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Research Article

STUDYING INVERSE RELATIONSHIP THEORY BETWEEN ECONOMIC GROWTH AND EARNING DISTRIBUTION FROM SIMON KUZNETS AMONG COUNTRIES MEMBERED IN BRICS GROUP

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ABSTRACT
Achieving economic development in order to enhance people life's quality and increase in public welfare is one of the goals which are being followed by world different governments. To achieve these 2 purposes, 2 variables of economic growth and earning distribution have an essential role. Economic growth is a variable which guarantees productions level. Better facilities in economy are raised in order to consume and invest more. Fair earnings distribution also causes appropriate use of all from current facilities and resources. These 2 variables together provide contexts to facilitate and accelerate economic development process in the country with forming other political, cultural and social institutions. To achieve economic growth, effectiveness of these 2 variables is so imperative. Economists have always provided various hypotheses and viewpoints in the context of effectiveness of these 2 variables on each other. The most important and obvious viewpoint is the theory by famous American economist, Simon Kuznets which considered a reverse relationship between economic growth and earnings distribution. In this paper, it is mainly aimed to investigate famous theory by Simon Kuznets which is popularized as inverted U theory in which final model which has been drawn by Kuznets for relationship between economic growth and earnings distribution has been considered as the research main model. Target population is countries member in Department of Economic Cooperation BRICS. Data related to 20 years economic growth and earnings distribution have been extracted from reliable sources such as IMF and World Bank and based on this data, inverted U model has been measured and its results have been estimated.

Keywords: *Economic Growth, Earnings Distribution, Newfound Economic Powers, BRICS Group*

INTRODUCTION
Economic growth is always accounted as one of the most important indices to estimate countries' development. On the other hand, earnings distribution is being used as a scale to measure equality in interest distribution driven from economic growth. When global economy especially during 90s experienced considerable growth rate of 2.5% of GDP in a year, attention by global economic community to this issue more increased .Meanwhile in 199s and 2000s, some of the developing countries could continuously keep their annual GDP at a high level and in average could increase annually about 6 percent of national earning production and slowly raise their share of global trade and economic growth and introduce their name as the new developed economies. Countries such as Brazil, China, Russia, Turkey, India, Argentina, Singapore and Malaysia are such countries which are known as the newfound economic powers in the world. Emerging groups such as BRICS which consist of these newfound economy countries indicate effectiveness of these countries on global economy, so that 5 countries member in BRICS including Brazil, Russia, India, China and South Africa solely have 28 percent of GDP of the world and 44 percent of the earth's population. This kind of countries mainly started their growth process and economic development in the 70s and 80s .With the emergence of these countries in the global economy as a phenomenon and their considerable role in world economy growth average, serious discussions about how this subsequent growth is distributed in developing countries are formed. Somehow, they were looking forward to find an answer for this question that is this derived growth able to lead to fair earnings distribution? (Abou and Ghaderi, 2006).

Meanwhile, many investigations and rationalizations have been made which are generally divided into two categories: international institutions like World Bank and International Monetary Fund (IMF) believed that economic policies trend toward growth have to be supported in order to create required opportunities to increase earnings of poor people. For example, we can refer to Dollar and Kraay's study (2000) in the World Bank in which it was shown that economic growth regardless of the earnings 'growth nature causes to increase poor people in the society and economic growth in regard with Kuznets's famous hypothesis (1995) will lead to poverty reduction (Abuo and Abbasi, 2006).

In contrast, some other groups believed that economic growth would lead to increase in inequality in earnings and capital distribution and this issue would cause to decrease poverty. For example as it was brought in Richard and Adams s' study (2002). Forsyth (2000) proposed many evidences that globalization and economic growth have ignited the earnings disparity and they are acted as a barrier against poverty reduction. According to the opinions of this group, decrease in inequality of earning distribution can cause poverty reduction in the developing countries (Abuo and Abbasi, 2006).

Literature Review

Ahmad and Siok (2013) in their study entitled "Environmental Kuznets Curve: Evidences from Developed and Developing Economies", the research was expressed that "Previous studies show that the environmental quality and economic growth can be represented by the inverted U curve called Environmental Kuznets Curve (EKC). In this study, we conduct empirical analyses on detecting the existence of EKC using the five common pollutants emissions (i.e. CO2, SO2, BOD, SPM10, and GHG) as proxy for environmental quality. The data spanning from year 1961 to 2009 and cover 40 countries. We seek to investigate if the EKC hypothesis holds in two groups of economies, i.e. developed versus developing economies. Applying panel data approach, our results show that the EKC does not hold in all countries. We also detect the existence of U shape and increasing trend in other cases. The results reveal that CO2 and SPM10 are good data to proxy for environmental pollutant and they can be explained well by GDP. Also, it is observed that the developed countries have higher turning points than the developing countries. Higher economic growth may lead to different impacts on environmental quality in different economies.

John (2012) in their study entitled "Is There a Kuznets Curve?" we read that "There has never been good evidence for a pattern of rising inequality in low-income countries and falling inequality in higher income countries. The only evidence that appears to support the Kuznets hypothesis is the cross-sectional pattern of inequality levels across countries, although the Kuznets hypothesis is an assertion about the path of inequality within countries. Numerous cross-sectional studies established the Kuznets curve as a stylized fact, dominating empirical and theoretical research on the effect of economic growth on income inequality since then. New international panel data with the first internally consistent time series for a large number of countries shows no evidence of a Kuznets curve. The data show an anti- Kuznets curve: inequality decline in low-income countries, and inequality increase in high income countries. The U-shaped pattern shows up strongly in a non-parametric trend, in stochastic kernel estimation, but weakly in a quadratic fixed effect trend. Akbarian and Zare (2011) in the study entitled "Studying effect of market openness and economic growth on poverty in Iran" arrived at this conclusion that economic growth in short term and long term will lead to poverty reduction.

Moosai and Keihani (2008) in their study entitled "Economic growth and earnings development in Iran" have studied Kuznets's hypothesis in Iran and showed that this hypothesis hasn't done in Iran and U curve relation of Kuznets between economic growth and earnings distribution hasn't been occurred.

Sadeghi and Arani (2008) in the study entitled "Studying relation of economic growth and poverty with tractive approach in Iran" arrived at this conclusion that economic growth in Iran would not lead to the poverty reduction and poverty index in terms of tractive approach is not constant value and as well as economic growth, it is dependent on other factors such as primary inequality too. Yousing (2005) in the paper entitled "Economic growth and earnings distribution in the US" and using indigenous growth model came to this conclusion that higher Gini coefficient (more earnings inequality) makes the economic

growth slower and economic growth has positive relationship with urban employment growth, investment costs, technology improvement and human capital.

Almas (2004) in the paper entitled "Inequality of measurement indices" has investigated the relationship between earnings distribution inequality and learning and also relationship between employment inequality and health inequality. Based on his claim, employment has effect on earnings distribution and also earning distribution on employment. Increasing employment means that more families can have income and subsequently more balanced distribution. Also, inequality in capital distribution impacts of long-term growth and makes it slow. To explain and depict distribution inequality, Lorenz curves and Gini Coefficient have been used. She examines earning distribution in the national level and lower.

Proposing a Model and Introducing Variables

Kuznets expresses his opinion in 1995 in the paper entitled "Economic growth and earnings inequality". Kuznets in this paper studied earnings distribution in the cross-sections from countries with different level of development. He compared 5 countries, India, Sri Lanka, Puerto Rico, United Kingdom and United States and came to the conclusion that earnings inequality at the first steps of economic growth is increasing and then it get balanced. Ultimately, at the next steps, it will decrease. Kuznets based on trend of economic development of developed countries, justifies his theory. At the beginning of economic development trend, inequality in earnings distribution increases, because workers don't have required skills and specialty and payments will be low. In the next durations, economic growth which is align with education development, expansion of social insurance, expansion of capital ownership of massive units and increase in earnings due to work compared with earnings due to ownership, helps general decrease in earnings distribution. Kuznets claims that unequal earnings distribution at the first steps of industrializing guarantees economic development trend for the long time and also causes to add society material resources. In his idea, marginal propensity to consume in low-income groups is high and strategy of fair earnings distribution will solely lead to the demand increase. So, due to constraint in facilities and production resources, increase in demand causes increase in prices and imports, but since marginal prosperity to consume in the wealthy classes (higher income group) is small, as a result in these classes marginal prosperity to save overtakes consumption and aforementioned savings are consumed in regard with investment. In the final analysis, employment and national income will increase which in fact is economic growth and development. At the middle steps, the economic growth and development process of human force has been transformed and has changed to the human capital. In the other word, skill and specialty texture of human forces are developed and impact on payments and also will lead to decrease in equality of earnings groups (Gharebaghian, 2000).

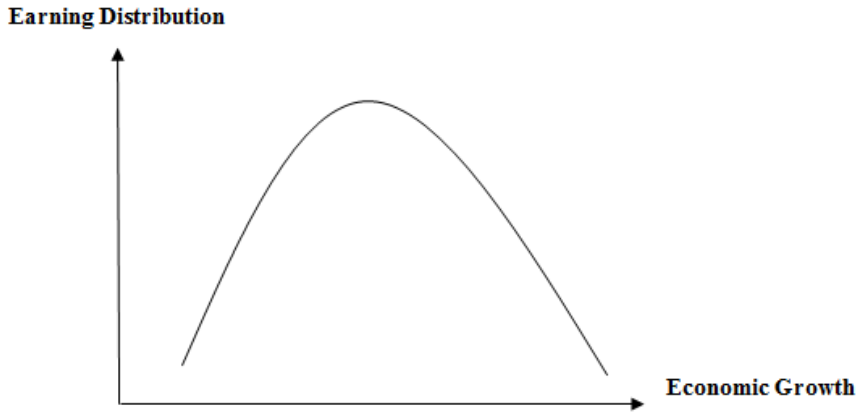

Figure 1: The graph of Kuznets theory

This pattern was popularized as Kuznets inverted U curve. Kuznets looks at economic growth as a process of transition from traditional economy (rural) to the modern economy (urban) and he comes to

this conclusion that in the first development steps, earnings distribution is deteriorated, because minor people have this ability to be transferred to the modern part. Therefore, wages difference between traditional and modern part is high and in the next development steps, earnings distribution would improve, because more number of people are attracted by modern sector and gradually, due to shortcoming of human force in traditional sector, wage level in traditional sector also would be increased and it is close to the level of wages in the modern sector (Mehregan, 2008).

In a graph, Kuznets theory indicates inverted U curve relationship between economic growth and earnings distribution which can be displayed as the following graph.

The above graph shows second degree function which has an extreme point and has the following mathematical function:

$$G = \alpha_0 + \alpha_1 Y + \alpha_2 Y^2 + U_t \qquad 1)$$

Earnings distribution Kuznets theory is true when α_1 and $\alpha_2$coefficients are significant and signs of these coefficients are positive and negative, respectively (Mehregan, 2008).

The main core of Kuznets analysis is this hypothesis that changes in economic inequality level is derived from changes in growth rate. Kuznets has investigated earnings distribution in a temporary cut of countries with different levels of development and with comparison between 5 countries, India, Sri Lanka, Puerto Rico, United Kingdom and United States of America, has arrived at this conclusion (Mehregan, 2008).

Kuznets based on experiences of developed countries says that history teaches us that at the beginning of economic growth trend, inequality is increasing. The reason behind this issue is low wages and unskilled workers. So, countries' economic development gradually causes decreasing these inequalities. In viewpoint of this theory, policies which have directly targeted earnings redistributions are accounted as a barrier to economic growth way, because they reduce entrepreneurship incentives and decrease individual saving which is mostly invested. They also limit choosing technology having higher outcome through tend to produce user. In this theory, in sum, it is hypothesized that at the primary steps, inequality development is severed, but in the next steps, economic development of earnings would be fairer (Mehregan, 2008).

Analytical model in this study is originated from a model proposed by Simon Kuznets, an American economist. Kuznets proposed this model in the paper entitled "Economic growth and earnings inequality" in 1995. To use this model in this research, it is changed as following:

$$\mathrm{GINI}_{it} = \alpha + \beta_1 Y_{it} + \beta_2 Y_{it}^2 + U_{it} \qquad (2)$$

In this model:

GINI_{it} Is Gini coefficient

Y_{it} Is economic growth index

Y_{it}^2 Is the square of economic growth

U_{it} Is disorder sentence

β_1 And β_2 are estimated coefficients

α Is interception of the model

This hypothesis can be applied when coefficients of β_1 and β_2 are significant and they are positive for β_1 and negative forβ_2 (Kuznets, 1993).

RESULTS AND DISCUSSION

Testing Stability of Research's Hypotheses

Before estimation the model, it is necessary to investigate the stability of variables. In the current study, to test stability, ADF test has been used.

Table 1: Results of stability test for studied variables

Variable	T statistic	Probability	Result
RGDP	40.9934	(0,000)	Stable
RGDP2	38.7391	(0,000)	Stable
GINI	41.433	(0,000)	Stable

Reference: Research findings

Regression Assumptions

Conducting hypothesis test requires establishing normality assumption of dependent variables and variance homogeneity, because if these assumptions are not applied, obtained results will not be reliable and this issue causes wrong inferences.

F-Limer Test and Hausman Test

After testing stability of variables, it is time to the method is estimated. Based on aforementioned contents, data in this study are combined ones, but before model estimation, it is necessary to determine the estimation method (combination or panel). To reach this purpose, F-Limer test has been used. For the observations which have the test probability more than 5%, or in another word their test statistic is less than table statistic, combination method is being used and for the observations which have the test probability less than 5%, panel method is being used. Panel method can be done using two models of "Random effects" and "Fixed effects". To determine the model, Hausman test has been used. Fixed effects model is being used for the observations which have the test probability less than 5% and random effects model is being used for the observations which have the test probability more than 5%. Consider the following chart. To determine the estimation method, F-Limer test and Hausman test have been conducted for the primary and secondary models. Results of the test are as following:

Table 2: Results from F-Limer test and Hausman test

Model		Statistic	P-value	Results
Gini	**F-Limer test**	48.59	0.000	Panel method
	Hausman test	1.94	0.3776	Random effect method

As it is shown in table 2, for all of F-Limer tests for all of hypotheses is less than 5%. So, H0 hypothesis (combination model) is not approved. In another word, there are individual and group effects and panel data method has to be used to estimate the model. In the next step, to determine using fixed effects model against random effects model, Hausman test is being conducted. Due to models, test probability of hypotheses is more than 0.05. So, H0 hypothesis (random effects model) is accepted. This issue means that there is a relationship between estimated regression error and independent variables. Due to the results from Hausman and Chao's test, to estimate parameters and test hypotheses, random effects model has been used.

Model Estimation using Random Effects Model

To estimate model, ordinary least squares (OLS) method has been used.

Table 3: Results of model estimation from ordinary least squares (OLS) method

Variable	Variable coefficient	T statistic, probability level	Result
RGDP	16.75	(0,000) and 5.96	Acceptable
RGDP2	-13.95	(0,000) and -2.15	Acceptable
C	8.70	(0,000) and 5.96	Acceptable

The coefficient of determination, Durbin – Watson statistic and F Fisher statistic are also calculated as following:

Table 4: Results from the coefficient of determination Durbin – Watson statistic and F Fisher statistic

R^2	coefficient of determination	0.88
DW	Durbin – Watson statistic	1.71
F	Fisher (F) statistic	57.24831

All of coefficients of variables of the model have the high significance so that coefficient of economic growth variable and other variables of the model are significant at the 95% significance level.
In terms of calculated t statistic and probability level, variable of economic growth is significant and has the expected sign. It means that with increasing one unit in the economic growth variable, earnings distribution (Gini coefficient) is increasing about 16.75 which is acceptable and is accepted at 0.05 error levels.
In terms of calculated t statistic and probability level, variable of square of economic growth is significant and has the expected sign. It means that with increasing one unit in the variable of square of economic growth, earnings distribution (Gini coefficient) is decreasing about -13.95 which is acceptable and is accepted at 0.05 error levels .Above results are acceptable based on Kuznets's hypothesis, but since we have compared Iran with the newfound economic powers, Kuznets's hypothesis is proved, but if the sample is limited to the developing countries, results will be considerably changing.
As it is clear from table 4, Durbin – Watson statistic in the model is equal to 1.71 which indicates lack of autocorrelation in the model. Fisher (F) statistic which is applied to express the hypothesis that coefficients are not zero simultaneously is significant and shows that in the estimated model, the hypothesis that all coefficients are zero simultaneously is rejected. Coefficient of determination in the model is also equal to 0.88 which means that descriptive variables explain 88% of changes in dependent variable. This issue indicates a very high explanatory power of the model.

Conclusion and Suggestions

There is a significant relationship between economic growth and earnings distribution of economic newborn powers.

Based on model results and assuming that estimated functions slope and difference in interception is equal, it is seen that Kuznets theory which is based on the relationship between economic growth and earnings distribution is verified, but based on results obtained from data analysis and investigating interception related to each country, it is observed that there is no especial difference in calculated interception for countries. In another words the verification severity of this theory in studied countries is not the same. In 2 countries of South Africa and Brazil which have experienced lower economic growth during the studied domain, interception is positive and for countries such as Russia, India and china which have higher economic growth, interception is negative. Also, this difference in interception has happened in studied years. During 1998 to 1999 which all of countries have low economic growth and somehow negative, interception has been obtained negative. This trend has also been happened in 2008. With referring to global economy trend, we find that in aforementioned years, global economy has suffered temporary slump. On the other hand, calculated coefficients and also their signs for β_1 and β_2 have been obtained as it was expected. This issue is another cause to verify Kuznets theory which is based on the relationship between economic growth and earnings distribution. Of course, as we know, studied theory might not be completely healthy in all of cases, as it is seen in investigations in last year's like studies by Richard and Adams (2002) and Forsyth (2000) that this issue is clearly transparent. This study has been encountered with problems such as lack of adequate statistics and reliable sources to choose

information and data. Even in some cases, there weren't required data related to economic growth and Gini Coefficient of countries in different years in reliable global banks and IMF and World Bank. To extract these data, researcher is forced to trust internal information resources such as statistical centers and central banks of studied countries and take an advantage of their information to estimate model. We hope, with better accessibility to information and measuring this model in statistical population, to reach more accurate results in future investigations.

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