Our Heritage

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Foreign Direct Investment, Trade and Growth – Causal Links Evident From India Using Ardl Approach

(1) Akshay Sakharkar(corresponding author)

Research Scholar,Goa Business School, Goa University

Email id – Akshaysakharkar2018@gmail.com

(2) Prof. Dr. B. Ramesh,

Professor,Goa Business School, Goa University.

Email id – brames@rediffmail.com

Abstract:

The aim of our study is to empirically investigate into the causal links between the variables of interest namely FDI, GDP, Export and Import evident for India based on a data set for 40 years from 1978 to 2017. This study highlights some prominent literature on GDP and FDI causal links and essentially provides for the base of the study. The estimation of causal links is based on the ARDL Bound testing approach to test for cointegration on the selected variables which shows evidence of long run association when GDP and FDI occupy the dependent variable position. In addition to this we have applied the ECM based granger causality test to estimate the long run and short run causality the results indicates the presence of weak form of bidirectional causality between FDI and GDP, secondly we have found that there exist bidirectional causality between GDP, Import and Export respectively, third finding is that strong form of bidirectional causation is evident between FDI, import and export respectively and finally no evidence of causation between export and import evident from India.

Keywords:*FDI, Growth, Cointegration, Causality, ARDL.*

JEL Code Classification: C12, C32, F14, F43

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

1. INTRODUCTION

The prime focus of every economy may it be a developed or developing one is to ensure economic growth and development, it is usually measured as a percentage increase in the Gross Domestic Product (GDP) of the country there are various drives of economic growth however in the recent literature foreign capital flows as a driver to growth have been widely studied by researchers, causal link evidences is the most prominent aspect studied by them. Overtime a very attractive form of foreign capital inflow has emerged with a huge significance to the growth which is FDI. FDI inflows in the form of stock or flow has been a noticeable determinant of growth for many developing and developed economies around the world. Our study has also attempted to fill in some additional information regards to the growth driving phenomenon of FDI to the India's economic growth. The study is based on 40 years of data pertaining to GDP growth, FDI inflows, Exports and Imports. Traditional studies have shown significant impact and insignificant impact on growth reported from different economies however our study has attempted to cover up some of the methodological flaws in the earlier works by employing the ARDL bound testing approach proposed by Pesaran et al. (2001).

The relevance of this study is more prominent for developing economies like India as they can essentially focus on the means of attracting such drivers to growth. The most explored field of study in international business areas if relevance of FDI with researchers determining the determinants, the causal links, effects, role and the spillovers led by FDI on the concerned economy.

2. LITERATURE REVIEW

Akinlo (2004) studied the possible impact of FDI on the Nigerian economic growth, the study revealed that FDI overall had a quite non-significant positive impact on the growth, moreover the study supported the argument of extractive type of FDI which does not contribute to substantial growth, other parameters like exports, labour force and human capital have shown a significant positive impact on the growth and however indicator of financial development measure have marked a negative impact on the output. Asheghian (2010) tried to gaze into the possible impact of FDI flows on the US

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Economic growth, the study based on a period of 40 years ranging from 1960 up to 2000 showed that FDI had a significant positive impact on the economic growth and factor productivity growth of US, more to indicated a uni-directional casualty of FDI leading to Growth in factor productivity and economic growth. Athukorala (2003) assessed the impact of FDI flows on to the Sri Lankan economy from 1959 up to 2002 for a period of 43 years, the analysis through the study revealed that the FDI led growth trend has not been favorable for Sri Lanka moreover there exist a causation of GDP leading to FDI, other factors unto consideration like domestic investment and trade liberalization however have offered some favorable outcomes by providing positive impacts on GDP growth and a direct independent causation to GDP. The attitude analysis carried out also suggested some key factors like political instability, regulatory barriers, low levels of human capital and poor infrastructures and so on have resulted into minimal flow of productive FDI into Sri Lanka. Atique, Ahmad & Azar (2004) study focused on assessing the relative effect of FDI flows along with an emphasis to the liberalized trade policy on the Pakistan economy, the work revealed that FDI had positive significant impact on the economic growth of the country. Baharumshah & Thanoon (2006) in their study attempted to analyze the impact of foreign capital flows on the selected East Asian countries the study revealed that firstly the domestic savings contributed positively to the economic growth also the FDI flows have contributed in enhancing the short run and long run economic growth of the countries in panel. in addition the study also focused on assessing the impact of short and long run debts on the growth the results revealed that short term debts have adverse effects on the short and long run growth on the other hand the long term debt had shown positive effects on growth however in the long run the trend disappears. Basu, Chakraborty & Reagle (2003) carried out a study to assess the interlinkage between FDI, Growth and Economic Liberalization for a panel of 23 developing countries for a period of 1978 to 1996, the results of the study based on a panel cointegration approach revealed that there exist a bidirectional causality between FDI and GDP growth for open economies, however a uni directional trend exist for relatively closed economies with restrictive trade and investment regimes from GDP causing FDI. Bengoa & Robles (2003) carried on a study to look into the causal links between economic freedom, FDI and economic

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

growth in relation to 18 Latin American countries into the panel, the study showed that economic freedom of the country is one of the most significant and positive determinant of FDI inflows in addition to human capital, economic stability and market liberalization, the study also revealed that there exist a positive correlation between FDI and Growth. Saaed and Hussain (2019) studied the impact of FDI, export, import, trade openness on the GDP of UAE. The study uses the ARDL approach to assess the long run relationship among the variables. The results indicate that there exist a bi-directional granger causality between economic growth and FDI, FDI and import however no causality is evident between export and imports. Muhammad Haseeb et al. (2014) studied the empirical relationship between FDI, export and economic growth in Malaysia. The results indicate that for Malaysian economy there exist an Export-led and FDI-led growth. Hussain and Haque (2016) study focused on the linkage between foreign direct investment, trade and economic growth with special emphasis on Bangladesh. The study revealed that there exist a long run positive relationship between foreign direct investment, trade and economic growth based on the VECM model.

3. DATA AND RESEARCH METHODOLOGY

Our study is emphasized to India, hence incorporates data from 1978 to 2017 i.e. for a period of 40 years. The data is annual time series data collected from prominent sources like RBI database and the World Bank Development Indicators based on IMF database. The study seeks to examine the long run and short run relationships amongst the selected variables like Foreign Direct Investment (FDI), Gross Domestic Product (GDP), Exports (EXPORT), and Imports (IMPORT). The results have been analyzed using MS excel and EViews 10 software's.

3.1 Data Definitions

Variables	Variable Description
GDP	Gross Domestic Product (GDP) measured as GDP per capita growth rate on annual basis, World Bank.
FDI	Foreign Direct Investment (FDI) measured as Million USD derived from World Development Indicators and expressed as a percentage of GDP, World Bank.
IMP	Imports (IMP) measured as a Million USD derived from World Development Indicators and expressed as a percentage of GDP, World Bank.

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

EXP	Export (EXP) measured as a Million USD derived from World Development Indicators and expressed as a percentage of GDP, World Bank.

Source: Authors own elaboration

3.2 Methodology and Model specifications

Our empirical study is based on annual time series data which has its own limitations in terms of the data characteristics like normality, stationarity, heteroscedasticity and autocorrelation, thus to overcome this weaknesses related to the data indigenous statistical tests have been applied who's brief description is presented as further.

3.3 Model Specification

The long run interrelationship amongst the variables into consideration for the study namely (GDP, FDI, EXP, IMP) can be expressed as under

$$\mathbf{GDP = \mathit{f}\ (FDI, EXPORT, IMPORT)} \text{ ……. Or,}$$

$$\mathbf{GDP_t = \alpha + \beta_1 FDI_t + \beta_2 EXPORT_t + \beta_3 IMPORT_t + \varepsilon_i} \text{……. (1)}$$

Where, GDP_t is the per capita growth of GDP on annual basis, FDI_t is flow of FDI expressed as a percentage of GDP, $EXPORT_t$ is the export measured value as a percentage of GDP, $IMPORT_t$ is the of Imports value measured as a percentage of GDP and $\beta(1,2,3)$ are the respective coefficients and ε_i is the error term.

In our study we have applied two step method of estimating causality amongst the variables based on Engle and Ganger (1987), firstly we try to explore into the long run bodings amongst the variables and secondly we employ error correction based on the causality.

Before running the model to estimate causality we must gaze into the order of integration of the variables that is whether the variables are stationary at level – I (0) or at its first difference – I (1) or at the second difference – I (2) respectively, we have employed two widely used and reliable tests of stationarity estimation in the time series which are Augmented Dickey Fuller Test (ADF) test and secondly the Phillips-Perron Test (PP) test.

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

The ARDL approach to testing for cointegration and causality is an alternative to the tradition Johansen Cointegration model. The ARDL model is considered versatile as its one of the basic assumption is that the time series variables should be integrated of either I (0) or I (1), thus a combination of this is well suited for analysis using the ARDL model with one restriction that the variables should not be intergraded of order two that is I (2) as it would offer spurious results and moreover bound testing using the F statistics provided by Pesaran et al. (2001) would not be possible. However the Johansen Cointegration model requires the variables to be integrated of only one uniform order and not a combination of them. In our study stationarity test results indicates the use of ARDL approach.

3.4 Test for Cointegration

Our study uses the Autoregressive Distributed Lag (ARDL) approach to estimating the cointegration amongst the variables Foreign Direct Investment (FDI), Gross Domestic Product (GDP), Exports (EXPORT) and Imports (IMPORT). The ARDL approach to cointegration was developed by Pesaran and Shin (1999) and Pesaran et al. (2001), this approach has relatively three merits in comparison to other available approaches firstly this model is versatile in terms of the order of integration of the variables that is variables can be integrated of any order except order two, secondly this method is more effective in testing for small and somewhat finite samples and finally as advocated by Harris and Sollis (2003), this approach tend to provide unbiased estimates for the long run model.

The ARDL models for functional specifications of the long run relationships amongst the variables Foreign Direct Investment (FDI), Gross Domestic Product (GDP), Exports (EXPORT) and Imports (IMPORT) be as follows:

$$\Delta GDP_t = \alpha_1 + \sum_{t=i}^{n} \beta_1 \Delta GDP_{t-1} + \sum_{t=i}^{n} \beta_2 \Delta \mathbf{FDI}_{t-1} + \sum_{t=i}^{n} \beta_3 \Delta \mathbf{EXPORT}_{t-1} + \sum_{t=i}^{n} \beta_4 \Delta \mathbf{IMPORT}_{t-1} + \delta 1\ GDP_{t-1} + \delta 2\ \mathbf{FDI}_{t-1} + \delta 3\ \mathbf{EXPORT}_{t-1} + \delta 4\ \mathbf{IMPORT}_{t-1} + \varepsilon_{1t} \quad \ldots. \ (2)$$

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

$$\Delta \mathbf{FDI_t} = \alpha_1 + \sum_{t=i}^{n} \beta_5 \Delta GDP_{t-1} + \sum_{t=i}^{n} \beta_6 \Delta \mathbf{FDI}_{t-1} + \sum_{t=i}^{n} \beta_7 \Delta \mathbf{EXPORT}_{t-1} + \sum_{t=i}^{n} \beta_8 \Delta \mathbf{IMPORT}_{t-1} + \delta 5 GDP_{t-1} + \delta 6\ \mathbf{FDI}_{t-1} + \delta 7\ \mathbf{EXPORT}_{t-1} + \delta 8\ \mathbf{IMPORT}_{t-1} + \varepsilon_{1t} \ldots \mathbf{(3)}$$

$$\Delta \mathbf{EXPORT_t} = \alpha_1 + \sum_{t=i}^{n} \beta_9 \Delta GDP_{t-1} + \sum_{t=i}^{n} \beta_{10} \Delta \mathbf{FDI}_{t-1} + \sum_{t=i}^{n} \beta_{11} \Delta \mathbf{EXPORT}_{t-1} + \sum_{t=i}^{n} \beta_{12} \Delta \mathbf{IMPORT}_{t-1} + \delta 9 GDP_{t-1} + \delta 10\ \mathbf{FDI}_{t-1} + \delta 11\ \mathbf{EXPORT}_{t-1} + \delta 12\ \mathbf{IMPORT}_{t-1} + \varepsilon_{1t} \ldots\ldots \mathbf{(4)}$$

$$\Delta \mathbf{IMPORT_t} = \alpha_1 + \sum_{t=i}^{n} \beta_{13} \Delta GDP_{t-1} + \sum_{t=i}^{n} \beta_{14} \Delta \mathbf{FDI}_{t-1} + \sum_{t=i}^{n} \beta_{15} \Delta \mathbf{EXPORT}_{t-1} + \sum_{t=i}^{n} \beta_{16} \Delta \mathbf{IMPORT}_{t-1} + \delta 13 GDP_{t-1} + \delta 14\ \mathbf{FDI}_{t-1} + \delta 15\ \mathbf{EXPORT}_{t-1} + \delta 16\ \mathbf{IMPORT}_{t-1} + \varepsilon_{1t} \ldots..\mathbf{(5)}$$

Where ε denotes white noise and Δ represents the first difference operator.

The ARDL bound test proposed under this approach is used to gaze into the long run relationship amongst the one period lagged variables mentioned in the above equations denoted by δ (1 – 25) respectively. The bound test is based on the joint F statistics for the asymptotic distribution with a null hypothesis of no cointegration.

In the ARDL modelling first and foremost step is estimating the long run equations for the set of variables as provided on the above equations (eq. 2, 3, 4, 5 and 6), once the equations are estimated they are being tested using the Ordinary Least Square (OLS) method. In order to estimate for cointegration a joint test is performed using each equations lagged variables at level represented by the δ coefficient using the Wald test of estimation with a null hypothesis of

$\mathbf{H_0}$**- δ1= δ2= δ3= δ4=0……** (No long run relationship)

$\mathbf{H_1}$**- δ1 ≠ δ2 ≠ δ3 ≠ δ4 ≠0 …….** (Long run relationship)

Indicating that there is no long run relationship with a sum of all coefficients equal to zero, the alternate hypothesis for the Wald test would be that there exist a long run relationship and the sum of all coefficients is not equal zero. The testing of cointegration is based on the Pesaran et al. (2001) provided CV for I (0) and I (1). If the computed F statistics value through the Wald test lies above the I (1) bound value then there can be clear rejection of the null hypothesis with no cointegration however when

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

the F statistics value lies below the I (1) bound value then we can reject the null and accept the alternate concluding that there is evidence of cointegration in the model. Once after the Wald test conclusion the and there exist a cointegration in any of the vector relationships i.e. amongst the (eq. 2, 3, 4, 5, or 6) then we go to estimate the long run and short run models. The long run model equation (7) and short run model equation (8) are estimated as under

$$GDP_t = \alpha_1 + \sum_{t=i}^{n} \beta_1 \, GDP_{t-1} + \sum_{t=i}^{n} \beta_2 \, \mathbf{FDI}_{t-1} + \sum_{t=i}^{n} \beta_3 \, \mathbf{EXPORT}_{t-1} + \sum_{t=i}^{n} \beta_4 \, \mathbf{IMPORT}_{t-1} + \varepsilon_{1t} \ldots\ldots\ldots\ldots \textbf{(6)}$$

$$\Delta GDP_t = \alpha_1 + \sum_{t=i}^{n} \beta_1 \, \Delta GDP_{t-1} + \sum_{t=i}^{n} \beta_2 \, \Delta\mathbf{FDI}_{t-1} + \sum_{t=i}^{n} \beta_3 \, \Delta\mathbf{EXPORT}_{t-1} + \sum_{t=i}^{n} \beta_4 \, \Delta\mathbf{IMPORT}_{t-1} + \delta \, \mathbf{ECT}_{t-1} + \varepsilon_{2t} \ldots\ldots\ldots\ldots \textbf{(7)}$$

Where δ denotes the coefficient of the Error Correction Term (ECT), this term is relevant as it indicates the speed at which the variables would reach equilibrium. One of the emphasis on this term is that it should bear a negative sign and secondly it should have a significant p-values.

3.5 Causality Test

In order to determine the causation amongst the variables in the study we have applied the Granger causality test that is in general to test if variable X granger cause variable Y. as per Granger (1969) one variable say X will granger cause the other variable say Y only and only if the forecast for Y variable is improved by using the past values of X and Y variable together. Granger causality test can be utilized to determine two different types of causations namely unidirectional running from X to Y, and bidirectional running either way that is X cause Y simultaneously Y cause X.

4. EMPIRICAL RESULTS AND DISCUSSIONS

After an intensive look into the proposed methodology and varied testing procedures this section will provide essentially the cooked product based on the methodical preparations in the above section.

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

4.1 Stationarity Testing

The term stationarity implies a time series data variable with a constant mean, variance and autocovariance for each of the given lag value. The use of a stationary series leads to a stable model with accurate and reliable estimations and results however a non-stationary series with none of the above properties lead to spurious results which are unrealistic and unreliable. Literature specifies several techniques of estimating stationarity in the time series data, however our study has focused on two prominent and most widely adopted methods of estimating stationarity. Firstly we use the Augmented Dicky Fuller test (ADF) and secondly we use the Phillips-Perron test for stationarity estimation both the methods have a similar null hypothesis of nonexistence of stationarity in the series. Table 1 provides for the results of stationarity testing using the ADF and P-P test. Our aim through the analysis is to ensure that none of our series data is integrated of the second order which can make ARDL testing impractical.

The results for the annual data on the Indian economy for GDP per capita growth, Export as a percentage of GDP, Import as a percentage of GDP and FDI inflows as a percentage of GDP show that the GDP is found to be stationary at its level hence it can be used at the for any analysis and for the other variables apart from GDP both the test failed to reject the null hypothesis indicating that they are not stationary at the level, however the first difference of this variable have shown enough significance to reject the null hypothesis hence we can conclude that the variables FDI, Export and Import are stationary at I (1) hence integrated of order one apart from GDP which is stationary at level i.e. I (0). The summation of the entire exercise is to conclude with that our data is integrated either of I(0) or I(1) but not I(2) thus it is best fitted to apply the ARDL methodology to estimate the long run cointegration.

Table 1. Unit Root Tests

Variables	Intercept	Trend & Intercept	Neither Trend nor Intercept	Decision
Augmented Dickey-Fuller Test (ADF)				
GDP	-4.93***	-7.06***	-1.03	
Δ (GDP)	-	-	-	**I(0)**
FDI	-1.59	-2.91	-0.78	

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Δ (FDI)	-6.99***	-6.88***	-7.01***	**I(1)**
EXP	-0.75	-1.52	0.92	
Δ (EXP)	-6.31***	-6.22***	-2.93***	**I(1)**
IMP	-0.87	-1.22	0.82	
Δ (IMP)	-4.88***	-4.80***	-4.78***	**I(1)**
Phillips – Perron Test (P – P)				
GDP	-4.97***	-7.34***	-2.01**	
Δ (GDP)	-	-	-	**I(0)**
FDI	-1.53	-2.91	-0.72	
Δ (FDI)	-7.17***	-7.05***	-7.02***	**I(1)**
EXP	-0.81	-1.83	0.75	
Δ (EXP)	-6.35***	-6.27***	-6.15***	**I(1)**
IMP	-0.98	-1.65	0.54	
Δ (IMP)	-4.89***	-4.81***	-4.83***	**I(1)**
	level	Intercept	Intercept & Trend	Neither Trend nor Intercept
Test Critical values	1% ***	-3.61	-4.21	-2.62
	5% **	-2.93	-3.52	-1.94
	10% *	-2.60	-3.19	-1.61

Source: Author's Calculations

Notes: Δ Implies First Difference, **** denotes 1%, ** denotes 5% & * denotes 10% levels of significance.*

4.2 ARDL Bound Testing for Cointegration

The bound testing in ARDL enables us to determine for long run cointegration amongst the variable sets. The widely used Wald test is applied on the coefficients the results of the bound testing is offered in Table 2 we have provided for each equation above stated the proper diagnostics of the F statistics along with the level criteria's for either to accept or reject of the possibility of cointegration.

The results are based on the null hypothesis with no cointegration in the model hence the sum of coefficient equal to zero which implies no cointegration, the alternate hypothesis is that there exist cointegration and the joint sum is not zero.

The test have offered 2 cointegrating vectors firstly when FDI is placed as the dependent variables with F statistics of 15.97 which is way greater than the upper bound value at 1, 5 and 10% .

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Secondly when import is placed into the dependent variable criteria there is cointegration evident significant at 10% level. However for other vectors there is no evidence of cointegration thus we accept the null as the F statistics is lower than the upper bound value.

Table 2. ARDL Bound Test for Cointegration results

Eq. No.	Long Run Equations	Lags	F Statistics	Decision		
2	GDP (GDP, FDI, Export, Import)	3	4.01*	Cointegration		
3	FDI (GDP, FDI, Export, Import)	3	5.02**	Cointegration		
4	Export (GDP, FDI, Export, Import)	3	1.66	No Cointegration		
5	Import (GDP, FDI, Export, Import)	3	1.92	No Cointegration		
Significance level				***1%	**5%	*10%
Lower bound critical value				4.29	3.23	2.72
Upper bound critical value				5.61	4.35	3.77

Source: Author's Calculations

Our study have shown evidences of cointegration for two of the equations hence we go ahead to estimate the long run and short run model as well as to ascertain the Error Correction term as discussed earlier the ECT should be negative and should possess significance it will thus imply that there exist a short run relationship and it will specify the speed at which it will reach equilibrium in the longer run.

In the event of the ECT being positive it indicates a divergence, similarly when the value is negative it indicates convergence, a point to note here is that the value also plays a crucial role, when ECT is 1 it implies 100% correction within the same period, when it is 0.5 it indicates 50% of correction done and when the value is 0 it implies no cointegration or no long run relationship exist thus ECT play dual role in terms of determining the short run relationship as well as the long run.

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Table 3 Statistical output for Short run model

ARDL Error Correction Regression Dependent Variable: D(GDP) Selected Model: ARDL(1, 3, 1, 1) Case 3: Unrestricted Constant and No Trend Sample: 1978 2017 Included observations: 37				
ECM Regression Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.689213	0.332410	-2.073383	0.0478
D(FDI)	-3.055054	0.665657	-4.589530	0.0001
D(FDI(-1))	0.830420	0.791015	1.049815	0.3031
D(FDI(-2))	3.146958	0.735617	4.277982	0.0002
D(EXPORT)	1.513566	0.447208 -	3.384478	0.0022
D(IMPORT)	1.165297	0.320531	3.635520	0.0012
ECM*	-0.819252	0.128882	-6.356618	0.0000

R-squared	0.694698	Mean dependent var	0.031903
Adjusted R-squared	0.633638	S.D. dependent var	2.707857
S.E. of regression	1.639008	Akaike info criterion	3.994718
Sum squared resid	80.59045	Schwarz criterion	4.299486
Log likelihood	-66.90228	Hannan-Quinn criter.	4.102163
F-statistic	11.37723	Durbin-Watson stat	2.065440
Prob(F-statistic)	0.000001		

Source: Author's Calculations using E-Views 10.

Table 3 provides the glimpses towards the short run characteristics of the ARDL model. The stability of the model can be ascertained with the F statistics and the respective probability. Also the R^2 value signifies 69.46% reliability along with an adjusted R^2 value of 63.36%. Our focus in this model is on the value on the ECT term and its probability significance as discussed earlier the ECT term in this model is estimated at -0.8192 with a probability of 0.0000 thus we can rightly infer that there exist a short run relationship and moreover the speed at which this is corrected towards the long run equilibrium is 81.92% which is significant at 1% level conveying that the disequilibrium in GDP of the previous year's shock is adjust back to the long run equilibrium in the current year.

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Table 4. Statistical output for long run Model

Levels Long Run Equation Case 3: Unrestricted Constant and No Trend Dependent Variable: GDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	-4.507819	2.168876	-2.078412	0.0473
EXPORT	0.503649	0.402218	1.252179	0.2212
IMPORT	0.159862	0.376778	0.424285	0.6747

Source: Author's Calculations using E-Views 10.

The ARDL approach to cointegration also enables the researcher based on the model specified to estimate the long run model that can be utilized in order to test the research questions Table 4 provides insights into the long run model. The estimated long run equation using the above output is as follows.

GDP = -4.5078*FDI + 0.5036*EXPORT + 0.1599*IMPORT)

The long run model offers very useful information to us firstly when we look into the model and see the values of FDI we can conclude that FDI has a negative relationship with GDP which is significant at 5% or at 10% level which implies that when FDI increases by 1 percent GDP falls by 4.50. the results of export however are promising it signifies that export and GDP have a positive long run association as when Export increases by 1 percent the GDP grows by 0.50 value similarly the imports too have shown a positive trend as when import increases by 1 percent the GDP value also grows by 0.16 approx.

4.3 Causality Analysis

The causality estimation amongst the variables is done by employing the ECM granger causality approach as widely discussed in the literature, this method helps in estimating the causation amongst the variables of interest of the researcher. The results of the analysis are presented in table 5 are as follows.

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Table 5 Granger Causality results.

Pairwise Granger Causality Tests
Sample: 1978 2017
Lags: 3

Null Hypothesis	**Observations**	**F-Statistics**	**Probability**
FDI does not Granger Cause GDP	37	2.32535	0.0948*
GDP does not Granger Cause FDI	37	5.27921	0.0048***
EXPORT does not Granger Cause GDP	37	3,59399	0.0273**
GDP does not Granger Cause EXPORT	37	2.96828	0.0476**
IMPORT does not Granger Cause GDP	37	2.55100	0.0743*
GDP does not Granger Cause IMPORT	37	3.36682	0.0314**
EXPORT does not Granger Cause FDI	37	7.12901	0.0009***
FDI does not Granger Cause EXPORT	37	9.46142	0.0001***
IMPORT does not Granger Cause FDI	37	5.69879	0.0033***
FDI does not Granger Cause IMPORT	37	4.77469	0.0077***
IMPORT does not Granger Cause EXPORT	37	1.31720	0.2871
EXPORT does not Granger Cause IMPORT	37	1.31770	0.2869

Source: Author's Calculations

*Notes: *** denotes 1%, ** denotes 5% & * denotes 10% levels of significance.*

The outcomes of the granger causality test are quite promising and supportive of the existing literature firstly to speak about FDI and GDP causation there exist a weak causation from FDI to GDP due to a higher probability value but marginally significant at 10%, however GDP causation to FDI is quite strong and very significant thus we can conclude here that indeed GDP growth leads to increase in FDI flows into India. Secondly Export GDP causation results indicate that there exist a strong bidirectional causality between GDP and Export as both granger cause each other significantly at 5% level. The causality between GDP and Imports have shown similar trends as in case of export marking a bidirectional granger causality provided Import causing GDP is less significant than GDP causing Imports growth. Moving ahead on to other variables other than GDP our results show that FDI and export causal links are quite significant and relatively promising, at 1% significance we can say that there exist a bidirectional string form of causality between FDI and exports and thus both granger causing each other.

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Causal links among FDI and Imports have shown similar trends as in case of FDI and exports marking a bidirectional strong and significant causality. However our study have found conclusive evidences that there is no causation from export to import or vice versa as the probability value being so high that we cannot reject the null hypothesis Thus we conclude the causality analysis by highlighting some prominent facts about the causation firstly our study is evident of weak form of bidirectional causality between FDI and GDP, secondly we have found that there exist bidirectional causality between GDP, Import and Export respectively, third finding is that strong form of bidirectional causation is evident between FDI, import and export respectively and finally no evidence of causation between export and import evident from India.

4.4 Model Stability and Diagnostics

The stability of the model adds on to the reliability of the results thus the literature supports the fact of testing for the model stability in econometrics. Several methods are applied for testing of model stability we have opted to choose for two quite reliable and widely employed tests of model stability in our study namely the cumulative sum (CUSUM) test and secondly the cumulative sum of squares (CUSUMSQ). Pesaran et al. (2001) suggested using both the test in estimating the ARDL model stability. The CUSUM and CUSUMSQ test are very simple to interpret one important condition is that the CUSUM and CUSUMSQ lines should be within the 5% significance bound lines. The results are provided in Figure 1 specifying the CUSUM and Figure 2 specifying the CUSUMSQ tests of model stability.

Figure 1. Plot of Cumulative Sum of Recursive Residuals, Sum of Square of Recursive Residuals.

Apart from the stability we have also attempted to provide a brief about the model diagnostics in Table 6by primarily testing for serial correlation using the Breusch-Godfrey Serial Correlation LM Test the results indicate there is no presence of serial correlation in the residual terms. Secondly we tried to estimate for Breusch-Pagan-Godfrey Test of Heteroskedasticity the results have made us reject the possibility of Heteroskedasticity and accept the presence of Homoskedasticity. Lastly we tried to see

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

the normality statistics using the Jarque-Bera Test for Normality we thus conclude on its basis that our data is normally distributed.

Table 6 Model diagnostics test summary.

Null Hypothesis	Statistics	Sig.	Decision	Test
There is no serial correlation in the residual terms	1.480969	0.1228	Fail to reject the Null hypothesis	Breusch-Godfrey Serial Correlation LM Test
Homoskedasticity	0.246802	0.9713	Fail to reject the Null Hypothesis	Breusch-Pagan-Godfrey Test of Heteroskedasticity
The series are normally distributed	2.892742	0.235423	Fail to reject the Null Hypothesis	Jarque-Bera Test for Normality

Source: Author's Calculations

5. CONCLUSION AND POLICY IMPLICATIONS

The study seeks to investigate the dynamic causal links between economic growth and selected variables like FDI, export and imports. Empirical studies in the past have shown that this variables have significant impact on the growth however the relationships vary from country to country. Our study also tried to walk on the same route to investigate the causal links evident to Indian economy, the study is based on annual time series data collected over for a period of 40 years ranging from 1978 to 2017 for India. Our study applied the ARDL bound testing approach to estimate cointegration and the ECM based Granger causality test to estimate long run causal relationships. The analysis of the data in our study revealed that there is significant cointegration at short and long run period for India. The results also throw light on the causality factors amongst the variables we found that our study is evident of weak form of bidirectional causality between FDI and GDP, secondly we have found that there exist bidirectional causality between GDP, Import and Export respectively, third finding

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

is that strong form of bidirectional causation is evident between FDI, import and export respectively and finally no evidence of causation between export and import evident from India. The model parameters and diagnostics have significantly supported our study's relevance. The recommendations based on the study findings are quite relevant to India as it is being a rapidly developing country, in addition the role of government towards export promotion is seen quite active in the recent years moreover the GDP growth projections made by the government if attained can significantly improve the foreign capital inflows and thus essentially contributing to the overall development of the nation.

REFERENCES

Akinlo, A. E. (2004). Foreign direct investment and growth in Nigeria: An empirical investigation. *Journal of Policy modeling*, *26*(5), 627-639. https://doi.org/10.1016/j.jpolmod.2004.04.011

Asheghian, P. (2004). Determinants of economic growth in the United States: The role of foreign direct investment. *The international trade journal*, *18*(1), 63-83.https://doi.org/10.1080/08853900490277350

Athukorala, A. W. (2003). The Impact of Foreign Direct Investment for Economic Growth: A Case Study in Sri Lanka: 9th International conference on Sri Lanka Studies, 2003. *Matara, Sri Lanka*.https://www.jstor.org/stable/41261022

Baharumshah, A. Z., & Thanoon, M. A. M. (2006). Foreign capital flows and economic growth in East Asian countries. *China economic review*, *17*(1), 70-83.https://doi.org/10.1016/j.chieco.2005.09.001

Basu, P., Chakraborty, C., & Reagle, D. (2003). Liberalization, FDI, and growth in developing countries: A panel cointegration approach. *Economic Inquiry*, *41*(3), 510-516.https://doi.org/10.1093/ei/cbg024

Batten, J. A., & Vo, X. V. (2009). An analysis of the relationship between foreign direct investment and economic growth. *Applied Economics*, *41*(13), 1621-1641.https://doi.org/10.1080/00036840701493758

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Batten, J. A., & Vo, X. V. (2009). An analysis of the relationship between foreign direct investment and economic growth. *Applied Economics*, *41*(13), 1621-1641.https://doi.org/10.1080/00036840701493758

Bengoa, M., & Sanchez-Robles, B. (2003). Foreign direct investment, economic freedom and growth: new evidence from Latin America. *European journal of political economy*, *19*(3), 529-545.https://doi.org/10.1016/S0176-2680(03)00011-9

Chakraborty, C., & Basu, P. (2002). Foreign direct investment and growth in India: A cointegration approach. *Applied economics*, *34*(9), 1061-1073.https://doi.org/10.1080/00036840110074079

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, *74*(366a), 427-431.https://doi.org/10.1080/01621459.1979.10482531

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: journal of the Econometric Society*, 1057-1072.https://www.jstor.org/stable/1912517

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.https://www.jstor.org/stable/1913236

Haseeb, M., Hartani, N. H., Bakar, A., Azam, M., & Hassan, S. (2014). Exports, foreign direct investment and economic growth: Empirical evidence from Malaysia (1971-2013). *American Journal of Applied Sciences*, *11*(6), 1010-1015.http://dx.doi.org/10.3844/ajassp.2014.1010.1015

Hussain, M., & Haque, M. (2016). Foreign direct investment, trade, and economic growth: An empirical analysis of Bangladesh. *Economies*, *4*(2), 7.https://doi.org/10.3390/economies4020007

Johansen, S. (1988). Statistical analysis of cointegration vectors. Journal of economic dynamics and control, 12(2-3), 231-254.https://doi.org/10.1016/0165-1889(88)90041-3

ISSN: 0474-9030

Vol-68-Issue-30-February-2020

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and statistics*, *52*(2), 169-210.https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.https://doi.org/10.1002/jae.616

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335-346.https://doi.org/10.1093/biomet/75.2.335