An Empirical Analysis Of Trade Openness And Income Inequality In India (1970-2013)

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ABSTRACT: Stolper-Samuelson theory that emerged from the Heckscher-Ohlin theory predicts that trade openness increases the income inequality in developed countries and decreases the income inequality in developing countries by favourably influencing the returns of the country's abundant factors and vice-versa .But in theoretical as well as in empirical literature many studies are present who do not support the Stolper-Samuelson's prediction regarding this particular relationship. Among the empirical literature some studies support the Stolper-Samuelson theory, while many of them find positive, negative as well as mixed and inconclusive results. So, this study is conducted in order to examine the long run relationship between trade openness and income inequality in particular case of India over the study period 1970-2013. The study applies Stability tests for structural breakpoint, Augmented Dickey-Fuller (ADF) Unit Root test, Johansen (1991) and Johansen and Juselius (1990) Cointegration test. The results of the cointegration test suggest that there is no long run relationship between trade openness and income inequality in India. This implies that increasing income inequality in India is due to some other reasons. Research can be carried out to determine the drivers of income inequality in India and this will be fruitful to maintain income inequality at a minimum level.

Index Terms: Trade Openness, Income Inequality, Structural Breakpoint, Uniot Root, Cointegration

1. INTRODUCTION:

Trade openness' refers to the opening of an economy to foreign trade by removing the trade barriers on goods and services imposed upon the economy. This leads to the integration of domestic market into a single world market. Here an expected question is – why does a country go for opening her economy to foreign trade? The answer is found with better understanding in the words of 'Staffs of World Bank and IMF' in 'Market Access for Developing countries' (2011), who argued that – "Integration into the world economy has proven a powerful instrument for countries to promote economic growth, development and poverty reduction……….The growing integration of the world economy has raised living standards and brought increased opportunity to many parts of the globe."It is also argued in the literature that importance of trade openness differs from country to country. Normally, openness is less important for those countries that have a wide geographical area and great variety of natural resources in comparison to those countries that are small in geographical size and endowed with less variety of resources. During the last few decades, many countries in the world, mainly developing or third world countries have opened their economies to foreign trade. As a result of that, the share of world trade in world output has increased to 59.84 percent in 2014 which was only 26.71 percent in 1970 (World Development Indicators, World Bank). At the same time world output as well as world income inequality has also shown increasing trend .Cornia and Court (2001) argued that the trend of income inequality has risen, in many cases sharply, since the early 1980s.In particular case of India also Income inequality has been seen to increase since the structural reforms of 1991. The income inequality indicator Gini Coefficient of India stood at 37.64 (in percentage) in 2004 which was below 28 percent in 1990 (WIID, World Bank).The value of Gini Coefficient ranges from 0 to 100 (in percentage form).

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The Gini Coefficient of 0 denotes perfect equality while Gini Coefficient of 100 indicates perfect inequality The relationship between trade openness and income inequality is a subject of debate among the existing academic literature, where transmission channels that linked openness of trade and income inequality remain very elusive. Stolper-Samuelson theory which is coming from Heckscher-Ohlin theory explains that trade openness increases income inequality in developed countries and decreases income inequality in the developing countries. According to this theory, trade changes the returns to various factors of production. The rate of return on the country's abundant factors which are used in the production of the exported good would increase due to foreign demand. On the other hand, the rate of return to the scarce factor would decline because of the reduction of demand arises from the importation of the scarce factor intensive product. Since developing countries are well endowed with unskilled labour and developed countries are well endowed with skilled labour and capital, Stolper-Samuelson theory predicts that trade openness increases the relative return to the unskilled laboures in developing countries and increases the relative returns to the skilled laboures and capital owners in developed countries. But Spilimbergo et al (1999) claims the opposite view by arguing that trade openness decreases the income inequality in a country relatively well endowed with capital since openness reduces the rents deriving from the ownership of capital. A number of channels are explained in the literature through which openness of trade could affect income inequality. Some important channels are explained by Andersion (2005). Firstly, greater openness could reduce inequality if it raises the real incomes of poorer groups. Secondly, trade openness can increase the income inequality between the urban and rural areas of a country if the country has comparative advantage in manufactures. When a country has comparative advantage in manufactures, then returns to human resources relative to the natural resources increases and the ratio of human to natural resources is relatively higher in urban areas .Moreover, manufacturing industries are mainly concentrated in urban areas and primary productions are mainly concentrated in rural areas. Narrowing down of income inequality between rural and urban areas will occur if a country has comparative advantage in primary products. Thirdly, Anderson (2005) supports the view of Fujita,

Krugman & Venables (1999) that the regional income disparities are smaller in a country well integrated with international trade. Since trade openness expands the firm activities in different regions because it makes it possible to get foreign sources of demand and intermediate inputs. This reduces the income gap between different regions especially in the real earnings of immobile factors like land. Moreover, Anderson (2005) claims that governments of open economies are eager to implement income distribution policies because there are some groups of people who may definitely suffer from trade openness and without re-distribution policies, losers of openness will try to prevent the implementation of free trade policies. But Spilimbergo et al (1999) claims the opposite. According to Spilimbergo et al (1999), governments of open economies have no tendency to re-distribute income and have less re-distribution policies. So, this implies positive correlation between trade openness and income inequality.

2. Review of Empirical Literature

The empirical literature on the relationship between trade openness and income inequality is not conclusive. While some studies find positive relationship between the two variables, then some other studies find negative as well as no association between the two. There are also some studies that have showed that the relationship is contingent upon some particular conditions.Many studies by enquiring the distributional effect of trade openness found that openness of trade increases income inequality (Barro, 2000; Wahiba, 2013; Mahesh, 2016 etc.). Barro (2000) investigated the relationship between income inequality and growth. By using a panel of countries, the study tries to estimate the Kuznets curve. But after the addition of the interaction term between the lagged values of openness ratio and the log of per capita GDP, the study finds that greater openness to trade goes along with more inequality both in the short run as well as in the long run in poor countries which contradicts the prediction of the standard trade theory. For rich countries, the study finds negative association between the two. Wahiba (2013) found remarkable positive effect of trade openness on the level of inequality in the wage distribution over the period when the Tunisian economy integrated with the global economy .Mahesh (2016) has found significant positive relationship in BRIC countries for the period 1991-2013 by using the GMM technique. The study also found same positive result when the test is conducted separately.The second group of empirical studies (Bourguignon and Morrisson (1990), Calderon and Chong (2001) etc.) supports the prediction of the Heckscher-Ohlin model. Bourguignon and Morrisson (1990) employed a cross country panel data analysis in developing countries and find significant effect of foreign trade in reducing income inequalities in these countries. According to them, trade openness reduces income inequalities in the less developed countries because they are labour abundant and trade openness increases their real wage. Calderon and Chong (2001) also find negative effect of trade openness on income inequality by using a dynamic panel data approach. According to this study, not with the terms of trade but with the volume of trade, the findings are consistent with the Heckscher-Ohlin model.Many studies (Spilimbergo et al. 1999; Bensidoun et al, 2011 etc.) however showed that effects of trade openness on income inequality are dependent upon the country's level and pattern of factor endowments, which is not consistent with H-O model. Spilimbergo et al. (1999) find that countries that are land and capital intensive have less equal income distribution while countries that are skill intensive have more equal income distribution. The study has also shown that the effects of trade openness on income inequality depend on factor endowments is not consistent with the simple H-O framework, but it is consistent with several recent case studies. Bensidoun et al. (2011) showed in their study the significant impact of factor content of trade on income distribution. According to them, labour content of trade and income inequality is positively related in poor countries and negatively related in rich countries. The reverse is true in case of capital content of trade and its impact on income inequality in poor and rich countries respectively.   Some studies (Edwards, 1997; Agusalim and Pohan, 2018 etc.) showed no significant relationship between trade openness and income inequality. Edwards (1997) uses a large sample of countries and time series analysis with the utilization of different estimation techniques to examine the relationship between trade openness and income distribution in the sample countries. The study doesn't find any significant effect of trade openness on income inequality. Agusalim and Pohan (2018), although find significant negative short run relationship between trade openness and income inequality, but do not find any significant relationship in the long run. They investigated this relationship by using Vector Error Correction Model (VECM) and Impulse Response Analysis. The particular case of India regarding the relationship between trade openness and income inequality is controversial and not conclusive. While some studies (Jha, 2000; Pal and Ghosh, 2007; Cain et al. 2010; Mahesh, 2016; Mahenty, 2017 etc.) support the view that openness has not contributed to the reduction in income inequality rather increases it, but some other studies (Mishra and Kumar, 2005; Ganaie et al.2018 etc.) find that trade openness reduces income inequality in India. In addition to this, some studies showed mixed result regarding both vertical and horizontal inequality (Agarwal et al. 2008; Krishna and Sethupathy, 2011; Khan and Basir, 2011 etc.).Thus from the literature it is cleared that majority of the studies on the relationship between trade liberalization and income inequality are panel data studies of a group of countries. Limited time series studies are found on a single country (Khan and Basir, 2014) .Moreover, theoretical literature although not conclusive, but somehow able to explain the linkages between the two variables. But empirical literature on the one hand is not uniform regarding the relationship and on the other hand many of them show no connection or relationship between the two variables. In case of India also, the empirical evidences are not unambiguous and single country time series studies are very few. One of them is the Khan and Bashir (2014).The present study is organized in order to reinvestigate the relationship between trade openness and income inequality in particular case of India over a long time period 1970-2013 by applying time series techniques. The null hypothesis (H_0) is that there is no cointegration or long run relationship between trade openness and income inequality in particular case of India.

3. Data and Methodology

3.1 Data

To investigate the relationship between trade openness and income inequality, the present study uses secondary data. Data of the variables are converted into their natural logarithm form in order to avoid heterogeneity problem. Table (1) describes the variables name and the sources of data used in the present study.

Table 1: Variables Name and Data Source

Variable Name	Indicator Used in the study	Data Source
Trade Openness	Trade as a percentage of GDP, LTRADE	World Development Indicators(WDI), World Bank
Income Inequality	Gini Coefficient, LGINI	World Income Inequality Database(WIID),World Bank

3.2 Econometric methods

Stability Test for Structural ChangeBy the term structural change, it is meant that the value of the parameters of the model undergoes a structural change throughout the entire sample period. Structural changes occur due to different reasons. Sometimes, it may be due to external forces or due to policy changes or due to other causes.A number of tests of parameters instability have been proposed in the literature. Among them some of the most known tests are – Chow Breakpoint test, Wald test, Lagrange Multiplier (LM) test, Likelihood Ratio (LR) test, CUSUM test, CUSUM of Square test etc. In order to check the stability of the system or to investigate whether the variables under the model undergo a structural change or not, the present study employs two stability tests –

    i) CUSUM of Square Test and
    ii) Chow Breakpoint Test.

Unit Root Test Generally, time series data are non-stationary or they contain unit root. For cointegration test, all the series should be non-stationary in level but stationary at first difference or integrated of the same order. Therefore, it is necessary to check stationarity of the time series data which mainly contain unit root. Few tests are available to check stationarity properties of the variables among which Augmented Dickey-Fuller test is most popular and generally applied test to check unit root. This test is conducted on the basis of null hypothesis (H_0) that the variable has a unit root or non-stationary against the alternative hypothesis (H_1) that the variable is stationary. The ADF test with trend and intercept generally has the following expression:-

$$\Delta Yt = \beta 1 + \beta 2t + \delta Yt - 1 + \sum_{i=1}^{m} \beta i\, \Delta Y_{t-1} + \varepsilon_t$$

…………………………………… (Equation 1)
    Where,

$$\Delta Y_{t-1} = (\Delta Yt\text{-}1 - \Delta Yt\text{-}2),$$
$$\Delta Y_{t-2} = (\Delta Yt\text{-}2 - \Delta Yt\text{-}3)\ etc$$
ε_t = Pure white noise error term.

Cointegration Test

Estimation of ordinary least square (OLS) on the non-stationary time series data creates the problem of Spurious Regression (Engle and Granger, 1987). In such situation, cointegration analysis is very significant to avoid this problem. The very meaning of cointegration is that although

individual time series is non-stationary but linear combination of two or more non-stationary time series can be stationary. Cointegration suggests long run or equilibrium relationship between two or more time series (Gujrati and Sangeetha, 2010). The present study uses Johansen (1991) and Johansen and Juselius (1990) approach to check the cointegration of the variables. There are two tests under Johansen approach of cointegration test through which number of co integrating vectors are identified, namely-

    ➢ Trace Test and
    ➢ Maximum Eigen Value Test

Trace test and Maximum Eigen Value test under Johansen method of cointegration are expressed in equation (2) and (3) respectively.

Trace Test

$$T\,trace = \sum_{i=r+1}^{k} log(1 - \lambda i)$$

……………………………………….(equation 2)
In this test, the null hypothesis (H_0) is r=0 which is tested against the alternative hypothesis (H_1) of r+1 cointegrating vectors.

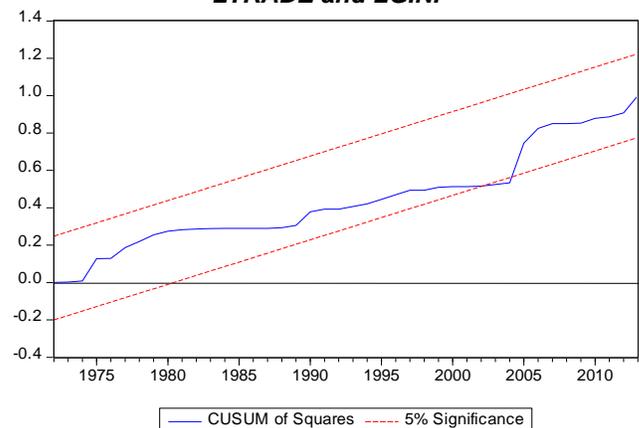Maximum Eigen Value Test

$$T\,max = -T\,log\,(1 - \lambda_{r+1})$$

………………………….(equation 3)
Here, the null hypothesis (H_0) of r=0 is tested against the alternative hypothesis (H_1) of r=1 and r=1 is tested against r=2 and so on.

4.0 Results and Discussions
4.1 Stability Test

Fig 1: Cusum of square stability test on regression of LTRADE and LGINI

CUSUM plot crosses the critical lines at 5 % significance level in the year 2004. This implies existence of a structural breakpoint in 2004. Chow breakpoint test is conducted to check the significance of the breakpoint on the model for the year 2004.

Table- (2)

Chow breakpoint test :2004			
Null Hypothesis : No breaks at Specified breakpoint			
F- Statistic	5.026275	Probability	0.0113
Log likelihood ratio	9.864536	Probability	0.0072

The Chow test results on the regression of LTRADE and LGINI indicates that there was a structural break in the series in 2004 which is significant at 5 % level. The structural changes of the economy along with promotion of private sector which is the heart of economic policies, disinvestment of the public sector and deregulation (which means de-reservation and delicensing of public companies and industries) etc. weighing the economy substantially in favour of capital compared to labour. This may appear to have significant impact on the income inequality of the country since 1991-92. This is the reason of the structural break in the series of the model. As the preliminary step, the degree of integration of the variables namely GINI, Trade (% share of GDP) is checked. If both the variables are non stationary in level but stationary at first difference, then the methodology permits to go for Johansen Cointegration test to check the long run relationship between the variables. ADF unit root test with trend and intercept is used to check the stationarity of the variables.

Unit Root Test:
Table (3) represents the results of ADF unit root test.

Table (3): ADF Unit Root Test Results

Results of ADF Unit Root Test in level			
Variables	t-Statistic	Critical 5 %	Prob	Inference
LGINI	-3.045161	-3.518090	0.1324	Non stationary
LTRADE	-1.607967	-3.518090	0.7733	Non stationary
Results of ADF Unit Root Test at first difference			
Variables	t-Statistic	Critical 5%	Prob	Inference
LGINI	-7.277437	-3.520787	0.0000	Stationary
LGDP	-5.641605	-3.520787	0.0002	Stationary

The results of ADF unit root test in table (3) reveals that all the variables are non stationary in level but stationary at first difference and thus integrated of order 1 i.e.; I(1). Lag Order Selection The results of lag order selection criteria for two variables namely trade as a percentage share of GDP (LTRADE) and Gini Coefficient (LGINI) is shown in the table (4).

Table (4): Results of Lag Length Selection Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	10.59464	NA	0.002231	-0.429732	-0.345288	-0.399200
1	94.24663	154.7562*	4.16e-05*	-4.412331*	-4.159000*	-4.320735*
2	96.89314	4.631388	4.46e-05	-4.344657	-3.922437	-4.191995
3	97.65721	1.260721	5.27e-05	-4.182860	-3.591753	-3.969135
4	98.41555	1.175422	6.25e-05	-4.020777	-3.260782	-3.745987

*indicates lag order selected by the criterion
From the results of the lag length selection criteria, the optimum lag length '1' is selected on the basis of LR, FPE, AIC, SC and HQ criterion.
Johansen Cointegration Test
For the examination of cointegration or long run relationship between trade openness and income inequality, the Johansen cointegration test is applied and the results of the test are shown in the table (5).

Table 5: Results of Johansen Cointegration test

Trace Test				
Hypothesized No of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob
None	0.220248	10.76208	15.49471	0.2266
At most 1	0.007433	0.313341	3.841466	0.5756
Maximum Eigen Value Test				
Hypothesized No of CE(s)	Eigen Value	Max Eigen Statistic	0.05 Critical Value	Prob
None	0.220248	10.44874	14.26460	0.1841
At most 1	0.007433	0.313341	3.841466	0.5756

In the above table (5), both the values of trace statistic and maximum Eigen Value statistic examine the null hypothesis of no cointegration between trade openness and income inequality against the alternative hypothesis of cointegration. For the null hypothesis of no cointegration or r=0 the study gets the trace test statistic 10.76208 which is smaller than the 5 % critical value ,15.49471 and the max-Eigen statistic 10.44874 which is also smaller than the 5 % critical value , 14.26460. Moreover, the probability values for both cases are greater than 0.05. Hence, the study accepts the null hypothesis of no cointegration between the two. From the results of Johansen Cointegration test, it is found that trade as a whole and income inequality is not related in India for the long run. So the null Hypothesis or more specifically no long run relationship between trade openness and income inequality in India is accepted.

5. Conclusion
Without any doubt a significantly large number of studies are present in the literatures that have explored the relationship between trade openness and income inequality. But they are not conclusive and doubtless in their findings. Therefore, more work is needed in the literature to find out the relationship between trade openness and income inequality. This paper investigates the relationship between the two variables in case of India over the period 1970-2013. By applying time series cointegration techniques the present study has found that no long run relationship exists between trade openness and income inequality in case of India although after openness of trade in India, income inequality has increased. Since there are a number of drivers in an economy that can lead to income inequality about which no discussion is made here, so it can be said that income inequality is due to those factors other than openness of trade. Further studies can be carried out to identify the determinants of income inequality in India. It will be fruitful in reducing the influences of the determinants so as to maintain inequality at a minimum level. Inequality at a lower level induces growth by making socio – political stability.

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