



Exports, Imports, and Economic Growth in India

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ABSTRACT

The purpose of this research study is to shed light on the causal relationship between foreign trade and economic growth in India. This study analyzes Export-led growth (ELG) and Import-led growth (ILG) hypothesis in India. The author does so by analyzing the yearly data of Export, Import and Gross domestic product of India between 1980 and 2016. The author employed augmented Dickey-Fuller method and Phillip-Perron method to transform the all the data series into a stationary form. The author finds that all three variables i.e. Export, Import and Gross domestic product are highly positively correlated to each other. The result of Johansen co-integration test indicates cointegration and long-haul relationship among the variables. The result of the Granger causality and Toda-Yamamoto causality test shows unidirectional causal relationship between export and economic growth; the one-way causation exists between import and economic growth while economic growth causes export and import in India. The result of the impulse response function indicates that a change in the GDP is due to its own shocks whereas the impact of export shows certain effect on GDP. The analysis of the variance decomposition demonstrated that only 28.25% fluctuations in the GDP were explained due to its own shocks. Thus the outcome of the study indicates importance of export and import for economic growth is significance and foreign trade is heavily relied on economic growth of the country

Keywords: Export-led growth, Import, Economic growth, Cointegration analysis, Granger causality, India.

JEL classification: C 32, F 1, F 10, F 41, O 11, O 40.

INTRODUCTION

A consistently increasing growth rate of macro-economic indicators and growing economic development of the country indicates prosperity of the human beings. It attracted various classical and neo classical economists time to time to analyze various economic and non-economic factors responsible for better economic growth and development of the country. There are various economists considered foreign trade as an important economic factor for economic growth. They believe that, International trade of any country is one of the important economic indicators for economic growth. A group of economist believes that export of any country is responsible for better economic growth and their empirical research studies supported Export-led growth hypothesis (e.g. Emery, 1967; Maizels, 1968; Voivodesa, 1973; Michaely, 1977; Balassa, 1978, 85, 88; Bhagwati 1978, 88; Heller & Porter, 1978; Williamson, 1978; Fajana, 1979;

Tyler, 1981; Feder, 1983; Kavoussi, 1984; Ram, 1987; Kohli & Singh, 1989; Moschos, 1989; Bonelli, 1992; Marin, 1992; Greenaway & Sapsford, 1994; Bodman, 1996; Henriques & Sadorsky, 1996; Irwin & Tervio, 2002; Awokuse, 2007; Awokuse & Christopoulos, 2009). There are various studies shows diversity in their findings related to international trade impact on the economic growth of the country (e.g. Kugler, 1991) and thus it is difficult for policy makers to frame trade policy on the basis of any specific research finding. The present world trade is experiencing a revolutionary change due to adopting trade openness policy by various countries which advocating Export-led growth hypothesis, it is an output of traditional classical trade theories developed by Adam Smith and David Ricardo whereas neo-classical economists criticized previous international trade theories and advocated competition-led growth hypothesis. The export-led growth hypothesis emphasis that, not only factor of production such as labor and capital is

important for the economic development but the contribution of export also perform as a 'growth engine' for the country. A group of economist justifies the importance of export for the betterment of economic growth via efficient allocation of resources, better trade policies, infrastructural and technological growth (Edwards, 1998). Nevertheless, various studies rejected Export-led growth hypothesis (e.g. Feder, 1983; Jung & Marshall, 1985; Krueger, 1990; Chen, 1990; Kugler, 1991; Oxley, 1993; Baltho, 1996). The study by Tyler (1981) and Balassa (1985) evolved —new conventional wisdom as mentioned by Shirazi & Manap (2005) whereas Singh, 2010 study shows brief descriptions of previous studies and discuss the importance of trade for economic growth. There are number of studies based on export-led growth hypothesis but only few are based on the importance of import in the economic growth of the country. Import, an important sector for developing countries, it can be supportive element for better economic growth and price stability (Shirazi and Manab, 2004). The optimum productivity of any resources depends on the various factors such as accessibility of raw materials, well advance plant machinery, efficient technological edge and good equipment's etc., thus for the developing nations, they have to import these items from developed countries which again leads to increase the production level of the country. Most of the time, these elements are not available domestically or may be of not standard level, thus, country have to go further for import for consistently production (Coe & Helpman, 1995; Mazumdar, 2001; Krishna et al. 2003; Malhotra and Mennu, 2009). There are various studies indicating the importance of import for better economic growth and indicating causal relationship between import and economic growth (e.g. Kim et. al., 2007; Awokuse, 2007). On the one sides empirical finding suggested and supported Export-led growth hypothesis while others are accepting the importance of import for better economic growth. Such variety of contradictory thoughts is outcomes of the study based on different methodologies, time series data and econometric analysis. The evidences from various countries, adopted free trade policies, provides basis and attract various researchers to analyze the dynamics of the relationship between international trade and economic growth. India, a leading fastest growing economy, thus, it is attracted many researchers to study on this dynamic relationship. Most of the economies around the world, today, are

focusing to improve their Gross domestic product, which is an indicator of better economic growth of the country; increase in GDP indicates better economic growth whereas decreasing GDP rate indicates poor economic growth. The fast growing countries like India and China, focusing on their international trade; involved in many economic integrated groups such as BRICS, G8, G20, BASIC, APEC, SAARC etc., focusing on economic integration for getting better economic growth via increasing their international trade around the world, without fearing any drawback for export-led growth hypothesis. Alert to any negative impact of trade on economy, the developing country like India, focusing on economic growth by promoting its export. Recently, the Government of India revised its foreign trade policy (2015-2020) during its mid-term review for enhancing the scope of export sector i.e. increase in MEIS and SEIS incentives, single window facility, Simplified credit's rule, interest subsidy scheme, various agreements under Look east policy etc. Various economist suggested the idea for trade promotion because it increase various macro-economic indicators of the country such as production growth, income, infrastructural growth, employment generation (e.g. Harrison 1994; Harrison & Revenga, 1995; Frankel & Romer, 1996; Riezman et.al., 1996; Edwards, 1998). Therefore, many economists is attracted towards the study of Export-led growth hypothesis and Import-led growth hypothesis. The findings of some original studies Balassa (1978); Bhagwati (1978); Feder (1983); Krueger (1990) indicates causal relationship between international trade and economic growth. India, Of course, it is on the path of far-reaching economic growth which leads to attributed to the nation's international trade, cohesive trade policies, and better cooperative trade relation with other countries. Although India's experiences in past few years steady economic growth, negative export and import growth rate, but still it is promoting its export. There is a major changes recorded in Indian economic structure after adopting LPG policy in 1991. India has opened its door for multinational companies and it moved from closed economy to open economy. Over the past 28 years, India has made remarkable changes in foreign trade policy and FDI policy and made great strides in promoting domestic support to export oriented industrial units by establishing special economic zone (SEZ). India is focusing on export promotion activities to achieve better production growth. During the 48th World Economic Forum 2018, held in Davos

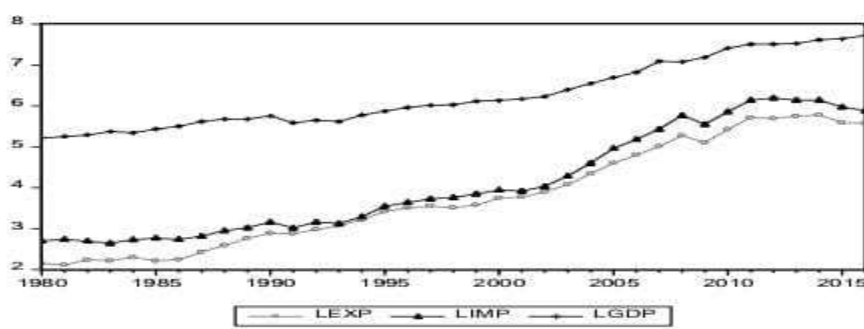
(Switzerland), Narendra Modi, the prime minister of India, unveiled India's vision towards international trade, said that, "While protectionism is growing around the world, India has embraced Mahatma Gandhi's ideology of opening up to the world and its diversity". In a press meeting in 2017, Suresh Prabhu, the minister of Commerce and Industry, India enlighten his vision regarding India's international trade, and said, "When we import something that also adds to consumption adds to the capacity of Indian manufacturing to create world- class products. Obviously when we export, it creates new capabilities. The annual report 2016-17, released by Ministry of Commerce and Industry, Government of India, indicates negative growth rate of India's merchandise exports compare to previous year and recorded stagnant 1.6 % contribution in world merchandise export in 2015. The India's global trade 2017-18 data released by Department of Commerce, Government of India indicating 16.32 % growth rate. The provisional data of 2017-18 shows rise in India's global trade from 660.2 billion in 2016-17 to 767.9 billion in current fiscal year. Therefore, further research by economists and researchers will strengthen the debate on the contribution of international trade for the economic growth of the country or vice-versa and such study also provide a basis for policy makers. Given to the above background, we present empirical evidences and reinvestigate the relationship between international trade and economic growth in India. Given the importance of export-led growth hypothesis in previous literature, we have critically analyzed causality of both export and import to economic growth of India.

Export, Import and Economic Growth of India (1980-2016)

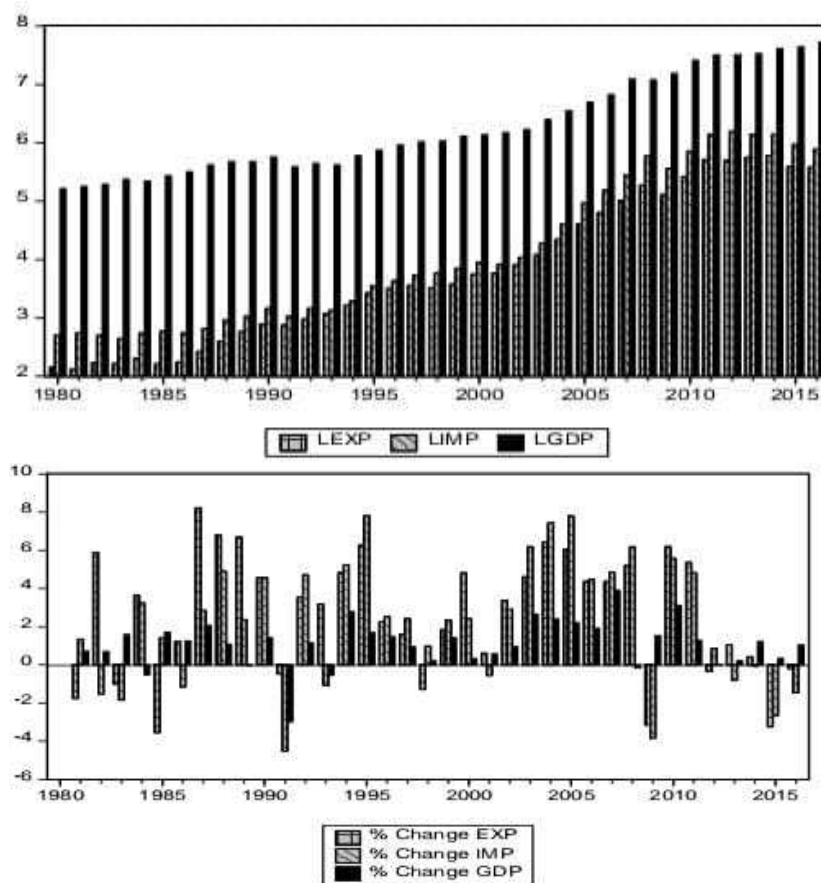
The following graph 1.1 and 1.2 shows the time series plot of the international trade i.e. export and import with gross domestic product (GDP) during 1980 to 2016 whereas graph 1.3 shows the percent growth rate of export, import and gross domestic product of India. It can be clearly observe form the graph 1.1 and 1.2 that all the three variables has increased at constant rate in last few decades whereas the

import of India has always been more than the export of India. Although, India has adopted economic reform policy in 1991 and opened its market for foreign buyers and sellers but still export trade of India never surpasses import trade. During 1980 -1981, the export value by India was 8.586 billion US dollar and the import value was 14.86 billion US dollar whereas gross domestic product value recorded 183.84 US billion dollars. The export of India in 1981 was declined by -1.77 percent and import has achieved 1.34 percent increase whereas gross domestic product achieved 0.72 percent change compare to previous year. In 1981-82, exports by India witnessed 5.88 percentage growth rate which is very high compare to last year and import has witnessed -1.52 negative growth rate whereas the percentage growth of gross domestic product was 0.69 almost constant to the last year. In 1986-1987, there was tremendous 8.227 percent growth rate was recorded in export of India and gross domestic product witnessed 2.07 percent growth whereas import witnessed on 2.84 percent growth rate. India has adopted LPG policy in 1991 and opened its economy for foreign companies. Thus there were tremendous changes in the economic system of the country were recorded. As a result, the composition, pattern and growth of foreign trade of India was highly affected. In 1990-1991, exports by India witnessed negative percentage growth rate of -0.46 and imports by India also witnessed -4.52 whereas gross domestic product of India also recorded -2.99 represented by graph 1.3. The result of adaptation of LPG policy in 1991 started to comes out in coming five years, thus in 1995, exports by India witnessed 6.283 percent growth rate and imports by India also recorded 7.807 percent growth rate. In 2004-05, exports by India again recorded 6.04 percent growth rate and import recorded 7.80 percent growth rate whereas gross domestic product recorded 2.21 percent growth rate. From 2005 to 2016, the gross domestic product of India did not witnessed negative growth rate but exports by India recorded negative growth rate of -0.35 in 2012 and imports by India witnessed negative growth rate from 2013 to 2016.

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Graph
(1.1):
Export, Import and Gross Domestic Product of India



Graph (1.3) Export, Import and Gross Domestic Product of India (Percentage Growth Rate)

Significance of The Research

The following research study has multifarious significance in the existing academic domain when compared to the previous research studies focusing on same research background. India is very fast growing economy in the world after China. The foreign trade and gross domestic product (GDP) of India has increased in last few decades. The empirical finding of the research study indicates that export and import of country is highly positively correlated with the economic growth of the country 98.87 percent and 99.20 percent respectively. In the following study gross domestic product (GDP) is used as a proxy of economic growth. This correlation and integration property between foreign trade and economic growth distinguishes it from other existing research

finding; thus, this study has greater relevance for the policy makers and it also attracts interest of researchers. Hence, there is a need to investigate the relationship between foreign trade and economic growth. There are only few studies focusing on the causality, cointegration and long-run and short run relationship between foreign trade and economic growth of India. This finding of the research will help to analyze the variations in research among other researches.

RESEARCH OBJECTIVE

The objectives of this study is to analyze the importance of the international trade i.e. export and import for the economic growth in India. This study also validates the empirical findings of the previous research studies based on same background. Specifically, this study is designed

to study following areas: 1. How much innovation in one variable leads to affect the movement of another variables? 2. Does the export-led growth hypothesis works in India? 3. How export and import cause economic growth of India? Finally and crucially, to study the objectives, this paper investigates the causal relationship and directions of causality among export, import and economic growth of India within the period of 1980 to 2016 by employing the multivariate Granger causality test and modified wald test developed by Toda and Yamamoto (1995). There are few study has employed Toda-Yamamoto wald test and Impulse response function (IRF) to study the relationship among export, import and economic growth in India, so far. There is multivariate cointegration technique develop by Johansen (1988) has been employed to study the longhaul relationship among export, import and economic growth of India. The organization of the research study organized as follows. Section 1 briefly discusses introduction and overview of export, import and economic growth of India. Sections 2 discuss previous research studies related to the theme of this study. Section 3 deals with the empirical framework of the paper and Section 4 discuss empirical findings of the study followed by Section 5, which is the core subpart of the paper discussing conclusion of the paper.

REVIEW OF LITERATURE

The contribution of export activity for economic growth and development is questioned in some previous research studies by Keasing (1967) and Krueger (1985). The research by Nurkse (1961) also questioned this relationship. Findlay & Watson (1996) study on China economic support Export-led growth hypothesis whereas Krueger (1995) advocated the importance of foreign trade policy for better

economic growth. There are number of studies available on the healthy discussion on the importance of international trade for economic growth of the country (e.g. Jung & Marshal, 1985; Edwards, 1993; Greenaway & Sapsford, 1994; Dhananjayan & Devi, 1997; Shan & Sun, 1998). There are various research studies rejected ELG hypothesis and contribution of export for economic growth (e.g. Jaffee, 1985; Buffie, 1992). There are various empirical literature on the relationship between international trade and economic growth is available using different methodologies i.e. time series, panel data sets, Granger causality, Vector error correction Model etc. The finding of these studies providing conflicting evidence on the relationship between export, import and economic growth. The relationship between international trade and economic growth of the country is studied by classical economist to modern economists. The classical economist i.e. Adam Smith and David Ricardo propounded their theory emphasizing on the importance of internal trade for the economic growth of the nation. The economist Eli Heckscher and Bertil Ohlin in their comparative advantage theory emphasize on the importance of export of goods and specialization in production for the economic growth. The relationship between exports and economic growth also confirm by various empirical research (e.g. Michaely, 1977; Krueger, 1978; Balassa, 1978; Fedder, 1982). Nurkse suggested economic growth via international trade of the products available easily in the economy whereas Kravis explain that international trade can play a supportive role only for the economic growth. The modern economists suggested that developing nations cannot fully depend on the international trade for their economic growth and development.

Table : Research findings of previous studies.

Authors	Research Objective/s	Variables	Period	Methodology	Empirical Findings
Anwar, M. S., & Sampath, R. K. (2000)	To analyze ELG Hypothesis in 97 countries including India, Pakistan and Sri Lanka	Real GDP & Export	1960-1992	Johansen cointegration; Granger causality test	Rejected ELG in India, UDC in Pakistan & Sri Lanka
Judith A. Giles & Cara L. Williams (2000)	To analyze ELG Hypothesis in South Korea & Japan	Real GDP & Export	1963-1999	Survey Method	Trade can affect growth, Relationship is very

					complex
O'rourke, K. H. (2000)	To analyze Tariffs relation with growth in ten countries	Real GDP, Import, Tariffs rates	1875-1914	Panel Data Estimation; Conditional & Unconditional Convergences Model; Factor Accumulation Model	Positive correlation exists between Tariffs and economic growth in given period.
Rodriguez and Rodrik (2000)	To analyze relationship between trade barriers & economic growth	Real GDP, Tariffs rate & Investment	1970-1985	Weighted least squares; OLS; IV estimator & Sensitivity analysis	Skeptical view on the relationship between trade and economic growth
Amavilah, V. H. (2002)	To analyze ELG Hypothesis in Namibia	Export and Factor of Production	1968-1992	Correlation Model; Production Function Analysis; Multiple Regression Analysis	Rejected ELG
A. Vamvakidis (2002)	To analyze relationship between Trade openness & economic growth	Real GDP per capital; Tariffs	1870-1990	Ordinary least squares (OLS); Regression analysis; Spearman rank correlation	No correlation during 1870 to 1970 but positive correlation during 1970 to 1990 exist between openness & growth
Dilip Dutta & Nasiruddin Ahmed (2004)	To analyze import demand and relation with Economic growth in India	Real GDP and Import, Import price	1971-1995	Unit root test; Johansens cointegration test; Error correction Model	Import is cointegrated with GDP
Shirazi, N. S., & Manap, T. A. A. (2005)	To analyze ELG Hypothesis in South Asia including India	Real GDP Export & Import	1960-2003	Johansen and Juselius cointegration; Vector autoregression (VAR) Model; Granger causality test	Export, Import doesn't cause GDP in India
Sharma, A., & Panagiotidis, T. (2005).	To analyze ELG Hypothesis in India	Real GDP, Export, Import, Employment & Gross domestic	1971-2001	Johansen cointegration; Vector Autoregression (VAR) Model; Granger causality test;	Export, Import are not cointegrated with GDP; Export doesn't

		capital formation		Impulse Response Function (IRF)	cause GDP
FST Hsiao & MCW Hsiao (2006)	To analyze relationship between Trade & Economic growth in eight Asian Economy	Real GDP, Export and FDI	1986-2004	Vector Autoregressive Model; Granger causality test,	BDC between Export & Economic growth
Chandra Parida, P., & Sahoo, P. (2007)	To analyze ELG & manufacturing ELG Hypothesis in South Asia including India	Real GDP, Export, Import & 11 others	1980-2002	Pedroni's panel cointegration; Ordinary Least Square (OLS); Growth accounting equations method	ELG
Kim, S., Lim, H., & Park, D. (2007)	To analyze ELG & ILG in Republic of Korea	Real GDP, Export & Import	1980-2003	Unit root test; Johansens cointegration analysis; Vector error correction model; Granger causality test	Import has positive impact on economic growth rather than export.
Titus Awokuse (2008)	To analyze the relationship between export, import and economic growth in Argentina, Columbia & Peru	Real GDP, Export and Import	1993-2008	Unit root test; Johansens cointegration analysis; Impulse response function; Error correction model	ELG & GLE
Fatih Yucel (2009)	To analyze relationship between Trade openness and Economic growth in Turkey	Real GDP & Export	1989-2007	Unit root test; Johansens cointegration test; Vector Error Correction Model; Granger causality test	Trade openness positively affects GDP
G. Jayachandran & A. Seilan (2010)	To analyze relationship between Trade & Economic growth in India	Real GDP, Export and FDI	1970-2007	Unit root; Johansens cointegration test; Granger causality test	ELG
P.K.Mishra (2011)	To analyze the relationship between Exports & Economic growth in	Real GDP & Export	1970-2009	Unit root; Johansens cointegration test; Vector Error Correction	GDE, UDC

	India			Model, Granger causality test	
Enrico Marelli & Marcello Signorelli (2011)	To analyze relationship between Trade openness and Economic growth in India & China	Real GDP & Export	1980- 2007	Multiple Regression analysis	Trade openness positively affects GDP
P.K.Mishra (2012)	To analyze relationship between Import & Economic growth in India	Real GDP & Import	1970- 2010	Unit root; Johansens cointegration test; Vector Error Correction Model; Granger causality Test	Import is cointegrated with GDP; BDC
Deepika Kumari1& Neena Malhotra (2014)	To analyze ELG hypothesis in India	Real GDP per capita	1980- 2012	Unit Root; Johansen cointegration; Granger causality	Rejected ELG; BDC
Md. Haseeb et.al. (2014)	To analyze relationship between Export & Economic growth in Malaysia	Real GDP, FDI and Export, Labor growth	1971- 2013	Unit root test; Johansens cointegration test; Error correction Model; Auto Regressive Distributed Lag (ARDL)	ELG
Agrawal, P. (2015)	To analyze ELG Hypothesis in India	Real GDP, Export & Exchange Rate (REER)	1960- 2012	Johansen cointegration; Vector error correction (VEC) model; Granger causality test; Variance decomposition	ELG
Singh, G. (2015)	To analyze ELG Hypothesis in India	Export & Industrial productio n index (IIP)	2005- 2014	Johansen cointegration; Granger causality test	Export is cointegrated with GDP; BDC
Srinivasan, P. (2016)	To analyze ELG Hypothesis in BRICS nations	Real GDP & Export	1990- 2014	Johansen cointegration; Vector Autoregression (VAR) Model; Granger causality test	Export is significantly related with GDP; BDC

Serhat Yüksel & Sinemis Zengin (2016)	To analyse Trade relation with GDP in Argentina, Brazil, China, Malaysia, Mexico & Turkey	Real GDP, Export & Import	1961-2014	Engle-Granger Causality Analysis; Vector Error Correction Model; Toda Yamamoto Causality Test	Export, Import doesn't cause GDP in Brazil & Mexico; ELG in Argentina
Sayef Bakari & Md. Mabrouki (2016)	To analyse import, export relation with GDP in Turkey	Real GDP, Export & Import	1960-2015	Vector Auto Regression Model; Granger Causality test	Export, Import doesn't cause GDP

METHODOLOGY

The research is an effort to study the relationship between international trade and economic growth of India and thus whole study is based on three variables i.e. export, import of India and gross domestic product of India. The study is based on the yearly data of these selected variables of India from 1980 to 2016. All the variables are taken current US\$ (billion). The export and import represents the growth of international trade in the country whereas gross domestic product represents the economic growth as suggested by various studies. The export of India is represented by EXP; import of India is represented by IMP and gross domestic product of India is represented by GDP. All the yearly data of these selected macro-economic variables are taken from World Bank websites. The major problems of the time series studies are heteroskedasticity which is avoided in this study by using natural log data of numerical values. The following empirical research includes the study of movements, cointegration and long-haul relationship between these selected variables. For the empirical analysis and findings, there are various econometric techniques is applied to test the relationship among these variables. There are various tests such as Unit root test (ADF and PP), Johansens cointegration test, Correlation analysis, Impulse Response Function (IRF), Variance decomposition analysis and Granger causality test is applied over the sample period.

Unit Root Test (Augmented Dickey-Fuller/Phillip-Perron)

The study of time series data start with checking the stationarity property of data. It can be analyze by performing unit root tests, which indicates whether the data sets is stationary or non-stationary in nature. The

Unit root test involves various methods such as Augmented-Dickey Fuller (ADF) test, PhillipsPerron (PP) Test, Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) Test and Ng and Perron (NP) Tests. There are two widely accepted unit root methods Augmented-Dickey Fuller (ADF) and Phillips-Perron (PP) Tests is employed in this study. Augmented-Dickey Fuller (ADF) test is an extended version of Dickey-Fuller (DF) Test (1979) used to test the null hypothesis. The negative number used in ADF statistics indicates rejection of null hypothesis. The more negative number provides strongest reason to accept or reject null hypothesis. The ADF test can be represent into following form: (1) In the following equation, α is expressing constant, β is representing coefficient on time scales and p representing lag order of autoregressive process. In this equation $\alpha=0$, $\beta=0$ are corresponding to modeling in a random walk. This test includes lags of the order p which is determined by - values on coefficient.

Johansen multivariate cointegration analysis

In time series data study the confirmation of unit root in data sets indicate a path for further econometric studies. After the confirmation of unit root in the selected time series data sets, the next step is to check the long-haul relationship among the variables which is known as cointegration test analysis. In the following study Johansens (1998, 1991) multivariate cointegration analysis based on VAR model is used to capture the relationship among the logarithm of export, import and gross domestic product. Considering a VAR of order p : (2) In the above mentioned equation, shows k -vector non-stationary $I(1)$ variables and is used to represent d -vector of deterministic variables, and indicating coefficients matrices and showing vector of

innovations. Further, The VAR model can be expressed in the following terms: \sum Where, \sum According to Granger's representation theorem (GRT) if the coefficient matrix Π reduced its rank $r < k$, then $k \times r$ matrices α and β each with the rank r such that $\Pi = \alpha \beta'$ and $\beta' \gamma$ is $I(0)$. The cointegration relationship can be shown by r number (cointegrating rank) whereas each column of β shows cointegrating vector. There are two another statistics known as trace test statistics and maximum eigenvalue statistics which is used in the Johansens cointegration.

Impulse response function (IRF)

According to Wold representation theorem, every covariance stationary time series can be expressed in the sum value of two time series where one time series is deterministic and other one is stochastic. It can be expressed in the following equation form: (4) Electronic copy available at: <https://ssrn.com/abstract=3250105> Electronic copy available at: <https://ssrn.com/abstract=3250105> \sum Whereas, is considered to be as a time series; representing uncorrelated sequence of the time series. It is explaining innovation process to the process. It is a white noise process and input to linear filter $\{C_j\}$; b is coefficient representing possible infinite vector for moving average weights; representing deterministic time series. The interpretation of matrix can be written as: In the following equation i and k representing row and column respectively are the element of which identifies the consequences increase due to unit in k th variable's innovation at data for i th variable value at the time $+ j$ which is holding all innovation at all the dates being constant (Luca Gambetti, 1999

Variance Decomposition Analysis

Variance Decomposition or Forecast Error Variance Decomposition (FEVD) helps to explain VAR model and explain the relationship among the variables. It gives proportion of the movement of a variable due to shocks to itself and to shocks to the other variables. Lütkepohl, H. (2005) discussed variance decomposition analysis and represent VDC into VAR(p) form in equation.

Granger causality Test

The method of granger causality helps to investigate the causal relationship between the two variables for the given time series data. This method is based on the probabilistic account of the causality. It uses empirical data sets to study the correlation between two variables. Granger (1969) analyzes time series data to determine the causality between variables. In this method, if x is useful for forecasting 1 , then it can be said that x is a

cause of. The value of F-statistics and p-value and appropriate lag level is helpful to explain the result of granger causality. It used both null and alternate hypothesis. The value of F statistics is helpful to reject the null hypothesis. The following two equations can be used to find F-value for restricted and unrestricted model to find if for all lags

Toda Yamamoto Modified Wald Test

There are few shortcomings regarding biasness and spurious regression analysis in granger causality method proposed by Granger (1969). This method is based on stationary property for the linear combination of X and Y data series whereas each series is not stationary but if both are non-stationary but cointegrated then the Granger-causality result will be invalid (Engel and Granger, 1987). Toda and Yamamoto (1995) have introduced a model based on augmented VAR method to solve these problems. It is an improved method for granger causality test. In the following equation is representing Gross domestic product (GDP) whereas a representing export (EXP) and import (IMP) data series in log form

RESULTS

The analysis begins with testing of unit root in time series data with the help of Augmented Dickey-Fuller (ADF) test and Phillip-Perron (PP) test. The results of ADF and PP are shown in table 5. After converting all the variables into stationary form, the next is selection of optimum leg length depicted in table 6. The Akaike information criterion (AIC) suggested lag 7. After the selection of lag length, the next step Johansen multivariate cointegration analysis is used between log of export (LEXP), log of import (LIMP) and log of Real GDP (LGDP). The result for the sample (1980-2016) of Johansen (trace and eigenvalue) cointegration test statistic suggest three cointegrating vector at 5 % level of significance depicted in table 7. Further, Impulse response function is used to analyze transmission from one variable to another variable. Variance decomposition analysis is also employed to investigate the relationship among various variables. Finally, Granger causality test indicates the causal relationship and direction for the causality among variables. Toda-Yamamoto wald test validate the result of causality.

CONCLUSION

The purpose of the following research study was to analyze the long-haul relationship of gross domestic product (GDP) of India with the export (EXP) and import (IMP) of India. The study is based on yearly data from 1980 to

January 2016. The data is transformed into stationary form by employing augmented Dickey-Fuller test and Phillip-Perron (PP) unit root test. The Johansen multivariate cointegration method is used to check the long-haul relationship between gross domestic product (GDP) of India with the export (EXP) and import (IMP) of India. The Granger causality test and Toda-Yamamoto wald test is employed to analyze the causal relationship among selected variables and also direction of causation. The result of the descriptive statistics revealed that the yearly average return of gross domestic product (GDP) is 6.27% with the volatility of 0.81, while minimum and maximum returns were recorded at 5.21 % and 7.72% in a yearly time period; yearly average return of export (EXP) is 3.78 % with a volatility of 1.26, while minimum and maximum returns were recorded at 2.11 % and 5.77% in a yearly time period; yearly average return of import (IMP) is 4.11 % with a volatility of 1.27, while minimum and maximum returns were recorded at 2.64 % and 6.19 % in a yearly time period; The results of the kurtosis show that the data series following normality patterns. The value of the Skewness shows that all the data series are positively skewed. The result of the augmented Dickey-Fuller test and Phillip-Perron (PP) unit root test concluded that the data of gross domestic product (GDP) of India and export (EXP) and import (IMP) of India showed a level unit root. Therefore, the data series are transformed at first difference. The data series at their first difference in both augmented Dickey-Fuller test and Phillip-Perron (PP) unit root test shows stationary property and data series are integrated at order I(1). The Akaike information criterion (AIC) is used for the identification of lag length which suggests seven lags for data series of selected sample period. Further, Johansen multivariate cointegration model have employed to examine the long-run relationship. The long-run associations among these variables are confirmed by trace test statistics indicating three cointegrating vector. The results of the Granger causality test and Toda-Yamamoto Wald tests indicate unidirectional causal association between gross domestic product (GDP) and export (EXP) of India; gross domestic product (GDP) and import (IMP) of India It also confirms bidirectional causal association between export (EXP) and import (IMP) of India. The results of the impulse response function indicates that If the impulse is GDP, the every response of GDP is positive

for EXP and GDP itself at each time in the responsive period whereas in case of IMP it shows straight negative line at each time in the responsive period. Thus, the positive shock of GDP makes GDP itself and EXP positive. The variance decomposition demonstrated that the first difference of natural log of DGDP shows only 28.25 % fluctuations which is explained due to its own shocks in succeeding 12 months while the rest of the variables showing their forecast variation. Therefore, it can be finally concluded based on the empirical finding that gross domestic product (GDP) of India with the export (EXP) and import (IMP) of India has the long-run relationship. Thus, it is concluded that variation in one variable leads to cause other variable.

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