Inequality, Poverty and Economic Growth in Different Income Classifications

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Abstract

This paper defines the relationship between inequality and economic development, analyzes the impact of economic growth on income inequality and poverty rate. The study uses different indicators and panel data over 10 years and across 46 countries worldwide. As the Kuznets Curve suggested, a country's inequality level and economic development share a non-linear relationship. The author applies this concept to 3 different models and found different results between low and middle-income countries and high-income countries. In result, this study confirms the Kuznets law as the author finds an unequal income distribution in low and middle-income countries.

JEL Classification: D31, O47, I24
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1.0 Introduction

Poverty defines a state when people cannot satisfy their basic needs. This means that they may not have clean water, adequate shelter, or access to health services. There are billions of people who live in poverty; one in two children in the world do not have the proper support (Shah 2013). This situation has worsened after the 2008 financial crisis. Even when countries are slowly stepping out of the recession, commodity prices have already gone up with the prices of oil and iron. This does not help the poor to recover from the financial crisis at all. When the rich part of the world start to do better and benefit from the economy, the poor seemed to have stayed where they were before the crisis.

In 1955, Simon Kuznets published his paper on the Kuznets Curve. He predicts an inverted U-shaped relationship between income levels and inequality (Kuznets 1955). He assumed that in rural areas of a country income is lower and more equal than in urban areas. Then with the expansion of a country's economy, income inequality will raise given that a portion of the rural population will become industrial workers and earn more income than those who are not. As this gets to a tipping point where most of the population becomes industrial workers, income inequality will then fall. In the 1950s, Kuznets only had data for the change in income distribution in the Unites States, United Kingdom, and two states in Germany. His hypothesis was not popularly tested until the mid 1970s due to the lack of data.

With most jobs being created at the top and the bottom of the ladder, America may have difficulty remaining a middle-class society (Kuttner 1983). According to Kuttner, job opportunities in the United States are polarizing. The author believe that this

situation can now be applied to other countries such as China and India since they are experiencing similar growth the U.S experienced in the past three decades. Middle-class in low and middle-income countries are diminishing, increasing income inequality, and the poverty gap.

This study aims to test the global relationship between economic growth, and poverty as suggested by Simon Kuznets, and to answer the following questions:

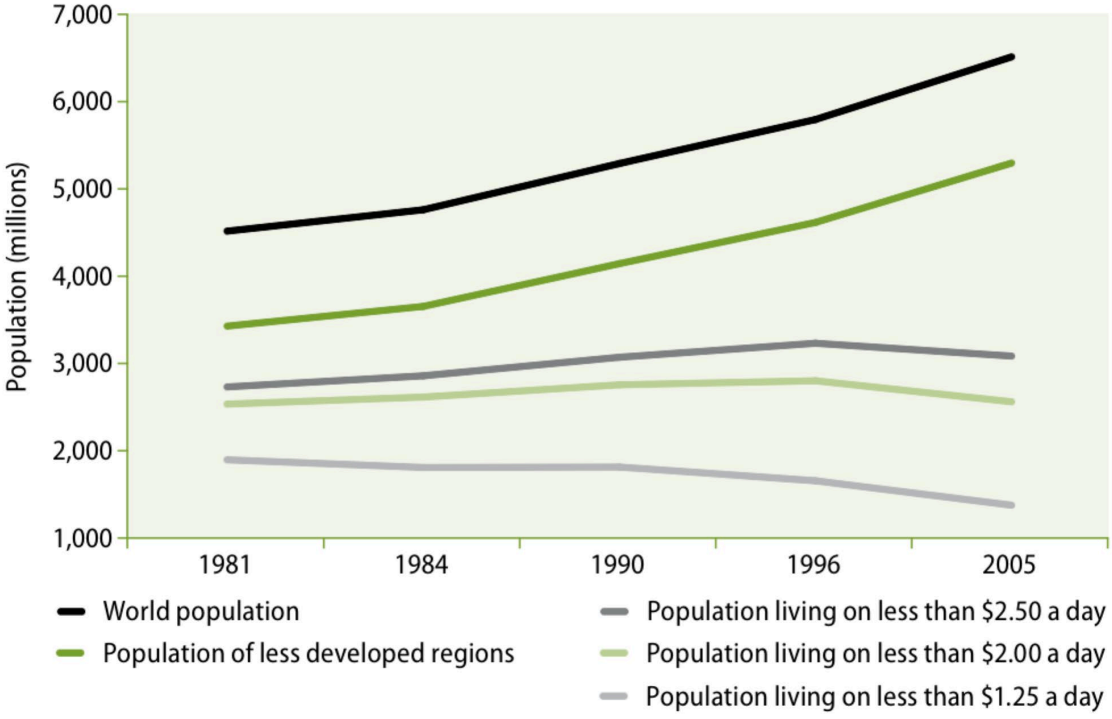
- Will inequality harm economic growth?
- How do we reduce inequality?
- Does economic growth and government spending reduce poverty?

The rest of the paper is organized as follows: Section 2 is a quick trend analysis on poverty. Section 3 gives a brief literature review. Section 4 outlines the data and empirical methodology, followed by a discussion of empirical results in section 5. Finally, section 6 will include conclusions for this paper.

2.0 Trend in Poverty

Usually, poverty is measured in monetary terms like income and consumption per capita/household. If income is the measurement, then people who are living under $1.25 per day are in poverty. According to the 2005 International Comparison Program issued by World Bank, global poverty level has been dropping since the 1980s, especially in the developing world. From 1981 to 2005, the proportion of people who are living under $1.25 a day has dropped from 52.0% to 25.7%. Even with the growing population and the raising poverty line, there is still a strong sign of decrease around 1996 (shown in Figure 1).

Figure 1: World Population and Number of People Living in Poverty, 1981 - 2005



Source: *Rethinking poverty: Report on the world social situation 2010*. United Nations Publications.

The drop in poverty is possibly due to good economic performance, higher wages, and better social systems. However, after the 2008 global financial crisis, there is a chance for poverty level to rise. High unemployment rate, increasing world population (especially in developing countries), and decreasing social resources (where population density is high) can all contribute to poverty. Also, rapid economic developments in Asian countries can also influence the numbers.

In Figure 2, the table shows poverty levels in 1980, 2000, and 2010. China's poverty level almost dropped by half in two decades. India and Indonesia's numbers also differ by a lot. Considering most of the world's population is in Asia, the decreasing

trend is reasonable. But, this also suggests that poverty can still be a big issue in the rest of the developing world and people should not be 'deceived' by the numbers.

Figure 2: Table of Poverty levels in 1980. 2000, and 2010

Under $1.25				Under $2.00			
Countries	1980	2000	2010	**Countries**	1980	2000	2010
China	84.3	28.1	9.2	China	97.9	50.7	23.2
India	55.5	41.6	32.7	India	84.8	75.6	59.2
Indonesia	62.8	29.4	18	Indonesia	88.4	67.1	43.3
Malaysia	3.2	0.5	0	Malaysia	12.3	7.8	2.3
Thailand	22	3	0.3	Thailand	44.1	18	3.5

Source: World Bank data

3.0 Literature Review

Various studies have been conducted to understand inequality and poverty. Easterly and Fischer (2000) used polling data for 31,869 households in 38 countries. They found that the poor (mostly uneducated and blue collars) are more likely to mention inflation as one of their financial concerns than the ones who are not. They also measured national income, percentage decline in poverty, and the percentage change in the real minimum wage. They found inflation to be negatively correlated to those variables. High inflation can potentially lower the share of the bottom quintile and the real minimum wage, which can increase poverty. They concluded in their research that the poor suffer more from inflation than the rich. Thus, the poor becomes poorer while the rich slowly recover from an economic shock.

Brown et al. (2001) discussed in their paper that it is best for policymakers to keep macroeconomic stability in order to reduce poverty. Which means that all

government budget and poverty reduction policies must be conducted in a noninflationary manner. They suggest that inflation is one of the factors that can be a burden to poverty reduction. The lower income households tend to hold their assets in cash form rather than interest-bearing assets. Once inflation goes up, they are less able to protect their incomes and assets. The governments should utilize their fiscal, monetary, and exchange rate policies to support a stable economy and thus reduce poverty in their countries. Unstable macroeconomic activities can lead to a negative effect on poverty reduction.

In Pakistan, Economists suggest that economic growth and investments can negatively influence poverty (Chani et al., 2011). They used a time series annual data for all their variables over their period of 1972 – 2008. After testing the model, they found that economic growth and investments can decrease poverty, but inflation and trade can increase poverty in Pakistan. The effect of trade openness is however insignificant in this study.

Powers (1995) suggests that unanticipated inflation might have the biggest effects on consumption poverty since people cannot incorporate the unexpected changes into their decision making process. While she discovers an adverse effect on poverty in her study, she also found that inflation rate is only influential to poverty rate. Unemployment has more effect in increasing poverty. Structural employment affects the long-term incomes of the poor, and cyclical unemployment causes a permanent income loss. Therefore, it is interesting for her to see how these three factors influence each other.

In some developed nations, inequality levels are a lot lower than what some third–world nations have. One can argue that the wealth distribution within a country is very likely to change over time as it slowly grow from an agricultural society in the past to a rich industrial-based society (Kuznets, 1955). In his paper, Kuznets pointed out the non-linear relationship between inequality and economic development over time. As a country develops, its inequality level will rise in the beginning due to the rapid expansion of the urban area, and then fall as its economy slowly stabilizes. He also suggested that income distribution during economic development (from agricultural society to industrial) in a country is unequal. Meaning that a portion of the population will become wealthier faster than the rest.

Iradian (2005) believe that different country has different responses to economic growth due to different levels of poverty and inequality. He used a panel dataset to examine the empirical relationship between inequality and growth. He found out that government spending is also important to poverty reduction. Surprisingly, his empirical results show that inequality can actually help development, and increase the rate of growth in low to middle income countries. But this relationship is only in the short term, in the long term, inequality can have an adverse impact on growth.

In the MENA region, income inequality reduces economic growth and increases poverty. But inequality is not the only cause of poverty in Africa. Foreign direct investment, population growth, inflation rate, and the attainment of only primary education can all contribute to high poverty rates. However, domestic investment, urbanization, infrastructure development, trade openness, and mineral rent as a percentage of GDP all showed signs to increase economic growth (Ncube et al, 2013).

By drawing a compilation of data from household surveys representing 130 countries over a period of 25 years, the results implies negative correlations between growth and both poverty and inequality. The relationship between growth, inequality and poverty were found to be different in each country (Ferreira and Ravallion, 2008). Usually, the countries that have a faster growth reduce poverty more rapidly. The authors also pointed out the possibility of greater inefficiencies in a country's economy due to inequality.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

This study uses annual panel data from 2003 to 2011 across 46 countries. The data for this paper were obtained from various sources. The majority of the information has come from the World Bank Database (data.worldbank.com) and the World Fact Book which can be found on the website of the Central Intelligence Agency (www.cia.gov). Summary statistics for the data are provided in Table 1.

Table 1 Summary Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
EDUC	240	91.3708	7.5051	61.2552	99.8366
GCF	240	22.8261	4.1131	13.9319	36.0478
GINI	239	33.78	7.9956	24.06	67.40
GOVE	240	19.68	4.0025	9.38	28.06
GPC	240	38373.82	12057.28074	9895.30	74609.19
GR	240	1.78	3.1842	-8.86	15.24
INFL	240	2.49	2.039	-4.48	12.68
POPGR	240	0.69	0.7757	-1.69	5.32
POV	240	5.37	16.1922	0.00	42.90
UNEM	240	7.60	4.8857	2.30	27.10

4.2 Empirical Model

Following Iradian (2005), this study adapted and modified the models used in his paper. The author is running three models in this study and could be written as follow:

$$GR_{it} = \alpha_{it} + \beta_1 GINI_{it-1} + \beta_2 LogGPC_{it-1} + \beta_3 GCF_{it} + \beta_4 INFL_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

In model (1) the author runs a regression to investigate the determinants of economic growth. The intention is to see whether the indicators are universal. The dependent variable in this model is GR, which is the growth rate of GDP (PPP adjusted). There are 4 estimators: first, GINI represents the Gini-coefficient, where data is obtained from the World Bank Data. Second, GPC is the per capita GDP in dollars (PPP adjusted). The third one is GCF, it represents the share of gross fixed capital formation in GDP, and the forth one is INFL, which is the average consumer price inflation rate.

$$LogGINI_{it} = \beta_1 LogGPC_{it} + \beta_2 Log^2 GPC_{it} + \beta_3 GOVE_{it} + \beta_4 EDUC + \beta_5 POPGR + \mu_i + \varepsilon_i \quad (2)$$

The second regression looks into the relationship between income and inequality in different income classes. The author uses this model to test the Kuznets curve (non-linear relationship between income and inequality). The dependent variable is Log GINI. It is the natural logarithm of the Gini index. The independent variables are the natural logarithm of GPC; the squared logarithm of GPC; GOVE, which represents government expenditures as a percent of GDP; EDUC, the secondary school enrollment rate (in percent of the total secondary school-aged population); and POPGR is the percent change in population (annual %).

$$\Delta POV_{it} = \alpha_i + \beta_1 GR_{it} + \beta_2 \Delta GINI_{it} + \beta_3 \Delta GINI_{it-1} + \mu_i + \varepsilon_{it} \quad (3)$$

The third model is to see how poverty rate interacts with economic growth and income inequality. This regression aims to explain whether poverty rate can be reduced

by economic growth or not. As a dependent variable, ΔPOV represents the change in poverty headcount of the total population (in percentage points) that live under $2 a day (PPP adjusted). The independent variables are GR (GDP growth), ΔGINI is the change in gini-coefficient; and $\Delta GINI_{it-1}$ is the change in gini-coefficient from the past year.

5.0 EMPIRICAL RESULTS

The empirical estimation results for the Economic growth model (1) are presented in Table 2.

Table 2: Regression results for Economic growth

	Economic Growth		
	All Countries	Low and Middle Income Countries	High Income Countries
CONSTANT	2.390723	6.3186*	-19.78802**
	(0.58)	(1.61)	(-2.01)
GCF $_{it}$	.2445641***	0.1109**	.5143843***
	(8.70)	(1.75)	(6.82)
$GINI_{it-1}$	.1397825*	0.0468	.298252
	(1.64)	(0.59)	(1.07)
GPC $_{it}$	.0023446***	0.0089***	7.16e-06
	(-12.47)	(16.29)	(0.05)
GPC $_{it-1}$	-.0027746***	-0.0098***	
	(-17.39)	(-20.14)	
INFL	-.0251237	-0.0015	-.1775496
	(-0.81)	(-0.04)	(-1.10)
Countries	45	23	22
Number of observations	405	207	198
R-Squared	0.429	0.4450	0.4063
F-Statistics	40.54	97.24	13.97

Note: *** , **, and * denotes significance at the 1%, 5%, and 10% respectively.
T (z)-scores in parentheses.

Generally, the determinants for economic growth are about equally important in all countries. The empirical estimation shows a positive relationship between Economic Growth and Gross Capital Formation in both high and low-middle income countries. This suggests that the more developed a country's capital market is, the more economic growth a country will have. The GINI coefficient is insignificant in high and low-middle income-countries, this could imply that inequality isn't significant in increasing a county's GDP growth. However, in the all-country estimation, it shows up as a significant variable, which is perhaps caused by a larger dataset. Reasonably, as GDP per capita in the current year increases by one unit (dollar, PPP adjusted), the country's GDP growth will go up by 0.89%. Although there is a negative relationship between inflation rate and GDP growth, all estimations are insignificant.

The empirical estimation results for the Inequality model (2) are presented in Table 3. This model indicates a negative relationship between enrollments in secondary school as a percentage for high-income countries, but a positive relationship for low and middle-income countries. For lower-income countries, when secondary school enrollment increases by 1%, inequality raises for 0.2459%. In higher-income countries, as secondary school enrollment increases by 1%, inequality actually decreases by 0.3117%. This may be the result of ongoing economic development. Since the low and middle-income countries are still developing their economy, a person who is more educated than others is more likely to receive more income. As for the high-income countries, secondary enrollment rates are much higher, there is not much inequality, and therefore the estimation is a negative number.

Table 3: Regression results for Inequality

	Inequality		
	All Countries	Low and Middle Income Countries	High Income Countries
CONSTANT	3.8201	-2.3675	1.382331
	(5.56)	(-0.77)	(0.10)
Log EDUC	-0.01151	0.2459***	-0.3117**
	(-0.29)	(4.25)	(-1.92)
Log GOVE	-0.0505**	0.1838***	-0.3037***
	(-2.19)	(3.64)	(-6.73)
Log GPC	0.87858***	1.0443*	0.9309
	(5.75)	(1.48)	(0.35)
Log2GPC	0.05019***	-0.0616*	-0.0488
	(-6.32)	(-1.57)	(-0.39)
POPGR	-0.031	0.1431***	0.0339***
	(-0.53)	(7.22)	(2.52)
Countries	45	24	22
Number of observations	405	240	220
R-Squared	0.2702	0.2277	0.3009
F-Statistics	37.96	13.21	18.42

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively. T (z)-scores in parentheses.

The estimations also suggest a negative relationship between government expenditure and inequality in high-income countries and a positive relationship in low and middle-income countries. The author suspects that there are some degree of corruption in the low middle-income countries such as China and India, and parts of the government expenses were not being used as intended, thus increasing the inequality level by 0.1838% when government expenses increase by 1%. Corruption levels are relatively lower in high-income countries such as the U.S and Canada. Hence, as government spending increase by 1%, inequality decreases by 0.3037%.

Simon Kuznets (1955) mentioned a non-linear relationship between income inequality and economic growth overtime. The inequality model proves this relationship

significant in low and middle-income countries: as GDP per capita increases to a certain level, it starts to decrease (the negative relationship between Log^2GPC and gini-coefficient). However, in high-income countries, this non-linear relationship seems to be insignificant due to the insignificant estimations. This finding can be explained by the 'diminishing middle class' theory (Kuttner 1983). As middle class citizens in countries like India and China gets wealthier through better various different channels, they join the upper-income class. This widens the gap between the rich and the poor, hence the positive coefficient of 1.0443. In high-income countries, this phenomenon is less obvious because the economies in those countries are more developed and settled down, and the relationship becomes insignificant.

There is a positive relationship between population growth and inequality in both lower and higher income countries. Since resources are limited, as the population grows by 1%, inequality will increase by 0.1431% in lower income countries and by 0.0339% in higher income countries. The difference between the two estimates could be a result to different levels of economic development in different countries.

The empirical estimation results for the poverty model (using the rate of change in poverty as a dependent variable) are presented in Table 4. This model shows a positive relationship between inequality in the current year and a country's poverty rate. When gini-coefficient increases by 1%, poverty rate also increase by 0.3714% in low and middle-income countries and by 0.1052 in high-income countries. This result shows that inequality does increase income inequality.

Table 4: Regression results for Poverty

	Poverty		
	All Countries	Low and Middle Income Countries	High Income Countries
CONSTANT	0.2358	1.8414***	0.4897
	(0.37)	(2.65)	(0.59)
$GINI_{it}$	0.4152*	0.3714	0.1052***
	(1.70)	(1.47)	(3.73)
$GINI_{it-1}$	0.01889	0.0129	-0.0301
	(0.96)	(0.73)	(-1.07)
GOVE	-0.054***	-0.6151**	0.0213
	(-2.97)	(-2.30)	(1.12)
GR	0.0083	0.0155***	-0.0094*
	(1.38)	(2.44)	(-1.49)
Countries	45	23	22
Numbers of observations	405	207	198
R-squared	0.5089	0.3222	0.4785
F-Statistics	31.93	15.36	5.99

Note: *** , **, and * denotes significance at the 1%, 5%, and 10% respectively. T(z)-Scores in parentheses.

When Government expenditure increases by 1%, it can decrease poverty rate by 0.054% in low and middle-income countries. Although the estimation for high-income countries carries a positive sign, it is statically insignificant. When GDP growth increases by 1%, it can increase poverty rate in low and middle-income countries by 0.0083%, but it is not significant in this model. As GDP growth increase by 1% it decreases poverty rate in high-income countries by 0.0094%. This is due to the different levels of economic development. In poorer countries, as the economy expand, only a portion of the population will increase their wealth faster than others since resources are limited. Therefore, poverty rate will increase as GDP growth also increases.

However, the estimate results for economic growth different between the two income classes. There is a positive relationship between economic growth and poverty.

This could also be one of causes to the 'diminishing middle-class' theory (Kuttner 1983). Richer countries have relatively completed their economic developments, when GDP continues to grow, the rest of the population will have more opportunities and resources to increase their personal income and become a part of the middle-class. This again confirms the Kuznets law that as economic growth continues; the gap between rich and poor will widen, and then slowly decease as the economy continues to expand.

6.0 CONCLUSION

In this section, the author wishes to answer the three questions that were asked in the introduction of this paper. The questions are:

- Will inequality harm economic growth?
- How do we reduce inequality?
- Does economic growth and government spending reduce poverty?

Generally, findings in this paper confirmed Kuznets' findings in 1955. First, in the economic growth model (1), the gini-coefficient variable is significant in both high and low-middle income countries. This means that inequality will not harm GDP growth by much.

Then, to reduce inequality, there should be different solutions for different economic systems. In high-income countries, inequality can be reduced by increasing school enrollment percentages (i.e., cheaper education), government expenditures, and in continuing the expansion of the economies (increase GDP growth). According to Kuznets (1955), income distribution is unequal and will rise at first stages of expansions and then it will slowly decrease overtime. Therefore in the low and middle-income

countries, continued growth in their economies might be the only way to reduce income inequality at the beginning stages of economical expansion.

Finally, economic growth can help in the process of poverty reduction, but only in high-income countries. Since most high-income countries have already passed the beginning stages of economic transition (from agricultural to industrial), economic growth can actually increase poverty reduction. In low and middle-income countries, increasing government spending can help decrease poverty rate, however, the governments should also be aware of potential corruption in the process of increasing government expenditure to make sure the resources are allocated efficiently as the author has mentioned previously. On the other hand, as government expenditure increases, there will be more resources in society for the lower-income population to utilize and becomes a part of the middle-income population, which can help reduce the gap between rich and poor.

In conclusion, this paper has proved the Kuznets' Law, that poverty rates in different countries react to economic growth differently and that there is a non-linear relationship between income inequality and economic growth.

Appendix A: Variable Description and Data Source

Acronym	Description	Data source
EDUC	Secondary school enrollment (% net)	World Bank Data
GCF	Gross Capital Formation as a percentage of GDP	US Bureau of Economic Analysis
GINI	Gini-Coefficient, World bank estimation	World Bank Data CIA Fact Book
GOVE	Government consumption of final products as a percentage of GDP	World Bank Data
GPC	GDP per capita, PPP adjusted, constant 2011 international $	World Bank Data
GR	GDP Growth in percentage	World Bank Data
INFL	Consumer prices	World Bank Data
POPGR	Percentage change from the past year (annual percentage)	World Bank Data
POV	Poverty Head count ratio at $2 a day(PPP) (% of population)	World Bank Data
UNEM	Total Unemployment Rate as a percent of total labor force.	World Bank (Modeled ILO estimation)

Appendix B- Variables and Expected Signs

Acronym	Variable Description	What it captures	Expected sign
EDUC	Secondary school enrollment (% net)	Education level in countries	+/-
GCF	Gross Capital Formation as a percentage of GDP	Purchase /Income level	+/-
GINI	Gini-Coefficient, World bank estimation	Inequality	+/-
GOVE	Government consumption of final products as a percentage of GDP	Government expenditure	+/-
GPC	GDP per capita, PPP adjusted, constant 2011 international $	Personal income	+/-
GR	GDP Growth in percentage	Economic expansion	+/-
INFL	Consumer prices	Instable economic activities	+/-
POPGR	Percentage change from the past year (annual percentage)	Population growth in countries	+/-
POV	Poverty Head count ratio at $2 a day(PPP) (% of population)	Poverty rate	+/-

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