A Study on the Impact of FII, FDIand GDs on GDP of India

R. Venkataraman* Thilak Venkatesan**

**Professor, Presidency College, Bangalore.*

***Research Scholar, Bharathiar University, Coimbatore.*

Abstract

Gross Domestic Product (GDP) is the broadest quantitative measure of a nation's total economic activity. GDP represents the monetary value of all goods and services produced within a nation's geographic borders over a specified period of time. A country's financial health and growth in the global economy is measured with the help of this macroeconomic factor. In the recent times, India's GDP has developed immensely emphasizing the country as one of the most promising emerging economy. India remains the fastest growing country across the world with an estimated GDP growth of 7.5% compared to global GDP of 2.5% in the current year. The economic theories on growth, state's investment and savings are the most significant factors contributing to a higher growth. This investment can be broadly classified into domestic savings & foreign capital aiding the growth. In this context the study was focused to understand the relationship among various investments and savings augmenting the GDP growth. The data for the analysis was secondary, collected from the RBI Bulletin. Econometric tools such as ADF test, vector auto regression & Granger causality test were used for the analysis. FII was found stationary at level and was dropped from the analysis; the remaining factors were used to fit a ARDL Model. The Granger causality test as well proved a unidirectional relationship from FDI and GDS to GDP.

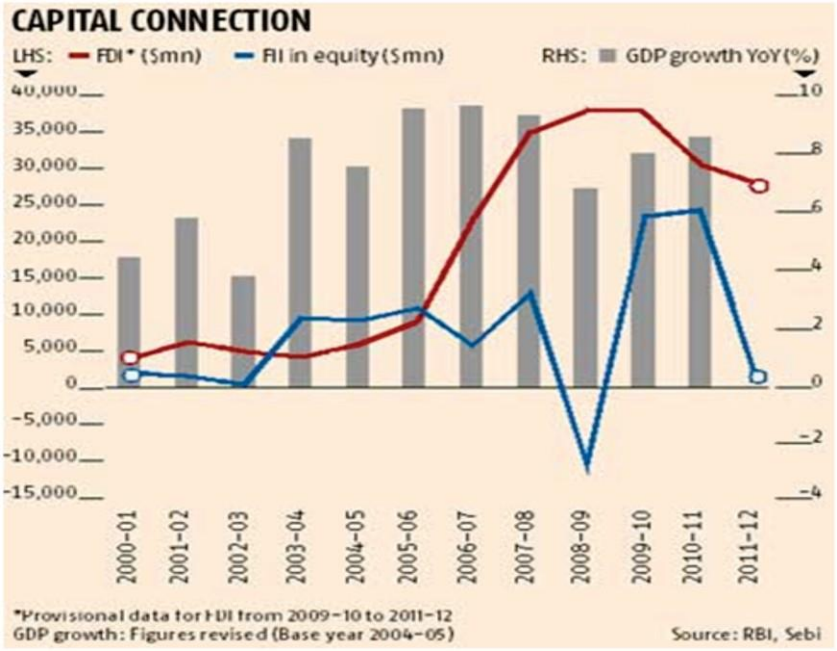
Keywords: *Investment, Savings, GDP, Econometric Model& Causality*

1. Introduction

The growth of Indian economy is significantly large compared to the other Asian peers & the emerging countries. The increase in GDP is driven by various factors including the consumption, investments, government expenditure, exports, and imports and so on. Foreign investment acts as a catalyst in aiding the GDP growth. The government has taken various initiatives in the recent years including the increase in FDI limits, attracting more foreign capital to achieve a higher GDP growth.

Business Standard reported "India's growth trajectory over the last decade has thrown up a direct link between capital flows and GDP expansion. While domestic consumption is a big growth booster, nearly 20 per cent of the country's growth has been fueled by capital flows — both portfolio and foreign direct investment (FDI)."

The research was initiated to find and to fit a model between



GDP, FII, FDI and GDS. The focus of the paper is to substantiate which form of investment yields a higher GDP growth. The tools used for the analysis were ADF, VAR, ARDL and Granger causality test. A step by step approach of econometric tools using e-views was followed.

2. Review of literature

Shrivastav (2013) examined that the investments in Indian market was attributed to institutional investors among whom foreign investors are of primary importance. The analysis focused to check whether foreign investors (FII) direct the Indian stock market. The study examined whether market movement can be explained by these investors and their impact on the stock markets. The short-term nature of FII had bidirectional causation with the returns of other domestic financial markets such as money markets, stock markets and foreign exchange markets. The author observed a positive correlation between the FII investments and returns of SensexNifty. The various sectoral indices were as well studied for their relationship.

Menani (2013) compared FDI and FII as drivers of growth for Indian economy. Her studies proved that there is unidirectional causality from FII towards GDP at lag 1 and causality from GDP to FII at lag 2. Her studies compared both FII & FDI, and since both provide impetus to growth, she suggested FDI to be encouraged as it provides a long term framework unlike FII which remains a short term phenomenon.

Malhotra (2014) analyzed the impact of FDI on the Indian economy, challenges to particularly after two decades of economic reforms, and the challenges to implement reforms post globalization. The research analyzed the FDI inflow patterns to evaluate the key factors determining FDI flows. The research found that there has been a positive impact of the FDI inflows on the economic growth and the FDI flows supplements the shortfall of the domestic capital.

Mehta (2014) analyzed the causal relationship between real gross domestic product (GDP) and real gross domestic saving (GDS) in India. The focus of the paper was to assess the direction of causality between saving and economic growth. The tools used were Granger-causality technique to analyze the causal relationship during the period 1951- 2011. The granger causality test revealed that there is no evidence of causality in any direction between per capita GDP.

Abdu (2015) studied the impact of savings, foreign aid on growth in India for the period 1981 to 2011 and concluded that the factors are positively co-integrated and exhibit stable long run equilibrium. His studies suggested utilizing aid for productive sectors and implements poverty reduction policies.

3. Statement of the Research Problem

The growth of India's GDP has largely depended on the domestic consumption, followed by the foreign flows. Among the foreign flows, foreign direct investments would significantly aid in creating employment, increasing standard of living and thereby act as a multiplier to a consistent growth story, whereas foreign institutional investments are more volatile in nature to add constructively to higher growth. The purpose of the study is to evaluate the impact of GDS, FII, FDI on the GDP of India and model the factors using VAR to test the linear interdependency among the variables. ARDL model was used to find the long-term relationship among the multiple variables and finding out the significant determinant of the affecting factor to Indian GDP.

Objectives of the Study

1. To study the impact of foreign institutional investment on gross domestic product.
2. To study the impact of foreign direct investment on gross domestic product.
3. To study the impact of gross domestic savings on gross domestic product.

Database& Methodology

The data for the research was collected through secondary sources mainly from Reserve Bank of India publications that is RBI Bulletin. The time period for the study is 15 years from 2000 to 2015. E-Views version 7.2 was used to analyse the data.

Augmenteddickeyfuller test- unit root:

A series is said to be (weakly or covariance) stationary if the mean and autocovariances of the series do not depend on time. Any series that is not stationary is said to be non stationary. ADF test can be specified with no drift and no trend; with trend and no drift; lastly with both trend and drift as follows.

$$\Delta Y_t = \delta Y_{t-1} + \Sigma \alpha_i \Delta Y_{t-1} + U_t$$ No drift, no intercept

$$\Delta Y_t = \beta_0 + \delta Y_{t-1} + \Sigma \alpha_i \Delta Y_{t-1} + U_t$$ Intercept, no drift term

$$\Delta Y_t = \beta_0 + \beta_1 t + \delta Y_{t-1} + \Sigma \alpha_i \Delta Y_{t-1} + U_t$$ With intercept and trend

The test specify the Null hypothesis (H0) as that the time series has unit root, thus the time series is non-stationary against the Alternative Hypothesis (H1) that the time series has no unit root, thus a stationary time series:

H0: Time series has a unit root ($\delta = 1$)

H1: Time series has no unit root (6 ≠1)

Vector Auto Regression

Vector Auto Regression is an economic model used to capture the linear interdependencies among multiple times series of data. Vector auto regression is used to interpret the univariate autoregressive model by allowing for more than one evolving variable. Vector auto regression calculated with estimates in this project gives an equation which is used in solving ARDL model. The structural approach to simultaneous equations modeling uses economic theory to describe the relationships between several variables of interest.

Normality Test

An informal approach to testing normality is of comparing a histogram of the sample data to a normal probability curve. The empirical distribution of histogram data should be resembled normally distributed. It is difficult to analyze the distribution if the sample is small. In regressing the data for smaller sample one might proceed against the qualities of normal distribution with the samemean.

Breush- Godfrey Serial Correlation

The Breusch-Godfrey serial correlation LM test is a autocorrelation in the errors in the regression model. It makes use of the residuals from the model being considered in a regression analysis, and the test statistic is derived from the above test. The test also specifies about the null hypothesis that there is no serial correlation of any order up to the p value.

Breusch-Pagan-Godfreyfor Heteroskedasticity

Breusch-Pagan-Godfrey test was developed in the year 1979which is used for heteroskedasticity for a linear regression model. It tests whether the estimated variance of the residuals from a regression are dependent on the values of the independent variables. In that case it means it has heteroskedasticity. In other words heteroskedasticity means that the variables are scattered and does not have a linearity which is not favorable for the analysis.

Stability Test(CUSUMTEST)

The CUSUM test (Brown, Durbin, and Evans, 1975) is based on the cumulative sum of the recursive residuals. This option plots the cumulative sum together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines.

VARGrangercausalitytest

The Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another. Granger causality is a statistical concept of causality that is based on prediction. According to Granger causality, if a signal X1 "Granger-causes" (or "G-causes") a signal X2, then past values of X1 should contain information that helps predict X2 above and beyond the information contained in past values of X2 alone.

Auto Regressive Distributive Lag Model

The test is used for finding out the long term relationship among the variables and finding out the significant determinants of Gross Domestic Product.

4. Data analysis and interpretation

The data was collected from the RBI Bulletin and the data was differenced to obtain stationarity. The Gross domestic product was considered as dependent variable,foreign institutional investments, foreign direct investment and gross domestic savingswere independent variables.

Table 1: GDP at Factor Cost, FII, FDI & GDS

Year	YearGDP at Factor Cost	FII	FDI	GDS
2000	18642.28	1329	10,733	4329.468
2001	19726.05	2293	18,654	4874.588
2002	20482.9	527	12,871	4916.977
2003	22227.6	7769	10,064	5657.718
2004	23887.69	8599	14,653	7333.365
2005	26161.02	9929	24,584	8249.81
2006	28711.2	7011	56,390	9392.25
2007	31297.18	24448	98,642	10647.23
2008	33393.74	-16553	1,42,829	10171.2
2009	45160.72	17910	1,23,120	13963.35
2010	49185.31	37985	97,320	15818.34
2011	52475.28	2168.26	1,65,146	16627.09
2012	54821.12	30110.74	1,21,907	16412.86
2013	57417.9	7027.23	1,47,518	16837.36
2014	98270.89	38008.27	1,89,107	28785.55
2015	51597.57	8443.898	1,91,063	

The stationary was observed at the first difference of GDP (gross domestic product). It was observed that the probability value was 0.0006 which is less than 0.05 inferring that the data is stationary.

Table 2: ADF: GDP (gross domestic product at factor cost)

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.499550	0.0006
Test critical values:	1% level	-5.124875	
	5% level	-3.933364	
	10% level	-3.420030	

*MacKinnon (1996) one-sided p-values.

Table 3: ADF test: FDI (foreign direct investment)

Null Hypothesis: D(FDI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic ¯based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.657526	0.0032
Test critical values:	1% level	-4.004425	
	5% level	-3.098896	
	10% level	-2.690439	

*MacKinnon (1996) one-sided p-values.

The stationarity was obtained at the first difference of FDI (foreign direct investment). It was observed that the probability value was 0.0032 which is less than 0.05 inferring that the data is stationary.

Table 4: ADF test: GDS (gross domestic saving)

Null Hypothesis: D(GDS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.070142	0.0005
Test critical values:	1% level	-5.295384	
	5% level	-4.008157	
	10% level	-3.460791	

*MacKinnon (1996) one-sided p-values.

The stationarity was obtained at the first difference of GDS (Gross domestic savings). It was observed that the p–Value was 0.0005 which is less than 0.05 inferring that the data is stationary. The same can as well be observed by the t-statistic of 8.070145.

Table 5: ADF : FII (Foreign institutional investments)

Null Hypothesis: FII has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.868828	0.0019
Test critical values:	1% level	-3.959148	
	5% level	-3.081002	
	10% level	-2.681330	

*MacKinnon (1996) one-sided p-values.

The stationarity was obtained at the level of FII (foreign institutional investment). It was observed that the probability value was 0.0019 which is less than 0.05 inferring that the data is stationary. The same can as well be observed by the t-statistic of 4.868828.

Vector Auto Regression Analysis

The vector auto regression (VAR) is an econometric model used to capture the linear interdependencies among multiple time series. VAR models generalize the univariate autoregressive model (AR model) by allowing for more than one evolving variable. All variables in a VAR are treated symmetrically in a structural sense (although the estimated quantitative response coefficients will not in general be the same); each variable has an equation explaining its evolution based on its own lags and the lags of the other model variables. VAR modeling does not require as much knowledge about the forces influencing a variable as do structural models with simultaneous equations: The only prior knowledge required is a list of variables which can be hypothesized to affect each other inter temporally.

Table 6: Vector Auto regression Estimates

Date: 05/03/16 Time: 15:29
Sample (adjusted): 2003 2014
Included observations: 12 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DGDP	DFDI	DGDS
DGDP(-1)	1.274379	-14.84190	0.462883
	(2.48260)	(9.51833)	(0.74297)
	[0.51332]	[-1.55930]	[0.62302]
DGDP(-2)	3.815938	11.89551	0.918278
	(2.69895)	(10.3478)	(0.80772)
	[1.41386]	[1.14957]	[1.13688]
DFDI(-1)	0.082174	-0.082867	0.011296
	(0.11363)	(0.43566)	(0.03401)
	[0.72317]	[-0.19021]	[0.33218]
DFDI(-2)	-0.158232	0.239423	-0.054845
	(0.12222)	(0.46858)	(0.03658)
	[-1.29469]	[0.51095]	[-1.49947]

DGDS(-1)	-6.908431	22.65152	-2.099964
	(5.15954)	(19.7818)	(1.54410)
	[-1.33896]	[1.14507]	[-1.35999]
DGDS(-2)	-12.05358	-19.73790	-3.332423
	(6.61636)	(25.3673)	(1.98008)
	[-1.82178]	[-0.77809]	[-1.68297]
C	10582.69	21406.31	3602.450
	(5480.09)	(21010.8)	(1640.03)
	[1.93112]	[1.01883]	[2.19657]
R-squared	0.704614	0.511979	0.700954
Adj. R-squared	0.350150	-0.073646	0.342098
Sum sq. resids	4.05E+08	5.95E+09	36270798
S.E. equation	8999.725	34505.12	2693.355
F-statistic	1.987832	0.874244	1.953302
Log likelihood	-121.0338	-137.1608	-106.5570
Akaike AIC	21.33897	24.02680	18.92616
Schwarz SC	21.62184	24.30966	19.20902
Mean dependent	6482.333	14686.33	1989.048
S.D. dependent	11164.08	33300.66	3320.572
Determinant resid covariance (dof adj.)		2.76E+22	
Determinant resid covariance		1.99E+21	
Log likelihood		-345.3458	
Akaike information criterion		61.05763	
Schwarz criterion		61.90622	

Equation derivedfromthe VAREstimates:

DGDP = C(1)*DGDP(-1) + C(2)*DGDP(-2) + C(3)*DFDI(-1) +C(4)*DFDI(-2)+C(5)*DGDS(-1)+C(6)*DGDS(-2)+C(7)

ARDL: Autoregressive Distributive Lagmodel:

The test is used for finding out the long term relationship among the variables and finding out the significant determinants affecting GDP. The model equation used at the beginning of the approach consisting of all the variables is:

DGDP = C(1)*DGDP(-1) + C(2)*DGDP(-2) + C(3)*DFDI(-1) + C(4)*DFDI(-2) + C(5)*DGDS(-1)+ C(6)*DGDS(-2)+ C(7)

DFDI = C(8)*DGDP(-1) + C(9)*DGDP(-2) + C(10)*DFDI(-1) + C(11)*DFDI(-2) + C(12)*DGDS(-1) + C(13)*DGDS(-2) + C(14)

DGDS= C(15)*DGDP(-1)+ C(16)*DGDP(-2)+ C(17)*DFDI(-1) + C(18)*DFDI(-2) + C(19)*DGDS(-1) + C(20)*DGDS(-2) + C(21)

Table 7: Dependent Variable: DGDP

ARDL Model: Method: Least Squares

Date: 05/03/16 Time: 15:36

Sample (adjusted): 2003 2015

Included observations: 13 after adjustments

DGDP = C(1)*DGDP(-1) + C(2)*DGDP(-2) + C(3)*DFDI(-1) + C(4)*DFDI(-2) + C(5)*DGDS(-1) + C(6)*DGDS(-2) + C(7)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.068364	1.405292	0.048647	0.9628
C(2)	4.794228	2.046467	2.342685	0.0576
C(3)	0.097732	0.104701	0.933442	0.3866

C(4)	0.124705	0.103091	-1.20966	0.2719
C(5)	5.670292	4.481677	-1.265217	0.2527
C(6)	14.48063	4.983009	-2.906001	0.0271
C(7)	12073.02	4632.743	2.60602	0.0403

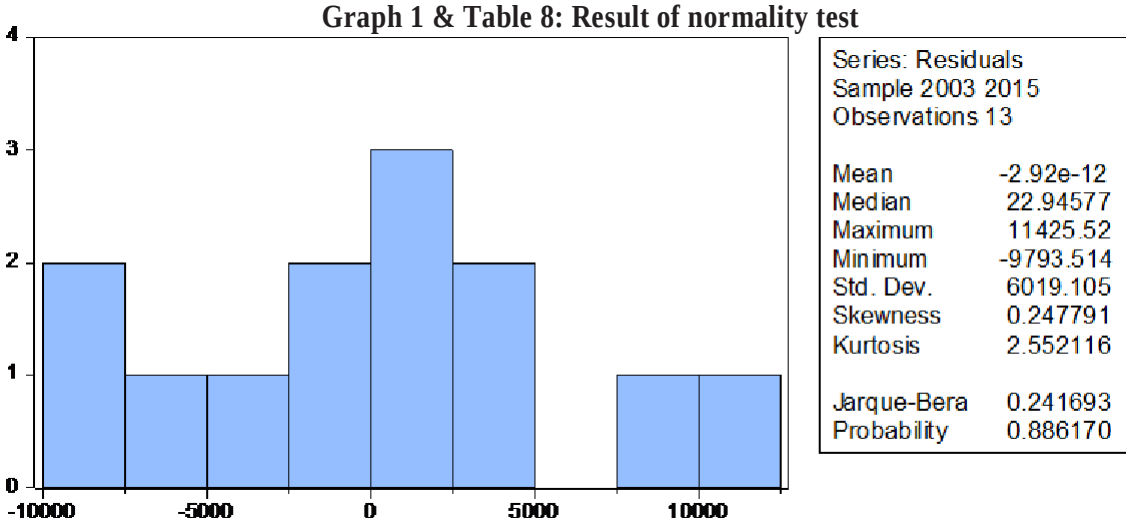
R-squared	0.890742	Mean dependent var	2393.43
Adjusted R-squared	0.781485	S.D. dependent var	18209.8
S.E. of regression	8512.3	Akaike info criterion	21.2401
Sum squared resid	4.35E+08	Schwarz criterion	21.5443
Log likelihood	-131.0609	Hannan-Quinn criter.	21.1776
F-statistic	8.15268	Durbin-Watson stat	1.77957
Prob(F-statistic)	0.010998		

The ARDL Model, R square is .89 which translates to 89% prediction of the dependent variable. The F-statistic being 0.01 less than 0.05% suggest that the overall model has greater predictive power. The tests for residual diagnostics are tabled below.

Normality test:

Normality tests are used to determine if the data arenormallydistributed.The results of the normality test are given below.

Graph 1 & Table 8: Result of normality test



The value of Jarque-Berastatistics, is more than 0.05 that is 0.886170. The P-value evidences that the data is normally distributed. The Null hypothesis being that the data is not normally distributed which is being rejected according to the P-Value.

Test for Serial Correlation

The test was performed to check the relationship between a given variable and itself over various time intervals. Serial correlations are often found in repeating patterns when the current value of a variable effects its future value.

Table 9: Serial Correlation test

Date: 05/03/16 Time: 21:22 Sample: 2003 2015 Included observations: 13

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. | . |	. | . |	1	0.069	0.069	0.0780	0.780
.***| . |	****| . |	2	-0.469	-0.476	3.9792	0.137

From the above result of the serial correlation, the probability is more than 0.05 or 5% which is 0.780 and therefore the test suggests that there is no serial correlation in the model.

Heteroskedasticity Test

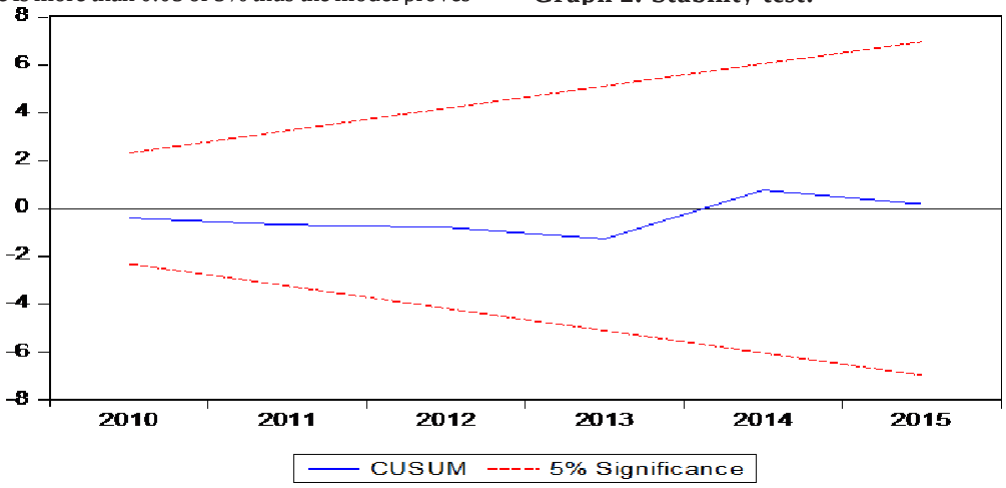
One of the key assumptions of regression is that the variance of the errors is constant across observations. If the errors have constant variance, the errors are called homoscedastic. Typically, residuals are assessed this assumption

Table 10: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.041765	Prob. F(6,6)	0.2031
Obs*R-squared	8.726166	Prob. Chi-Square(6)	0.1896
Scaled explained SS	1.442558	Prob. Chi-Square(6)	0.9632

From the above table, the probability of the chi square with the observed R square is more than 0.05 or 5% thus the model proves that there is no heteroskedasticity.

Graph 2: Stability test:



From the above graph, the blue line of the data is within the 5% significance. This refers that the data in the model using ARDL

Table 11: VAR Granger Causality

Date: 05/03/16 Time: 15:48 Sample: 2000 2015 Included observations: 12

Dependent variable: DGDP			
Excluded	Chi-sq	Df	Prob.
DFDI	4.709301	2	0.0949
DGDS	8.346115	2	0.0154
All	11.85425	4	0.0185
Dependent variable: DFDI			
Excluded	Chi-sq	Df	Prob.
DGDP	2.492986	2	0.2875
DGDS	1.436596	2	0.4876
All	3.622755	4	0.4595

It was observed that the DFDI has a probability of 9.49% (Less than 10% level) and DGDS has a probability on 1.54% (Less than 5% level) in table 10. It is concluded that GDS Granger Causes GDP at 5% level and FDI Granger Causes GDP at 10% level. The same relationship is checked for a two way relationship. It was observed that the relation is only one way.

5. Suggestions

The unidirectional causality was significant in the VAR causality test. GDS was found significant at 5% level were as FDI was found significant only at 10% level. GDS was found to have a higher impact over GDP compared to FDI. Hence the policy makers are suggested to incentivize the domestic savings as well along with priority to foreign direct investments to encourage higher GDP growth.

6. Implications

The research paper proves that there exists a strong relationship between GDS and GDP, which was significant at 5% level and between FDI and GDP at 10% level. The various initiatives taken by the policy makers to increase FDI augers well to increase the GDP growth. The policy makers can provide incentives to increase domestic savings which would contribute a higher GDP growth. The various schemes of increase the domestic savings can be relooked to facilitate a higher savings.

7. Conclusion

The research demonstrates that Gross domestic savings leads to an increase in the GDP with 2 lags. It is observed from the ARDL linear estimates (Table 6). The relationship using Granger causality was found unidirectional. The various tests for normality, serial correlation &heteroskedasticity proved residuals to be free from all the criteria's. The ARDL model fit estimates a 89% accuracy (R2 value) with the model fit F-value (0.01). The data suggests that a higher growth of GDP can be achieved by increasing the domestic savings.

8. Limitations and Scope for further research

The data collected was limited to 4 variables- GDP, GDS, FII & FDI. The other forms of investment such as portfolio investments can also be considered to give a clear picture. FII proved stationary al level leading to rejection of the variable from the model. The other theoretical models of savings can as well be tested to obtain reliable estimates. The model can be extended to a higher time period; the study was performed using 15 years data i.e. from 2000 to 2015. GDP data used for the analysis was at factor cost, other substitutes can yield a different dimension to the model.

References

Abdu, Murtala(2015).Impact of savings, foreign aid on growth in India, Retrieved from http://www.globalbizresearch.org/Chennai_Symposium/conference/pdf/C541.pdf

Gujarati, Damodar N. (2009). Basic Econometrics, Tata Mc-Graw hill,492-499.

Handbook of statistics on Indian economy, Retrieved from, http://dbie.rbi.org.in/DBIE/ dbie.rbi?site=publications

Koop, Gary (2005). Analysis of economic data, John Wiley & Sons, 121-133.

Malhotra, Bhavya(2014). Foreign direct investment: Impact on Indian economy, Retrieved from http://www.ripublication.com/gjbmit/ gjbmitv4n1_03.pdf

Mehta, Sachin N. & Rami, Gaurang D. (2014).Causal relationship between savings and economic growth in India,Retrieved from https://www.academia.edu/5903697/CAUSAL_RELATIONSHIP_BETWEEN_SAVINGS_AND_ECONOMIC_GROWTH_IN_INDIA?auto=download.

Menani, Shikha(2013).FDI and FII as drivers of growth for Indian economy: A Comparison, Retrieved from www.ijird.com/index.php/ijird/article/viewFile/44248/35762

Shrivastav, Anubha(2013).Influence of FII flows on Indian stock market, Retrieved from http://accman.in/images/feb13/Shrivastav%20A.pdf

http://www.business-standard.com/article/opinion/indian-gdp-growth-largely-depends-on-capital-flows-111121400005_1.html