IOSR Journal of Economics and Finance (IOSR-JEF)
e-ISSN: 2321-5933, p-ISSN: 2321-5925.Volume 6, Issue 5. Ver. II (Sep. - Oct. 2015), PP 01-08
www.iosrjournals.org

Trade Liberalization and Economic Growth in China Since 1980

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Abstract: *The aim of this study is to explore the causality relationship between the foreign trade and economic growth of Chinese economy using time series data running from 1980 to 2013.Co integration, Granger Causality analysis and Vector Error Correction Mechanism (VECM) has been used in order to test the hypotheses about the presence of causality and co integration between the two variables. The co integration test confirmed that foreign trade and GDP are co integrated, indicating an existence of long run equilibrium relationship between the two as confirmed by the Johansen co integration test results. The Granger causality test finally confirmed the presence of bi-directional causality.*

Keywords: *Foreign Trade, Economic Growth, Exports, Co integration, Granger Causality*

I. Introduction

China introduced a sequence of market-oriented reforms that dramatically improved economic incentives and efficiency and reduced distortions since 1978. In line with the Washington Consensus, and motivated by an increasingly open and transparent multilateral trading system, opening up to foreign trade and promoting exports were key elements, accentuated by the WTO accession in 2001. China has managed nearly double digit growth rates since it began economic reforms and opening in 1978. The reform has transformed the Chinese economy from a planning economy to mixed economy where market plays a dominant role in resource allocation. Much of China's remarkable growth between 1978 and 2000 can be explained by the reform. China began its export-led growth in the mid 1980s, much inspired by the success of its East Asian neighbors. However, the more recent and faster growth in the last decade has been driven mainly by exports.

In 1978, China was a closed economy which played a marginal role in international trade.

Thirty years later, China is the leading world exporter, having overtaken Germany. Since the inception of China's open up policy in 1978, China's foreign trade has increased much faster than international trade and much faster that its GDP. From 1978 to 1990, both exports and imports increased smoothly and at a similar pace. An important ingredient in China's economic reforms since 1979 has been the economic policy termed open-door. The objective of this policy, which ended 30 years of economic semi-isolation from the rest of the world, was to expedite China's industrialization and modernization through economic interaction and integration with the world economy. Since 1978, China introduced a sequence of market-oriented reforms that dramatically improved economic incentives and efficiency and reduced distortions. In line with the Washington Consensus, and motivated by an increasingly open and transparent multilateral trading system, opening up to foreign trade and promoting exports were key elements, accentuated by the WTO accession in 2001. In line with both the Washington Consensus and strategies of other East Asian countries, China also increasingly pursued orthodox macroeconomic management. However, China explicitly pursued investment and industry-heavy growth, with a strong role for the government. In its transition from a centrally-planned to a market economy, China diverged from the "shock" approach to economic reform used in the Soviet Union. Instead, China followed the successful East Asian economies in combining export-oriented opening up to the global economy with maintaining a leading role for the government in allocating and mobilizing resources towards selected industrial sectors and investment, including infrastructure. The government also encouraged and subsidized savings, especially by companies; forfeited dividend from SOEs, channeled cheap credit to industry; underpriced key industrial inputs—energy, resources, land, and the environment; and managed the exchange rate. In this policy setting, investment reached a very high share of GDP while industry rather than services drove much of the growth. With the link between production and consumption loosened by access to the open multilateral trading system, China became an export powerhouse. Industrial companies became increasingly profitable under this pattern of growth, which also benefited parts of the government, directly or indirectly. Thus, a constituency was built up in favor of maintaining the pattern of growth. China's growth model has been very good for the supply side. Looking at the drivers of "potential" GDP (production) growth, reflecting China's towering investment to GDP ratio, the contribution of capital accumulation has been very high. An important driver, particularly since the late 1990s, is that in a policy setting favorable to industry and capital, flourishing industrial firms ploughed back increasingly large profits into new capacity. With wage increases lagging behind productivity growth, the share of companies' profits in GDP could rise—pushing up the national savings rate.

The Present Paper has been divided into five sections. Section- I is devoted to Review of Literature. Section -II analyzes the china's export-driven growth since 1980s and mechanism of export-led growth. In Section-III we have discussed about the methodology and data sources. Section – IV deals with the empirical results and their interpretation. The main conclusions emerging out of the study are discussed in the Section-V.

II. Survey Of Literature

Economic Liberalization implies the introduction of market mechanism in various sectors of the economy such as trade-liberalization, Financial Liberalization, Liberalization of Agriculture and Liberalization of Industry etc. In this section we present a brief and critical review of trade liberalization.

Traditional economic theory establishes trade as an engine of economic growth. Since the beginning of early 1980s economists have supported and recommended market oriented reforms that included as a fundamental component the reduction of trade-barriers and the opening of International trade to foreign competition (Edwards, 1993). The rapidly growing East Asian economies are excellent example of the economic growth benefits of more open and outward-oriented economies. International institutions such as the World Bank, The IMF and the OECD have urged and advocated developing countries to embark on trade liberalization, and to open their trade as a pre-condition for receiving financial assistance. All prominent economists including Rod gigues and Rodrik (1999:1), Kruger and Stiglitz etc. agree on the positive gains from outward-oriented trade strategies and external openness for economic growth.

The hypothesis that "openness" of the economy plays a positive role in economic Growth has been largely analyzed in the theoretical and empirical literature (e.g. Frankel & Romer, 1999; Bensidoun et al., 2009). Most empirical studies confirm the positive effects of "openness" on growth. Keren (2009) highlights the possible role of the different "architecture of economic systems" for economic growth and investigates the differences between the development paths of India, the largest democracy, and China, the largest of the few remaining communist ruled economies. Bensidoun et al. (2009) examine, in particular, the nature of Chinese and Indian growing trade integration with the rest of the world together with their changing specialization: while China has become a major hub of the increasingly segmented global production process, India has become more specialized in certain niche service sectors, with a proportionately higher price-quality composition. They argue that major challenges remain for both countries: for India to broaden the industrial base of its economy, beyond its current services niche, and for China to improve its terms of trade. With reference to the balance of payment imbalances caused by exchange rate misalignments. Patnaik and Shah (2009) argue that considerable distortions have been created by the monetary interventions of authorities in China and India, which have *de facto* pegged the exchange rates of their currencies, and thereby led to the accumulation of large quantities of reserves, feeding into imbalances in the global economy. Cohen (2009) presents a decomposition of sources of economic growth highlighting a higher contribution to growth coming from capital rather than labor for China, and the contrary for India, with the contribution to growth of factor productivity slightly higher for China than India; however, total factor productivity has been accelerating in India and decelerating in China, reaching growth rates similar to the 1995-2003 period. Valli and Saccone (2009) discuss, in a "Fordian perspective", the complexity of both Chinese and Indian economic transformations, by focusing on the increasing scale of production, the rising profits and investment, and finally various types of productivity-enhancing shifts. Some authors highlight that India cannot escape from the industrialisation phase (e.g. Alessandrini et al. 2007; Dasgupta and Singh, 2005). Bensidoun et al. (2009) provide a detailed comparative analysis of the different paths of specialisation of China and India. Rodrik (2006) observes that China's (but also India's) export shares in sophisticated products goes far beyond what is justified by comparative advantage. According to him, this is the consequence of the government's approach *("it is not how much you export, but what you export that matters"* for economic growth) and the consequent industrial policies. The instruments to support high value added productions have been "promotion and protection" (at least in a first stage), rather than complete liberalizations (similarly to the earlier "Asian Tigers" experience).

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Fig:-1.1 China's Percentage Share In World Exports & World Imports (1980-2012)

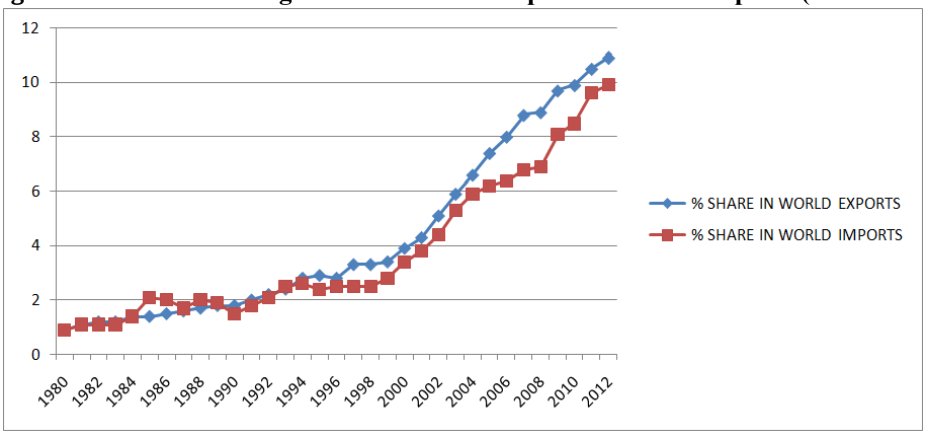
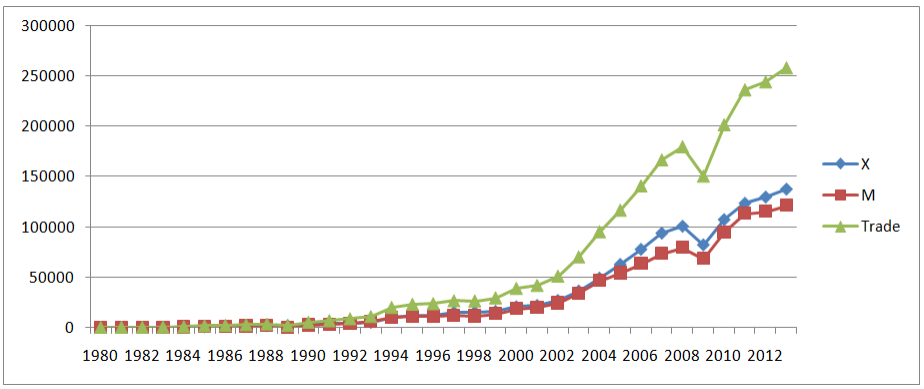


FIG:-1.2 CHINA'S TRADE VOLUMES : 1980-2013



The above Fig. 1.1 reveals that China's share of exports in world's exports was only 0.9 percent in 1980 which increased to 2 percent in 1991 and further to 7.4 percent in 2005 and 10.5 percent in 2011. It implies that China's percentage share in world exports has shown a rising trend due to the aggressive trade liberalization and various export promotion schemes adopted by the government of Chinese economy. Rapid export growth has been largely driven by china's participation in vertically integrated global production supply chains – where different activities in the production of single good are carried out in different economies. Fig. 1.2 shows that China's Trade has increased during the period under study i.e. 1980-2013. China experienced trade deficit for the period 1980. The ratio was found to be zero in 1981. The trade surplus ratio was found to be positive during the period 1982 and 1983. But it was found to be negative from 1984 to 1989 which implies that Chinese economy was experiencing the trade deficit due to large volume of imports. But After the entry of China in WTO in 2001 it maintains an economically significant trade surplus.

III. Econometric Methodology:-

The present research study aims to test the empirical relation between foreign trade and economic growth (GDP) of Chinese economy using the natural logarithms of variables for the time period 1980 to 2013. The data used in the study is secondary and have been collected from Statistical Yearbook of China (various issues), International Financial Statistics Yearbook (various issues) etc.

Stationary and Order Of Integration:

In order to avoid spurious regression, we need to distinguish the stationary of the series. By doing so, we ensure the validity of the usual test statistics (t-statistics and F-statistics and R^2). Stationary could be achieved by appropriate differencing and this appropriate number of differencing is called order of integration. The standard Augmented Dickey Fuller (ADF) [Dickey and Fuller 1979] Unit root tests and Phillips Perron test have been used to check the stationary of the series.

Augumented Dicky Fuller Test:

The Augmented Dickey Fuller (ADF) test is preferred as most of the studies have adopted it to examine the Unit root in the series foreign trade and GDP. In case of Dickey-Fuller test, there may create a problem of Autocorrelation. To tackle the problem of Autocorrelation problem, Dickey Fuller has developed a test called

Augmented Dickey Fuller (ADF) test.

1. **With Constant (Intercept):-**
$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + \Sigma\alpha_i Y_{t-1} + e_t$$
2. **With Constant and Trend:-**
$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \Sigma\alpha_i Y_{t-1} + e_t$$
3. **Without Constant and Trend:-**
$$\Delta Y_t = \delta Y_{t-1} + \Sigma\alpha_i Y_{t-1} + e_t$$

Hypothesis:-

Null Hypothesis $\Rightarrow$Ho: $\delta = 0$ (Series is not stationary or got unit root)

Alternative Hypothesis $\Rightarrow$H1: $\delta \neq 0$ (Series is stationary or no unit root problem).

If the computed absolute value of the tau statistics (τ) exceeds the ADF or Mackinnon critical values, we reject the hypothesis that $\delta = 0$, in which case the time series is stationary. On the other hand, if computed absolute value of the tau statistics (τ) does not exceed the critical tau value, we do not reject the null hypothesis, in which case the time series is non-stationary. The augmented Dickey-Fuller test is based on the assumption that the errors are statistically independent and have a constant variance. While relaxing these assumptions we can use an alternative test namely Phillips-Perron test.

Phillips Perron Test:-

This test allows the disturbances to be weakly dependent and heterogeneously distributed. To explain this procedure considers the following regression equations:

$y_t = \alpha^* + \beta^* y_{t-1} + \mu_t$ and

$y_t = \alpha_0 + \beta_0 y_{t-1} + \gamma_0(t-T/2) + \mu_t$

Where T= number of observations and the disturbance term μt is such that E (μ_t) =0, but there is no requirement that the disturbance term is serially uncorrelated or homogeneous. Phillips-Perron characterize the distribution and derive test statistics that can be used to test hypotheses about the coefficients α^*, β^*, α_0, β_0 and γ_0 under the null hypothesis that the data are generated by $y_t = y_{t-1} + \mu t$. Thus the Phillips-Peron test statistics are modifications of the Dickey-Fuller t-statistics that take into account the less restrictive nature of the error process. If the two time sequences are all integrated of order one i.e., I (1) either following the augmented Dickey-Fuller test or the Phillips-Perron test we can perform co-integration test with them.

Cointegration Test:

Once the unit roots are confirmed for data series, the next step is to examine whether there exists a long-run equilibrium relationship among the variables. This calls for co integration analysis which is significant so as to avoid the risk of spurious regression. Co integration analysis is important because if two non-stationary variables are co integrated, a VAR model in the first difference is mis specified due to the effect of a common tend. If a co integration relationship is identified, the model should include residuals from the vectors (lagged one period) in the dynamic Vector Error Correcting Mechanism (VECM) system. In this stage, the Johansen (1988) co integration test is used to identify a co integrating relationship among the variables. In this study, Johansen test was used to assess the co integration of the interest variables. We have applied two maximum likelihood tests, the Trace test and Maximum Eigen value tests, advocated by Johansen (1988) and Johansen and Juselius (1990).

Vector Error Correction Model (Vecm)

Once the co integration is confirmed to exist between variables, then the third step Entails the construction of error correction mechanism to model dynamic relationship. The Purpose of the error correction model is to indicate the speed of adjustment from the short run Equilibrium to the long-run equilibrium state. A Vector Error Correction Model (VECM) is a restricted VAR designed for use with non-stationary series that are known to be co integrated. Once the equilibrium conditions are imposed, the VECM describes how the examined model is adjusting in each time period towards its long-run equilibrium state. Since the variables are supposed to be co integrated, then in the short-run, deviations from this long-run equilibrium will feedback on the changes in the dependent variables in order to force their movements towards the long-run equilibrium state.

Hence, the co integrated vectors from which the error correction terms are derived are each indicating an independent direction where a stable meaningful long-run equilibrium state exists. The VECM has co integration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge on their co integrating relationship while allowing for short-run adjustment dynamics. The

co integration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. The dynamic specification of the VECM allows the deletion of the insignificant variables, while the error correction term is retained. The size of the error correction term indicates the speed of adjustment of any disequilibrium towards a long-run equilibrium state. The error correction term represents the long-run relationship. A negative and significant coefficient of the error correction term indicates the presence of long-run causal relationship.

Granger – Causality Test:

This test is based on the Granger (1969) approach to the question of whether X causes Y. Granger proposed to know how much of the current value of Y can be explained by the past values of Y and then to find out whether adding lagged values of X can improve the explanation. The direction of causality determines the direction of the relationship among variables and Granger causality test has three different directions for these purposes: In case of one way causality, in a single equation model, Y is the dependent variable and X independent. Here, there is a causality relationship from X towards Y (X Y). Independent variable is the cause and causes a one-way effect on dependent variable, which shows the presence of one-way causality and the relationship is determined as (Y X), whereas in two-way causality, there can be a reciprocal effect between the variables. If there is no relationship among variables, this implies the absence of causality. Granger's causality test is carried out by using the following equations:-

$$Y_t = \sum_{i=1}^{m} \alpha_i Y_{t-1} + \sum_{J=1}^{m} \beta_j X_{t-j} + u_{1t} \quad (1)$$

$$X_t = \sum_{i=1}^{m} \lambda_i X_{t-1} + \sum_{J=1}^{m} \delta_j Y_{t-j} + u_{2t} \quad (2)$$

The above equation (1) shows a causality relationship from X to Y, and the equation (2) from Y to X. For the model presented above, Granger causality test is carried out as

H_0: B= 0 and H_1: $B \neq 0$. When H_0 hypothesis is accepted, X is not the cause of Y. If H_1 hypothesis is accepted X is the cause of Y. If both hypotheses are rejected, this means there is a two-way causality between X and Y.

IV. Empirical Results And Discussion:-

The objective of this study is to empirically validate the role of foreign trade in increasing economic growth of Chinese economy. Given the nature of problem and quantum of data we first study the data properties form an econometric perspective starting with the stationary of data. We employ co integration technique to investigate the causality between China's foreign trade and economic growth. If the two variables are found to be integrated of same order, only then we can apply the co integration analysis. Before we apply co integration test, we check that series are non stationary. Hence, we have done stationary test on the sample series, the results of stationary test are given in the following table 1.1:-

TABLE:-1.1 Augumented Dicky Fuller Unit Test Results

VARIABLE	**WITH CONSTANT**	**WITH CONSTANT & TREND**
FOREIGN TRADE	**-6.664056****	**-6.548805****
CRITICAL VALUES		
5% level	-2.967767	-3.574244
10% level	-2.622989	-3.221728
GROSS DOMESTIC PRODUCT	**-4.948352****	**-4.950519****
CRITICAL VALUES		
5% level	-2.963972	-3.568379
10% level	-2.621007	-3.218382

***&** denotes significance at 5% and 10% level of significance.**
The lag length was determined using Schwartz Information Criteria (SIC)

The above table (1.1) shows that series belonging to foreign trade and GDP is not stationary in level value. It becomes stationary only when second difference is taken. The table further reveals that as the calculated ADF statistics exceed the tabulated critical values at 5% and 10% level of significance, therefore we reject the null hypothesis of unit root and non-stationary and conclude that variable is stationary only at the first difference. Strong evidence emerges that all the time series are I (II) at the 5% and 10% Level of significance.

TABLE:-1.2 Phillips Perron Test

VARIABLE	WITH CONSTANT	WITH CONSTANT & TREND
FOREIGN TRADE	**-3.89485****	**-5.08712****
CRITICAL VALUES		
5% level	-2.960411	-3.562882
10% level	-2.619160	-3.215267
GROSS DOMESTIC PRODUCT	**-5.666871****	**-5.650520****
CRITICAL VALUES		
5% level	-2.960411	-3.562882
10% level	-2.619160	-3.215267

***&** denotes significance at 5% and 10% level of significance.**

The Philips Perron (PP) Results as shown in above table (1.2) indicate that the results obtained by Augmented Dickey Fuller (ADF) test confirm to the PP test results. Hence the Null Hypothesis of a Unit root is rejected and we conclude that all the variables are stationary at first difference integrated of same order I (II). To employ co integration technique it is a pre condition that the series have to be non stationary which is met. Hence we employ co integration techniques to determine the existence of stable long run relationship between foreign trade and economic growth in India for the period 1980 to 2013. The co integration results are reported in Table 1.3. Results of co integration are obtained using the optimal lag length calculated using VAR lag length order selection criterion.

TABLE:-1.3 Johansen Cointegration Test Results

Hypothesized Number of Co integrating Equations	Eigen Value	Trace Statistics	Critical Value at 5% (p-value)	Maximum Eigen statistics	Critical Value at 5% (p-value)
None*	0.676407	54.21701	15.49471 **(0.0000)**	34.97631	14.26460 **(0.0000)**
At Most 1	0.462415	19.24070	3.841466 **(0.0000)**	19.24070	3.841466 **(0.0000)**

Source: Author's own Calculation

*** denotes rejection of the hypothesis at the 0.05 level**

The above table (1.3) shows that first hypothesis i.e. No co integration among variables can be rejected as p-value (0.00%) is less than the critical value (15.49%) at 5% level of significance on the basis of trace statistics. The second Null hypothesis i.e. there is at most one co integrating equation can be rejected again because p-value (0.00%) is less than the critical vale (3.84%) at 5% level of significance. Both the trace statistics and Maximum Eigen Statistics indicate two co integrating equations at 0.05 levels. Our two variables foreign trade and GDP are co integrated i.e. both the variables have long run association between them. After analyzing that there is significant co integration in the sample series we employ Granger causality test to know the causality between the two variables. Granger causality is a statistical concept of causality that is based on prediction. The results of Granger test done for 2 Time lags between the two variables for which unit root test is carried out are shown in the following table (1.4):-

TABLE:-1.4 Granger Causality For The Period 1980 To 2013

Pair wise Granger Causality Tests			
Sample: 1991-92 TO 2012-13			
Lags 2			
Null Hypothesis	**F-statistics**	**Probability**	**Decision**
Foreign Trade does not Granger Cause GDP	**8.51386***	0.0005	Reject
GDP does not Granger Cause Foreign Trade	**6.01928***	0.0033	Reject

The results exhibited in Table 1.4 confirm the two way causality between China's foreign trade and economic growth (GDP) with p-value < 0.05 in both the cases Hence the test results confirm bi- directional causality of the two variables namely foreign trade and economic growth. In the next step, we employ Vector Auto Regression (VAR) which is a statistical model used to capture the linear interdependencies among multiple time series. The coefficients of Error Correction Term contain information about whether the past values affect the current values of the variable under study. A significant coefficient implies that past equilibrium errors play a role in determining the current outcomes. The information obtained from the ECM is related to the speed of adjustment of the system towards long-run equilibrium. The information obtained from the ECM is related to the speed of adjustment of the system towards long-run equilibrium. The results are given in following table (1.5):

TABLE:-1.5 Vector Auto Regression Estimates:

D(GDP) = C(1)*(GDP(-1) - 3.42565805022*FT(-1) + 86498.8033419) + C(2)*D(GDP(-1)) + C(3)*D(GDP(-2)) + C(4)*D(FT(-1)) + C(5)*D(FT(-2)) + C(6)

VARIABLES	D(GDP)	D(Foreign Trade)
ECM	**-0.179180**	-0.158121
	(0.04252)	(0.07944)
	[-4.21418]*	[-1.99054]
D(GDP(-1))	0.328059	-0.390082
	(0.33825)	(0.63195)
	[0.96986]	[-0.61726]
D(GDP(-2))	-0.082114	-0.034548
	(0.31064)	(0.58036)
	[-0.26434]	[-0.05953]
D(Foreign trade(-1))	-0.412528	-0.227937
	(0.24048)	(0.44928)
	[-1.71547]	[-0.50734]
D(Foreign trade(-2))	-0.529825	-0.463071
	(0.14044)	(0.26239)
	[-3.77248]*	[-1.76482]
Constant Term	21243.50	20611.99
	(4654.28)	(8695.52)
	[4.56430]*	[2.37041]
R-squared	**0.896988**	**0.273496**
Adj. R-squared	**0.876386**	**0.128195**
F-statistic	**43.53812**	**1.882271**

Notes: Standard errors are in brackets and t-statistics in square brackets.

The results given in table (1.5) show the long-run causality between China's foreign trade and economic growth. The information obtained from the ECM is related to the speed of adjustment of the system towards long-run equilibrium. But it must be significant and sign must be negative. The short-run dynamics are captured through the individual coefficients of the difference terms. The estimated error correction term has negative sign (-0.179180) and is statistically significant at 5 per cent level of significance (-4.21) which confirms that there is not any problem in the long run equilibrium relation between dependent and independent variables. The significant error term supports the existence of long-run equilibrium relation between the foreign trade and economic growth of China for the period 1980-2013. The value of R^2 is also found to be high i.e. 0.90 and F-value is also found to be statistically significant at 5% level of significance which shows that the overall model is significant. In order to check the short-run causality from economic growth to foreign trade we apply Wald test:-

H_0 :- C(4)=C(5)=0
H_1:- C(4)=C(5)≠0

TABLE:-1.6 Short Run Causality (Wald Test)

HYPOTHESIS	CHI-SQUARE	P-VALUE	DECISION AT 5% LEVEL OF SIGNIFICANCE
H_0 = GDP doesn't Granger Cause Foreign Trade	**20.38541***	0.0000	Reject Ho

Source: Author's calculation

The results are given in the above table (1.6) clearly indicates that there is a positive relationship and short run causality running from GDP to foreign trade as p-value (0.00%) is found to be less than 5% level of significance. If p-value is found to be less than 5% level we can reject the null hypothesis which means that there is existence of short run causality between two variables.

V. Conclusions:

The paper tries to assess empirically, tries to examine the relationship between foreign trade and economic growth (GDP) of Chinese economy using annual data over the period 1980 to 2013. Co integration test confirmed that foreign trade and economic growth are co integrated, indicating an existence of long run equilibrium relationship between the two as confirmed by the Johansen co integration test results. The Granger causality test finally confirmed the presence of bi-directional causality between the two variables. The error correction estimates gave evidence that the Error-Correction Term is statistically significant and has a negative sign, which confirms that there isn't any problem in the long-run equilibrium relation between the independent and dependent variables. Export-led growth has sustained high growth rates in China. The fast growth of the export is a result of the combination of China's double transition and it's fully integration into world system. Lastly, increasing share of china's exports has made a positive contribution in the Gross Domestic Product (GDP) of Chinese economy. This may be due to the aggressive economic reforms and export promotion policies adopted by the Chinese government.

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