

# ECONOMIC GROWTH AND INCOME INEQUALITY IN INDIA: A TIME SERIES ANALYSIS

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## **Abstract**

In the literature, the relationship between economic growth and income inequality has not been solved properly till now. A considerable amount of debate is still going on regarding the relationship between the two. In this study, an endeavor has been made to explore the relationship between economic growth and income inequality in India over the time period 1970-2013 by applying time series techniques such as johansen cointegration test, VECM and Granger-Causality test. Johansen Cointegration test suggests that long run relationship exists between economic growth and income inequality in India over the study period. From the granger causality test it is found that the direction of causality is running from income inequality to economic growth, that means income inequality is not detrimental to economic growth rather it enhances economic growth in case of India. However the study does not support more income inequality to enhance most needed economic growth in India . Because income inequality at higher level retards growth by creating the problems of socio-political instability.

### **Key Words**

**Economic Growth, Income Inequality, Unit Root, Cointegration, Causality.**

### **1. Introduction**

Economic growth is regarded as the most important goal of an underdeveloped economy. It is a gradual process which cannot be achieved immediately but can be realized only after a period of time. Economic growth is important “.....because it betters the lot of the poor and reduces the proportion of the people who are poor.” (Easterly 2001, p.3) .A large numbers of weapons or mechanisms are present such as export-import or trade of a country, technological advancement, capital accumulation etc. which can promote growth. But a perception is found in the literature that the mechanisms of economic growth can create the problem of income inequality either through enhancing economic concentration or through reducing relative and absolute position of the lower income groups (Tendulkar and Jain, 1995).

By the term income inequality we mean unequal distribution of income among the populations of a country or state. A minimum and lower level of income inequality is considered as favourable to enhance economic growth. But a very high level of income inequality creates the problems of social unrest and political instability which is very harmful to meet the most needed objective of economic growth (Barro 2000).

The early literature that has investigated the relationship between economic growth and income inequality is provided by Simon Kuznets (1955).According to Kuznets argument, in the early stage of economic development of an economy, income distribution tends to be deteriorated .Because in the initial development process dualism is found in various sectors like rural-urban, traditional-modern, agricultural-non agricultural activities and in this process the

beneficiaries of economic growth are those which are engaged in modern sector activities. But these dualism forces as well as income inequality are started to fall in the later stages of economic development, because with the development of the economy the labour force participation started to increase in the modern or industrial sector and it started to fall in the traditional or agricultural sector. Moreover with development some other activities which have positive externality like spread of education, increasing earning opportunities of the people etc. are taking place. So at the later stages expansion of modern sector and contraction of traditional sector ultimately reduces the income inequality and we have inverted U-shape curve explaining the relationship between economic growth and income inequality.

Many studies theoretically explained the linkages between growth and inequality where causality is running from income inequality to growth. Kaldor (1957) provides the argument that income inequality is not harmful for growth rather it enhances growth by promoting marginal propensity to save and thus capital accumulation of the richer section of the society. Another argument which is related with the redistribution of income through progressive taxation explained that this type of redistribution of income reduces the incentives of the people to accumulate wealth. This negatively affects the economic growth.(Aghion et al. 1999; Person and Tabellini 1994). Perotti(1996) provides four channels through which income inequality can affect economic growth. According to the first argument, income inequality reduces economic growth because unequal distribution of income leads to redistribution of income either through distortionary government spending or through distortionary taxes. Secondly, higher income inequality leads to socio-political instability as the more unequal societies are associated with rent-seeking activities. The economy with socio-political instability is not promising for investment activities; rather it retarded growth by reducing investment, disrupting market activities and labour relations. In the presence of imperfect capital market, according to the third argument, income inequality reduces investments in human capital, hence growth. According to the fourth argument, fertility increases because of income inequality which also reduces growth by reducing investments in human capital. Aghion et al. (1999) however provides an argument according to which income inequality can be growth enhancing. Many investment projects are involved with huge sunk costs. So in the absence of well developed credit markets, investors have to use their own concentrated wealth and income to recover these huge sunk costs. Only after recovering these costs one can go for initiating a new investment project.

So, although theoretical literature considerably large enough to explain the linkages between economic growth and income inequality, yet they are ambiguous. There is still debate on growth-inequality nexus because from the theoretical literature it is found that income inequality can be both good and bad for economic growth. Moreover whether positive or negative relationship exists between the two is not clearly and unanimously answered.

### **1.1 A brief outline about economic growth and income inequality in India:**

In order to make India economically self reliant and a strong one Indian government adopted inward looking development strategy, just after getting the independence from the British rule. This decision of the government was regarded as the best decision as the structure of the Indian economy was totally damaged at that time because of long time British exploitation. But inward looking restrictive economic policy was not successful to provide a satisfactory growth rate. Over the three decades after independence (1950-80), growth performance of the economy was almost stagnant at around 3-3.5 percent. This is popularly known as the Hindu Rate of Growth. A remarkable change in the economic growth scenario was achieved only after economic reforms that had taken place in 1991. This structural reforms permit Indian economy to engage in liberalization policies and allow moving towards free trade, deregulation and privatization. After reforms India's share in merchandise trade (%of GDP) shows remarkable improvement as this percentage share increased to 34.0 percent in 2010 as against the 14.3 percent in 1991 (WDI, World Bank). Along with trade, growth rate of the economy also shows an increasing trend. The growth rate of the economy was 5.6 % during 1980-81 to 1990-91 and it reached at 6.4% during 1991-92 to 2008-09. There is no dispute that income inequality of India has increased after the structural reforms. This is evident from the data of Gini coefficient. Gini coefficient of India stood at 37.64% in 2004 which was only 27.7% in 1990 (WIID, World Bank).

### **1.2 Literature Review**

The first empirical literature on the evolution of income inequality over the development process is given by Kuznets' hypothesis. Kuznets (1955) finds an inverted U shaped relationship between growth and income inequality by applying both cross section and time series data over the sample countries. Many studies (Ahluwalia, 1976; Papanek and Kyn, 1986; Matins-Bekat and Kulkarni, 2009; Deininger and Squire, 1998 etc.) had tried to experiment empirically whether Kuznets U-type relationship exist or not. Ahluwalia (1976) has found evidence in support of the Kuznets hypothesis. He investigated the Kuznets inverted U-shaped relationship between growth and income inequality by using a sample of 40 developing countries, 14 developed countries and 6 socialist countries. Matins-Bekat and Kulkarni (2009) also have found the evidence in support of Kuznets hypothesis in the Brazilian economy. In their study Papanek and Kyn (1986) finds ambiguous result. While cross section estimates support the Kuznets hypothesis, but time series regression partially supports the hypothesis. Like that Deininger and Squire (1998) applied cross country panel data technique and find little evidence in support of the hypothesis.

Many studies are found in the literature that investigated the direct association between economic growth and income inequality either from income inequality to growth link or growth to income inequality link. They are also not unanimous and these findings can be classified into three broad categories – a) positive; b) negative and c) inconclusive. Li and Zou (1998) theoretically explained that if in the utility function public utility get entered, then income inequality is not bad for growth. Empirically the study applies baseline regression estimations and sensitivity analysis and with the help of these techniques the study has proved that income inequality is positively associated with economic growth. Forbes (2000) has challenged the argument that income inequality and economic growth has negative association. By applying cross country panel data technique, Forbes (2000) has clearly showed that income inequality induces growth and this finding is robust in case of the samples, variables and also model specification. Krangkaew and Kakwani (2003), Nahum (2015) and Dhongde et al. (2015) also provide the same result of the existence of positive relationship between income inequality and economic growth.

But many studies like Panizza Ugo (2002), Wahiba et al.(2014) etc. have found negative relationship between growth and income inequality. By using Cross state panel data of United States and Standard fixed effect and GMM estimation techniques, Panizza Ugo (2002) finds negative relationship between the two. Wahiba et al.(2014) have investigated the relationship in Tunisian economy over the period 1984-2011 by using regression analysis. The two variables growth and income inequality are negatively associated in the Tunisian economy. Kajling V (2017) has provided inconclusive results when the relationship between the two variables is investigated in 357 metropolitan cities of America. By applying OLS regressions the study has showed that income inequality as represented by Gini has significant positive linkage with GDP per capita growth. But at the same time inequality has insignificant negative relationship with GDP per capita.

In case of India also many studies (Sehrawat and Giri, 2015; Munir and Sultan, 2017; Ghosh and Pal, 2004; Li et al. 2017 etc.) have examined the relationship between growth and income inequality. But the results they have found are ambiguous. While some studies (Sehrawat and Giri,2015; Munir and Sultan, 2017) find positive relationship , then others(Ghosh and Pal, 2004; Yee et.al, 2017) have found negative linkage between the two. Again some other studies find mixed and inconclusive results (Li et al., 2017) .Moreover most of the studies are mainly based on cross country analysis which is using cross section or panel data. It is to be noted that the results of cross country analysis may not be applicable for a particular country since countries are different on their characteristics. Gobbin and Rayp (2008) clearly mentioned that- a country specific study is needed to investigate the inequality-growth nexus since ‘one size fits all’ does not apply to all countries on this particular relationship.

Thus, the relationship between income inequality and economic growth is comprehensively analyzed both theoretically and empirically, but considerable amount of debate still remains there as there is no consensus regarding their relationship. Because of this reason, investigation about the relationship between income inequality and economic growth in the present day scenario also remains as a resurgence of interest among the researchers.

Following the considerable debate and significant research interest the present study examines the long run relationship between income inequality and economic growth in India over a long time period 1970-2013 by using time series techniques. The study assumes the null hypothesis ( $H_0$ ) that – There is no long run relationship between income inequality and economic growth.

## 2. Data and Methodology

### 2.1 Data

The present study is totally based on secondary data and data are annual time series in nature. Table (1) shows the variables and the sources of data used in the present study.

Table 1: Variables name and data source

Variable Name	Indicator Used in the study	Data Source
Economic Growth	Real GDP at factor cost (at 2004-05 constant price),LGDP	Official Website of Reserve Bank of India(RBI),
Income Inequality	Gini Coefficient, LGINI	World Income Inequality Database(WIID),World Bank

All the variables are transformed into natural logarithm form. Log transformation of a variable can reduce the problem of heteroscedasticity (Gujrati 2004). The present study uses E-views to carry out all the econometric estimation.

## 2.2 Econometric Methods

The Econometric tests used in the present study are – ADF Unit Root Test, Johansen(1991) Cointegration Test, Vector Error Correction Model (VECM) and Granger Causality Test with VECM framework which is also known as Block Exogeneity Wald Test.

In order to determine the cointegration and causal relationship between income inequality and economic growth, empirical testing procedure has to go through some important steps. Firstly, it is necessary to check the stationarity of the time series data before conducting the Johansen cointegration and Granger Causality tests. Although a few tests are available to check stationarity of the variables, Augmented Dickey-Fuller (ADF) test is applied here which is the most popular and generally applied test to check unit root. Secondly, optimum lag length is selected on the basis of AIC, SC and HQ criteria. In the third step, Johansen (1991) cointegration test is done to check cointegration between the variables. This test can be done only if the variables are integrated of the same order. Vector Error Correction Model (VECM) as suggested by Engle and Granger (1987) is applied in the fourth step in order to check long run causality of the cointegrated variables. Lastly, Block-Exogeneity Wald test or Granger Causality test under VECM is applied to check the short run causal relationship between the variables.

## 3. Empirical Results

### 3.1 Unit Root Test:

As a preliminary step to investigate the cointegration between income inequality and economic growth, the study tests the order of integration of the variables by applying ADF unit root test with trend and intercept. The results of ADF unit root test are presented in table 2.

**Table 2: ADF Unit Root Test Results**

<b>Results of ADF Unit Root Test in Level</b>				
<b>Variables</b>	<b>t-Statistic</b>	<b>Critical 5%</b>	<b>Probability</b>	<b>Inference</b>
LGDP	-1.984654	-3.518090	0.5929	Non-Stationary
LGINI	-3.045161	-3.518090	0.1324	Non-Stationary
<b>Results of ADF Unit Root Test at First Difference</b>				
<b>Variables</b>	<b>t-Statistic</b>	<b>Critical 5%</b>	<b>Probability</b>	<b>Inference</b>
LGDP	-7.482609	-3.520787	0.0000	Stationary
LGINI	-7.277437	-3.520787	0.0000	Stationary

The ADF test indicates that both the variables are non-stationary in level but stationary at first difference, thus integrated of order one, I (1).

### 3.2 Lag Order Selection:

**Table3: Results of Lag Length selection Criteria**

<b>Lag</b>	<b>Log L</b>	<b>LR</b>	<b>FPE</b>	<b>AIC</b>	<b>SC</b>	<b>HQ</b>
0	-3.265292	NA	0.004461	0.263265	0.347709	0.293797
1	135.8153	257.2991*	5.20e-06*	-6.490766*	-6.237434*	-6.399170*
2	138.6106	4.891804	5.54e-06	-6.430532	-6.008312	-6.277871
3	140.1396	2.522756	6.30e-06	-6.306979	-5.715872	-6.093253
4	144.5320	6.808263	6.23e-06	-6.326601	-5.566605	-6.051810

\*indicates lag order selected by the criterion

The appropriate lag length is “1” for Johansen cointegration test which is selected on the basis of AIC, SC and HQ criteria.

### 3.3 Johansen Cointegration Test

The results of Johansen cointegration test with lag length 1 is reported in the Table 4.

**Table 4: Results of Johansen Co-integration Test**

Trace Test				
Hypothesized No of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Probability
None	0.377653	22.88606	15.49471	0.0032
At most 1	0.068211	2.967266	3.841466	0.0850
Maximum Eigen Value Test				
Hypothesized No of CE(s)	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	Probability
None	0.377653	19.91879	14.26460	0.0057
At most 1	0.068211	2.967266	3.841466	0.0850

The Johansen's cointegration test is applied here with the null hypothesis that there is no cointegration between the two variables that are considered. But Trace test and Maximum Eigen Value test confirms the rejection of null hypothesis at 5 percent level of significance. In case of the trace test results, Trace statistic 22.88606 is found to be higher than the 5 percent critical value of 15.49471. So we reject the null hypothesis ( $H_0$ ) of no cointegration and accept the alternative hypothesis ( $H_1$ ) of cointegration between the two. Thus, according to the trace test, there is one cointegrating equation between income inequality and economic growth. The maximum Eigen value test gives the same result since max-Eigen statistic 19.91879 is found to be higher than the critical value of 5 percent i.e. 14.26460 at  $r=0$ .

Thus, Johansen Cointegration test confirms the existence of long run relationship between income inequality and economic growth in India.

### 3.4 Vector Error Correction Model (VECM)

The findings of the existence of cointegration or long run relationship between the variables justify the use of error correction mechanism in order to model dynamic relationship. The coefficient of the error correction mechanism indicates the speed of adjustment of the short term shocks to get long run equilibrium. VECM describes how deviation from the long run equilibrium is corrected in each period through the partial short term adjustment.

If the coefficient of the error correction term is found to be negative and significant, then this implies positive move to the long run equilibrium from its deviations. The results of Vector Error Correction Model are represented in the table 5.

**Table 5: Estimation of Error Correction Model**

Error Correction	D(LGDP)	D(LGINI)
Coint Eq(1)	-0.001786 [-3.38393] (0.0000)	0.003600 [2.10441] (0.0420)
D(GDP(-1))	-0.179914 [-1.12981] (0.1307)	0.113296 [-0.21946] (0.8275)

D(GINI(-1))	-0.096173 [-1.91232] (0.0181)	-0.036357 [-1.91232] (0.8247)
C	0.064113 [6.82386] (0.0000)	-0.0022417 [-0.07935] (0.9372)

t-Statistics in [] and probability value in ()

The coefficient of the error correction term of growth variable (LGDP) carries the correct sign that means negative (-0.001786) and also statistically significant at 1 % level of significance with the speed of convergence to equilibrium of 0.17 percent. However the restoration to Equilibrium position will take a longer time because the coefficient of the error correction term is quite small (0.0017). The coefficient of the error correction term of income inequality has unexpected positive sign but it is statistically significant at 0.05 significance level. This implies that the system will be unstable because divergence from equilibrium will take place due to some disturbance in the system.

Thus, the coefficients of the error correction terms depict that in the long run unidirectional causality from income inequality to growth take place. Moreover, the coefficient of the one period lag of the first difference of LGINI term in LGDP equation is found to be statistically significant at 0.05 level of significance. This implies the existence of short run causality running from income inequality to economic growth.

For confirmation of short run causality running from income inequality to economic growth, the study has performed Granger causality test based on VECM framework which is known as Block Exogeneity Wald Test.

### 3.5 Causality Test:

**Table 6: Results of Block Exogeneity Wald Test**

<b>Dependent Variable : D(LGDP)</b>			
<b>Excluded</b>	<b>Chi Sq</b>	<b>df</b>	<b>Prob</b>
D(LGINI)	3.656971	1	0.0558
All	3.656971	1	0.0558
<b>Dependent Variable : D(LGINI)</b>			
<b>Excluded</b>	<b>Chi Sq</b>	<b>df</b>	<b>Prob</b>
D(LGDP)	0.048163	1	0.8263
All	0.048163	1	0.8263

The results of Granger Causality test indicates that the null hypothesis (income inequality does not Granger causes economic growth) is rejected at 10 percent level of significance. But the null hypothesis which assumes that economic growth does not Granger causes income inequality is accepted. Thus, income inequality leads to economic growth both in the long run as well as in the short run.

### 4. Conclusion

The present study examined the cointegration between income inequality and economic growth over the period 1970-2013 by assuming the null hypothesis (Ho) that there is no long run relationship between income inequality and economic growth. The results of the ADF test shows that both the series namely real GDP and gini coefficient are non-stationary in level but stationary at first difference, thus integrated of the order one, I(1). If the variables are integrated of the same order then only one can proceed for cointegration test. Johansen (1991) cointegration test suggests that cointegration or long run relationship exist between income inequality and economic growth in India over the study period. VECM results also confirm the existence of cointegration between the two and have shown that the direction of causality in the long run is running from income inequality to economic growth. Granger-causality

test under VECM framework shows that the direction of causality is running from income inequality to economic growth in the short run.

The obtaining results suggest that income inequality is not detrimental to economic growth in India rather it is helpful for economic growth. In the less developed countries (LDCs) like India, higher income inequality yields higher aggregate savings in the hands of the richer groups, which leads to capital accumulation and ultimately economic growth. Although income inequality has proved to be favourable for economic growth in this study, but it is also true that income inequality at higher level creates socio-political instability by motivating the poor to engage in crimes or disruptive activities (Barro, 2000). Moreover, the growth which does not benefit the lower income groups of a country, most particularly for India where a very large number of people are belonging to poor and vulnerable sections are not desirable. In a country like India growth should be inclusive-which takes care of poverty. Therefore, although a minimum level of income inequality is preferable for economic growth but higher growth at the cost of higher income inequality is not desirable because it is not only bad for the society but also bad for the growth objective itself.

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