income distribution, factor endowments, and trade openness. *Journal of Development Economics*, [online] 59(1), pp. 77-101. <[https://doi.org/10.1016/s0304-3878\(99\)00006-1](https://doi.org/10.1016/s0304-3878(99)00006-1)>
- Stolper, W.F. and Samuelson, P.A., 1941. Protection and real wages. *The Review of Economic Studies*, [online] 9(1), pp. 58-73. <<https://doi.org/10.2307/2967638>>
- Thalassinos, E.J. and Politis, E.D., 2012. The evaluation of the USD currency and the oil prices: a Var analysis. *European Research Studies Journal*, [online] 15(2), pp. 137-146. Available at: <https://www.ersj.eu/repec/ers/papers/12_2_p9.pdf>>
- Thalassinos, E., Ugurlu, E. and Muratoglu, Y., 2012. Income inequality and inflation in the EU. *European Research Studies Journal*, [online] XV (Issue 1), pp. 127-140. <<https://doi.org/10.35808/ersj/347>>
- Thornton, A., 2001. The developmental paradigm, reading history sideways, and family change. *Demography*, [online] 38(4), pp. 449-465. <<https://doi.org/10.1353/dem.2001.0039>>
- Wan, G., 2004. Accounting for income inequality in Rural China: A regression-based approach. *Journal of Comparative Economics*, 32(2), pp. 348-363.
- Wolff, E.N., 2012. The asset price meltdown and the wealth of the middle class. *National Bureau of Economic Research*, (No. w18559).
- Wood, A., 1997. Openness and Wage Inequality in Developing Countries: The Latin American Challenge to East Asian Conventional Wisdom. *The World Bank Economic Review*, [online] 11(1), pp. 33-57. <<https://doi.org/10.1093/wber/11.1.33>>
- Zhang, S., Ondrich, J. and Richardson, J.D., 2004. The link between trade and income: export effect, import effect, or both. *faculty. maxwell. syr. edu/jondrich/PapersOnLine/shuo. jan. dave-10.pdf*.