MACROECONOMIC DETERMINANTS OF INCOME INEQUALITY IN INDIA: AN EMPIRICAL ANLYSIS

A dissertation submitted to the University of Hyderabad in partial fulfilment of the requirement for the award of

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ECONOMICS

BY

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CERTIFICATE

This is to certify that the dissertation entitled "Macroeconomic Determinants of Income Inequality in India: An Empirical Analysis"submitted by Dakrushi Sahu being Registration Number 17SEHL06 in partial fulfilment of the requirement for Master of Philosophy in the school of economics is a bonafide work carried out by him under mu supervision and guidance. This dissertation is free from plagiarism and has not been submitted previously in part or full to this or any other university for award of any degree.

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DELARATION

JUNE 27, 2019

I, DakrushiSahu, hereby declare that the work embodied in this dissertation entitled "**Macroeconomic Determinants of Income Inequality in India: An Empirical Analysis**" submitted to the School of Economics, University of Hyderabad for award of the degree of Doctor of Philosophy in Economics is original work carried by me under the supervision of Dr. Krishna Reddy Chittedi, School of Economics, University of Hyderabad.

I declare to the best of my knowledge that no part of this thesis previously formed the basis for award of any degree, diploma, fellowship or any other similar title of recognition of any other University.

Date

(Signature of the Candidate)

Place

Name: **DakrushiSahu**

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Dedicated to
My
Parents and Teachers

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LIST OF ABBREVIATIONS

GCIP- Global Consumption and Income Projects

CPI- Consumer Price Index

WPI- Wholesale Price Index

WDI- World Development Indicators

GDPPC- Gross Domestic Product Per Capita

GC- Gini Coefficient

GCE- Government Final Consumption Expenditure

INF- Inflation

Open- Trade Openness

HDI- Human Development Index

IHDI- Inequality Adjusted Human Development Index

CS- Credit Suisse

NSSO- National Sample Survey Organisation

OLS- Ordinary Least Squire Estimator

GLS- Generalised Least Squire Estimator

GMM- Generalised Methods of Moments

ECM- Error Correction Model

VECM- Vector Error Correction Model

ARDL- Auto Regressive Distributive Lag Model

ADF- Augmented Dicky-Fuller Test

LogL: Log Likelihood Test Statistic

LR: Sequential Modified Likelihood Ratio Test Statistic

FPE: Final Prediction Error

AIC: Akaike Information Criterion

SC: Schwarz Information Criterion

HQ: Hannan-Quinn Information Criterion

VAR- Vector Auto Regression

NREP- National Rural Employment Program

RLEGP- Rural Landless Employment Guarantee Program

SMSEs- Small and Medium Sized Enterprizes

Chapter-1

1. Introduction

1. Introduction

Inequality is not an easy task to specifically interpret or define or measure in the correct way since it involves value judgements. Let's look back to the etymological origin of the term 'Inequality'. It has been derived from the Latin word 'in-aequalis' which means 'not equal'. In other words, Inequality in its literary sense denotes absence of equality. Thus, the term is negatively connoted to the distributive justice of a defined group of economic agents i.e. individuals, households, firms, countries or any other groups. It gives a sign of unfairness prevailing within a geographical area or amongst the group of economic agents. To make the term more justifiable, economists always associated it with a measurable element of distribution answering the question 'inequality of what? The common examples being income, wealth, consumption etc.

In this study, the measuring element of inequality, as a conventional understanding of economic inequality, will be the income amongst individuals or households. The reason for the choice of this variable is of two folds. Fist one being a valid indicator that is closely related to economic growth and second one to accord with the developed literature in this area of study.

Before proceeding for income inequality, it is essential to understand clearly the concept of income and wealth as two terms are often interchangeably used, and both are related to people's economic resources. However, they are not same as distinguished under;

Income is a flow concept that is accrued by a household from being employed, owning a business, state benefits, rents on properties, and so on. Peoples sometimes think that before-tax receipts of cash balances in a time interval as their income. But it is the disposable income that depicts the actual amount of income that is spent on food, clothes, rent and so on. The disposable income is defined as the flow of money into ahousehold in a given time period (time period may be on the monthly or annual basis) minus the amount that goes out in taxes. Difference between the market income and the disposable income is substantial in various geographical parts of the world. Without taxes and transfers, inequality would be even higher than it currently is[1]. Economists also explain income in terms of equivalised household income or household per

[1]For empirical finding and further analysis of it look at Brian Keeley's 'Income Inequality: The Gap between Rich and Poor', p. 53.

capita income. The size of households varies to a greater extent. The equivalised household income is obtained by dividing household income by the square root of the household size.

Wealth is a stock concept and generally represents people's savings that is typically higher than income. Wealth from a layman's perspective means money in the bank, property and land, shareholdings, jewellery and art, possibly life insurance and so on. Wealth comprises both positive and negative aspects. In addition to assets like savings, wealth also includes liabilities such as loans and mortgages. Difference between these two aspects gives us the net wealth. Measuring wealth is a complex task and it varies country to country. For instance, some countries may include value of pension and others don't. Thus, while measuring wealth inequality, it should be carefully looked at which items are included in wealth.

Wealth is typically higher than income as the former is accumulated over time. One more feature of wealth is that it spreads out even more unequally than that of income. To be more specific, the degree of wealth inequality is always higher than that of the degree of income inequality. Since wealth is a source of investment, widening inequality means an increasing tendency of gap between rich and poor in their abilities to take advantage of investment opportunities. Although wealth matters but income matters more considerably as it is used as an indicator of people's day-to-day economic resources.

In several countries, intensity of poverty is influenced greatly by the inequitable distribution of income and wealth. Various development strategies in developing countries also aggravate the degree of income inequality as the people start migrating from the less unequal and less income regions to the higher unequal and higher income regions.Several studies such as studies by Garfinkel et al. (2006) and Fuest et al. (2010) reveal that there exists strong association between redistributive policies and the degree of income inequality and changes in these policies affect the working of the economy to a greater extent. Concentration of income in a few hands does affect the acquisition of human capital and physical assets.

India has scored the 103rd position among 119 countries on the Global Hunger Index in 2018. Both the monetary and non-monetary measures well-being of the people shows much darker picture relative to the other countries. Studies by Chaudhuri and Ravallion, 2006 shows that gains from trade spread unevenly in India. Opening up of the trade and market deregulation has resulted in continuous and sharp increase in income inequality in India. To the best of our knowledge, several macroeconomic factors does influence the degree of income inequality in india.

For tackling the severity of income inequality, it is imperative to understand the leading factors governing the income distribution in India. This study is mainly concerned with the leading macroeconomic factors that influences the degree of income inequality in India. It also seeks to explain the behaviour and evolution of income inequality from the post-independence period.

2. Research Questions

The study mainly seeks answers to the following research questions;

1. How did income inequality in India evolve in the post-independent period?
2. Did policies and programs introduced in the late 1960s made any significant effects on income distributions in India.
3. In which direction and to what extent does macroeconomic variables affect the degree of income inequality in India?

3. Research Gap

Recently there have been a considerable attention on linking economic growth, flauction in price level, globalization and financial development with degree of income distributions world over. Some of them include Ataman and Aylin (2008), Areosa and Areosa (2006), Easterly and Fischer (2001). Most of these studies have tried to examine the impact of macroeconomic variables on income inequality at international level. There are a few studies that have focused on time series analysis for examining the empirical association between macro-monetary variables and income distribution from the Indian context. These studies have faced severe criticisms so far as household income data is not available and the prospects of income inequality has been analyzed by taking proxies such as wage inequality and earning inequality from a small sample size. The interpolation tools the studies employed are not standard enough for empirical analysis. The data on income inequality they employed for econometric analysis cannot be comparable for the rest of the countries. We have taken into considerations these aspects and gathered data for the time series Gini index from the newly complied data source the Global Consumption and Income Projects (GCIP). The data compiled in this source are more authentic in comparison to the data available in any other sources till now as the data series have been standardized and made

internationally comparable through the modern econometric tools. The source has employed the recent interpolation and extrapolation tools proposed Chen and Ravalion (2004) and Ferriara at al. (2015). Further many studies have used the Wholesale Price Index (WPI) as the measure of inflation. So far as cost of living is more sensitive to the household consumption expenditure and thus the degree of income inequality, we have used the Consumer Price Index (CPI) as the measure of Inflation. The previous studies have ignored the macroeconomic conditions of India in the post- independence period while analysing the nexus between the underlying variables, we have carefully investigated it with great details. Despite the several attempts to empirically address the relationship, a very few literatures have focused for examining the long-run and short-run dynamic results. These dynamic relationship between the variables are inconclusive. Till now, there is hardly any study that attempted to examine these relationships from empirical grounds for the case of India. Particularly there is no single study that has taken Gini coefficient as the measuring rod of the degree of income inequality and studied its empirical relationship with macroeconomic variables both in the short-run and the long-run for the case of India.

4. Objectives of the Study

The study is mainly based up on two specific objectives;

- To investigate for the trend of income inequality in India from the post-independent period.
- To examine the macroeconomic determinants of income inequality both in the short-run and the long-run.

5. Data and Methodology

All the datahave been extracted from the secondary sources. The data for the dependent variable i.e. Gini Coefficient has been extracted from the recently compiled source Global Consumption and Income Projects (GCIP). All other data for independent variables such as Inflation (CPI), Trade Openness (TO), Economic Growth (Real GDP per capita) and General Government Consumption Expenditure (GCE) have been gathered from the World Bank's World Development Indicators (WDI). Consumer Price Index (CPI) instead of Wholesale Price Index (WPI) has been taken as the measure of inflation. This is mainly because household

income or consumption is more sensitive to the cost of living and it varies to the larger extent when the lifestyle changes. Thus, it is having greater effect on the degree of income inequality than the Wholesale Price Inflation. An index has been constructed for measuring the trade openness. It is the ratio of the exports and imports to the GDP. For measuring economic growth, we have used the Real Per Capita GDP as it is the most widely employed tool for measuring growth in economic activities. The government consumption expenditure is the final per capital real consumption expenditure by the government. All the variables we have considered basing upon the empirical and theoretical literatures. By considering the availability of data to the latest time period possible, the study period covers from 1970 to 2015.

We have employed the empirical econometric model called Auto-Regressive Distributed Lag (ARDL) Model for empirically addressing the long-run and short-run empirical relationship amongst the macroeconomic variables under study. There is a handful of techniques for resolving the issue such as Granger (1981), Engle and Granger (1987) and Johansen and Juselius (1990). As our study involves small sample size and single cointegrating vector, bound testing approach to ARDL model proposed by Pesaran and Shin (1995) and Pesaran et al (1996b) have been used. The cointegration test deals with pairing individually the time series variables that have been drifted away from the equilibrium. The ARDL approach integrates the variables under study in such a way that working of the equilibrium forces does not drift too far apart. The bounds cointegration technique checks for the existence of cointegrating relationship amongst the different time-series variables. It is the bounded cointegration amongst the time series variables that brings the statistical and econometric basis for the empirical Error Correction Model (ECM). The ECM technique is generally employed for examining the short run nexus between the variables under study. Irrespective of other econometric tools, we have used Autoregressive Distributed Lag (ARDL) cointegration technique for examining the long-run relationship amongst the variables. The requirements and the major advantages of the ARDL model have been discussed as under;

The prerequisites for ARDL model have been mentioned as under;

- ARDL model can be applied for all the time series variables for either of order I (0) or I (1) or combination of both except I (2). One of the first and foremost important prerequisites for the ARDL technique is that the variables under study must be co-integrated at less than I (2).

- For re-parameterizing the ARDL bound testing approach into the Error Correction Mechanism (ECM) efficiently, the F-statistics based on Wald Test (WT) statistic approach must be established for single long-run relationship between the variables.
- The sample size should be small.
- If the F-statistics based on Wald Test or Trace statistics or maximum eigenvalue fail to establish the unidirectional cointegrating relationship, then ARDL bound testing model can't be employed. Hence, an alternative approach available in the literature like Johansen and Juselius (1990) may be used.

There are advantages of using Autoregressive Distributive Lag (ARDL) model that has been pointed out as under;

- Since all the underlying variables are contained in a single equation, there exists lesser risk of confronting endogeneity problem as it is free of correlation amongst the residuals.
- ARDL model can differentiate between dependent and independent variables, if there exists a single cointegrating association between them. The ARDL model follows the assumption that only one reduced form equation exists for analysing the cointegrating association between the regressors and the regressand?
- One of the major advantages of this approach is that it is based on the single cointegrating vector. Thus, the researcher need not be worried about the complexities of multiple vector analysis.
- We can easily reparametrize the ARDL mechanism into the ECM mechanism through the linear transformation of the reduced form equations. During this procedure, short-term adjustment is integrated by Error Correction Mechanism with the long-term equilibrium. It should be mentioned here that we do not confront the loss of long-term information while doing so. The derived ECM model takes into account the optimum lag length for capturing the data generating process to establish the linear specific modelling framework.

We have tested here the null-hypothesis that the coefficients of the pre-determined variables are equal to zero for examining the cointegrating relationship between the variables.

Hence;

H_0: $\delta_1 = \delta_2 = 0$

H_1: $\delta_1$neq $\delta_2$neq0

The alternative hypothesis which is two tailed tests in this case is tested which states that there is no long run relationship between the variables under study.

The null hypothesis is tested with the help of F-statistic which involve Wald Test. Pesaran and Pesaran (1996a), and Pesaran et al. (2001) have revealed detail about this statistic including the case for ARDL. They have verified that whether the ARDL model contains intercepts and trend components. Two groups of critical values have been provided by them. One group assumes that all the underlying variables are integrated at level or I (0) which is also referred as lower critical bounds. This symbolizes that there does not exist cointegrating relationship between the variables. Another group of critical values assume that all the variables are integrated at first difference or they are I (1) which is the representative of upper critical bounds. The upper critical bounds refer to the presence of cointegration between the variables. There is a band between the upper critical bund and the lower critical bound within which the F-statistic value may fall, or it may exceed in the either sides. When the calculated value of F-statistic exceeds the critical upper limit, then we generally reject the null hypothesis. This implies the existence of cointegrating relationship between the variables under study. Likewise, if the calculated F-statistic value lies under the lower critical bound, then the null hypothesis cannot be rejected. This implies that the variables under study are not cointegrated. If the computed F-statistic value falls between the critical bounds, then the inference become inconclusive. That is why the researcher should go for checking unit root before examining F-bounds test and ensure that underlying variables are stationary at level or at first difference or at both level and first difference.

- **Choosing the Lag Length for The Model**

Since Gaussian error term is taken into consideration, it must be ensured that appropriate lag length has been selected for each of the underlying variables. The Gaussian error term is the standard normal error term that does that follows the assumption of Classical Linear Regression Model. The optimum lag length can be selected by using proper model of lag selection criteria i.e. AIC or Akaike Information Criterion, SBC or Schwarz Bayesian Criterion and HQC or Hannan-Quinn Criterion.

- **Reparametrizing the ARDL Model into The Error Correction Model**

The study is mainly concerned for examining both the trend and macroeconomic determinants of income inequality for the case of India. For obtaining short run determinants we

must reparametrize the ARDL model into the ECM model. The term EC_tacts as the adjustment parameter. It shows the speed at which adjustment takes place in the current periods for the disequilibrium caused in the previous periods. If the coefficient is positive, then the variables move farther away from the equilibrium and if the coefficient is negative, the variables under study converge to equilibrium. However, if the estimate of the error correction term equals to one, then the disequilibrium caused in the preceding year is adjusted by 100% in the current year. If it is 0, then there is no adjustment within the time period and the explanation for the relationship among the variables make no sense.

6. Context of the study

The study we conducted is quantitative in its nature. The whole findings are based on the econometric interpretation of the empirical model namely Autoregressive Distributive Lag (ARDL) model. To meet the prerequisites of the model, we have gone through preliminary econometric tastings. The study specifically is on Indian context. Analysis of the study is based on the aggregate level only. We have investigated for the background of income distribution at Indian context as well as at global context in the later 1950s before entering the methodological section and findings. The trend of income inequality in India has been analysed taking the time-period from 1970 to 2015. Effects of various initiatives and programs on income distribution have been looked at carefully. The study has explored the macroeconomic determinants of income inequality such as Inflation, Trade Openness, Economic Growth and Government Consumption Expenditure for the case of India. The study mainly seeks for analysing the trend of income inequality particularly in the post-independent period and empirically examining both the short run and the long run determinants of income inequality in case of India.

7. Organisation of the study

The rest of the studies have been organised as follows;

Chapter-2 investigates for the literatures available till now on the issues under study. The first section of it discusses about the studies conducted on the nexus between the underlying variables at cross country level. Then the study analyses critically the availability of literatures for the developing countries. Last section of second chapter illustrates various studies which examined nexus between the macroeconomic variables and income inequality focusing only on individual countries. Then third chapter discuses about various issues, dimensions and conceptual

understandings of income inequality. This chapter also illustrates prospects, degree and severity of income inequality at global level as well as national level. This chapter reveals stand and position of India with respect to the degree and severity of income inequality being prevailed in various parts of the globe. The fourth chapter reveals the results for the objectives we cited in the first chapter. First section of it explains about the trend of income inequality in India and the second section shows the empirical results for macro-economic determinants. The second section follows the systematic steps for ARDL modelling. First the study has analysed the behaviour of the variables with the help of summary statistics and various line graphs. Then, we went for testing the stationarity of the underlying variables by employing the well-known ADF test. Then we have proceeded for both the F-bounds testing and T-bonds testing approach for examining the existence of cointegration among the variables used in the study. Then we have analysed the short-run and the long-run dynamic results. After that we have shown the diagnostic results following the structural stability test of the model. Finally, the fifth chapter depicts concluding remarks, limitations and policy implications of the study.

Chapter-2

2. Review of Literature

1. Introduction

The degree of income inequality has increased to in various parts of the globe steadily since 1990 particularly after the advent of globalisation and trade liberalisation. According to the Global Agenda Survey, the poorest half of the population owns less than 10 percent of its wealth in Developed Countries and Less Developed Countries alike. These studies state that there is an increasing tendency of income inequality world over. Several studies have been conducted for cross-country practices that include both the developed as well as developing countries, experiences of the developing countries and experiences of the individual countries. These studies mainly involve the empirical and theoretical analysis for the inter-relationship between the macroeconomic variables. The broad outline of such studies has been presented as under;

2. Cross-Country Practices

Easterly and Fischer (2001) examined the effects of inflation on poor as well as on the distribution of income by looking forward whether inflation is an important national problem. They have taken the help of survey data collected by Roper Starch during the period February to May 1995. The primary survey covers 31,869 respondents in 38 countries. Out of 38 countries 19 were developed and another 19 were developing countries. As per their study the relative measures of well-being are associated with inflation rate. They have taken the changes in the share of the bottom quantile as the indicator of income inequality. They have found out that when an economy moves from zero inflation to hyperinflation, income inequality increases by 1.7%. Their results do support the views of the existence of the nagetive relationship between the rate of inflation and the degree income distribution. According to them, higher level of inflation is crueller for the poor than the non-poor households. The steady rise in the rate of inflation does reduce the relative income of the poor thereby making them poorer. They found that the share of household income to the national income declines sharply with the steady increase in the rate of inflation lowers. Hence inflation hurts much to the marginalised sections of the society particularly to the people under below poverty line, uneducated ones and daily

labourers. Their work presents the evidence that the poor sections of the society suffer more from inflation than the rich ones.

Hoyos and Medvedev (2009) examined whether the food prices affect the incidence of poverty from a global perspective. They concluded that an average of 5.6 percent increase in food prices implied 1.7 percentage points increase in the poverty head count at global level. According to them, the food prices and the level of income of the households are determined by the production of agricultural goods. By applying general equilibrium model to the household survey data, they found that a 5.5% increase in food prices due to rising demand for biofuels leads to increase in global poverty by 0.6%.

Bulir (2001) went for examining the possible association between the rate of inflation and the degree of income inequality with reference to the conventional Kuznets's curve. Starting from Kuznets work, it has been a general belief amongst the economists that income distribution in a country shifts from relative equality to inequality and again gets back to equality as the country acquire capacities to improve all the sectors of the economy simultaneously. However, several multi-country empirical studies including that of the Bulir do not support the hypothesis[2]. Country specific studies suggest that 50% of the variations take place in comparison to Kuznet's postulations. Bulir has been inspired by the work of Milanovic and he used his original database for his studies. Keeping in mind the Kuznets curve, he incorporated the relationship between inflation and income distribution for 75 countries. He employed the standard econometric tools like Ordinary Least Squares (OLS) and Instrumental Variable (IV). The variables he considered involve non-linear Gini, GDP, state employment and transfers, degrees of inflation i.e. higher inflation, high inflation, low inflation and very low inflation. He found that inflation prevailed in the previous periods does affect the income inequality for today's period. He shows that his result is robust even if the redistributive polices are taken into considerations. According to him, there exists a non-linear positive relationship between inflation and income distributions. Thus, if the rate of inflation is reduced from the hyper-inflation, then the degree of income inequality comes down. But reduction in income inequality is limited to a particularly low level of inflation and it does don go down further if the rate of inflation falls below the threshold level. He found an important result that when inflation is included during the study of income inequality, the traditional view that Kuznets curve is inverted "U" shape mainly because for the inclusion of the Latin American countries does not hold.

[2]Contributions to the empirical literature were surveyed in Bulír˘ and Gulde (1995). Practically no single-country study supports the simplest version of the Kuznets hypothesis. See Ram (1991) for a detailed analysis for the U.S. and Deininger and Squire (1996b) for analyses of several other countries.

Sima and Hudso (2016) examined to find out the possible nexus between inflation and income inequality taking the panel data of 26 developed and 66 developing countries over the period of 1990 to 2014. They considered Gini index as a function of inflation rate, Gross Domestic Product (GDP) per capita, openness to international trade and urbanisation index. They concluded that there exists a non-linear long run relationship between the variables. An increase in the inflation rate over a period lower income inequality until a minimum point is reached and then start increasing again. Their findings show the existence of Kuznets hypothesis across the countries. They suggested for policy implications that monetary authorities should intervene with the monetary policy objectives of decreasing inflation rate to reduce income inequality.

Areosa and Areosa (2006) revealed the inequality channel of monetary transmission by incorporating inequality into the standard new Keynesian framework. They employed the empirical Dynamic Stochastic General Equilibrium (DSGE) model for finding out the result. In their model they have introduced unskilled labourers as economic agents not having access to financial system of the economy. They have shown that inequality in consumption affects the objects of the monetary policy authorities. They have shown that the level of welfare decreases with the increase in the size of low-income recipients. Instruments of monetary policy affect the output gap and income distribution ultimately influencing the level of inflation. They have found the following results; 1) the contractionary monetary policy worsens the income distributions. 2) The contractionary monetary policy is associated with the fall in inflation and output gap. 3) Inequality stabilisation acts as one of the targets of monetary authorities working under a welfare seeking institution (Central Bank) within the democratic country. 4) As the number of unskilled populations increases, the level of welfare declines gradually. 5) If there exist many unskilled labour forces in an economy, then monetary policy becomes less effective. It is the fiscal policy that influence economic activities to a larger extent under such economic surrounding. It should be mentioned here that this study is the first attempt to address “social macro dynamic” within an empirical model.

Christopher (2004) presented a political model of inflation that results from the social conflicts. According to him economic agents are heterogeneous in terms of income. It is the level of income that gives ability to cove the risk resulting from the change in inflation. The interaction between the heterogeneous income holders and interventions by government through fiscal policy results in conflicts over financing government expenditure. The model he used predicts the conducive environment for the emergence of inflation within an economy. He

revealed that the country with higher inequality in income is having higher level of inflation and is pro-rich bias towards the political system. Countries with lower income inequality uses higher income tax regimes and faces lower pro-rich bias. He found that income inequality although affects aspects of government revenues, government spending is neutrally affected by it. This happens only if the government spending is on public goods. Many empirical studies support these findings. His study supports the stylised fact that higher inflation is reflected in more unequal society. His model used the simplified overlapping framework that captures essential features of a cash economy. In his model he introduced an electorally motivated policy maker and a pro rich bias political environment and predicted that higher inequality and greater pro-rich bias both would result in greater recourse to seigniorage in comparison to income tax. He brought this prediction to cross-section data of fifty countries.

Cysne, et al. (2005) investigated for theoretical explanation of the link between inflation and inequality. They based their work on the shopping-time approach. It is the shopping time of both the rich and the poor at which the payment of inflation tax can be assessed. The shopping time-based analysis of inequality explains the actual rationale that governs the link between the changing rate of inflation and income distributions. This link is examined through the effects of inflation tax on economic agents. One of the assumptions they made for formalising their theoretical work is that some households have better access to transacting technology than the others. With certain assumptions, they proved theoretically the existence of the association between the increase in the rate of inflation and income distribution. Increase in the rate of inflation leads to improvement in the productivity of the interest-bearing assets thereby improving income distribution. It should be noted here that they used inflation tax as the connecting rod in the association between the price level and income inequality. They found the positive correlation between the rate of inflation and the degree of income inequality. Their intuition came true as their study work went on assuming the financial transaction approach.

A lot of studies have been worked out depicting the possible association between the rate of inflation and the degree income inequality. In addition to the analysis of bi-variate empirical relationships, extensive studies have been conducted by bringing additional monetary and political variables like central bank independence, democracy, influence of trade openness etc. into the nexus. Various factors responsible for inflation experiences between countries and within the country has been examined by Dolmas et al. (2000). They analysed the determination of inflation from the political economy point of view. They examined the relationship between inflation and income inequality with the presence of central bank independence. According to

them when the rate of inflation increases income inequality also increases and vice-versa. They have shown the political mechanism through which the higher degree of income inequality pressurises redistribution policy thereby influencing the level of inflation within the economy. This channel is linked to the operating procedure of the central bank. Countries with more central bank independence experiences lower annual inflation rate. This fact is evident from New Zealand, Canada, France and most recently by the United Kingdom. It may lead, when central banks are not independent, to the higher level of inflation thereby worsening income distributions. They also found that the higher degree of income inequality is associated with the countries with higher level of inflation and this fact is true particularly in case of democratic countries. A democratic country with more central bank independence tends to have better inflation with a given level of income inequality. Statistical results obtained by them are different for the democratic countries and for the non-democratic country. In case of the non-democratic countries income inequality is not reflected in the policy designs by the policy making institutions. These countries are more concerned with political outcomes and alternative policy mechanisms for people living in the region of high unequal income. Their study faces with the severe criticism in the context that rich individuals do not hold large amount of wealth in the form of cash. According to the authors, rich individuals experiences more harmful effect of inflation in absolute sense than the poor ones. As the individuals with the higher wealth holds higher portions of their wealth in the form of currency denominated assets, the higher level of inflation hurts more to these people than the poor ones. It is also a general believe that rise in inflation cause the capital price to fall and hence the rate of return on capital. As these capitals are held by the wealthier sections of the society, the higher inflation rate affects them more severely.

Before the emergence of central bank independence, many countries experienced fluctuation in economic outcomes. One of the characteristics of this fluctuation is that inflation and inequality were fluctuating significantly. Various political economy models show that these fluctuations were mainly due to political manipulations in the economy (Huffman, 1997). Huffman found out thatwhen citizensare allowed to vote basing upon the targeted level of inflation and taxes on labour to finance government deficits, inflation, output and investment fluctuates more frequently. However, if there exists central bank independence and citizens are not permitted to vote based on inflation and taxes, such fluctuations do not arise. Radhika and Shyama (2010) examined the empirical relationship between inflation and income inequality from the perspective of political economy. With the help of a general equilibrium model, they

found that inflation-inequality relationship within any time period depends up on institutional and preference related parameters. According to them, the higher level of inflation affects income inequality in the two ways; Static and Dynamic. At the initial phase when Gini coefficient falls, higher inflation rate affect income inequality positively in the static way. But this relationship turns out to be negative when the relationship becomes dynamic over the time period. They have shown that the nature of the relationship is conditioned by the prevalence of initial parameters. The findings of the study are similar to that of the findings by Bhattacharya et al. (2005).

Albanesi (2001) went on examining the possible association between the rate of inflation and the degree of income inequality. According to him, higher level of income inequality in an economy is the result of the distributional conflicts of the determinants of fiscal policy. He gathered the data for inflation and income inequality from Easterly et al. (1994) and Deininger and Squire (1996). For income inequality, he took into consideration before tax income inequality measures and income quintile distribution within each five years period. Power transformation means that break in the executive power of the concerned ruling political party. This variable ranges between 0 and 1. 0 represents perfect stability and 1 represents perfect instability. His study is based on the economy in which income inequality arises from exogenous differences in human capital and money is demanded for transaction purchases. Generally, government raises revenue by imposing taxes on labour income or issuing money within the economy which leads to inflation. As a result of which, in more income inequality prone economies, the relative vulnerability to inflation by the poor households increases. However, his scope of analysis is limited to the re-distributional effects of inflation.

Although, there exists a large body of literatures on the study of the effects of inflation on financial variables, a smaller number of studies focuses on the impact of higher level of price on income distribution. Only a few empirical studies, which are based on the consequence of higher level of inflation on income distribution, have been conducted with reference to United States and United Kingdom. It is evident from the recent studies that a high volatility in inflation is present in the countries of Latin America, Asia, and Africa. These countries are also more prone to income and wealth inequality than the developed ones. Li and Zou (2002) have employed a newly compiled data source. They have used the Instrumental Variable and Sensitivity Regression models to confirm the empirical results for the cross-country analysis. According to them, as the rate of inflation increases, degree of income inequality also increases. It results in the increase in the income shares of the richer section of the economy at a rate higher than the

decrease in the income shares of the poorer section of the economy. Final it is reflected as the low level of economic growth.

Dollar and Kraay (2003) examined the for the effects of various macroeconomic and financial variables on the income of bottom 20% of the population. The scope of their study is much broader. The sample size of their study involves 953 observations covering 137 countries over the period 1950-1999. Their study covers the largest data set to examine the impact of inflation, trade openness and economic growth on income inequality. By Examining major determinants of economic growth and that of the income of the bottom 20% of the population with the help of Ordinary Least Squire (OLS), they found out the relationship between the variables. They found out that trade openness reduces the degree of income inequality over time. However. However the higher level of inflation, government consumption expenditure and financial development aggravates the gap between the rich and the poor.

3. Developing Countries' Experiences

Walsh and Jiangyan (2012) made a comparative study between India and China depicting the role of food and non-food inflation in the inflation-inequality nexus. The variables they used in the empirical analysis include income inequality, food and non food inflation, growth rate of GDP, GDP per capita and primary and secondary school enrolment ratio. They used the General Methods of Moments (GMM) tool given by Arellano-Bond (AB) and Fixed and Random effect model of Generalised Least Squire (GLS) regression to find out empirical results. This method allows for the time invariant country specific effects. Their findings show that when headline inflation increases, then the degree of income inequality increases in China. Increase in the rate of economic growth slowly widen the income inequality in China. However, the picture becomes different when the effect of disaggregated inflation (food and non-food inflation) is analysed through the AB GMM specification. Although not significant, an increase in food inflation does reduce income inequality in China during the study period. It is evident from the AB GMM specification that the higher level of inflation affects income inequality very weakly in case of India. They also have shown that higher economic growth is widening the income inequality in India. According to them, headline inflation and income inequality are positively related in case of urban areas. In other words, income inequality increases with the increase in the rate of inflation in case of the urban India. The same kind of relationship holds for the case of GDP per capita as well. However, literacy rate and real GDP growth are not significant. The results become stronger when headline inflation is divided into food and non-food inflation. In rural areas, food inflation significantly reduces income inequality while the opposite happens in

case of non-food inflation and income inequality. They have depicted in their study that income inequality is more severe for the states with higher level of GDP growth. An increase in non-food inflation also leads to higher level of income inequality in case of urban areas. To sum up they found that higher level of non-food inflation causes income inequality to increase in both rural and urban areas. They concluded for China that inequality rose at a faster rate in rapidly growing states and pointed out this effect was stronger in urban areas.

There is the strong debate amongst the economists since inflation crisis in 1980s in developing countries on the issue of the effect of the democracy and dictatorship on price stability. There was a greater interest on the issue during the transition period of the socialist countries (1990). There emerged a conflicting theoretical and empirical work citing the issue for nearly two decades. Political theory of inflation categorised in two segments. First one is the populist approach and the second one is the state -capture approach. First approach states that inflation rate is used by democratically elected leaders to generate government revenues for meeting the public demands for redistribution. Political determinants of income inequality have been examined in many studies from the global as well as regional contexts. Such works include that of the work by Campillo and Miron (1997), Gasiorowski (2000), Treisman (2000). Desai R. M. et al. (2003) made a comparative study on whether democracies do suffer more from higher inflation than non-democracies. They made a hypothesis before estimation which states that higher intensity of the democracy leads to higher level of inflation. This suggest that electoral competition increases inflation. Later, this higher level of inflation results in higher degree of income inequality in these countries. In other words, they hypothesised that democracy affect inflation in such a way that it enlarges the degree of income inequality. Their study is also based on cross country analysis. The time period they include ranges from 1960 to 1999. For estimating results, they used different dynamic panel data estimation methods. They took inflation as the dependent variable and Gini coefficient, political regimes and other variables as the independent variables in their model framework. The vector of other variables includes various fiscal variables, disposable income, trade openness, growth rate of GDP, various financial variables, foreign reserves, inflation etc. As the political parties follow populist approach, inflation results from the public demand for transfers which is financed by inflation tax. Their finding suggests that inflation worsens income distribution while trade openness improves it.

Naceur and Zhang (2016) examined for the empirical association between financial development and income distribution at the cross-country level. They took into considerations of

143 countries. The study period was from 1961 to 2011. They found out significant relationship between the variables by employing Ordinary Least Squire and Instrumental Variable regressions. Their results show that four out of five dimension reduces income inequality significantly except for financial liberalisation. They went for examining the impact of banking sector and stock market development on income distributions. They found out that banking sector development affect income distribution more significantly than the stock market development. In their study, they have further shown that GDP per capita and government consumption does reduce income inequality while inflation and trade openness enlarge it in a significant manner. However, after a quite revision, they have postulated that GDP per capita and inflation might increase or decrease income inequality basing up on the characteristics of the economy. They suggest for enhancing financial efficiency and stability to walk on a smooth development path for the developing countries.

Beck et al. (2007) examined the redistributive effect of financial development taking into consideration of the major developing countries. They have used the Ordinary Least Squire (OLS) regression, Dynamic panel Instrumental Variables regression and Generalised Methods of Moments (GMM) involving 245 observations for finding out empirical results. The variables they used in their study are income shares of lowest income quantile group, Gini index, rate of poverty, financial development (private credits), economic growth, schooling, rate of inflation, trade openness etc. According to their findings, as the financial development takes place, the degree of income inequality decreases. It is evident from their study that increasing rate of inflation affects income inequality positively. An increase in the rate of inflation increases income inequality and vice-versa. Growth in GDP per capita also reduces degree of income inequality significantly. However, the relationship between these two variables vary considerably with the change in the initial degree of income inequality over time. These results are complementary to the work by Clarke, at al. (2006). Although the number of observations is comparatively less, the results are quite robust for empirical analysis. They have found that opening up of the trade and schooling have insignificant effect on income inequality when income share of the poor and financial development is assumed constant. It is evident from their study that inflation, trade openness and economic growth reduces the income share of the lowest income groups. However, these results hold in the case of dynamic panel Instrumental Variables regressions involving fixed effects of the pre-determined variables.

Doumal (2013) investigated for the linkages of regional inequalities and trade openness in case of India and Brazil. He has constructed regional inequality index for India from the time

period 1980 to 2004 and that for the Brazil from the time period from 1985 to 2004. He has estimated the results by employing VECM technique. The variables he took into considerations are Gini coefficients, trade openness, FDI and GDP per capita. For testing the cointegration among the variables, he has used Engle-Granger two step procedure. From this test he obtained the result for the existence of long-term association between the trade openness and regional inequality. Then he used the ECM technique for estimating short run results. As per his findings, on an average, 1% increase in trade openness results in 0.11% decrease in regional inequality within one-year period in the Brazilian economy. However, assuming other factors remaining constant, 1% increase in trade openness causes to aggravate regional inequality significantly by 0.40% within the one-year period in the case of India. According to his calculations, the impact of increases in trade openness India last for three years. Opening up of the domestic economy allowing foreign competitors to take part in Indian markets makes poor poorer and richer richer. This result is consistent with the Barua and Chakraborty (2010), although it contrasts with that of the results found by Milanovic (2005). Milanovic found that greater trade openness results in narrowing down the gap between rich and the poor in India. After all, he (Daumal M.) didn't give any political or economic suggestions to bridge the gap of regional inequality in India as the closeness to international trade is not the solution. International trade plays a crucial role as it is regarded as the engine of economic growth for pushing forward the developing economies. The problem for India is not concerned with trade openness but for large and increasing regional inequalities.

4. Single Country Analysis

Deaton (2010) with the help of non-parametric statistical analysis made a study on whether higher rice prices make impact on the distributions of real income across rural and urban Thailand. One of the objectives of his study was to assess the effects of rice price on income distributions on the households of the Thailand. He proceeded by observing the consumption and production pattern of households taking into consideration the standard of living and geographical location of the households. He concluded in his study that higher rice price is beneficial to rural households of all categories. But exceptionally neither the poorest nor the richest rural households get benefit from the higher rice price. The direct benefits from the hike in rice price goes to the middle-income groups of the rural households in the entire Thailand. Although there was the existence of a marked regional differences depending upon the importance of the rice crop, he found no pattern by which higher prices support rural rich at the cost of rural poor.

Stuart (2003) worked on establishing the link between income inequality, monetary policy and business cycle with the help of general equilibrium model. The study is mainly based on the U.S economy. The study period he covered was 1965 to 1991. He used the variables such as economic growth, Gini coefficient, annual per capita monetary base, seigniorage tax rate, rate of inflation. He used the Method of GMM and Simulation technique for finding out the result. He found a break in covariance structure of monetary policy which is consistent with the findings by Gavin and Kydland (1999). According to his findings, monetary policy was counter cyclical in 1979 and was volatile over a time period. However, this result contrasts with that of the findings by Sims (1980, 1999) and Bernanke and Mihov (1998). The seignorage tax rate and income inequality are negatively related at -7.07 percent. The increase in the rate of inflation worsens income distributions and vice versa. Elasticity of money demand differs between the economic agents i.e. labourers and capitalists implying the influence of monetary policy on income distribution. He has shown the compatibility of Gini-based monetary policy rule with the several characteristics of U.S. economy.

Robert, Thomas, and Yaz (2017) examined how the changes in inflation targeting by the central bank affects income redistribution within an economy. In the post-financial crisis period, debate went on amongst the leading economists about the range of the rate of inflation the central bank should consider as an inflation targeting institution. The appropriate level of inflation became the central theme of the debate as any change in the target will impose cost not only to the banks but also to the economy as a whole. According to the authors, one of these costs fall on redistribution of national income amongst economic agents. The cost of changing monetary policy stems from nominal to real financial distortions in the economy. They used Canadian data of the distribution of nominal assets and liabilities for the sake of prediction of the redistribution of wealth. They examined how redistribution of income and wealth changes because for a permanent 1% increase in the price level. Their findings show that this change leads to a large redistribution of wealth from the household sector to the government sector. The large cost ultimately falls on the poor. This cost is unevenly distributed between the poor, middle-class and the rich household. According to their estimates about three quarters of households (10.8 million) suffer net loss, almost half (6.7 million) of the households losss more than 1% of their initial net worth. These results have been obtained by assuming that shift to the new rate of inflation occurs immediately. They have identified two specific channels through which changes in inflation targets influences distribution of resources within an economy. First one is that distribution of income might be affected by wage adjustment by the low-skilled

workers. Second one is that the loss falls on the banks' balance sheets as it shows mis-mismatch between long-term assets and short-term liabilities.

Fukuda (2017) examined for the empirical effects of financial variables on distribution in case of India. The time period he considered for the study was 1952-2011. With the help of the empirical models i.e. VARX and ARDL model, he revealed the economic effects of financial development on income distribution in India. According to him, financial development affect income inequality in India both linearly and non-linearly. Although he did not find the non-linear association between the variables, he found positive relationship between financial size and efficiency and income distribution and also between trade openness and financial openness and income distribution. In other words, financial advancement increases the degree of income inequality as that of the financial openness and trade openness does. It is evident from his study that greater trade openness results in higher level of income inequality.

Sehrawat and Giri (2015) examined for both the short-run and long-run relationship between inflation, trade openness, economic growth and financial development with income distribution in India. They employed Autoregressive Distributed Lag Model for finding out long-term impact and ECM technique for the short run determinant. The study period covers the annual time series of 1982-2012. It is evident from their study that, financial development worsens the income distributions in case of India. According to them, as an economy move towards greater trade openness, the degree of income inequality gradually comes down. As per his findings, 1% increase in trade openness on an average improves income distribution by 0.12% in the long run in India. However, increase in the rate of inflation by 1% causes income inequality to increase by 0.04%. Likewise, if trade openness increases by 1%, income inequality comes down by 0.08% in the short run. According to them, the short-run dynamics for inflation is same as that of the long-run dynamics.

Sulaiman et al. (2017) examined for the combined effects of economic growth and trade openness on income inequality for the case of Malaysia. The study period of their work covers from 1970 to 2014. They have used the Autoregressive Distributive Lag Model (ARDL) for cointegration and Error Correction Mechanism (ECM). According to their findings, trade openness affects income inequality positively. In other words, as the economy moves from closed economy to the open economy, income inequality gradually increases. While GDP per capita and income distribution are negatively related. Although result is highly insignificant for the former, it is highly significant for the later. But trade openness affects income inequality negatively in the short run. They suggest for improving education and strengthen human capital

endowment for the reduction of income inequality in Malaysia. They also suggest for creating more human capital with inclusive policy to redistribute income from the richer section of the society to the poorer section of the society.

Ang (2010) investigated for the empirical effects of finance on income inequality for the case of India. The time period that he considered in his study includes 1951-2004. He has found that financial development and income distributions are positively associated. In other words, an increase in private credits to GDP ratio does cause income distribution to be improved in the long run in India. In his study he has taken per capita GDP growth, trade openness and inflation as the control variables. As per his findings, a steady economic growth results in lower level of income inequality in the long run in case of India. At the same time trade openness cause income distribution to worsen in the long run. This result does support to the findings of Barro (2000). It is also evident from his empirical analysis that, higher level of inflation affects income inequality negatively. That is increase in inflation rate reduce income inequality by improving income distribution in the long run particularly for the case of India. Although several theoretical literatures show adverse effect of the rate of inflation on real agricultural wages and thereby income distribution, lower inflation also result in lower level of unemployment because for lower level of real wage rate. This help in the improvement of the living standard of the poor sections of the society. Here an empirical issue should be noted that the way inflation affects income inequality differ between economies because for the complications of taxation system.

Muhammad and Faridul (2011) investigated for the impact of finance on income distribution for the economy of Pakistan by applying the ARDL model. They also employed the empirical Error Correction Model (ECM) for analysing the short-run nexus between the variables. Their findings support the general view that financial development and economic growth lower income inequality while financial instability aggravates income inequality. In other words, availability of finance and overall growth performance of the economy are not inclusive and thus hurts the poor most. However, it is trade openness which helps in deteriorating income inequality benefiting the poor. The robust results found out by them show that GDP aggravates income inequality at the rate of 0.07% significantly in the long-run. However, the coefficient value of GDP in the short run is also significant and it is 0.0292. Likewise, financial development aggravates income inequality by 0.0051 units in the long run and 0.0002 units in the short-run. They also have found that if government expenditure increases by 1%, then income inequality increases by 0.17%. This is particularly because of government expenditure being driven by politicians for meeting their own ends. Since national resources are diverted

politically involving huge corruptions, the poor sections of the society are excluded from reaping the shares of consumption expenditure. Their findings again show that inflation reduces income inequality both in the short run and the long run. The reason they gave for this nexus is that the moderate inflation provokes optimistic attitude of the investors thereby expanding job market opportunities for the low skilled workers. According to them inflation also favours the debtors which is quite reasonable as the number of debtors is much higher in developing countries. According to their findings, increase in trade openness have a positive and significant effect on income inequality in the long run. But it has insignificant positive impact in the short-run. It is evident from various literature that most of the exporting firms in developing countries use educated workers for capturing higher productivities. Thus, the workers who are unskilled and poor do not get benefit from expanding export sectors which results from the growing trade openness[3].

Azleen and Mansur (2017) examined for the impact of financial development on income inequality for the Malaysian economy. The time period they covered was 1970-2007. Their study shows that income inequality of Malaysia decreased from 0.56 in 1976 to 0.4 in 2014. This was consistent with the expansion in banking industries and financial sector. They were also concerned in examining the role of financial sector reform in improving income distribution particularly in developing countries by mobilising savings into productive spending. They employed ARDL model for analysing the long run determinants and Variance Decomposition method for checking causal link between the selected variables. As per their study, financial development, economic growth and trade openness combined together impose impact on income inequality in the long run in the case of Malaysian economy. This is true for the shorter period as same result has been obtained by Law & Tan (2009)[4]. The Variance Decomposition (VDC) result shows that financial development is a desirable tool to employ for improving income distribution in the Malaysian economy. It is evident from their study that opening up of the trade does improve the income distributions in case of the Malaysian economy. Increase in trade openness by 1% results in 0.30% decrease in income inequality significantly in the long run. However, income inequality decreases by 0.14% significantly in the short-run. This implies that income inequality is more responsive to the trade openness in the short period than in the long

[3]For further understanding the readers can look at Bensidoun et al. (2005). Many literatures found out that trade openness leads to increasing income inequality both in the rich and the poor countries. However, it improves income distribution only in the middle-income countries.

[4]The study period of Law and Tan (2009) involves 1980-2000.

period. They suggest government to enhance access to financial market by inclusive policies to direct the economy towards pro-growth and pro-poor development path.

Hoi and Hoi (2013) examined the impact of financial development on income inequality for the Vietnam economy. Their empirical study is based on the time period 2002-2008. They have employed the panel regression model for examining the impact of financial variables on income inequality. In his regression model he took income inequality as dependent variable and rest including trade openness and inflation as explanatory variables. Inflation increases, instead of reducing, the degree of income inequality. The coefficients in fixed and the random effect models are 0.07 and 0.22 respectively being the former significant at 10% and later at 1% significance level. They also have found out that education and financial development jointly improves income distribution in Vietnam.

Agusalim and Pohan (2018) investigated for exploring the association between the trade openness and income distribution in the case of Indonesian economy by using secondary data. Time period covered by their study was from 1978 to 2015. They used the Vector Error Correction Model (VECM) for analysing empirical results. They found highly insignificant negative relationship between trade openness and income inequality in the long run. But in the short run (within two years period) this negative effect is highly significant, and the corresponding coefficient is 0.002458. Economic growth aggravates income inequality significantly in the short run like that of the long run. This indicates that the economy is in the path of jobless growth and need inclusive policies to combat income inequality.

Chapter-3

3. Severity of Income Inequality at National and Global Level

1. Severity of Income Inequality at Global Level

When we talk about developmental issues, the anatomy of income inequality can't be ignored. From the inception of economics as an organised science, income distribution has become one of the main concerns of the economist world over. Ricardo also has recognised that the problem of income distribution as one of the leading problems of the economy. Many economists have worked extensively on income inequality looking at dynamic characteristics, dimensions, impacts and remedial measures at the global, national and sub-national levels[5]. The working officials of the international organisations i.e. IMF, World Bank, OECD, Davos meetings etc. are worried much about the distributional aspects of the global wealth and income. The number of billionaires, with the higher shares in income and wealth, are increasing world over at a rapid pace. It should be mentioned here that American economists have focused less on income distributions than the European ones although income inequality is more acute in the United States.

For the first time in the history of the globe, the Sustainable Development Goals (SDGs) have included a goal on reducing inequality. The 10th goal of SDGs states to reduce income inequality within the country and across the countries. Target-1 of Goal 10 depicts "By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average". However, target-2is more broader one which states; "By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status".

It is Suresh Tendulkar who differentiated clearly between equity and inequality with broader perspectives. He challenged the monumental work of Simon Kuznets. Kuznets was of the view that income inequality increases following the initial phase of economic development, stays constant for a while at a certain point and then start declining. This notion is well explained with the help of Kuznets curve. In the initial phase of economic growth, inequality gets widened as the transformations take place in the structures of Rural-Urban economy. This transformation is mainly because for increase in rural migrants from the low productivity agricultural sector to the

[5]Moral philosophers have discussed more about the justice and ethical issues than the economist. For recent works, look at Rawls (1971), Sen (1973).

high productivity urban sectors (i.e. Industrial and Service Sectors). Tendulkar opined that although inequality may increase in this phase, but people may not feel the sense of inequality as they are more concerned for upward economic mobility. Two popular economists T. Scitovsky and A.O. Hirschman have also concluded that inequality does not led to inequity. Tendulkar has suggested three conditions for the feasibility of the degree of inequality in a democratic society. They are as follows:

- Individuals should realize the mobility of income made on the merit basis.
- The economy should foster efficiently the equality of opportunities.
- Realization of improvement in the day-today livelihoods of the bottom income quintile groups.

Revolutionary work of French economist Thomas Piketty (2014) "Capital in the Twenty First Century" has provoked debate over the prevalence of income inequality world over. In his monumental treatise, Piketty has collected a massive amount of historical data for several countries which shocked thinkers, researchers and the economist's world over. Western European countries were highly unequal in 18^{th} and 19^{th} centuries. This severity came down during 1970s. Since then, income inequality has shown further aggravating. From this historical findings and analysis, Piketty has formulated a grand theory of capital and inequality. He suggested all the national government to adopt global tax policy for checking the sharp rise in income inequality. According to him, these policies also will help in political and economic stability across the countries.

Credit Suisses (CS) has reported that 50% of world's wealth is concentrated among the top percentile of wealth holders. The richest deciles hold 87.7% of the global wealth. Fifty per cent of the global wealth is concentrated among the top 1% of income holders. Oxfam released a report following the World Economic Forum (2015) that richest 1% will overtake the wealth of the other 99% within a year if the income inequality raises at the same level.

The trend in income/consumption inequality across the developed and developing counties has recently been studied by the World Bank groups (2016). The study has some interesting conclusions; 1) Income inequality has increased at a sharp rate all over the world from 1820 to 1990. But Gini coefficient fell significantly from 66.8 in 2008 to 62.5 in 2013. This mainly because for the convergence in the average income of the populous countries like India and China. Hence, although between country income inequality has come down, the within country income inequality is still very high for the developing countries. The study shows that both the

income and consumption inequality has increased steadily for 42 countries, but it declined for 39 countries within 15 years. They found in their study that income inequality increased significantly in Bangladesh, China and Indonesia by 5, 7 and 5 points respectively. 3) The study reports that income inequality has declined in Brazil, Cambodia, Mali, Peru, Tanzania from 2008 to 2013.

Table 3. 1: Trend of Income Inequality in Various Parts of the Globe.

	Long run trend					
	No. of Countries				**Mean Gini**	
	Increase	Less Change	Decline	Total	1993	2008
East Asia and Pacific	5	1	3	9	37.8	39.1
Eastern Europe and Central Asia	5	2	6	13	33.9	32.5
Latin America and the Caribbean	8	0	11	19	49.0	47.0
Middle East and North Africa	1	1	3	5	39.8	36.4
South Asia	3	0	1	4	31.0	34.5
Sub-Saharan Africa	8	2	10	20	47.6	45.1
Industrialized countries	12	4	5	21	31.4	32.6
World	42	10	39	91	40.1	39.3
	Short-run trend					
	No. of Countries				**Mean Gini**	
	Increase	Less Change	Decline	Total	1993	2008
East Asia and Pacific	1	1	5	7	39.2	37.3
Eastern Europe and Central Asia	6	8	9	23	31.9	31.4
Latin America and the Caribbean	3	2	12	17	49.7	48.0
Middle East and North Africa	0	1	1	2	35.3	33.4
South Asia	0	1	2	3	36.7	36.2
Sub-Saharan Africa	3	2	4	9	44.1	43.8
Industrialized countries	6	6	8	20	32.0	31.8
World	19	21	41	81	37.9	37.1

Source: World Bank (2016).

It can be observed from Table 3-1, that increasing tendency of average income inequality in the industrialised countries is the highest in both the time periods. On an average, income inequality in these countries has increased by 12 points and declined to a smaller extent by only 5 points. However, average income inequality increased by smaller amount 6 points, it declined by relatively higher margin 8 points in the industrialised countries. The level of average income inequality is highest in the Latin American and the Caribbean countries within 15 years. The table shows that Middle East and North-African countries follows to the Latin American and the Caribbean countries in terms of the average Gini but the rate of increase or decrease in average Gini is lowest in these countries. The increase in average income inequality in the middle east and north African countries is the lowest in both the time period i.e. only by 1 point and 0 point

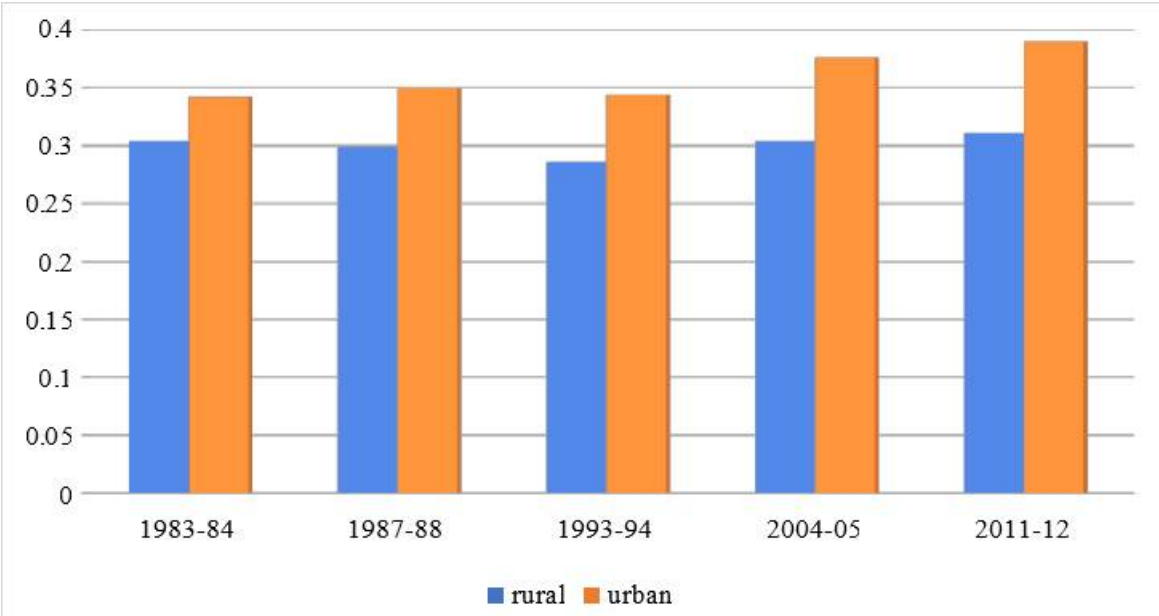
respectively. It declined by 3 point in the long run and by 1 point in the short run. The table 3-1 also shows that there exists the greater divergence in average inequality between countries. More specifically these divergences are more intense between the eastern and western regions of the globe.

2. Severity of Income Inequality with Respect to India

Credit Suisses (CS) has reported that the richest 1% hold 53% of the India's wealth. The richest 10% of the population captures 76.3% of the total wealth of the country.

Since household income data is not available for India, income inequality is measured considering consumption expenditure. It can be observed from the Figure 3-1, that income inequality has increased slightly in rural India particularly in 2004-05 from 0.286 to 0.304 and 2011-12 from 0.304 to0.311. The Gini-coefficient was 0.344 in urban areas in 1993-94 and it rose to 0.376 in 2004-05 and again to 0.390 in 2011-12. It should be mentioned here again that consumption expenditure has been taken as the proxy for household income data and the Gini coefficient has been constructed. NSSO also may not be capturing the consumption expenditure of the richer and poorer sections adequately so far as subjective constraints are concerned. If we would consider the household income, income inequality would be much higher than it was. Again, if we consider the access to education, health, electricity and drinking water, then the value of Gini-coefficient will be much higher.

Figure 3. 1: Income Inequality in Rural and Urban India



Source: Singh et al (2015)

We can examine the anatomy of income inequality in India by considering the growth rate of consumption for different classes of population. Such classifications involve; bottom 30%, middle 40% and top 30%. It is clear from the table given below that growth rates of monthly consumption expenditures by each household was quite higher from 193-94 to 2009-10 in comparison to the period 1983-97 for all the income groups. The rate of economic growth was much higher for urban areas in comparison to that of the rural areas. Growth rate during 1993-94 to 2009-10 was quite higher for top 30% income groups than for the bottom 30% income group in both the rural and urban areas. Putting it simple, richer sections of the society were consumed significantly more amount of goods and services than the poor and middle-class income groups.

Table 3. 2: Growth Rate of Consumption Expenditure by Various Income Quintiles

Period	Bottom 30%	Middle 40%	Top 30%	All Classes
Rural				
1983-97 (URP)	1.22***	0.93***	0.96***	0.99***
1993-94 to 2009-10 (MRP)	1.32***	1.32***	1.92***	1.62***
Urban				
1983-97 (URP)	1.36***	1.41***	2.00***	1.73***
1993-94 to 2009-10 (MRP)	1.71***	2.25***	3.32***	2.77***

***Significant at 1% level

Source: Radhakrishna (2015)

Inequality and Human Development in India

Gradual increase in income inequality causes hindrance in the path of human development of an economy. Suryanarayana (2013) conducted a study for estimating both the Human Development Index (HDI) and Inequality adjusted Human Development Index (IHDI) for the national level as well as state level.

Table 3. 3: HDI, IHDI and Loss (%)

States	HDI	IHDI	Loss (%)	Rank HDI	Rank IHDI
A.P.	0.485	0.332	31.6	19	20
Bihar	0.447	0.303	32.1	26	24
Chhattisgarh	0.458	0.297	35.1	24	25
Gujarat	0.514	0.363	29.5	15	13
Jharkhand	0.470	0.312	33.7	21	21
Karnataka	0.508	0.353	30.5	18	18
Kerala	0.625	0.520	16.8	1	1
M.P.	0.451	0.290	35.7	25	27
Maharashtra	0.549	0.397	27.8	7	8
Odisha	0.442	0.296	33.1	27	26
Punjab	0.569	0.410	28.0	4	4
Rajasthan	0.468	0.308	34.0	23	22
Tamil Nadu	0.544	0.396	27.3	9	9
U.P.	0.468	0.307	34.5	22	23
West Beng.	0.509	0.360	29.3	17	14
All India	0.504	0.343	32.0	--	--

Source: Suryanarayana (2013)

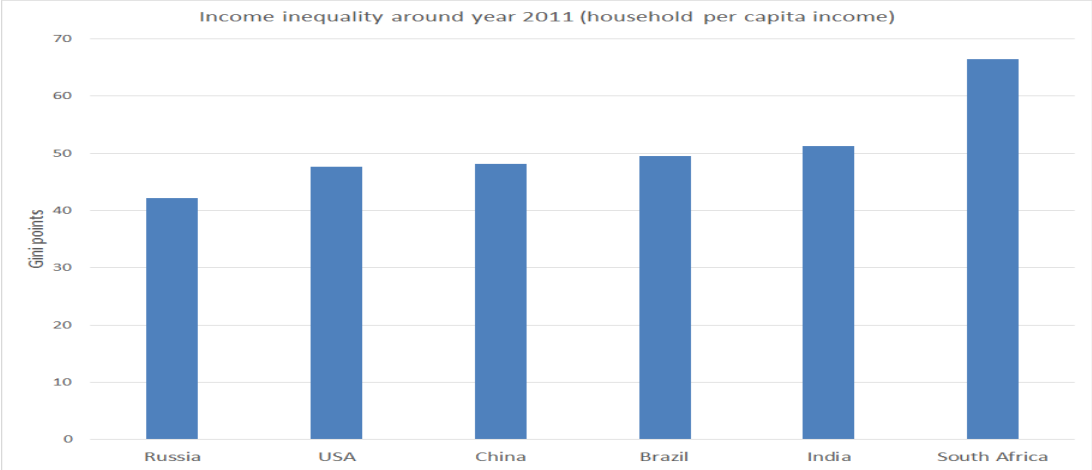
As can be seen from the Table 3-3, the rank for Inequality adjusted Human Development Index (IHDI) is lowest in Chhattisgarh while it is highest for Kerala. As per the given table, 32% of human development is lost due to the presence of inequality at the national level. Madhya Pradesh following the Chhattisgarh has scored the highest loss in human development due to the presence of inequality as it is 36% and 35% respectively. However, Kerala has scored the first rank in case of HDI as well as IHDI and the loss due to presence of inequality is lowest for Kerala i.e. 17%. Odisha has been ranked at the extreme last in both the case of human development index and inequality adjusted human development index i.e. 27th for HDI and 26th for IHDI. The loss of human development due to inequality is highest with respect to education

(43%). As per their findings, income related indicators are associated with higher level inequality than the non-income indicators. They found out that human development would be much higher if inequality would be excluded.

Prevalence of income inequality in India in comparison to the other parts of the globe.

Milanovic (2016) made a comparative study on income inequality across the countries. He gathered data on household per capita income from various sources for each of the countries and constructed Gini index for all the individual countries. As can be seen from the Income inequality in India is lower than the income inequality of only South Africa. Income inequality in India is much higher than even China. Income distribution in India is worse than that of the Russia, USA and Brazil. According to Milanovic, degree of income distribution is worst in South Africa followed by India. The Gini coefficient is near to 70% in South Africa. The value of the coefficient is above 50% in case of India.

Figure 3. 2: Degree of Income Inequality in India in Comparison to rest of the Countries.



Source: Milanovic (2016)

According to Simon Kuznets, the degree of income distribution worsens at the initial phase of economic development up to a point and then start declining. This mechanism suggests that if Government or Central Bank intervene to promote economic growth by expanding investment than the economy is bound to face the problem of income inequality. If it becomes more conscious to reduce income inequality, then saving and investment will go down and growth rate will fall. Hence, there exists the trade-off between growth and equity. However, many studies suggest for adopting policies for promoting growth and reducing income inequality simultaneously. But it should be noted here that people of china can fulfil basic needs of health

and education. But in case of India, majority of the people are still striving for fulfilling basic needs.

Another issue lies in reducing the intensity of Kuznets curve. Many studies have been conducted regarding this issue. Some economists support the endogenous growth theory which focus on investment in human capital for resolving the issue. This view can be evident from the comparative study between south Asia and east Asia. India for instance, has not made investment in human capital till now. But south Asian countries have made large investment in human capital. Countries should not wait for high growth for achieving human development. Human development can be maintained by a high level even keeping the level of economic growth rate at the moderate level. This notion is evident from the countries world over and from the Indian states.

In case of India, there lies an important issue of social exclusion of SCs, STs, minorities and gender. In this respect, inclusive economic policy alone can't solve the problem. Socio-political factors need to be emphasised for resolving the issue. If social transformation will not take place, then growth with distribution will not affect social behaviour. There is the need of a package of social reformative actions for reducing social exclusion in India.

One more challenge for the economy of having worsening degree of income distribution is to make the markets inclusive. Most of the government policies i.e. both the state and the central government policies are not inclusive in developing countries. Efforts should be put at global level, national level and most importantly grassroot level. In India local government authorities are concerned more for urban planning. The rural areas are being ignored by local authority for policy evaluations so far as geographical constraints and cost of designing policies for remote villages are concerned. Special programmes should be initiated to boost the overall growth with distributions.

There is the acute need of framework special by the central government for equitable distribution of income in India. The 12^{th} five-year plan took the issue little seriously and identified various kinds of inclusiveness as depicted under;

- Reduction in the level of poverty by initiating various inclusive programmes and policies in central, state and grassroot level.
- Group equality reflected as inclusiveness. In this category's issues of inclusiveness relating to all leading social groups such as SCs, STs, OBCs, URs, and minorities have been considered. The issue of gender equality also comes under this group.
- Inclusiveness as regional balance.

- Inclusiveness as reducing inequalities
- Inclusiveness as empowerment
- Inclusiveness through employment programmes (GOI, 2012).

Some authors are suggesting flagship programmes such as MGNREGA as the attempt by the government for reducing income inequality. There is no point to say that these programmes are not meant for poverty reduction. It should be noted here that inclusive growth or growth with equitable distribution of income is much broader than this. Government should focus on generating productive employment for putting the economy in the path of inclusive growth in the economy. Both the formal and informal sectors should be focused with great care. Emphasizing labour productivities and generating productive employment will take the economy to the path of equitable or inclusive growth.

Afterall there is the need of more diversified agricultural platform in India. Productivities of informal labour in non-agriculture sector was six times higher than that of the agriculture sector in 2011-12. Hence, government should intervene to shift the workers from the agriculture to the manufacturing and service sectors.

3. Effects of Inflation on Various Aspects of the Economy

Inflation affects various sections of the economy in several ways. It is a prerequisite for analysing the effects of inflation before proceeding further for the dynamics of inflation and income inequality. The effects have clearly been mentioned as under;

The effects of inflation on production process is of quite significance as it is concerned with the change in the behaviour of producers due to inflationary shocks. It is the viewpoint of John Maynard Keynes that the initial lower level of inflation during the prevalence of under-employment situation is desirable for the economy. Because it pushes forward the optimistic behaviour of the business community by influencing positively to the profitability of the business community, cost of production being unaffected.

But once the full employment ceiling is reached and the price level rises further and takes the form of hyper- inflation, it causes a disastrous effect on production process. The cost of production increases significantly due to increased input prices thereby reducing the profitability of the producer sections. The Hyper-inflation in general results in miss-allocation of productive resources. In short, efficient production process is distorted due to rapid increase in the rate of inflation.

Although enormous research has been carried out on group and sectoral effects of inflation in an economy, but the redistributive effects of inflation has recently been realised by the economists. It is the more general and socially relevant issue. According to some economists the redistributive inflationary impact on the economy is justified since all factor prices increases disproportionately do not rise in the same proportion. It is the producer class who are lesser affected in negative ways than the fixed income holders and wage earners. Inflation is looked at a perspective of hidden tax which is regressive in its nature and effects. So, inflation is more burdensome for the poor sections of the society than the rich ones as they can't afford their day to day basic needs with the limited incomes.

Unexpected inflation most often arbitrarily redistributes income amongst the individuals transacting in the financial markets[6]. The nominal rate of interest that is assigned during providing loans to the debtors involves price level. The debtors pay back their borrowed funds to the creditors at a lesser value in real terms during the prevalence of unexpected inflation. The creditors receive a lower amount than he had anticipated during providing loans. Hence in this case, the debtors are the gainers and the creditors are the losers. However, if inflation turns out to be lower than the both parties anticipated, the creditors will receive more in real terms and they will be gainers and their counterparts will be losers.

The cruel effect of unanticipated inflation also falls on the fixed pension holders. The effect is just like the debtors and the creditors. The workers get the fixed pension amounts agreed earlier with the owners of the firms after their retirement. They are paid lesser at their younger age during their labour services. Just like the creditors, the workers loss as they receive lower real return during unanticipated inflation. But if unanticipated inflation is lower than anticipated than the firm owners fall in loss and the workers gain.

However, it should be noted that more variable the inflation is crueller it is to the economy. The variability in inflation poses a risky situation to the economic agents. As most of the people are risk averse, the cost of unanticipated inflation falls on almost everyone.

Interest rate is one of the most important macroeconomic variables that has attracted the curious attention of the monetary theorists and financial economists to a considerable extent. It is a variable that link the present and the future economic activities of the economic agents. The way these two variables are interrelated is of quite significant for our study.

[6]For further understanding of it, look at the macroeconomic text book by N. Gregory Mankwi.

4. Redistributive Effects of Trade openness

One of the famous economists Joseph Stiglitz once revealed his view with great intensity looking at the dilemma regarding favourable and unfavourable effects of the growing international trade between the economy's world over. He recognised that positive gains of the international trade cannot be realised unless it is well managed. According to him free trade amongst the developed countries with the prevalence of underemployment situation will cause more job losses than the job creation. As per his theoretical postulation, the unskilled workers would receive least form the gains of free trade. Hence, greater openness to trade will benefit the economically well-off sections and cause loss to the economically worse-off sections of the developed economies. He suggests for compensating the negative consequences with the adaptation of management tools by the governments. Further he looked at the economic integrations between the countries critically. The protectionist policies adopted by the developed economies might lead to economic inefficiencies in the international markets because for the constraints in the supply chains. These policies also result in the appreciations of the local currencies undesirably.

In the G-20 summit (2017), leaders of various countries expressed fear of the potential risks of increasing trade liberalisation world over with greater worries than ever before. There are positive sides of the international trade[7]. The international trade has created enormous jobs and pushed price down thereby improving the living conditions of the poor. It is evident from the fact that 20% of the French labourers are working under exporting companies and 1 billion people have risen out of poverty because for international trade. Several economists have opined that greater trade openness will lead to higher level of inequality between and within the countries. The technological change has caused 80% of the job losses. There is the need of reformative policies for tackling growing inequalities both at global and national level. If national redistributive policies will not be facilitated, then the countries are eventually going to experience the unequal redistributions of gains from trade openness.

Since 1980s, two groups have reaped the fruits of trade openness. One is the middle classes from the developing countries and the second one is the top 1% from the developed countries. Lower middle classes of the developed countries have benefited less from the growing openness to trade. One positive aspect of international trade is that there has been a significant convergence in standard of living between people from developed and developing countries. But

[7]This fact has been clarified by Roberto Azevedo, Director General of the WTO.

income inequality has come to be more severe in developed countries than the developing ones. This is because for concentration of the gains from trade amongst the few traders.

According to Philippe Jahshan (2017), there is the grater chance that international trade might affect negatively the environment and hinders sustainable development. The trade openness leads to more competition between the middle class from the developed and developing countries. It is also responsible for climate change that has taken place in various parts of the globe as freight transportation and marine transportation has gone up significantly due to international trade. Trade openness cause losers and wieners within the domestic territory. One significant aspect of trade openness that losers don't get the compensations they need. Hence it aggravates income inequality between the people.

Paul Romer (2017) reacted on the ongoing debate amongst the economist on the issue of the negative socio-economic consequences on the economy. According to him, international trade has resulted in the increased level of well-being of the people in developing countries. This is mainly because for growing access to technology. Since none of the poor countries will be agreeing to give up these economic improvements, developing countries can't be forced to follow the developed counties' protectionism. He suggests that trade openness does not bear the sole responsibility to growing inequality. There is also a handful of redistributive policies to cope with these negative effects. Since the 1990s, US and Denmark followed the same economic policies, the path differed in terms of inequality. Trend in income inequality has declined significantly in Denmark as Gini coefficient came down from 31% to 21%. But in case of US Gini coefficient increased significantly from 43% to 47%.

Chapter-4

4. Results and Discussions

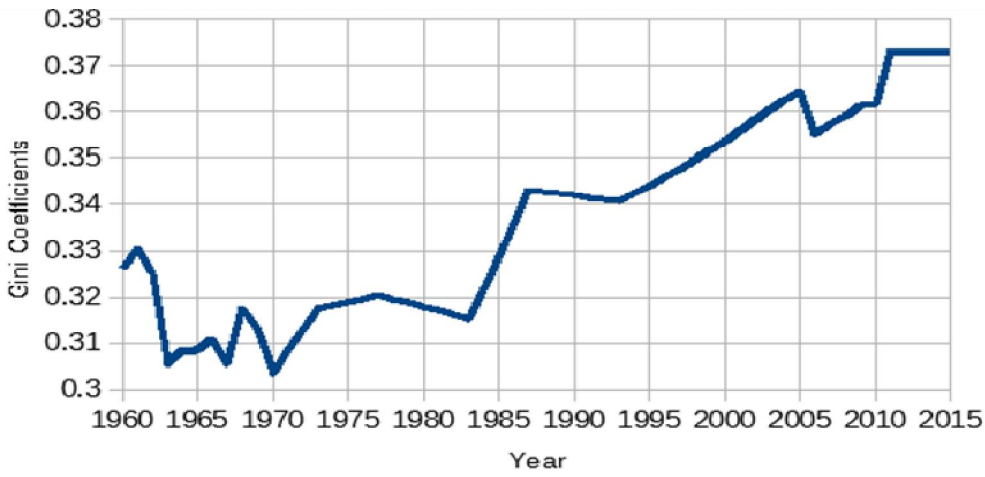
1. Trend of income inequality in India

After India got independence in 1947, primary concern of the government was for alleviating poverty and generating employment opportunities in rural areas which is reflected in major goals of almost all the Five-Year Plans. Jawaharlal Nehru remarked the tasks ahead by his government as “the ending of poverty and ignorance and disease and inequality of opportunity”. This was the foundation India built to put the economy in the path of smooth development over the long time period. The main objective of the development strategy was to establish a socialistic pattern of society. The planning commission of India focused on fostering economic growth with self-reliance. It was planned to achieve these goals within the mechanism of the mixed economy that allows the private and public sectors to coexist in the market. With the far-sighted vision of goals, a handful of poverty eradication and employment generation programs were initiated from the early 1960s. Some of the eye-catching programs include National Rural Employment Program (NREP), Rural Landless Employment Guarantee Program (RLEGP), land reforms etc. Several reforms took place in banking and financial sectors and inclusive policies were designed to enhance accessibility to finance by the rural poor. Direct credit programs were initiated to mandate minimum lending to priority sectors. Agriculture and Medium and Small Sized Enterprises (MSMEs) were being highly constrained by finance. To make the finance available at cheaper cost, interest rate ceilings were introduced during 1960s and 1980s. 1:4 branch license policy was introduced by RBI in 1977 to facilitate easy access to credit to the rural households which required to expand four bank branches in rural areas. Burgess and Pande (2005) found out that this branch license policy of RBI has reduced poverty to a greater extent in rural areas. However, these policies came to an end in the late 1980s with the advent of financial sector reform and new economic policies of market deregulation.

As can be seen from Figure 4-1, income inequality has come down sharply in the decade 1960-1970. This has been shown by the downward trend of the figure at which Gini coefficient came down from 0.33 in 1961 to below 0.31 in 1970. From 1970 to 1980, income inequality remained in a tolerable limit. Although accurate reason for this is not clear, it seems because for the initiatives taken by policy makers for inclusive growth as discussed above. This is also the result of dramatic increase in productivities and availability of High Yielding Varieties (HYVs) of cereals in the latter half of 1960s in Indian agricultural sector. During this time there was also

a significant hike in the rate of inflation. Although, degree of income inequality shows a significant reduction, many households continued to live in sever poverty. A widespread hunger and malnutrition were prevailed during this time. Income inequality increased at a rapid rate following the Balance of Payments (BOPs) crisis of 1990s. Advent of new economic policies in 1991 accelerated the pace of economic growth, but the benefit concentrated among the few capitalists and businessmen leaving aside the poor. The jobless growth of the post-reform period is reflected in the rapid rate of increase in income inequality which is evident from the Figure 4-1.

Figure 4. 1: Trend of Income Inequality in India (On in Scale)



Evolution of Gini coefficient in the post-independence era in India depicted in Figure 1-1 also confirm to that of the findings by Thomas Piketty and Lucas Chancel (2017). As per their findings, there was a sharp decline in top income shares during 1950s and 1970s. It is evident from the Figure 4-1 that Gini coefficient comes down to below 0.31 in 1970. This was because for the prevalent of socialist policy implemented by Jawaharlal Nehru up to 1970s which led to strong market regulations and high tax progressivity. However, the top income shares increased significantly from 1980s onwards. This is mainly because for market deregulation and reformative actions in various sectors of the economy. As can be observed from the given figure that Gini Coefficient has reached to its historically peak level at recent times. “The share of national income accruing to the top 1% is at its highest since the creation of the Indian Income tax act in 1922. The top 1% of earners captured less than 21% of total income in the late 1930s, before dropping to 6% in the early 1980s and rising to 22% in the recent period”-Thomas Piketty and Lucas Chancel (2017).

2. Empirical Results

The steps of the methodology adopted for finding out the results on long-term and short-term macroeconomic determinants of income inequality in case of India has been stated as under;

- All the variables have been converted into logarithmic form.
- Summary statistics and line graphs have been used for preliminary analysis.
- Stationarity has been checked with the help of Augmented Dicky-Fuller (ADF) test.
- AIC has been selected for maximum lags basing upon the lag selection criteria.
- ARDL bound test has been done for obtaining co-integrating relationship between the variables.
- Long-run impact has been examined with the help of bound testing approach to ARDL model.
- Short-run impact has been examined with the help of ARDL-ECM.
- Stability and diagnostic tests have been conducted for the model as a whole.

3. Summary Statistics

Table 4. 1: Summary Statistics Table (Sample: 1970-2015)

Statistic/Variables	GC	INF	OPEN	GDPPC	GCE
Mean	0.34	43.79	24.65	35646.74	2730bn
Median	0.34	30.05	16.46	27511.87	906bn
Maximum	0.37	147.67	56.10	86979.95	14300bn
Minimum	0.30	4.75	9.22	17393.05	42.3bn
Std. Dev.	0.02	39.64	15.31	19617.53	3800bn
Skewness	-0.07	1.10	0.85	1.14	1.68
Kurtosis	1.80	3.30	2.21	3.16	4.78

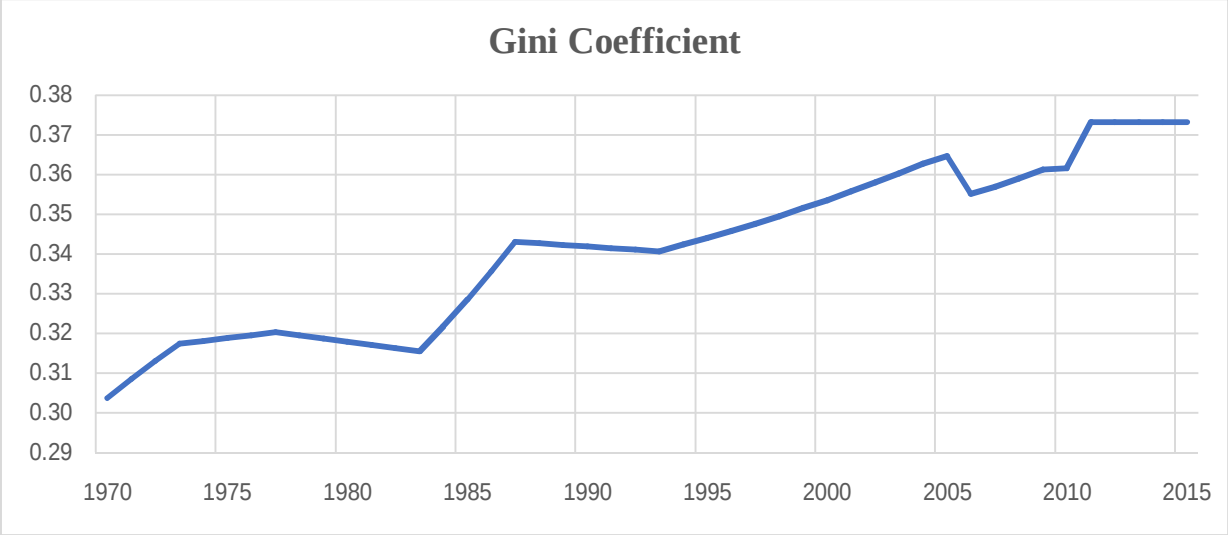
Note: GC= Gini Consumption, INF=Inflation, OPEN=Openness, GDPPC=Gross Domestic Product Per Capita, GCE= General Government Final Consumption Expenditure.

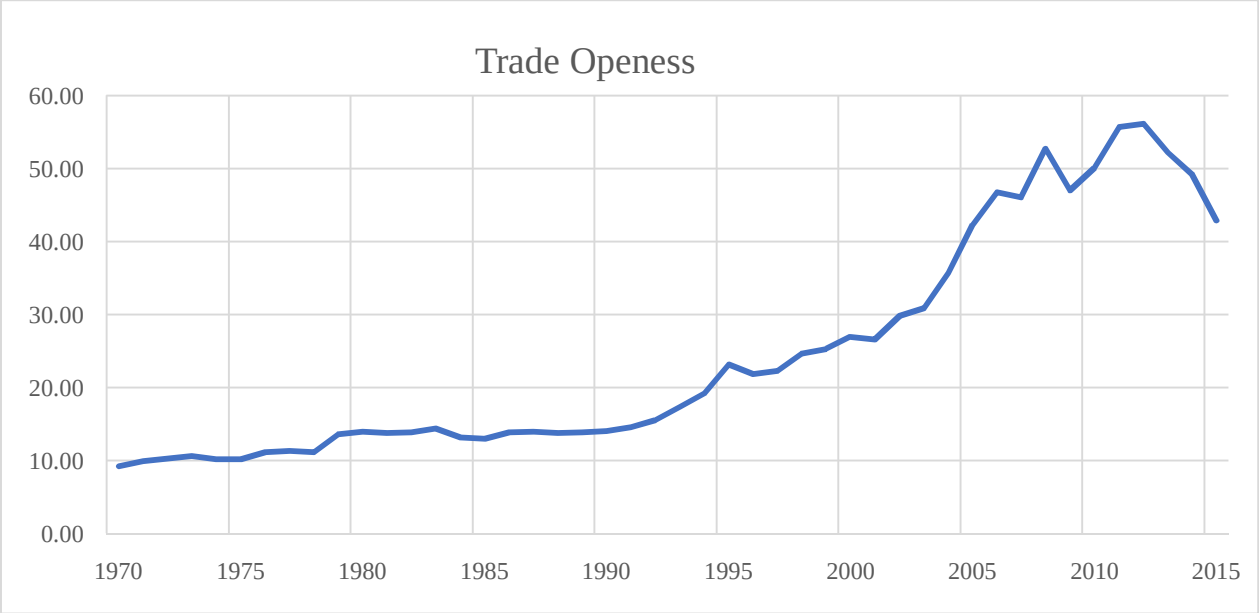
Source: Author's calculation using secondary data.

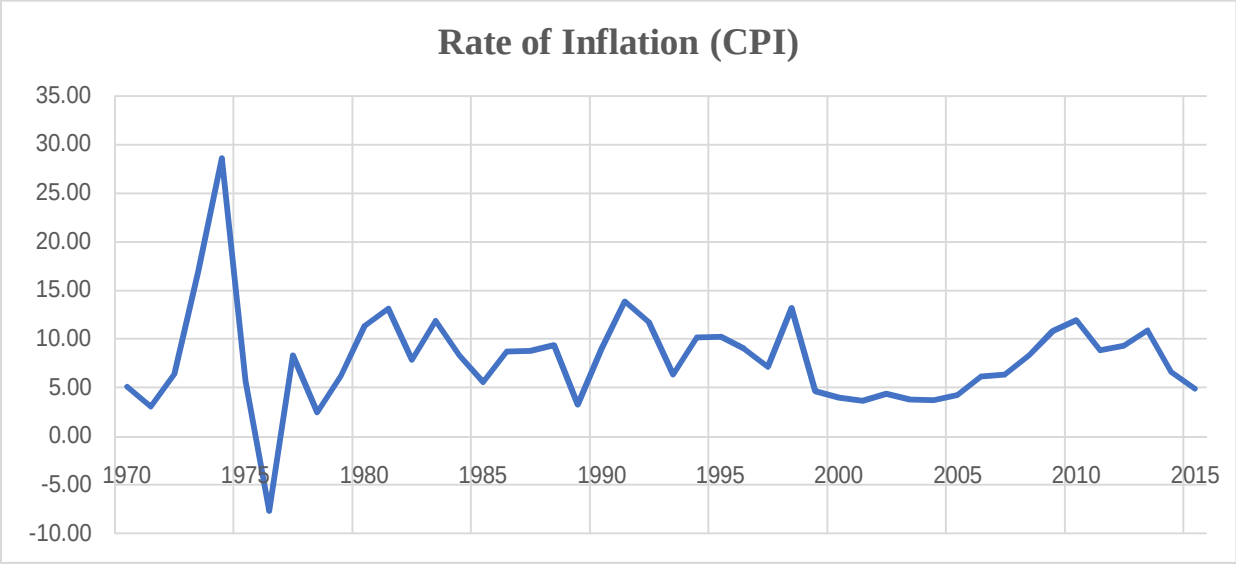
Before entering the regression analysis, generally summary statistics is performed. It is extremely useful for both the quantitative as well as qualitative study. It is normally used to have a preliminary idea about the series of the variables used for the study. During conducting

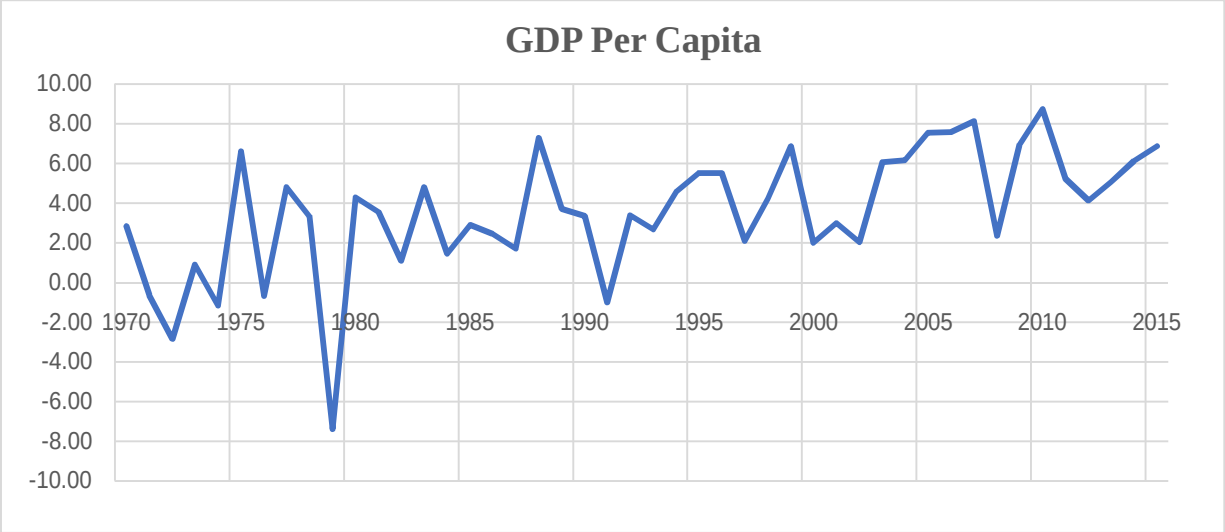
summary statistics table, only raw data must be used. In other words, variables should not be transferred into logarithmic or first difference form. It is evident from the table 4-1 that the mean value of the variables is positive for all variables i.e. GC, INF, OPEN, GDPPC, LGCE. Their respective values are 0.34, 43.79, 24.65, 35646.74, 2730bn. The case is same for the median as well. The maximum and minimum values of the variables symbolise the positive range as minimum value is positively lower than the maximum positive values. Standard deviation has been taken as a representative of the measures of dispersion in the series. The important aspects of the descriptive statistics are the measures of distributive nature of the series. In the case of Gini coefficient, although a negative skewness of 0.07 is present, the Jarque-Bera test statistics shows 0 skewness. Jarque-Bera value being 2.78, as probability is greater than 5%, we failed to reject the null hypothesis that the series is normally distributed. But as can be seen all other variables are positively skewed. This can also be evident from the Jarque-Bera statistics and respective p-values. If the kurtosis=3, the series is inferred as mesokurtic. For Gini, kurtosis value is 1.80 which is lower than 3. Hence the series is platykurtic. The same can be inferred for openness. But the rest of the variables are leptokurtic.

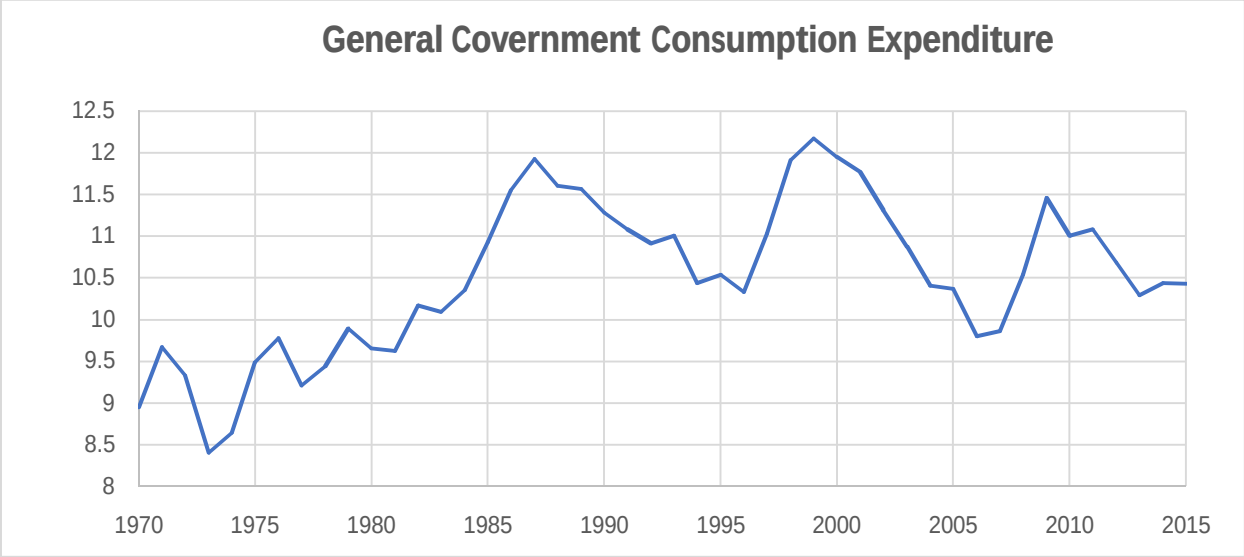
Figure 4. 2: Line Graphs of the Variables used in the Study




Trade Openess
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015


Rate of Inflation (CPI)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
-10.00
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015





The behaviour of the variables over the time periods can be judged from the above four graphs. The variables used for the graphs are original and have not been transformed into logarithmic form. As can be seen from the above graphs all macro variables are changing their behaviour depending upon macroeconomic shocks in various time periods. It is only Gini coefficient which shows stable and consistent behaviour for most of the time periods.

4. Testing Stationarity

It should be noted here that it is not the pre-condition to check unit root before proceeding for ARDL bounds cointegration technique. But we may face the trouble, if cointegration results comes out to be I (2) or greater than this in the middle while working with the model. Hence, it

is our general observation that stationarity should be checked for before proceeding for examining the ARDL cointegration.

The stationarity of each of the variables have been checked by employing both the Augmented Dicky-Fuller (ADF) test. As per the desirability of our studies, both constant and trend components have been selected during conducting ADF test. The ADF tests employed have been explained as under;

- **Augmented Dicky-Fuller (ADF) Test**

ADF test is one of the standard tests for checking stationarity of the variables used for the regression analysis. Dicky and Fuller have extended their work and named the new version of the empirical testing tool as the Augmented Dicky Fuller Test.The ADF test is the extended version of the Dicky-Fuller (DF) test. Dicky and Fuller made an assumption that the stochastic error terms independent to each other. But in case the error terms are correlated, DF test fails to produce accurate results. Thus, Dicky and Fuller extended their original model by augmenting the equations for constant, trend and pre-determined variables.

The null-hypothesis under the Augmented Dicky Fuller test states that there is the presence of unit-root. In other words, it is presumed that the series is non-stationary. When the null hypothesis is rejected at a given significance level, then we become bound to accept the alternate hypothesis that the variables are stationary. The decision can also be taken basing upon the test critical value (absolute) and the ADF critical value (absolute) at 5% significance level. If the test critical value exceeds the ADF critical value, then we fail to reject the null hypothesis. However, if the opposite happens, the null hypothesis is rejected. The Probability value (P-Value) criterion has gained more popularity and has been widely used amongst the researchers in the last few decades in almost all the statistical and econometric interpretations. It is mainly due to the mathematical simplicity and time saving nature of the criterion.

Table 4-2, the ADF unit root test results for each of the variables used in the study have been represented. The test has been conducted both at the level and first difference. Optimum lag order has been chosen by using Akaike Information Criterion (AIC) as its best fits for the model as depicted in Table 4-3.

Table 4. 2: Augmented Dicky-Fuller Test Results

Variables	Level/First Difference	Lags	Test critical value 5%	ADF critical 5%	P-Value	Decision
LGC	Level	2	-3.518090	-3.784113	0.0271	Stationary
	First difference	4	-3.526609	-4.859081	0.0018	Stationary
LINF	Level	1	-3.515523	-3.058678	0.1288	Non-Stationary
	First difference	1	-3.518090	-5.612498	0.0002	Stationary
LOPEN	Level	0	3.513075	-1.438398	0.8356	Non-Stationary
	First difference	0	-3.515523	-5.398795	0.0003	Stationary
LGDPPC	Level	4	-3.523623	-0.125059	0.9927	Non-Stationary
	First difference	3	-3.523623	-5.508294	0.0003	Stationary
LGCE	Level	1	-3.515523	-2.352822	0.3981	Non-Stationary
	First Difference	0	-3.515523	-3.622392	0.0393	Stationary

Notes: For ADF, AIC has been used for selecting lag length.

Lag length is selected generally to avoid the autocorrelation problem and to enhance the robustness of the results. As can be seen from the table 4-2, only income inequality is stationary at the level as well as first difference. The lags period selected by the AIC is 2 and 4 respectively. At level, p- value is 2% which is far lower than 5 per cent. Hence, we rejected the null hypothesis which states that income inequality is non-stationary at level. The decision taken for the first difference is same as that of the level. Therefore, the series is both integrated of order I (0) as well as order I (1) as per the ADF test. As can be seen below, LINF (Log of Inflation) is not stationary at level but it is stationary at first difference. At level, P-Value is 12% which is quite higher than the 5% significance level. Hence, we failed to reject the null hypothesis and accepted the assumption that the series has a unit root. At first difference, P-value is less than 5% (0.02% < 5%). Hence, we rejected the null-hypothesis and accepted the alternative hypothesis that the series is stationary at first difference. Likewise, the decision has been taken for other variables i.e. LOPEN, LGDPPC and LGCE basing upon P-value criterion. All the variables except income inequality are stationary at first which satisfies the desirable

condition of our ARDL and ARDL-ECM models. One can verify that the decision is same if one tests for stationarity according to the test critical value and the ADF critical value @ 5% significance level.

5. Lag Selection Criteria

After testing stationarity of the variables used in the study, we proceeded to obtain the optimum lag order. Table 4-3 shows the VAR lag order selection based on various criterion. As can be evident from the table that the optimum lag order is 4 as selected by the Akaike Information Criterion (-20.74798*).

Table 4. 3: Lag Order Selection Criteria Table

Lags Order	LogL	LR	FPE	AIC	SC	HQ
0	174.3702	NA	2.16e-10	-8.065248	-7.858383	-7.989424
1	455.1064	481.2621	1.12e-15	-20.24316	-19.00197*	-19.78822*
2	484.1401	42.85920*	9.77e-16*	-20.43524	-18.15972	-19.60117
3	506.7706	28.01868	1.26e-15	-20.32241	-17.01256	-19.10922
4	540.7076	33.93705	1.10e-15	-20.74798*	-16.40381	-19.15567

Notes: * Indicates lag order selected by the criterion

LogL: Log Likelihood test statistic

LR: sequential modified Likelihood Ratio test statistic (each test at 5% level)

FPE: Final Prediction Error

AIC: Akaike Information Criterion

SC: Schwarz Information Criterion

HQ: Hannan-Quinn Information Criterion

6. Cointegration through bounds test

Before applying ARDL model, co-integration amongst the variables is checked. The stationarity test results confirmed us the existence of cointegration among the variables which is less than I (2). Now we must look at whether these variables are co-integrated together or not. If

it is not, we cannot proceed for examining the long and short-run relationship through ARDL model.

For testing the presence/absence of co-integration amongst the variables used in the study, we have used both the F-bounds testing approach as well as T-bounds testing approach. The null-hypothesis for both the approaches is stated for non-existent of the cointegrating relationship between the variables under study. The F-statistics and T-statistics values are calculated and decision for cointegrating relationship between the variables is made by comparing it with the F or T statistics value. If the F or T statistics value increases the upper limit at a given significance level, then the null hypothesis is rejected in the long run. In other words, we accept that the variables under study are having long run relationship between them. If the values fall within the range of lower and upper bounds at the certain level of significance than the decision becomes inconclusive. Lastly if the values fall outside of the lower bound at the given level of significance than we fail to reject the null-hypothesis. The details have been explained as under;

- **F-bounds testing approach**

The F-bounds testing results have been presented in table: 4-4, 4-5 and 4-6. As can be observed from the Table 4-4, the test covers asymptotic distribution of the values of the variables up to 1000 (Asymptotic: n=1000) although our actual sample size is 42 after adjustment. The F-statistics value is 6.461608 which is higher than the upper bounds at all levels of significance. Hence, we rejected the null-hypothesis and accepted the alternative hypothesis that the variables are co-integrated.

Table 4. 4: F-Bounds Test Table with Asymptotic n=1000

Significance Level	F-Statistics	6.461608
	Lower Bound	Upper Bound
10%	3.03	4.06
5%	3.47	4.57
2.5%	3.89	5.07
1%	4.4	5.72

Actual Sample Size 42

Table 4. 5: F-Bounds Test Table with Finite Sample: n=45

Significance Level	F-Statistics	6.461608
	Lower Bound	Upper Bound
10%	3.298	4.378
5%	3.89	5.104
1%	5.224	6.696

Table 4. 6: F-Bounds Test Table with Finite Sample: n=40

Significance Level	F-Statistics	6.461608
	Lower Bound	Upper Bound
10%	3.334	4.438
5%	3.958	5.226
1%	5.376	7.092

It is evident from the Table 4-5 and Table 4-6, the bounds have been recalculated using the number of observations up to 45 and 40, F-statistics value remaining the same. In both the tables, F-statistics value (6.461608) falls above the upper bounds at 5% as well as at 10% level of significance. Thus, it supports our alternative hypothesis that the variables are co-integrated.

- **T-Bounds Testing Approach**

Table 4-7 shows the results of T-bounds testing approach we applied. We take into consideration the absolute values of the upper and lower bounds during our decision-making. The absolute T-statistics value as represented in the table 4-7 is 5.29. It is higher than the upper bound at all level of significance. Hence, we can conclude that the variables under study are co-integrated with each other.

Table 4. 7: T-Bounds Test Table

Significance Level	T-Statistics	-5.288110
	Lower Bound	Upper Bound
10%	-3.13	-4.04
5%	-3.41	-4.36
2.5%	-3.65	-4.62
1%	-3.96	-4.96

By taking the evidence obtained from both the F-bounds testing approach and the T-bounds testing approach, we rejected the null hypothesis at all significance levels. Now we can move ahead for analysing the long run and short run determinants of income inequality specifically be depicting the extent of effectiveness with the help of ARDL and ARDL-ECM.

7. Long -Run Determinants

The long-run relationship amongst our target variables have been analysed basing up on empirical AIC-ARDL (4, 2, 0, 2, 1) model. Our dependent variable in this model is LGC (Log of Gini Coefficient). As can be observed from the table-9 that LOPEN (Log of Openness) and LINF (Log of Inflation) are having coefficients with negative signs. This symbolises that trade openness and inflation affect income distribution negatively in the long run particularly in case of India at an aggregate level.

It is evident from the given table 4-8, the long -run coefficient for trade openness is -0.045761. The long run coefficient for the trade openness is highly significant. Thus, we can interpret the result for LOPEN that assuming ceteris paribus, 1% increase in trade openness can cause on an average to decrease in income inequality by 0.05% significantly in the long run.Several literatures do suggest that opening up of an economy to the global trade market improves productivity via technology and generates more employment opportunities particularly in exporting sectors. This means that trade liberalisation is improves the income distribution which supports the empirical findings by Florence, Subir, and Chris (2013). This finding is also justified from the well-known Stolper-Samuelson theorem. According to this theorem, if an economy liberalise trade with the other countries, then the demand for labourers will increase sharply in a labour-intensive economy. This implies that the theorem is based on Heckscher-

Ohlin theorem or H-O theorem. Alternatively, this implies that more unskilled labour will benefit from trade openness. Hence the gap between the poor and the rich will shrink in the long run.

The long-run coefficient for LINF is -0.039620 and it is not significant at 5% level of significance since P-value is quite larger than 5% significance level i.e. 29% > 5%. Hence, inflation is having negative association with income inequality. But it is not significant in the long run. In other words, inflation and income inequality are having negative weak relationship in the long run. Therefore, we can interpret that assuming ceteris paribus, 1% increase in the rate of inflation on an average causes income inequality to decrease by 0.04% in the long run but in a weak manner. The general theoretical building blocks of macroeconomics also supports this view. There exists the large body of theoretical literatures which favours the view that mild inflation aggravates economic activities thereby raising demand for unskilled labour and wage level in the economy. In the long run, this trajectory improves income distribution by transferring profits from the entrepreneur class to the labour class in the economy. This trajectory is mainly because mild inflation provokes optimistic attitude amongst the investors thereby generating more employment opportunities in the economy. One important theoretical justification for this relationship is that inflation favours the debtors instead of creditors. It is evident from several studies that most of the less developed countries like India possess large number of debtors. The results obtained do support the findigs by Muhammad and Faridul (2011), Bittencourt (2006, 2009), Jantti (1994) and Mocan (1999).

The interpretation can also be made for our control variables economic growth i.e. LGDPPC and general government final consumption expenditure i.e. LGCE. These two variables possess long-run positive coefficients. LGDPPC is significant at 5% significance level since 2% < 5%. Hence, assuming ceteris paribus, 1% increase in per capita GDP leads on an average increase in income inequality by 0.07% in the long run in case of India. This means that our growth pattern is not inclusive, and the finding pose evidence for the jobless growth. This result support the findings by Shahbaz (2009a), Shahbaz and Islam (2011).

LGCE also possess positive coefficient but it is not significant. Thus 1% increase in government consumption expenditure causes 0.07% increase in income inequality. This means that the general government final consumption expenditure is not channelized in a proper way. As per the findings of other studies, the consumption expenditure by government is politically operated and it does not meet the desirable targets. But this relationship is negligible in the long-run since it is not significant. Here it is worth notable the quotation by Muhammad and Faridul (2011). *"Maybe, government expenditures are driven by political considerations rather than*

necessity consideration. National resources are diverted to meet political ends at the expense of productive development projects. Expenditures on human capital formation and health care have taken the back seat".

Table 4. 8: Long-Run Estimates Based on AIC-ARDL (4, 2, 0, 2, 1)

Variables	Coefficients	Std. Error	T-Statistics	P-value
LOPEN	-0.045761	0.018504	-2.473053	0.0200
LGDPPC	0.069395	0.028274	2.454431	0.0208
LGCE	0.072955	0.040016	1.823150	0.0794
LINF	-0.039620	0.036545	-1.084123	0.2879

Notes: Dependent Variable: LGC

Likewise, according to Dollar and kaary (2003), *"This may not be very surprising, since in many developing countries, these social expenditures often benefit the middle class and the rich primarily, and the simple share of public spending on the social sectors is not a good measure of whether government policy and spending is particularly pro-poor*".

8. Short-run Determinants

After examining the results for long-run determinants, we are curios now to look at the short-run determinants of income inequality in case of India. This has been done by parameterizing ARDL model into ARDL-ECM (4, 2, 0, 2, 1) model as can be seen from the Table-10.

The coefficient of co-integrating equation is 2.918929 with negative sign being significant at 5% level. This shows the good sign for our model about the existence of co-integrating relationship amongst the variable. The highly significant error correction term suggests that 0.80% is adjusted in the current period for a 1% disequilibrium caused by the regressors in the last period. Since the value of stochastic error term is quite high, there exists a very high speed of adjustment towards the long run. Extent of the speed of adjustment towards long-run equilibrium is corrected by the magnitude of the error correction term.

We can have an overview at the robustness indicators from the Table 4-9. The R-squired value is much greater than 50% (i.e. 61% in this case). Hence our model ARDL-ECM does well

fit for the actual data. The F-statistic value is 4.86. Hence the response variable is combinedly well influenced by the predictor variables significantly.

It is evident from the Table 4-9 that 1% increase in income inequality itself in the two years back further increases income inequality in the current period by 0.44% significantly. Likewise, if income inequality increases by 1% in income inequality in the three years back, income inequality in the current year increases by 0.42% significantly. However, the same relationship exists between income inequality in the current year and the income inequality prevailed in the four years back, but it is not significant.

As we can observe from the table that income inequality increases with the increase in trade openness in the short run. As we can see, 1% increase in trade openness results in, on an average, 0.02% increase in income inequality. But the impact is weak and having negligible relationship within one year. But trade openness of the last two years increases income inequality in the current period by 0.40%. The result obtained does support the finding by Savvides (1998) andMohsen Bahmani-Oskooee, Scott W. Hegerty, And Harvey Wilmeth (2008). Savvides(1998) suggests that the impact of trade openness on income inequality often vary from country to country.

As can be seen from the Table 4-9, inflation and income inequality are negatively associated with each other in the short-run. In other words, 1% increase in inflation do cause to reduce income inequality significantly by 0.06%. Hence our empirical results for the negative effect of inflation on income distribution in the short run is convincing as per our theoretical understanding. It is also evident from the theoretical literatures that in the short-run retail inflation is must often driven by food inflation. Due to hike in food inflation, the poor producers in the rural agricultural sector gain much at the cost of the rich urban consumers.

Table 4. 9: Short-Run Dynamic Results from ARDL ECM (4, 2, 0, 2, 1)

Variables	Coefficients	Std. Error	T-Statistics	P-Value
C	-2.918929	0.479157	-6.091797	0.0000
@TREND	-0.002382	0.000409	-5.825330	0.0000
D (LGC (-1))	0.444774	0.122617	3.627345	0.0012
D (LGC (-2))	0.418277	0.132790	3.149913	0.0040
D (LGC (-3))	0.264622	0.138445	1.911382	0.0666
D (LOPEN)	0.016312	0.014348	1.136844	0.2656
D (LOPEN (-1))	0.040162	0.017545	2.289073	0.0301
D(LGCE)	0.093183	0.033877	2.750587	0.0105
D (LGCE (-1))	-0.104086	0.033048	-3.149508	0.0040
D(LINF)	-0.060627	0.026404	-2.296096	0.0297
Coint. Eq (-1) *	-0.796564	0.130787	-6.090519	0.000

Robustness Indicators	
R-squared= 0.610393	Akaike info criterion = -7.001963
Adjusted R-squared= 0.484713	Schwarz criterion= -6.546860
Sum squared resid= 0.001325	Hannan-Quinn critter. = -6.835150
Log likelihood= 158.0412	S.E. of regression= 0.006539
F-statistic= 4.856730	Durbin-Watson stat= 2.099450
Prob(F-statistic) = 0.000319	

Notes: ARDL Error Correction Regression

Dependent Variable: D (LGC)

It should be noted here that GDP per capita does not appear in the short run estimation table as because for its zero-lag order. As per the interpretation rule, the coefficient of LGDPPC obtained in table-9 is same for the coefficient to be interpreted for short-run dynamic results. Hence, if GDP per capita increases by 1%, income inequality also increases by 0.07% in the short run. This result provides strong support to several studies that held jobless growth in India.

It is evident from the table that the degree of income inequality increases with the increase in significantly in the short run. That is if government consumption expenditure increases by 1% do income inequality also increases significantly by 0.09%. This finding strongly supports the view that consumption expenditure by Government of India is not being properly channelized. Two conclusions can be drawn from here;

- Government intervention through consumption expenditure is ineffective to lower income inequality in India.
- It is rather redistributing income in the opposite direction. In other words, instead of benefiting the poor it is benefiting the richer section,

This result support the finding by Muhammad and Faridul (2011) for the economy of Pakistan.

9. Diagnostics test results of the model used

As can be seen from the table-11, Our ARDL (4, 2, 0, 2, 1) passes all the diagnostics tests i.e. Serial Correlation, Normality, Functional Form and Heteroscedasticity.

- **Serial Correlation Test**

The serial correlation has been checked by applying Breusch-Godfrey Lagrange Multiplier testing method. This test is generally applied to the models which involves predetermined variables. Generally, this kind of specification is often made in econometric modelling.

The null-hypothesis is stated for non-existence of serial correlation in the disturbance term of the regression model up to order 4 (in this case). This hypothesis is either rejected or not basing up on the P-value of F-statistics or Observed R-squired statistics. It is evident from the given Table 4-1, the p-value for F-statistic is 49%. Since it is greater than 5% level of significance , we failed to reject the null hypothesis. Hence the statement that there is no serial correlation in the disturbance term in the regression model up to order 4 is true and accepted at 5% significance level. The same can be inferred from the Observed R-squired and its corresponding P-value.

- **Normality Test**

As can be seen from the Table-11, Normality test has been performed by applying Jarque-Bera test statistic. It is stated under the null hypothesis that the variables under the model is normally distributed. Since P value is not significant, we concluded that the variables are normally distributed.

Table 4. 10: Diagnostics Test Table

Diagnostics test categories	Diagnostics tests results
A- Serial Correlation	F-statistic = 0.873900 Prob. F (4,23) =0.4946
	Obs*R-squared= 5.541118 Prob. Chi-Square (4) = 0.2361
B- Normality	Jarque-Bera= 1.551803 Probability= 0.460289
C- Functional Form	T-statistic= 1.644236(26) Probability=0.1122
	F-statistic= 2.703512(1, 26) Probability=0.1122
D- Heteroscedasticity	F-statistic= 0.882217 Prob. F (14,27) = 0.5848
	Obs*R-squared= 13.18246 Prob. Chi-Square (14) = 0.5122

Notes: A- Serial correlation has been checked by using BG serial correlation LM test, B- Normality has been checked with the help of Jarque-Bera test statistic. C- Functional form of the model has been checked by employing Ramsey's RESET test, D- Heteroscedasticity of the residual has been checked by employing BPG test.

- **Test for Functional Form**

We have employed the Ramsey's RESET test to check whether the model under study is correctly specified or not. The null-hypothesis is stated as the regression model as a whole under study is well-specified. The F-statistic is generally used for overall significance and in our case, it is significant. Thus, we cannot reject the hypothesis of correct specification of the model at the given significance level. One can verify the statement for the T-statistic and its P-value.

- **Test for Heteroscedasticity**

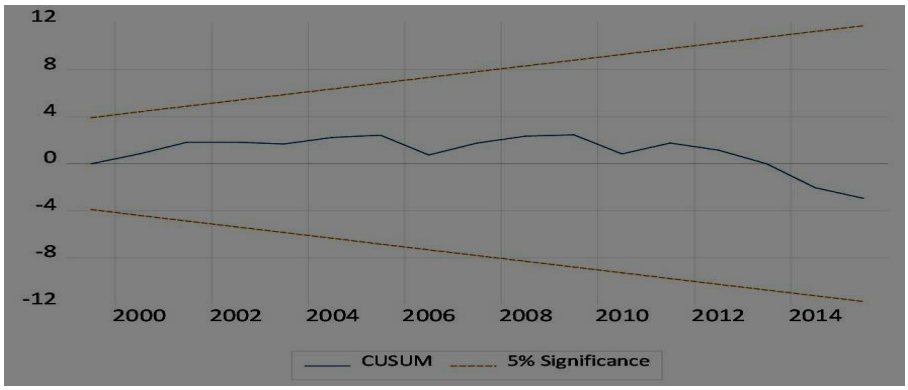
At last but not the least, we can look for the test of heteroscedasticity. Breusch-Pagan-Godfrey (BPG) test has been employed to check whether the stochastic error term is homoscedastic or not. The table specified below shows that the test involves F-statistic value and

Observed R-squired value and their respective probability value. For both the test statistic, the probability values are 58% and 51% respectively which are further higher than the 5% significance level. Thus, the null-hypothesis which states that there is the presence of homoscedasticity in the disturbance term is accepted at 5% significance level.

10. Stability Test Results

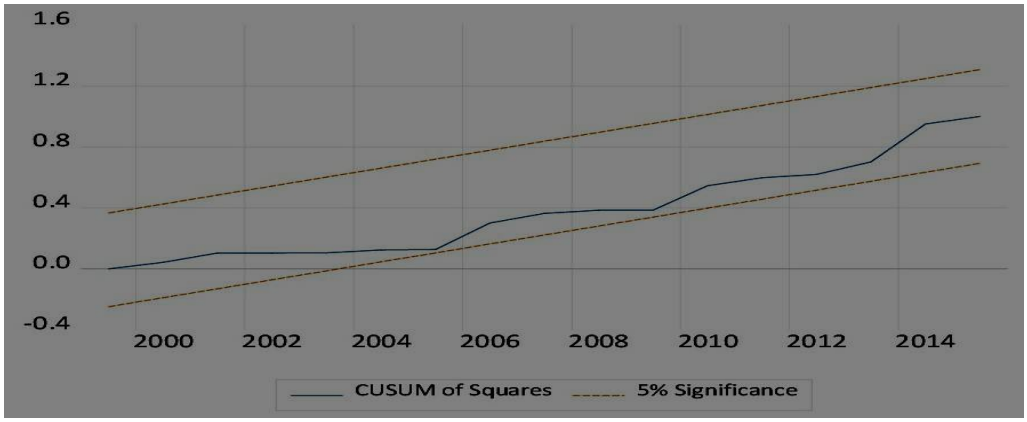
As can be seen from figure4.3 and figure 4.4, the model does not suffer from structural instability. Figure 4.3 depicts the Cumulative Sum of Recursive Residual (CUSUM) test and that of the Figure 4.4 Cumulative Sum of Squares of Recursive Residual (CUSUM-SQ) test. The variables under study lies within the boundaries of the 5% critical lines and does not suffer from structural instability.

Figure 4. 3: CUSUM Test Result



Notes: The straight lines represent critical bounds at 5% significance level.

Figure 4. 4: CUSUM SQ Test Result



Chapter-5

5. Conclusions, Policy Implications and Limitations

1. Conclusions of the Study

Income inequality declined rapidly in the initial phase of 1960s. Thereafter with a little fluctuation, it remained in a tolerable limit till the late 1980s. However, income inequality increased at a rapid pace since 1984 to 1987 and with a marginal decline, it again increased steadily from 1994 to 2005 following the reformative actions by GOI. A little fluctuation in income inequality took place between 2005 and 2010. From 2010 to 2011 (Within one year) income inequality increased from about 0.36 to more than 0.37. Income inequality is constant from 2011 to 2015. Our results do support conventional hypothesis made by many authors in relation to the nexus between the underlying variables.

Employing the ARDL model, we found out that trade openness affects income distribution negatively in the long run. But income inequality increases with the increase in the degree of trade openness in the short run. This empirical result is consistent with the views of Florence J., Subir L., and Chris P. (2013).According to our findings, both in the short-run and the long-run, higher level of inflation reduces the degree of income inequality. The reason for this nexus in India is either the economy possesses larger number of debtors, the inflation is mild, and inflation is due to hike in food prices. This result support the large body of literatures that include Muhammad and Faridul (2011), Bittencourt (2006, 2009), Jantti (1994) and Mocan (1999). General government consumption expenditure results in increase in income inequality in India. Both in the long run and the short run. It means that government consumption expenditure is not incurred in the proper channels. The result for the nexus between GDP per capita and income inequality is same both in the short-run and the long-run.

2. Policy Implications

The monetary authorities should rely on price stability, but mild inflation should be allowed for expanding the economic activities and checking income inequality. Government should intervene less in international trade as it enables productivity growth via enhancing technological efficiency and thereby improves income distribution in the long-run. There is the need of inclusive economic policies that will promote economic growth and check higher level of income inequality.

3. Limitations of the Study

After all, we recognize some of the limitations of our study. We have taken Gini coefficient for measuring income inequality. The consumption Gini has been taken as the proxy for income Gini. For India, household income data is not available as it is not collected by any authorities mainly because for the large informal sector. If we would have taken income Gini than income inequality would have been much larger than that we have considered for. Change in Gini coefficient also comes from the changes in relative and absolute shares of different income quantiles. Further the scope of the study contains only at the aggregate level. Further research needs comparative analysis on the relationship between the underlying variables at the state levels and distinctly on rural and urban areas. Various issues such as migration of households to different places during study period, effects of changing socio-cultural aspects, changing political climates etc. should be considered while analysing the nexus between these variables.

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Seminar Research Paper

IMPACT OF MACOECONOMIC VARIABLES ON INCOME INEQUALIUTY: EVIDENCE FROM INDIA

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Abstract:

The income distribution has worsened in various parts of the globe steadily since 1990 particularly after the advent of globalization and trade liberalization. According to the Global Agenda Survey, the poorest half of the population owns less than 10 percent of its wealth in Developed Countries and Less Developed Countries alike. These studies state that there is an increasing tendency of income inequality world over. Several studies have been conducted for cross-country practices that include both developed and developing countries, experiences of the developing countries and experiences of the individual countries. In this context, the study examined the severity of income inequality in India and impact of macroeconomic activities such as real GDP per capita, inflation, trade openness and government consumption expenditure during the period from 1970 to 2015. The study has utilized the Autoregressive Distributive Lag Model (ARDL Model) and ARDL-ECM technique to find out the long-run and the short-run effects of macroeconomic variables on income inequality. The study found out that increase in in real GDP per capita results in higher level of income inequality both in the short-run and long-run in India. The results show that higher rate of inflation improves income inequality both in the short-run and the long run. This is because inflation in India is mainly driven by food inflation which favorably affects the return of rural farmers. Inflation also redistributes income from the creditors to the debtors and India possesses large number of debtors. Increase in trade openness reduces the degree of income inequality in the long run but opposite happens in the short run. However, the results depict that government consumption expenditures increase income inequality both in the long run and the short run as it is not being channelized in the proper direction.

Key Words: Income Inequality, Inflation, Trade Openness, Economic Growth, ARDL

1. Introduction

For the first time in the history of the globe, the Sustainable Development Goals (SDGs) have included a goal on reducing inequality. The 10th goal of SDGs states to reduce inequality within and among the countries. Target-1 of Goal 10 depicts "By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average". As can be seen from Figure-1, income inequality has come down significantly within the decade 1960 to 1970. This has been shown by the downward trend of the figure at which Gini coefficient came down from 0.33 in 1961 to below 0.31 in 1970. From 1970 to 1980, income inequality remained in a tolerable limit. Although accurate reason for this is not clear, it seems because for the initiatives taken by policy makers for inclusive growth as discussed above. This is also the result of dramatic increase in productivities and availability of High Yielding Varieties (HYVs) of cereals in the latter half of 1960s in Indian agricultural sector. During this time there was also a significant hike in the rate of inflation. However, degree of income inequality shows a significant reduction, many households continued to live below poverty line. Income inequality increased at a rapid rate following the Balance of Payments (BOPs) crisis of 1990s. Advent of new economic policies in 1991 accelerated the pace of economic growth, but the benefit concentrated among the capitalists and business sectors leaving aside the poor poorer. The jobless growth of the post-reform period is reflected in the rapid rate of increase in income inequality as can be seen from 1993 to the present times in the figure presented below.

Evolution of Gini coefficient in the post-independence era in India depicted in Figure-1 also confirm to that of the findings by Thomas Piketty and Lucas Chancel (2017). As per their findings, there was a stronger reduction in top income shares in 1950s and 1970s. It is evident from the Figure-1 that Gini coefficient comes down to below 0.31 in 1970. This was because for the prevalent of socialist policy implemented by Jawaharlal Nehru up to 1970s which led to strong market regulations and high tax progressivity. However, the top income shares increased significantly from 1980s onwards. This is mainly because for market deregulation and reformative actions in various sectors of the economy. It can be observed from the figure that income inequality has reached to its historically peak level at recent times. "The share of national income accruing to the top 1% is at its highest since the creation of the Indian Income tax act in 1922. The top 1% of earners captured less than 21% of total income in the late 1930s, before dropping to 6% in the early 1980s and rising to 22% in the recent period"-Thomas Piketty and Lucas Chancel (2017).

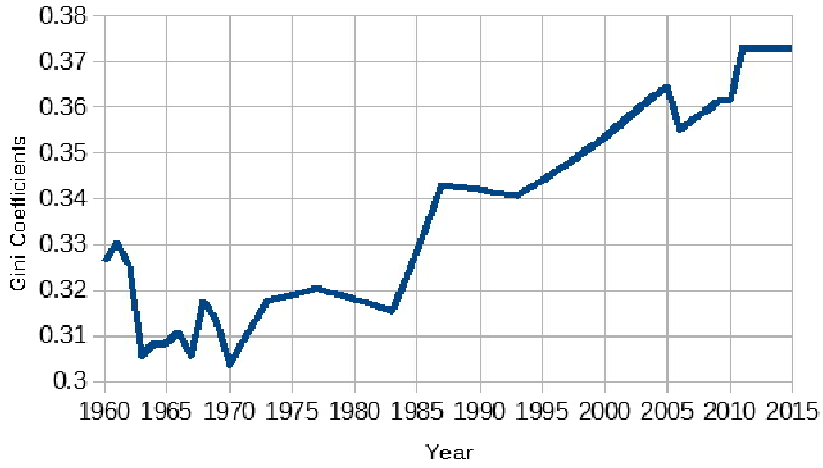

Figure-1**:** Evolution of the Gini Coefficient (On in scale)

Source: Author's calculation from Global Consumption and Income Projects

2. Review of Literature

Easterly and Fischer(2001) examined the effects of inflation on poor as well as on the distribution of income by looking forward whether inflation is an important national problem. Their work is based on the survey data collected by Roper Starch during the period February to May 1995. The primary survey covers 31,869 respondents in 38 countries. Out of 38 countries 19 were developed and another 19 were developing countries. As per their study the relative measures of well-being i.e.- share of the bottom quantile in income, poverty rate and real minimum wage are associated with inflation rate. They have taken the changes in the share of the bottom quantile as the indicator of income inequality. Their findings reveal that a movement from zero inflation to hyperinflation reduces the income shares of the bottom quantile by 1.7 percentage point. Their results support the views of the existence of the positive relationship between inflation and income inequality. Their findings also support that inflation is regarded as crueler for the poor than for the non-poor. They found that higher inflation lowers the share of household income to the national income. Hence inflation hurts much to the marginalized sections of the society particularly to the people under below poverty line, uneducated ones and daily laborers.

Deaton (2010) with the help of non-parametric statistical analysis made a study on whether higher rice prices affect the distributions of real income across rural and urban Thailand. One of the objectives of his study was to assess the effects of rice price on income distributions on the households of the Thailand. He proceeded by observing the consumption and production pattern

of households taking into consideration the standard of living and geographical location of the households. He concluded in his study that higher rice price is beneficial to rural households at all levels of living. But exceptionally neither the poorest rural households nor the richest rural households are the main beneficiaries. The direct benefits from the hike in rice price goes to the middle-income groups of the rural households in the entire Thailand. Although there was the existence of a marked regional differences depending upon the importance of the rice crop, he found no pattern by which higher prices support rural rich at the expense of rural poor.

Walsh and Jiangyan (2012) made a comparative study between India and China depicting the role of food and non-food inflation in the inflation-inequality nexus. Their findings show that increase in headline inflation leads to widening of the gap between the rich and the poor in China. Increase in the rate of economic growth slowly widen the income inequality in China. However, the picture becomes different when the effect of disaggregated inflation (food and non-food inflation) is analyzed through the AB GMM specification. There exists a very weak relation between the headline inflation and income inequality in case of India. They also have shown that higher GDP per capita is widening the income inequality in India. In case of urban areas, headline inflation and income inequality are having positive and significant relationship. The positive and significant relationship hold for per capita GDP and income inequality as well. The results become stronger when head line inflation is divided into food and non-food inflation. In rural areas, food inflation significantly reduces income inequality while the opposite happens in case of non-food inflation and income inequality. The noon-food inflation is associated with higher level of income inequality for urban areas as well. They concluded for China that inequality rose at a faster rate in rapidly growing states and pointed out this effect was stronger in urban areas.

Madhu and Giri (2015) examined both the short-run and long-run relationship between inflation, trade openness, economic growth and financial development with income distribution in India. Employing the ARDL bound testing aproach for long-run relationship and ARDL-ECM model for short-run relationship, he found some of the strange results for India. The study period covers the annual time series of 1982-2012. They found that financial development does not reduce income inequality rather it aggravates the gap between the rich and the poor. According to them, trade openness lowers income inequality as the trade liberalization provides more job opportunities to the workers. As per his findings, 1% increase in trade openness on an average improves income distribution by 0.12% in the long-run in India. However, 1% increase in the

inflation rate aggravates income inequality by 0.04%. 1% increase in trade openness causes income inequality to come down by 0.08% in the short-run. The short-run dynamics for inflation is same as that of the long-run dynamics.

Albanesi (2007) being motivated by the cross-country analysis of the positive correlation between inflation and income inequality, he explored the hypothesis that the correlation between inflation and income inequality is the result of distributional conflicts of the determinants of fiscal policy. His study is based on the economy in which income inequality arises from exogenous differences in human capital and money is demanded for transaction purchases. Generally, government raises revenue by imposing taxes on labor income or issuing money within the economy which leads to inflation. As a result of which, in more income inequality prone economies, the relative vulnerability to inflation by the poor households increases. However, his scope of analysis is limited to the re-distributional effects of inflation.

Fukuda (2017) found a strong relationship between financial development and income inequality in India. The time period he considered for the study was 1952-2011. With the help of the empirical models i.e. VARX and ARDL model, he revealed the financial development-income inequality nexus in India with great precision. He went for assessing both the linear and non-linear effects of financial efficiency on income inequality for the case of India. Although he did not find the non-linear association between the variables, he found positive relationship between financial size and efficiency and income distribution and also between trade openness and financial openness and income distribution. In other words, financial development increases income inequality as that of the financial openness and trade openness does. As per the study, it should be noted here that increase in trade openness aggravates income inequality in India.

Muhammad and Faridul (2011) examined the effects of financial development on income distribution for the economy of Pakistan by applying Autoregressive Distributive Lag Model (ARDL). Their results show that financial development and economic growth are negatively associated with income inequality while financial instability is positively associated with income inequality. In other words, financial development and overall growth performance of the economy are not inclusive and thus hurts the poor most. However, it is trade openness which helps in deteriorating income inequality benefiting the poor. The robust results found out by them show that GDP and government consumption expenditure aggravate income inequality significantly in the long-run as well as in the short run. Their findings again show that inflation

reduces income inequality in the long-run. They found the positive and significant relationship between trade openness and income inequality in the long-run but insignificant positive relationship in the short-run. It is evident from various literature that most of the exporting firms in developing countries use educated workers for capturing higher productivities.

Dollar and Kraay (2003) examined the effectiveness of trade openness, inflation, government consumption and financial development on the income of bottom 20% of the population. The scope of their study is much broader. The sample size of their study involves 953 observations covering 137 countries (Both the developed and the developing countries) over the period 1950-1999. Their study covers the largest data set to examine the relationship between inequality, income and economic growth. By Examining major determinants of economic growth and that of the income of the bottom 20% of the population with the help of Ordinary Least Squire (OLS), they found out the relationship between the variables. Their study shows that trade openness improves the income levels of the poor thereby reduces income inequality while inflation, government consumption and financial development worsens income inequality by reducing the income of the bottom 20% population.

Azleen and Mansur (2017) examined the long-run and short-run relationship between financial development and income inequality for Malaysia. Their study shows that income inequality of Malaysia decreased from 0.56 in 1976 to 0.4 in 2014. This was consistent with the expansion in banking industries and financial sector. They were also concerned in examining the role of financial sector reform in improving income distribution particularly in developing countries by mobilizing savings into productive spending. An important result they found is that financial development is not statistically significant in making impact on income inequality during the study period. This is true for the shorter period as same result has been obtained by Law & Tan (2009)[8]. The Variance Decomposition (VDC) result shows that financial development is a desirable tool to employ for improving income distribution in the Malaysian economy. It is evident from their study that trade openness does reduce income inequality in a developing economy like Malaysia. They suggest government to enhance access to financial market by inclusive policies to direct the economy towards pro-growth and pro-poor development path.

[8]The study period of Law and Tan (2009) involves 1980-2000.

Daumal. (2013) investigated for the linkages of regional inequalities and trade openness in case of India and Brazil. He has estimated the results by using Vector Error Correction Model (VECM). As per his findings, 1% increase in trade openness causes regional inequality to decrease significantly by 0.11% within one-year period for the Brazilian economy. However, 1% increase in trade openness causes to aggravate regional inequality significantly by 0.40% within the one-year period in the case of India. According to his calculations, the impact of increases in trade openness India last for three years. Opening up of the domestic economy allowing foreign competitors to take part in Indian markets makes poor poorer and rich richer.

Agusalim. and Pohan (2018) examined the effect of trade openness on income inequality in the economy of Indonesia by using secondary data. They used the Vector Error Correction Model (VECM) for analyzing empirical results. The variables they used for the study involves trade openness, GDP per capita, open unemployment rate and Gini coefficient. They found highly insignificant negative effect of trade openness on income inequality in the long-run. But in the short-run, this negative effect is highly significant. In the short-run economic growth aggravate income inequality significantly like that of the long-run. This indicates that the economy is in the path of jobless growth and need inclusive policies to combat income inequality.

3. Data and Methodology

All the datahave been collected from the secondary sources. The data for the dependent variable i.e. Gini Coefficient has been extracted from the recently compiled source Global Consumption and Income Projects (GCIP). Although Gini coefficient is most widely used index for measuring income inequality world over, there is no household income data for India. Thus, there is no single source that compile accurate time-series Gini income data for India. Because for this reason, we have taken Gini-consumption expenditure data as the proxy for Gini-income data. All other data for independent variables i.e. Inflation, Openness, GDP per capita and General government consumption expenditure have been gathered from the World Bank's World Development Indicators (WDI). Basing upon the availability of data to the latest time period possible, the study period covers from 1970 to 2015. Thus, the number of observations for the study is 46.

We have employed the empirical econometric model called Auto-Regressive Distributive Lag Model (ARDL model) for testing the long-run and short-run relationship amongst the macroeconomic variables under study. It is for a small sample size and single cointegrating

vector, ARDL model proposed by Pesaran and Shin (1995) and Pesaran et al (1996b) is generally used. Irrespective of other econometric tools, it is the Autoregressive Distributive Lag cointegration technique which is also called the bound testing approach has been employed for examining short-run and the long-run relationship amongst the variables.

4. Empirical Results and Discussions

4.1 Stationarity Test of The Variables Used in The Study

The stationarity of each of the variables have been checked by employing both the Augmented Dicky-Fuller (ADF) test. As per the desirability of our studies, both the constant and trend has been selected during conducting ADF tests.

4.1.1 Augmented Dicky-Fuller (ADF) Test

In table 2, the ADF unit root test results for each of the variables used in the study have been represented. The test has been conducted both at the level and first difference. Lag length has been selected by using Akaike Information Criterion (AIC). Lag length is selected generally to avoid the auto-correlation problem and to enhance the robustness of the results. As can be seen from the table, LGC (Log of Gini coefficient) is stationary both at the level and first difference. The lags period selected by the AIC is 2 and 4 respectively. At level p- value is 2% which is far lower than 5%. So, we rejected the null hypothesis that LGC has a unit root. The same decision has been taken for the first difference. Hence the series is both integrated of order I (0) as well as order I (1)) as per the ADF test. As can be seen below, LINF (Log of Inflation) is non-stationary at level but stationary at first difference. Their respective lag order is 1. At level, P-Value is 12% which is far greater than 5%. Hence, we failed to reject the null hypothesis and accepted the assumption that the series has a unit root. At first difference, P-value is less than 5% (0.02% < 5%). Hence, we rejected the null-hypothesis and accepted the alternative hypothesis that the series is stationary at first difference. Likewise, the decision has been taken for other variables i.e. LOPEN, LGDPPC and LGCE basing upon P-value criterion. Although all these variables are non-stationary at level, they all are stationary at first difference which satisfies the desirable condition of our ARDL and ARDL-ECM models. One can verify that the decision is same if one takes according to test critical value and the ADF critical @ 5% significance level.

Table 2: Augmented Dicky-Fuller Test Results

Variables	Level/First Difference	Lags	Test critical value 5%	ADF critical 5%	P-Value	Decision
LGC	Level	2	-3.518090	-3.784113	0.0271	Stationary
	First difference	4	-3.526609	-4.859081	0.0018	Stationary
LINF	Level	1	-3.515523	-3.058678	0.1288	Non-Stationary
	First difference	1	-3.518090	-5.612498	0.0002	Stationary
LOPEN	Level	0	3.513075	-1.438398	0.8356	Non-Stationary
	First difference	0	-3.515523	-5.398795	0.0003	Stationary
LGDPPC	Level	4	-3.523623	-0.125059	0.9927	Non-Stationary
	First difference	3	-3.523623	-5.508294	0.0003	Stationary
LGCE	Level	1	-3.515523	-2.352822	0.3981	Non-Stationary
	First Difference	0	-3.515523	-3.622392	0.0393	Stationary

Notes: For ADF, AIC has been used for selecting lag length.

4.3 Cointegration through bounds test

4.3.1 F-bounds testing approach

The F-bounds test results have been presented in table-5. As can be seen from the table-5, the test covers asymptotic distribution of the values of the variables up to 1000 (Asymptotic: n=1000) although our actual sample size is 42 after adjustment. The F-statistics value is 6.461608 which is greater than the upper bounds at all levels of significance. Hence, we rejected the null-hypothesis and accepted the alternative hypothesis that the variables are co-integrated.

Table-5

F-bounds test table

Asymptotic: n=1000

Significance Level	F-Statistics	6.461608
	Lower Bound	Upper Bound
10%	3.03	4.06
5%	3.47	4.57
2.5%	3.89	5.07
1%	4.4	5.72

Actual Sample Size 42

4.4 Long -run relationship

The long-run relationship amongst our target variables have been analyzed basing up on empirical AIC-ARDL (4, 2, 0, 2, 1) model. Our dependent variable in this model is LGC (Log of Gini Coefficient As can be seen from the table, the long -run coefficient for LOPEN is -0.045761 and it is highly significant at 5% significance level since P-value is less than 5%. Thus, we can interpret the result for LOPEN that 1% increase in openness can cause 0.05% decrease in income inequality in the long-run.There is large body of literature that suggest that opening of an economy improves productivity via technology and generates more employment opportunities particularly in exporting sectors. This means that trade liberalization is associated with lower

income inequality in the long-run which supports the empirical findings by Florence Jaumotte, SubirLall, and Chris Papageorgiou (2008).

The long-run coefficient for LINF is -0.039620 and it is not significant at 5% level of significance since P-value is quite larger than 5% significance level i.e. 29% > 5%. Hence, inflation income inequality negatively in the long-run but the relationship is not significant. In other words, inflation and income inequality are having negative weak relationship in the long-run. Therefore, we can interpret that 1% variation in inflation can lead to 0.04% decrease in income inequality in the long-run but in a weak manner. The general theoretical building blocks of macroeconomics also supports this view. There exists the large body of theoretical and empirical literature which favors the view that moderate inflation improves income distribution, but its effect is negligible in the long-run. One important theoretical justification for this relationship is that inflation favors the debtors and most of the poor in underdeveloped countries are indebted. The results obtained do support the findings by Muhammad Shahbaz And Faridul Islam (2011), Jantti (1994) and Mocan (1999).

Table-6

Long-run estimates based on AIC-ARDL (4, 2, 0, 2, 1).

Variables	Coefficients	Std. Error	T-Statistics	P-value
LOPEN	-0.045761	0.018504	-2.473053	0.0200
LGDPPC	0.069395	0.028274	2.454431	0.0208
LGCE	0.072955	0.040016	1.823150	0.0794
LINF	-0.039620	0.036545	-1.084123	0.2879

Notes: Dependent Variable: LGC

LGDPPC (Log of GDP Per Capita) and LGCE (Log of General Government Final Consumption Expenditure) possess long-run positive coefficients. LGDPPC is significant at 5% level of significance i.e. 2% < 5%. Hence, 1% increase in per capita GDP leads to positive and significant increase in income inequality by 0.07%. This means that our growth pattern is not inclusive, and the finding pose evidence for the jobless growth. This result support the findings by Shahbaz, M. (2009a), Shahbaz M. And Islam F. (2011).

LGCE also possess positive coefficient but it is significant at 10% significant level. Thus 1% increase in government consumption expenditure causes 0.07% increase in income inequality.

This means that the general government final consumption expenditure is not channelized in a proper way. As per the findings of other studies, the consumption expenditure by government is politically operated and it does not meet the desirable targets. But this relationship is negligible in the long-run since it is not significant. Here it is worth notable the quotation by Muhammad Shahbaz And Faridul Islam (2011).

4.5 Short-run relationship

After examining the results for long-run relationship, we are curios now to look at the short-run relationship amongst the variables under study.

The coefficient of co-integrating equation is 0.796564 with negative sign and also it is highly significant as P-value is 0.000 < 5% significance level. This shows the good sign for our model about the existence of co-integrating relationship amongst the variable. The highly significant error correction term suggest that 80 percent is corrected in the current period for a 1% disequilibrium caused by the regressors in the last period. Since the value of error correction term is quite high, there exists a very high speed of adjustment towards the long-run. The magnitude of the error correction coefficient captures the speed of adjustment towards long-run equilibrium.

It can be seen from table-10 that income inequality itself in the two years back worsens income inequality in the current year by 0.44% significantly. Likewise, an increase in income inequality in the three years back cause income inequality in the current year to increase by 0.42% significantly. However, the same relationship exists between income inequality in the current year and the income inequality prevailed in the four years back, but it is not significant.

As we can observe from the table that trade openness is having positive and statistically significant relationship with income inequality in the short-run. As we can see, 1% increase in openness, do cause income inequality to increase by 0.02%. But the impact is weak and having negligible relationship within one year. But trade openness of the last two years increases income inequality in the current period by 0.40%. The result obtained does support the finding by Savvides (1998) andMohsen Bahmani-Oskooee, Scott W. Hegerty, And Harvey Wilmeth (2008).

Inflation, as can be seen from the Table-10, is having negative significant effect on income inequality. That is 1% increase in inflation cause to reduce income inequality significantly by

0.06%. Hence our empirical relationship between moderate inflation and income inequality, as it is negative as per our theoretical understanding, is convincing in the short-run.

It should be noted here that GDP per capita does not appear in the short run estimation table as because for its zero-lag order. As per the interpretation rule, the coefficient of LGDPPC obtained in table-9 is same for the coefficient to be interpreted for short-run dynamic results. Hence, 1% increase in GDP per capita leads to 0.07% increase in income inequality in the short run as well. This result provides strong support to several studies that held economic growth in India is not inclusive.

Table-7

Short-Run Dynamic Results from ARDL ECM (4, 2, 0, 2, 1)

Dependent Variable: D(LGC)

Variables	Coefficients	Std. Error	T-Statistics	P-Value
C	-2.918929	0.479157	-6.091797	0.0000
@TREND	-0.002382	0.000409	-5.825330	0.0000
D (LGC (-1))	0.444774	0.122617	3.627345	0.0012
D (LGC (-2))	0.418277	0.132790	3.149913	0.0040
D (LGC (-3))	0.264622	0.138445	1.911382	0.0666
D(LOPEN)	0.016312	0.014348	1.136844	0.2656
D (LOPEN (-1))	0.040162	0.017545	2.289073	0.0301
D(LGCE)	0.093183	0.033877	2.750587	0.0105
D (LGCE (-1))	-0.104086	0.033048	-3.149508	0.0040
D (LINF)	-0.060627	0.026404	-2.296096	0.0297
CointEq(-1)*	-0.796564	0.130787	-6.090519	0.000

Robustness Indicators

R-squared= 0.610393	Akaike info criterion = -7.001963
Adjusted R-squared= 0.484713	Schwarz criterion= -6.546860
Sum squared resid= 0.001325	Hannan-Quinn criter. = -6.835150
Log likelihood= 158.0412	S.E. of regression= 0.006539
F-statistic= 4.856730	Durbin-Watson stat= 2.099450
Prob(F-statistic) = 0.000319	

Notes: ARDL Error Correction Regression

It is evident from the table that government consumption expenditure is also positively and significantly related with income inequality in the short-run. That is 1% increase in government consumption expenditure do cause to increase income inequality significantly by 0.09%. This finding strongly supports the view that consumption expenditure by Government of India is not being properly channelized.

4.6 Diagnostic tests result of the model used

Table-8

Diagnostic Test Results

Diagnostics test categories	Diagnostics tests results
A- Serial Correlation	F-statistic = 0.873900 Prob. F (4,23) =0.4946
	Obs*R-squared= 5.541118 Prob. Chi-Square (4) = 0.2361
B- Normality	Jarque-Bera= 1.551803 Probability= 0.460289
C- Functional Form	T-statistic= 1.644236(26) Probability=0.1122
	F-statistic= 2.703512(1, 26) Probability=0.1122
D- Heteroscedasticity	F-statistic= 0.882217 Prob. F (14,27) = 0.5848
	Obs*R-squared= 13.18246 Prob. Chi-Square (14) = 0.5122

5. Concluding Remark and Policy Implications

Exploring the results for the short-run and the long-run impact of macroeconomic variables on income inequality, we came now in a position to conclude the study work. Our results do support conventional hypothesis made by many authors in relation to the nexus between the underlying variables in general. We found a significant long-run negative impact of trade openness on income inequality for India during the given time period. However, in the short-run, it imposes large socio-economic cost to the developing nations. Trade liberalization being compliment with the globalization and privatization from 1991 onwards shows larger negative impact on the poor, although it has revived the Indian economy from low economic growth and Balance of Payments crisis. The impact of inflation on income inequality is quite interesting. According to our findings, both in the short-run and the long-run, higher level of inflation narrows down the income gap between the Indian haves and have nots. The reason for this nexus in India is either the inflation is mild, the economy possesses larger number of debtors and inflation is due to hike in food prices. Economic growth and government consumption expenditure worsens the degree of income inequality in the long run as well as in the short-run. This is mainly because economic growth is not inclusive in its nature and government consumption expenditure is not channelized in the proper direction.

The monetary authorities should rely on price stability and mild inflation should be allowed for expanding the economic activities and checking income inequality. Government should intervene less in international trade as it enables productivity growth via enhancing technological efficiency and thereby improves income distribution in the long-run. There is the need of inclusive economic policies that will promote economic growth and check higher level of income inequality. Packages of financial reforms are needed for access to credit in rural areas. There is the need to check on manipulation of government spending in meeting political ends.

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