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The Optimum Level of Income Inequality: Evidence from Panel Data

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This paper postulates that the relationship between income inequality and economic growth is non-linear. At low levels of income inequality, the relationship is positive, whilst at high levels of income inequality the relationship is negative. Thus, there exists a level of income inequality which maximizes economic growth. Such a level of income inequality is defined as the optimum level of income inequality. Panel data of 25 countries over a period of 50 years, from 1960 to 2010, was used to estimate an econometric model using the techniques of seemingly unrelated regression and three stage least squares. It was found that there exists a positive and statistically significant relationship between income inequality and economic growth at low levels of income inequality, and a negative and statistically significant relationship between income inequality and economic growth at high levels of income inequality. The results of this study confirm that the optimum level of income inequality occurs at a Gini value of 0.3836 on a scale of zero to one. Hence not only does income inequality matter for economic growth, but also the level of income inequality can matter for economic growth. Policies aimed at maximizing growth should consider the prevailing level of income inequality.

Field of Research: Development Economics

1. Introduction

This paper postulates that there exists a level of income inequality that maximizes economic growth. In the optimizing spirit of economics, it endeavors to find this level of income inequality using econometric techniques. The topic of this study, "The optimum level of income inequality", implies that there exists a level of income inequality that maximizes economic growth. Such a level of income inequality shall be referred to as the optimum level of income inequality. In the quest for finding this optimum level of income inequality, this study explores the nature of the relationship between income inequality and economic growth.

David Ricardo,(1821)in the preface to his work "Principles of Political Economy and Taxation" observed that the determination of the laws of the distribution of income was "the principal problem" in political economy. If we look at the data, we can easily observe that the level of inequality today is unbelievably high. The incomes of the poorest 10 percent of people increased by less than $3 a year between 1988 and 2011, while the incomes of the richest 1 percent increased by 182 times as much(1). In the US, recent research by economist Thomas Piketty shows that over the last 30 years the growth in the incomes of the bottom 50 percent has been zero, whereas incomes of the top 1 percent have grown by 300 percent(2). In Vietnam, the country's richest man earns more in a day than the poorest person earns in 10 years (3).

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AFTSE-100 CEO earns as much in a year as 10,000 people working in garment factories in Bangladesh [(4)]. Thus income inequality is a significant contemporary issue which demands serious scientific scrutiny.

The findings of this research are different since they focus on the optimum level of income inequality, rather than the relationship between economic growth and income inequality, likemost previous studies.The research question of this paper is"does an optimum level of income inequality exist?".If it does, then this paper further enquires, "what is the optimum level of income inequality?". National income is a scarce resource, and the notion of allocation of scarce resources is at the heart of all economics. Therefore, the main justification for choosing the topic of this paper was to address this fundamentally important question. In the aftermath of the global financial crisis of 2007, income inequality has become one of the most frequently discussed issues in economics. However, hitherto there is no widely accepted benchmark as to how much income inequality may be permitted in an economy without having any deleterious effects on economic growth. With this in mind, this paper proposes a threshold level of income inequality, based on empirical analysis, which is optimum for economic growth.

The remainder of this paper is structured as follows. Section 2 contains a review of the literature on the topic, which includes a detailed analysis of relevant research work on the topic that was conducted in the past. Section 3 explains the research methodology used in this paper, by describing the data, the variables used, and the specification of the econometric model. Section 4 contains the results of the statistical tests, the estimation output of the regression analysis, the calculation of the optimum level of income inequality, and a discussion about the results. Section 5 ends the paper with a conclusion.

2. Review of Literature

In the fourth century BC, Aristotle (350 BCE) talked about inequality in his work "Politics". Like most other Greek philosophers, Aristotle condemned acquisitive behavior in the strongest terms. He believed in the pursuit of knowledge and justice, rather than the quest for material possessions. Ironically, Aristotle supported the ownership of private property, which is in itself the result of acquisitive behavior. Under the existence of private property, some level of accumulation of wealth is inevitable and, subsequently, some inequality is unavoidable. Aristotle was aware of this issue. Regarding this matter, he referred to his predecessor, Plato:

> *"Plato in 'The Laws' was of the opinion that, to a certain extent, accumulation should be allowed, forbidding as I have already observed, any citizen to possess more than five times the minimum qualification."*
>
> *-Politics, Aristotle*

Hence, according to Aristotle (350 BCE) wealth accumulation should be allowed up to the point that the richest person is five times richer than the poorest person. Beyond this point, wealth accumulation should be forbidden. Thus Aristotle hints at the notion of an optimum level of inequality, albeit in vague terms. Simon Kuznets (1955), the winner of the 1971 Nobel Memorial Prize in Economic Sciences, suggested that in the early stages of development, income inequality tends to rise, whilst in the latter stages of development, income inequality tends to fall.

Hence, if we plot a graph of income inequality against GDP per capita, we will see that it forms an inverted U shape. Such a graph is called the Kuznets' curve. The Kuznets' curve is the product of some serious empirical work on the part of Kuznets. It is based on the data ofUS federal income tax returns over a 35 year period from 1913 to 1948, as well as Kuznets' own estimates. Kuznets' inverted U hypothesis appears in most development economics textbooks and is of considerable significance. There are primarily two reasons behind its importance. First, the inverted U hypothesis is grounded upon a firm statistical foundation. Kuznets', like Pareto, reached his conclusions from the analysis of real data. Second, the inverted hypothesis highlights the notion that the relationship between income inequality and per capita GDP growth is non-linear. This non-linear characteristic is a critical point that needs to be considered when studying income inequality and economic growth.

Kuznets' did not specify any detailed mechanism by which his inverted U hypothesis was supposed to occur. His theory was optimistic in terms of assuming that income inequality would automatically decrease during the advanced stages of economic development regardless of the policies pursued by the government or other external factors. In recent years French economist Thomas Piketty has caused quite a stir in the academic world with his book "Capital in the Twenty First Century". In terms of methodology, Piketty followed in the footsteps of Simon Kuznets and endeavored upon a task that was considered "too economic for historians and too historical for economists". However, Piketty vehemently criticized Kuznets' conclusions, particularly the inverted U hypothesis. Piketty believed that the Kuznets curve was misleading, and extrapolating the curve with new data would lead to vastly different results.Piketty went on to argue that the Kuznets curve has only succeeded in deluding economists and has distracted them away from research on the topic of inequality. Whilst Kuznets used time series data for the United States over a 35 year period, Piketty extended that period to 100 years and showed that income share held by the top 1 percent of the population followed a U shaped curve.

Interestingly, a casual glance at this graph reveals that inequality in the United States soared right before the Great Depression of the 1930s, as well as before the Financial Crisis of 2007. From this we may imply that excessive levels of inequality may lead to economic instability that can potentially trigger off an economic disaster. On the other hand, periods of relatively low inequality in the United States are associated with periods of stable growth and economic recovery. For example, in the period between 1947 to 1977, also known as "The Great Prosperity", the United States experienced arguably the largest economic expansion in history, all under the backdrop of low inequality. Piketty'swork does not directly invalidate Kuznets' findings. On the contrary it shows that Kuznets' conclusions were only accurate for the period that he studied, and could not be generalized for other periods.

Piketty(2014) believes that to some extent, inequality can be good for economic growth and innovation. However, he argues that when inequality gets too extreme, then it becomes useless for economic growth. High concentration of income and wealth can reduce social mobility. Moreover, extreme inequality can damage the democratic institutions of a country, by muffling the political voice of the poor. The influence of private money in public policy making is also a matter of concern. A strong middle class is good for growth because it is efficient and equitable.

Several economists, such as Li (1998), Forbes (2000), Castelló-Climent (2004),Alesina (1994), Alesina (1996), Barro (2008), Castelló and Doménech (2002), Dela Croix (2003), Garbis (2005), Knowles (2005), Persson and Tabellini (1994), haveconducted empirical studies to investigate the relationship between inequality and growth. A careful analysis of these studies reveals that there exists a non-linear relationship between inequality and growth, whereby at low levels of inequality the relationship is positive but at high levels of inequality the relationship is negative. This suggests that there exists a level of inequality at which growth is maximized. We can classify these studies into two categories based on their results.

- Studies where the database was predominantly configured by countries with high levels of inequality (Gini greater than 0.42) and the relationship between inequality and growth was negative.
- Studies where the database was predominantly configured by countries with low levels of inequality (Gini less than 0.35) and the relationship between inequality and growth was positive.

Based on such a classification, we find that in Li (1998), Forbes (2000), and Castelló-Climent (2004) there is a positive relationship between inequality and growth. All three of these studies used datasets composed mainly of countries with low levels of inequality. On the other hand, Alesina (1994)), Alesina (1996), Barro (2008), Castelló and Doménech (2002), Dela Croix (2003), Garbis (2005), Knowles (2005), Persson and Tabellini (1994), report a negative relationship between inequality and growth. Again we observe that these studies included countries with high levels of inequality.

Thus, a major drawback of past authors is their failure to point out if there is any optimum level of income inequality. Nevertheless, in accordance to the aforementioned research question, it is possible to draw the hypothesis that an optimum level of income inequality, which maximizes economic growth, does exist. Hence, based on the hitherto published literature, we can deduce our fundamental hypothesis that the relationship between income inequality and economic growth depends on the level of income inequality, and that there is a level of income inequality where economic growth is maximized. Such a hypothesis is theoretically superior to the existing literature since it takes into account the level of income inequality which is missing in the previous research on this topic.

Economist Coll (2010) of the Autonomous University of Tamaulipas, Mexico pioneered the research on the topic of the optimum level of inequality. In his 2010 paper, titled “The optimal rate of inequality: A framework for the relationship between income inequality and economic growth”, he used panel data from 108 countries over a 40 year period from 1960 to 2000 to show that the optimum level of inequality is at a Gini value equal to 0.39 or 39. Later in another paper titled “Inequality and growth in the context of the Mexican economy: Does inequality matter for growth?”, he conducted a similar study focusing on the Mexican economy and found that the optimum level of inequality is at a Gini value of 0.42 or 42. In both of these studies, he used three stage least squares (3SLS) and seemingly unrelated regressions (SUR) to estimate the optimal level of inequality.

This research builds on the work by Professor Charles Coll, using a similar methodology but different variables and datasets. A key difference, in particular, is

that it acknowledges the importance of top income shares in determining the level of inequality. There is no precedent of any past studies which have tackled the question of the optimum level of income inequality using the sample and time frame utilized in this paper. The main strength of this paper is that it juxtaposes two different, yet mainstream, views regarding income inequality and incorporates them into a single coherent hypothesis. The limitation of this study is its inability to include countries from all regions of the world.

3. Methodology

This study is based on panel data of 25 countries over a period of fifty years, from 1960 to 2010. The countries included were Argentina, Australia, Canada, China, Colombia, Denmark, Finland, France, Germany, India, Indonesia, Ireland, Italy, Japan, South Korea, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, UK, USA. The sample of countries and the time period were both selected based on the availability of data for the variables selected in the model.

3.1 Data

The table below summarizes the information regarding the variables used in this paper. The sample consists of 25 countries and the data used is from the years 1960 to 2010.

Table 1: Variables

Variable	Definition	Source
Economic growth	Annual percentage growth rate of per capita GDP	World Development Indicators
Income Inequality	Inequality measured by the Gini coefficient	World Income Inequality Database V 3.0B
Fertility	Total fertility rate	World Development Indicators
Education	Average number of years of secondary and tertiary school attainment	Barro& Lee
Tax Rate	Tax rate as a percentage of commercial profit	World Development Indicators
Tax Revenue	Tax revenue as a percentage of GDP	World Development Indicators
Top Income Shares	Income share held by top 10 percent, 5 percent and 1 percent of households	World Top Incomes Database(now World Wealth and Income Database)

3.2 Econometric Model

The model specification is as follows:

$$Y_{it} = \beta_0 + \beta_1 Gini_{it} + \beta_2 Gini_{it}^2 + \beta_3 X_{it} + \varepsilon_{it}$$

Where,

Y = annual percentage change in per capita gross domestic product

For the purpose of this study, economic growth is defined as the annual percentage change in per capita gross domestic product. Income inequality is measured using the Gini coefficient, which has a range from zero, which indicates perfect equality, to one, which indicates perfect inequality. The Gini and the Gini squared were used to investigate the nature of economic growth at low levels of inequality and high levels of inequality. The main objective of the model was to find the value of the Gini for which the value of economic growth, or Y, was maximized. An indicator of economic growth was chosen as the dependent variable, whilst an indicator of income inequality was chosen as the dependent variable so that the model can appropriately address the research question. A model specification such as the one above narrows down the myriad causes of economic growth to a specific set of factors. This allows for an isolated investigation whereby economic growth is primarily being driven by income inequality. Such a model makes it possible to study the effect of different levels of income inequality on economic growth, and is hence conducive to finding an optimum level of income inequality. This model is similar to the model used by Jorge Alberto Charles Coll (2010). However, notably some of the independent variables used in this paper, such as top income shares, have been specifically selected to address the effect of super-rich individuals on economic growth. Such an approach is critically missing from the paper by Jorge Alberto Charles Coll (2010).

4. Findings and Discussion

4.1 Statistical Tests

In order to investigate whether there was any long run association between the economic growth and income inequality,Pedroniresidual cointegrationtests were conducted.

Table 2: Results of PedroniCointegration Tests

Test Statistic (Probability)	No deterministic trend	Deterministic intercept and trend	No deterministic intercept or trend
Panel v-Statistic	0.980421 (0.1634)	-2.811525 (0.9975)	2.911810 (0.0018)
Panel rho-Statistic	-1.184902 (0.1180)	1.169793 (0.8790)	-4.797197 (0.0000)
Panel PP-Statistic	-5.583984 (0.0000)	-6.850018 (0.0000)	-7.179803 (0.0000)
Panel ADF-Statistic	-5.981570 (0.0000)	-6.015553 (0.0000)	-7.228182 (0.0000)
Group rho-Statistic	1.125240 (0.8698)	2.535556 (0.9944)	-0.677140 (0.2492)
Group PP-Statistic	-9.550552 (0.0000)	-10.75762 (0.0000)	-10.69829 (0.0000)
Group ADF-Statistic	-7.667841 (0.0000)	-7.983463 0.0000)	-10.81729 (0.0000)

Note: (i) probability values in parenthesis;
(ii) null hypothesis: no cointegration exists, alternate hypothesis: cointegration exists.

From table 2 we can see that if no deterministic trend is assumed, then four out of seven test statistics of the Pedronicointegration test are statistically significant. This means that we can reject the null hypothesis of no cointegration under the assumption of no deterministic trend. Similar results are also observed for the

assumption of deterministic trend and intercept. Again we find that four out of seven test statistics of the Pedronicointegration test have a probability value of zero up to the fourth decimal place. This means that the probability of the null hypothesis of no cointegration being true is nearly zero. Finally, the assumption of no deterministic trend or intercept gives the strongest result in the Pedronicointegration test. Here we find that six out of the seven test statistics are statistically significant. Therefore, under the assumption of no deterministic trend or intercept, we can reject the null hypothesis that no cointegration exists in favor of the alternate hypothesis that cointegration does exist. Hence, the results of the co-integration tests confirm that there is a long run association between economic growth and income inequality, as might be expected.

Table 3: Results of Pairwise Granger Causality Tests

Null hypothesis	**F Statistic (Probability)**
Tax revenue does not Granger cause GDP per capita growth	6.38256 (0.0042)
Top ten percent income share does not Granger cause Gini coefficient	8.46690 (0.0004)
Top five percent income share does not Granger cause Gini coefficient	8.59253 (0.0004)
Top ten percent income share does not Granger cause Gini squared	7.77134 (0.0008)
Top five percent income share does not Granger cause Gini squared	8.01065 (0.0007)
Total fertility rate does not Granger cause average years of total schooling	3.48523 (0.0334)
Top five percent income share does not Granger cause average years of total schooling	3.65659 (0.0295)
Tax revenue does not Granger cause total fertility rate	7.21032 (0.0023)
Tax revenue does not Granger cause top five percent income share	6.48874 (0.0056)

Note: (i) probability values in parenthesis

To test for causal relationships between the variables, pair wise Granger causality tests were conducted. The Granger causality test checks the ability of past values of one time series to predict the future values of another time series. It must be kept in mind, however, that Granger causality is simply predictive causality and not true causality. From Table 3, we can see that the probability that the null hypothesis that both top five percent income share and top ten percent income share do not Granger cause Ginicoefficient is true is 0.0004. This means we can reject the null hypothesis that top five percent income share and top ten percent income share do not Granger cause Ginicoefficient. This result is intuitively expected, since as income shares get more concentrated at the top, income inequality tends to rise. Most of the causal relationships, such as top income shares causing Gini and Gini squared, were expected. However, some of the other causal relationships, such as those between taxation and growth, fertility and education, and taxation and top income shares, were interesting revelations. Table 3 reports only the statistically significant results from the Granger causality test.

4.2 Regression Analysis

In order to find the optimum level of income inequality, regression analysis was performed using the methods of seemingly unrelated regression (SUR) and three stage least squares (3SLS). SUR is a generalization of a linear regression model that consists of several regression equations, each having its own dependent variable and potentially different sets of exogenous explanatory variables. Each equation is a valid linear regression on its own and can be estimated separately, which is why the system is called seemingly unrelated. SUR allows for correlation of error terms across equations. SUR was first proposed by Arnold Zellner in 1962. The 3SLS estimator was introduced by Zellner & Theil in 1962. It combines two-stage least squares (2SLS) with SUR.

The details of the 3SLS process are as follows:

Stage 1: Regress each endogenous variable in the equation on all exogenous variables in the simultaneous equation model using the OLS estimator. Calculate the fitted values for each of these endogenous variables.

Stage 2: In the equation to be estimated, replace each endogenous variable with itsfitted value. Use the 2SLS estimator to estimate each of the equations individually and estimate the errors for each equation.

Stage 3: Use the estimated errors to compute, for the system of equations, the estimated error covariance matrix and then use the SUR procedure to estimate the unknown parameters.

Since the relationship between income inequality and economic growth is rather complex, and works through many different channels, single equation regression models could not be used. This is why simultaneous equation models like SUR and 3SLS were used. The model was estimated using both of these methodologies based on a system of seven equations.

$$\textit{Economic growth} = \beta_0 + \beta_1 \textit{Income inequality} + \beta_2(\textit{Income inequality})^2 + \beta_3 \textit{Fertility} + \varepsilon \quad (i)$$

$$\textit{Economic growth} = \beta_0 + \beta_1 \textit{Income inequality} + \beta_2(\textit{Income inequality})^2 + \beta_3\ \textit{Education} + \varepsilon \quad (ii)$$

$$\textit{Economic growth} = \beta_0 + \beta_1 \textit{Income inequality} + \beta_2(\textit{Income inequality})^2 + \beta_3 \textit{Tax Rate} + \varepsilon \quad (iii)$$

$$\textit{Economic growth} = \beta_0 + \beta_1 \textit{Income inequality} + \beta_2(\textit{Income inequality})^2 + \beta_3 \textit{Tax Revenue} + \varepsilon \quad (iv)$$

$$\textit{Economic growth} = \beta_0 + \beta_1 \textit{Income inequality} + \beta_2(\textit{Income inequality})^2 + \beta_3 \textit{Top ten percent income share} + \varepsilon \quad (v)$$

$$\textit{Economic growth} = \beta_0 + \beta_1 \textit{Income inequality} + \beta_2(\textit{Income inequality})^2 + \beta_3 \textit{Top five percent income share} + \varepsilon \quad (vi)$$

$$Economic\ growth = \beta_0 + \beta_1 Income\ inequality + \beta_2 (Income\ inequality)^2 + \beta_3 Top\ one\ percent\ income\ share + \varepsilon \quad (vii)$$

The results from the SUR model estimation show that the sign of the coefficient of the Gini is positive, whilst the sign of the coefficient of the Gini squared is negative. This indicates that the relationship between economic growth and income inequality is positive at low levels of inequality, but negative at high levels of inequality. Both coefficients are statistically significant at one percent level.

The model was also estimated using the methodology of 3SLS. The instrument variables used were tax rate, tax revenue, one period lagged log of the total fertility rate, log of the GDP per capita growth, top one percent income share, and Gini squared. The instrument variables were chosen carefully with special consideration given to variables with low correlation, in order to avoid the problem of multicollinearity.

The results from the 3SLS model estimation show that the sign of the coefficient of the Gini is positive, whilst the sign of the coefficient of the Gini squared is negative. This again confirms that the relationship between economic growth and income inequality is positive at low levels of inequality, but negative at high levels of inequality. Both coefficients are statistically significant at ten percent level.

Table 4: Results of Model Estimation

Method	**SUR (Sequential weighting matrix & coefficient iteration)**	**SUR (Linear estimation after one-step weighting matrix)**	**SUR (Linear estimation after one-step weighting matrix)**	**Iterative 3SLS**
Variables	Economic growth	Economic growth	Economic growth	Economic growth
Constant	2.609380***	2.610132	2.610132***	-48.27679*
	(0.000898)	(0.000869)	(0.000869)	(28.42380)
Gini	0.036821***	0.036828***	0.036828***	2.825350*
	(0.0000055)	(0.00000545)	(0.00000545)	(1.611163)
Gini Squared	-0.000732***	-0.000732***	-0.000732***	-0.036818*
	(0.000000598)	(0.00000598)	(0.00000598)	(0.021521)
X	-0.000028***	-0.0000588***	-0.0000588***	-0.004668
	(0.000002)	(0.0000043)	(0.0000043)	(0.004617)

Note: (i) Standard errors in parentheses, (ii) *** p<0.01, ** p<0.05, * p<0.1, (iii) Tax rate, tax revenue, one period lagged total fertility rate, log of GDP per capita growth, and top one percent income share were used as stacked instruments for the iterative 3SLS estimation.

These findings are in conformity with the hypothesis of a non-linear relationship between economic growth and income inequality that was implied by previous studies in the literature. Therefore, we can accept the hypothesis stated in section 2, and can conclude that an optimum level of income inequality, which maximizes economic growth, does exist. Hence, we proceed to further calculations to find the optimum level of income inequality.

4.3 Calculation of the Optimum Level of Income Inequality

Using the value of the coefficients from the 3SLS estimation, the optimum level of income inequality can be calculated with simple differential calculus. The basic idea

is to find the level of growth optimizing inequality. Let us recall that our model specification was as follows:

$$Y_{it} = \beta_0 + \beta_1 Gini_{it} + \beta_2 Gini_{it}^2 + \beta_3 X_{it} + \varepsilon_{it}$$

Substituting the coefficients from the 3SLS estimation into the model, we get

$$Y = (-48.27679) + (2.825350)\, Gini + (-0.036818)\, Gini^2 + (-0.004668)\, X$$

Differentiating the equation with respect to Giniwe get

$$\frac{dY}{dGini} = 2.825350 - 0.073636\, Gini$$

At the turning point the first derivative is zero, so we get

$$\frac{dY}{dGini} = 2.825350 - 0.073636\, Gini = 0$$

$$-0.073636\ \text{Gini} = -2.825350$$

$$Gini = 38.3691$$

Thus, the optimum level of income inequality occurs at the Gini value of 38.3691 on a scale of zero to hundred or 0.383691 on a scale of zero to one. The second derivative is negative, further confirming the inverted U shaped nature of the relationship.

4.4 Discussion

From the results obtained through this study, it has been established that the optimum level of income inequality, or the growth optimizing level of income inequality, occurs at a Gini value of 0.3836. Below the optimum level, the relationship between economic growth and income inequality is positive, whilst above the optimum level it is negative. Lower levels of income inequality may lead to higher savings and greater capital accumulation which may result in higher economic growth. On the other hand, higher income inequality may lead to socio-political instability which leads to lower investment and result in lower economic growth. These are only a few examples of how the inequality-growth nexus works. In reality, the dynamics may play out through many different and diverse transmission mechanisms.

The findings of this research provide hard evidence in favor of the hypothesis that the relationship between income inequality and economic growth is non-linear. These results are different from previous studies which advocated either a positive or negative relationship between income inequality and economic growth.

5. Conclusion

The distribution of income is an issue which is too important to be studied simply by economists; it is of interest to everyone in every field. Throughout history, inequality

has either been denounced as a vice or revered as a virtue. The endless debate on income inequality and economic growth has often been fought from these ideological perspectives. However, as the discourse has progressed it has become more and more obvious that the fundamental stumbling block is the degree of inequality, rather than inequality itself. Thus the real question in the inequality-growth debate is how much income inequality is best for economic growth.

This research advocates that there exists a level of income inequality which is optimum since it maximizes economic growth. The results of this study confirm that the optimum level of income inequality occurs at a Gini value of 0.3836. Thus the research question initially posed in this study is answered through the findings of this paper. Hence not only does income inequality matter for economic growth, but also the level of income inequality can matter for economic growth.

These findings have important policy implications, as well as significant political repercussions. Policies aimed at maximizing growth should consider the prevailing level of income inequality. In countries where the level of income inequality is below the optimum level, the government should follow a "laissez faire" approach to inequality, and simply allow the forces of the free market to prevail. On the other hand, in countries where the level of income inequality is above the optimum level, the government should consider implementing progressive taxation on income and wealth, taxation on capital gains, elimination of tax loopholes and tax havens, as well as increased regulation of financial markets. Moreover, the government should also consider improving access to good quality higher education.

The notion that the level of inequality determines the inequality-growth nexus represents a significant departure from the existing literature on this topic. The key difference between the results of this study and the findings of previous authors is the concept that there can be a level of income inequality that maximizes economic growth. Most of the literature so far has failed to point out this crucial idea, and has instead focused on whether inequality is good or bad for growth. Thus this study opens up new avenues for future research on the relationship between income inequality and economic growth. Due to lack of data on the relevant variables, this study could not be extended to many countries, especially countries from Africa. It is hoped that once such data is available, this limitation can be overcome.

Endnotes

(1) D. Hardoon, S. Ayele and R. Fuentes-Nieva. (2016). "An Economy for the 1%".
(2) P. Cohen. (2016, December 6). "A Bigger Economic Pie, but a Smaller Slice for Half of the U.S". *New York Times*.
(3) Nguyen Tran Lam. (2017). "Even It Up: How to tackle inequality in Vietnam". Oxford: Oxfam. http://oxf.am/ZLuU
(4) Calculations by Ergon Associates using CEO pay data from the High Pay Centre and the minimum wage of a Bangladeshi worker plus typical benefits packages offered to workers.

References

Alesina, A. and Perotti, R., 1996,'Income distribution, political instability, and investment', *European Economic Review, Vol. 40, No. 6, Pp.1203-1228*.

Alesina, A. and Rodrik, D., 1994,'Distributive politics and economic growth', *The Quarterly Journal of Economics, Vol. 109, No. 2, Pp.465-490.*

Everson, S. ed., 1996. *Aristotle: The Politics and TheConstitution of Athens*. Cambridge University Press, Pp. 43.

Barro, R.J., 2008. Inequality and growth revisited. *ADB Working Paper Series on Regional Economic Integration*, No. 11, viewed 11 July 2014, <https://www.econstor.eu/bitstream/10419/109529/1/wp-011.pdf>.

Castelló, A. and Doménech, R., 2002. Human Capital Inequality and Economic Growth: Some New Evidence. *The Economic Journal*, 112(478), Pp.C187-C200.

Castelló-Climent, A., 2004. *A Reassessment of the Relationship Between Inequality and Growth: What Human Capital Inequality Data Say?*. Instituto Valenciano de Investigaciones Económicas, viewed 7 June 2017, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.630.4259&rep=rep1&type=pdf>.

Charles-Coll, J.A., 2013,'The Debate Over the Relationship Between Income Inequality and Economic Growth: Does Inequality Matter for Growth?',*Research in Applied Economics, Vol. 5, No. 2, P.1.*

Coll, J.A.C., 2014, Inequality and Growth in the Context of the Mexian Economy: Does Inequality Matter for Growth (No. 331).

De La Croix, D. and Doepke, M., 2003,'Inequality and growth: why differential fertility matters',*American Economic Review, Vol. 93, No. 4, Pp.1091-1113*.

Forbes, K.J., 2000,'A Reassessment of the Relationship between Inequality and Growth', *American economic review, Vol. 90, No. 4, Pp.869-887*.

Iradian, M.G., 2005. Inequality, Poverty, and Growth: Cross-Country Evidence (EPub) (No. 5-28). International Monetary Fund.

Knowles, S., 2005,'Inequality and economic growth: The empirical relationship reconsidered in the light of comparable data',*The Journal of Development Studies, Vol. 41, No. 1, Pp.135-159.*

Kuznets, S., 1955, 'Economic growth and income inequality', *The American Economic Review, Pp.1-28.*

Li, H. and Zou, H.F., 1998,'Income inequality is not harmful for growth: theory and evidence', *Review of Development Economics, Vol. 2, No. 3, Pp.318-334*.

Persson, T. and Tabellini, G., 1994,'Is inequality harmful for growth?',*The American Economic Review, Pp.600-621.*

Piketty, T., 2014, *Capital in the 21st Century*, The Belknap Press of Harvard University Press, Cambridge, viewed on 5 February 2017, <https://dowbor.org/blog/wp-content/uploads/2014/06/14Thomas-Piketty.pdf>.

Ricardo, D., 1821,*Principles of Political Economy and Taxation*, Batoche Books, Ontario, Pp. 5.

Zellner, A. and Theil, H., 1962,'Three-stage least squares: simultaneous estimation of simultaneous equations', *Econometrica: Journal of the Econometric Society, Pp.54-78.*

Zellner, A., 1962,'An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias', *Journal of the American statistical Association, Vol. 57, No. 298, Pp.348-368.*