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## **DOES FDI INFLOW AFFECTS THE EXPORTS, A MAJOR COMPONENT OF GDP? AN ANALYSIS IN THE INDIAN CONTEXT**

SAUMITA PAUL

M. Phil Student, Jadavpur University, Kolkata

### **ABSTRACT**

The trend towards the liberalization of regulatory regimes for Foreign Direct Investment continues apace across the globe. India introduced the New Economic Policy in 1991. This policy ushered in a new era of development where FDI played an important role. The present study examines how the FDI inflow in traditional and modern sector affects India's export during the period 2004-2017 by using simple regression analysis. This paper shows a positive significant effect of FDI inflow on export of India and also a shift both in the movement of FDI inflow and export from traditional sector towards the modern sector by using the mean comparison test. Here also a positive significant effect of export, investment and direct tax rate on India's GDP has been noticed for the period 1991-2011.

**Keywords:** FDI inflow, export, GDP, Indian traditional sector, Indian modern sector

### **1. INTRODUCTION**

Among all the forms of international investment FDI is the most important. "Foreign direct investment involves foreign investors taking a controlling and lasting stake in productive enterprise and inflows are generally associated with Multi National Enterprises (MNEs) that have operations and production facilities across the world" (Basu and Maertens, 2010). In other words capital investment that is owned and operated by foreign entity can be defined as FDI (Mankiw, 2011).

Unlike other private capital flows FDI is non-debt-creating flows. The amount of FDI in developing countries has increased in recent years mainly due to three major factors: the rise of MNCs and search for global profits; the liberalization of global capital markets; and economic liberalization with in developing countries (Thirwall, 2006). FDI plays a 'multidimensional' role in the overall development by generating the benefits through bringing in non-debt creating foreign capital resources, technological improvement, skill enhancement, creating new employment and more competitive business environment, contributing to international trade integration and increasing efficient allocation etc.

Although the liberalization process in India has been started in early 1980s ultimately the process of liberalization started emerging in India in a proper way in 1991. The reforms of 1990s are significant in respect of policies towards Foreign Direct Investment. India has liberalized FDI regime considerably since 1991 to penetrate into world market and also opening up some sectors to FDI such as mining, banking, insurance, telecommunications, air lines, roads & high ways, defence spending etc. As a result by 2005 India was only behind china and USA in terms of FDI and stayed within the top three ranks since then. "Foreign Investment Promotion Board (FIPB) was set up to speed up other applications for foreign investment. As of 2001, 100% foreign ownership is allowed in a large no. of industries and majority ownership in all but banks, insurance companies, telecommunication and airlines. 100% FDI is permitted for setting up Special Economic Zones (SEZs), Export Oriented Units and Industrial Park.

FDI is a powerful tool of export growth. However, the role of FDI in export promotion in developing countries remain controversial and crucially on the motive for such investment. If the motive behind FDI is to capture domestic market, it may not contribute to export growth. On the other hand if the motive is to tap exports markets by taking advantage of country's comparative advantage, then FDI may contribute to export growth (Sharma, 2000).

The export is a major component of GDP. FDI inflow leads to export growth which in turn increases the growth of GDP by improving a country's trade balance.

## **2. OBJECTIVES OF THIS PAPER**

The major objectives of the paper are:

- To study the effect of FDI inflow in traditional and modern sector on Export of India from 2004 to 2017.
- To evaluate how the export affects India's GDP during 1991 to 2011.

The paper is organized as follows. Section 3 reviews the literature in brief. Section 4 explains the data sources and the methodology used for the purpose of analysis. Section 5 analyses the paper. Section 6 concludes the paper.

## **3. LITERATURE REVIEW**

Many empirical studies have been undertaken to analyse the impact of FDI inflow on export performance of India. In a study by Sharma (2000) the role of FDI on export growth using the annual data for 1970-1998 has been analysed. This analysis suggests that FDI has no significant impact on export performance although FDI has a positive coefficient.

Kumar (2012) analysed the impact of FDI on export growth taking data from 1991-2010 and conclude that FDI can be treated as an accelerator of host countries' economic growth by improving productivity, technology etc.

In a study by Rajan et al. (2008), the policies and sectors attracting FDI in India has been examined. Their major finding suggests that FDI had been a relatively limited source of external financing in India. But India, with its relatively well developed financial sector, strong industrial base and critical mass of well educated workers, appears to be well placed to reap the benefits of FDI.

In another study by Kocher (2014), the trend and pattern of flow of FDI from 2000-2013 has been examined. The study observed that service sector and computers, hardware, drugs and pharmaceuticals attracts FDI most and the paper also finds no significant relationship between FDI and GDP in manufacturing sector.

Rajput et al. (2012) studied the trends and pattern of flow of FDI during 1991-2011 in India and the relationship between liberalized regime pursued by the countries and the level of FDI stock has been examined. Their finding suggests that FDI flows reaching the peak in 2008-09 then it decline in 2010-11 and again started to increase from January 2012. This study also observed a positive relation between openness of country and inflow of FDI.

Sultan (2013) in his paper examined the causal relationship between FDI inflow and export. By the Granger causality based on vector error correction model he shows that causality runs from export to FDI inflow direction and not from FDI inflow to export direction.

Konya and Singh (2006) in their paper examined the export- import-led growth and growth-driven export- import hypotheses for India. They shows that both the exports and imports Granger-cause GDP, both individually and jointly, which in turn increase the export-import led growth. By the Granger causality test they shows that the causality runs from GDP and exports to imports, also from GDP and imports to exports.

#### **4. DATABASE AND METHODOLOGY**

The data used in this paper has been drawn from the several secondary data sources. The sector wise FDI inflow data has been taken from several DIPP (Department of Industrial Policy and Promotion) annual issues for the year 2004 to 2017. The data of export, gross fixed capital formation, direct tax rate and indirect tax rate has been taken from RBI's handbook of statistics on Indian economy and from Indiastat.com. STATA software has been used in this paper to analyse the data. Linear regression analysis has been done here to analyse the relationship between FDI inflow in traditional and modern sector and export in India. We have used Granger causality test based on VAR model in this paper in order to see the direction of the causality

among export, FDI inflow in traditional sector and FDI inflow in modern sector. Mean comparison test has also been done to see the mean difference among FDI inflow in traditional sector and FDI inflow in modern sector and export.

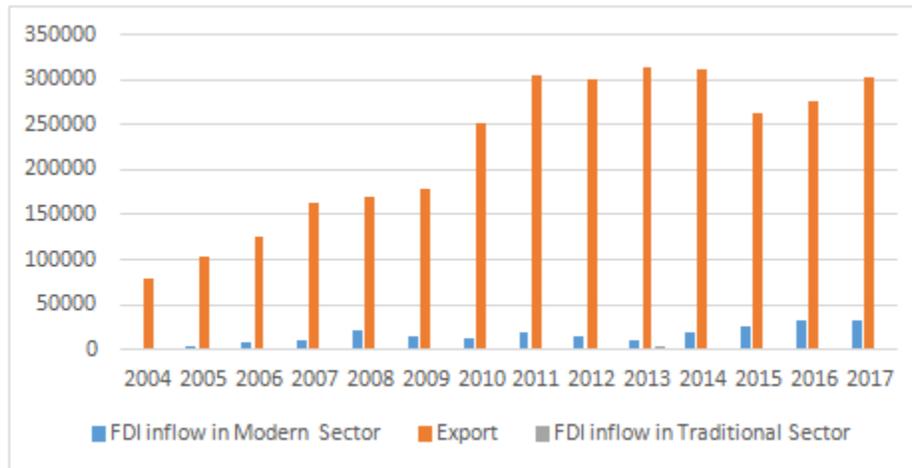
To analyse the effects of major components of GDP in its variation a number of linear regression analysis has been done on the basis of the data 1991 to 2011. The data is based on 2004-05 base year. We have not taken the further data as it is based on another base year i.e. 2011-12 moreover the calculation method has also been changed.

## **5. ANALYSIS**

### ***5.1 Sector wise FDI inflow during post reform period***

Sectoral distribution of FDI inflows changed in India due to the liberalization of FDI policy. During 1990s service sector was the most important recipient of FDI. During 1992-2000 engineering sector received the most FDI (20.4%) with chemicals and allied products (11.7%), services (9.4%), finance (7.6%), computers (5.8%) etc. During 2000-2010, the service sector was the leading sector in respect of attracting FDI. Here we concern with the inflows of FDI in India's traditional sector and modern sector. In the traditional sector we have considered ten industries namely textiles, food processing industries, vegetable oil and vanaspati, leather and leather goods, ceramics, timber products, sugar, glass, rubber goods, paper and pulp (including paper products). The modern sector also consists of ten industries that are the services sector, telecommunications, drugs & pharmaceuticals, chemicals (other than fertilizers), hotel & tourism, trading, power, metallurgical industries, electrical equipments and transportation industry. Specifically the services sector consists of financial, non-financial services, banking services, insurance, hospital and diagnostic centres and other services. Hotel and tourism industry is made of hotel and restaurant, tourism industry. Electrical equipment industry consists of electrical equipment, computer software industry, computer hardware industry and electronics. Transportation industry includes automobile industry, air and sea transport, passenger cars, auto ancillaries and parts and ports.

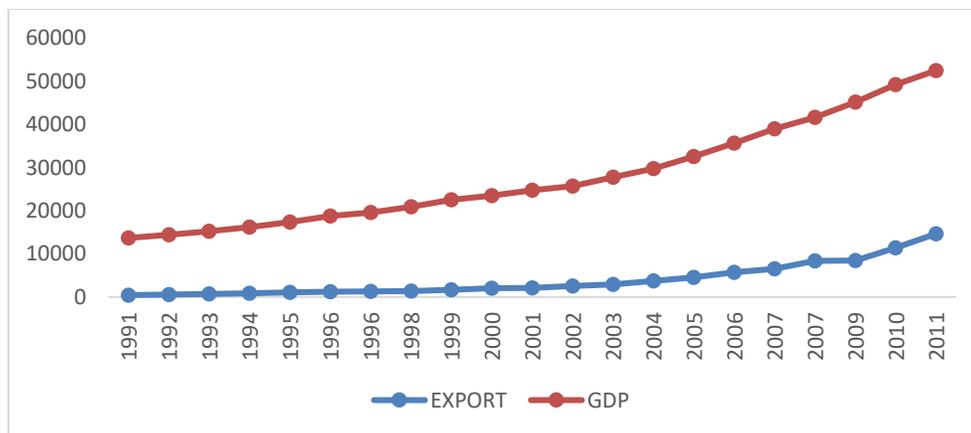
**Figure 1: Showing Export and FDI inflow in both Traditional Sector and Modern Sector in US \$ million during 2004-2017**



Source: Compilation from RBI handbook of statistics on Indian economy and various issues of DIPP.

From figure 1 we can see that FDI inflows in modern sector has increased throughout the time period but in case of traditional sector it increased only slightly. However, the growth of export is very high during the period 2004 to 2017. It has reached the peak in 2013-14.

**Figure 2: Showing Export and GDP in India in Rs Billion during 1991-2011**



Source: RBI handbook of statistics on Indian economy

Figure 2 shows a steadily increasing trend for both export and GDP from 1991 to 2011.

**5.2 Estimable model<sup>1</sup>:** Suppose we have ‘*n*’ paired observation (*xi, yi, zi*) on three variables X, Y and Z. This gives a scatter of *n* points justifying the presence of randomness at the level of observations. So, we write the ‘observed relation’ as following:

$$y_i = \alpha + \beta x_i + \gamma z_i + u_i \quad i = 1, 2, \dots, n$$

Where *ui* represents the stochastic disturbance terms or random error. Let us call FDI inflow in traditional sector as X, FDI inflow in modern sector as Z and India’s total export as Y.

In order to capture the causal relationship between the dependent variable i.e. total export of India and the explanatory factors i.e the FDI inflow in traditional sector and FDI inflow in modern sector, here a linear regression has been performed on the basis of the data from 2004 to 2017 in Table 1.1. Here the logarithmic transformation has been done so that reference point can be equidistant in either direction. The coefficient of this regression gives the elasticity value that shows the change in variation in the dependent variable due to one percent change in explanatory variable. Thus the regression equation is taken as the following:

$$Y(\text{Export}) = \alpha + \beta X(\text{FDI inflow in traditional sector}) + \gamma Z(\text{FDI inflow in modern sector}) + U$$

**Table 1.1: Regression Analysis: Dependent Variable: lnExport**

Explanatory Variable	Coefficient (Standard Error)
<b>lnFDI inflow in Traditional Sector</b>	<b>0.2699648**</b> <b>(0.0889612)</b>
<b>lnFDI inflow in Modern Sector</b>	<b>0.2511199**</b> <b>(0.1034542)</b>
<b>Constant</b>	<b>8.041608***</b> <b>(0.7239016)</b>
<b>No. Obs.</b>	<b>14</b>
<b>P&gt;F</b>	<b>0.0001</b>
<b>R-Squared</b>	<b>0.8085</b>
<b>Adj R Squd</b>	<b>0.7737</b>
<b>Root MSE</b>	<b>0.2178</b>

Source: Author’s Estimation

Table 1.1 shows both the FDI inflow in traditional sector and modern sector has a significant(5% level of significance) positive effect on export i.e. one percent increase in FDI inflow in both the traditional and modern sector significantly increase India’s export.

Now in order to examine the individual effect of FDI inflow in each traditional industry on export we run the following regression. For the problem of multicollinearity, each explanatory variable is considered distinctly in this regression analysis frame work.

**Table 1.2: Regression Analysis: Dependent Variable: lnExport**

Explanatory Variable	Model1	Model2	Model3	Model4	Model5	Model6	Model7	Model8	Model9	Model10
lnFDI inflow in Textiles	0.43** (0.145)									
lnFDI inflow in Food Processing industry		0.29*** (0.0626)								
lnFDI inflow in Vegetable oil and vanaspati			0.31*** (0.074)							
lnFDI inflow in Leather and leather goods				0.29*** (0.06)						
lnFDI inflow in Ceramics					-0.0012 (0.1027)					
lnFDI inflow in Timber products						0.078** (0.035)				
lnFDI inflow in Sugar							0.0303 (0.0686)			
lnFDI inflow in Glass								0.226*** (0.0598)		
lnFDI inflow in Rubber Goods									0.216*** (0.0688)	

<b>InFDI inflow in Paper and Pulp (including paper products)</b>										<b>0.188** (0.0787)</b>
<b>Constant</b>	<b>10.07*** (0.74)</b>	<b>10.64*** (0.36)</b>	<b>11.13*** (0.278)</b>	<b>11.68*** (0.1364)</b>	<b>12.24*** (0.359)</b>	<b>12.15*** (0.1137)</b>	<b>12.19*** (0.1601)</b>	<b>11.62*** (0.185)</b>	<b>11.27*** (0.323)</b>	<b>11.53*** (0.314)</b>
<b>No. of Obs.</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>
<b>P&gt;F</b>	<b>0.0121</b>	<b>0.0006</b>	<b>0.0013</b>	<b>0.0004</b>	<b>0.9908</b>	<b>0.0468</b>	<b>0.6661</b>	<b>0.0026</b>	<b>0.0086</b>	<b>0.0344</b>
<b>R Square</b>	<b>0.4205</b>	<b>0.6365</b>	<b>0.5917</b>	<b>0.6612</b>	<b>0.00</b>	<b>0.2904</b>	<b>0.0160</b>	<b>0.5440</b>	<b>0.4506</b>	<b>0.3216</b>
<b>Adj R Sqd</b>	<b>0.3723</b>	<b>0.6062</b>	<b>0.5577</b>	<b>0.6330</b>	<b>-0.0833</b>	<b>0.2312</b>	<b>-0.0659</b>	<b>0.5060</b>	<b>0.4048</b>	<b>0.2651</b>
<b>Root MSE</b>	<b>0.36274</b>	<b>0.28731</b>	<b>0.30449</b>	<b>0.27737</b>	<b>0.47653</b>	<b>0.40142</b>	<b>0.47269</b>	<b>0.32178</b>	<b>0.35322</b>	<b>0.39249</b>

Source: Author's Estimation

In table 1.2, model 1-model 10 has been considered to examine the causal relationship between export and FDI inflow in every individual industry considered under the traditional sector i.e. Model 1 represents the relationship between export and FDI inflow in textiles, Model 2 shows the relationship between export and FDI inflow in food processing industry and so on.

Table 1.2 shows one percent increase FDI inflow in all the industries except ceramics has a positive effect on export. Among them FDI inflow in food processing industry, vegetable oil and vanaspati, leather and leather goods, glass and rubber goods increase the exports at 1% level of significance. Whereas timber products, textiles, paper and plup (including paper products) have a positive effects on export at 5% significance level and sugar does not have any significance in order to increase the export.

However, one percent increase in ceramics reduces the export. Although it is not significant.

Similarly, the above analysis has been done for the modern sector also.

**Table 1.3: Regression Analysis: Dependent Variable: lnExport**

Explanatory Variable	Model1	Model2	Model3	Model4	Model5	Model6	Model7	Model8	Model9	Model10
lnFDI inflow in Services Sector	0.322*** (0.0989)									
lnFDI inflow in Telecommunications		0.138 (0.086)								
lnFDI inflow in Drugs & Pharmaceuticals			0.347*** (0.0902)							
lnFDI inflow in Chemicals (other than fertilizers)				0.494** (0.1312)						
lnFDI inflow in Hotel and Tourism					0.335*** (0.0515)					
lnFDI inflow in Trading						0.237*** (0.0373)				
lnFDI inflow in Power							0.324*** (0.088)			
lnFDI inflow in Metallurgical industry								0.365*** (0.1157)		
lnFDI inflow in Electrical Equipments									0.201 (0.168)	
lnFDI inflow in Transportation industry										0.373*** (0.0745)
Constant	9.628*** (0.8075)	11.27*** (0.6139)	10.07*** (0.5697)	9.136*** (0.828)	10.19*** (0.3212)	10.76*** (0.2406)	10.11*** (0.581)	9.931*** (0.737)	10.7*** (1.281)	9.59*** (0.533)
No. of Obs.	14	14	14	14	14	14	14	14	14	14

P>F	0.0069	0.1362	0.0023	0.0027	0.00	0.00	0.0030	0.0083	0.2550	0.0003
R Square	0.4684	0.1753	0.5520	0.5413	0.7787	0.7700	0.5332	0.4531	0.1064	0.6758
Adj R Sqd	0.4241	0.1066	0.5146	0.5031	0.7603	0.7509	0.4943	0.4076	0.0320	0.6488
Root MSE	0.34744	0.43275	0.31897	0.32273	0.22416	0.22852	0.32556	0.35239	0.45046	0.27134

Source: Author’s Estimation

In table 1.3, model 1-model 10 has been considered to examine the causal relationship between export and FDI inflow in every individual industry considered under the modern sector i.e. Model 1 represents the relationship between export and FDI inflow in services sector, Model 2 shows the relationship between export and FDI inflow in telecommunications and so on.

Table 1.3 shows the effect of one percent increase in FDI inflow in each industry on export. The FDI inflow in services sector, drugs& pharmaceuticals, chemicals (other than fertilizers), hotel and tourism, trading, power, metallurgical industry, transportation industry significantly (1% significant) increase the export. Whereas telecommunications and electrical equipments have a positive effect on export but it is not significant.

In order to see the direction of causality among these three variables namely export, FDI inflow in traditional sector and FDI inflow in modern sector we run the granger causality test based on vector auto regression model. Following table shows the result of the causality:

**Table 1.4: Granger Causality Wald Test**

Equation	Excluded	Chi2	df	Prob> Chi2
FDI inflow in Modern Sector	FDI inflow in Traditional Sector	2.4004	2	0.301
FDI inflow in Modern Sector	Export	0.35803	2	0.836
FDI inflow in Modern Sector	All	3.6314	4	0.485
FDI inflow in Traditional Sector	FDI inflow in Modern Sector	1.8344	2	0.400
FDI inflow in Traditional Sector	Export	17.381	2	0.000
FDI inflow in Traditional Sector	All	23.542	4	0.000
Export	FDI inflow in Modern Sector	39.652	2	0.000
Export	FDI inflow in Traditional Sector	1.3928	2	0.498
Export	All	51.149	4	0.000

Source: Author’s Estimation

Table 1.4 shows that lagged value of FDI inflow in modern sector granger cause export as  $p < 0.05$ . But FDI inflow in traditional sector do not cause export. Whereas the direction of the causality goes from export to FDI inflow in traditional sector.

Mean comparison test has been done here to see whether there exists any significant difference between FDI inflow in modern sector and FDI inflow in traditional sector and also the difference in export for the considered time period. If mean difference is positively (negatively) significant then it can be inferred that the FDI inflow in modern sector has been increased significantly (decreased) over the time having positive (adverse) impact on export of India. For this test we have divided our data set into two parts i.e. pre 2011 which is from 2004 to 2010 and post 2011 which is from 2011 to 2017.

**Table 1.5: Mean Comparison Test for FDI inflow from 2004-2010**

VARIABLES	NO. OF OBSERVATIONS	MEAN VALUE	MEAN DIFFERENCE
<b>FDI inflow in Modern Sector from 2004-10</b>	7	<b>10431.82</b> <b>(2528.464)</b>	<b>9982.974***</b> <b>(2436.969)</b>
<b>FDI inflow in Traditional Sector from 2004-10</b>	7	<b>448.8446</b> <b>(102.765)</b>	

Source: Author's Estimation

From table 1.5 it can be said that the mean difference (i.e. 9982.974 US \$ million) is significantly (1% level of significance) positive i.e. The FDI inflow in modern sector for pre 2011 has been significantly increased over time than the FDI inflow in traditional sector for the same time period.

**Table 1.6: Mean Comparison Test for FDI inflow from 2011-2017**

VARIABLES	NO. OF OBSERVATIONS	MEAN VALUE	MEAN DIFFERENCE
<b>FDI inflow in Modern Sector from 2011-17</b>	7	<b>21538.37</b> <b>(3255.756)</b>	<b>19519.64***</b> <b>(3438.273)</b>
<b>FDI inflow in Traditional Sector from 2011-17</b>	7	<b>2018.726</b> <b>(417.6977)</b>	

Source: Author's Estimation

Table 1.6 shows that the mean difference just has been doubled for the post 2011 period i.e. The FDI inflow in modern sector for post 2011 has been significantly increased than the FDI inflow in traditional sector for the same time period. This shows a change in pattern of FDI inflows i.e. a trend towards modern sector away from the traditional sector.

**Table 1.7: Mean Comparison Test for Export**

VARIABLES	NO. OF OBSERVATIONS	MEAN VALUE	MEAN DIFFERENCE
Export from 2011-17	7	295927.6 (7304.092)	143054.8*** (24204.27)
Export from 2004-10	7	152872.9 (21445.89)	

Source: Author’s Estimation

Table 1.7 shows that the mean difference for export from pre 2011 to post 2011 is 143054.8 US \$ million. So, It can be inferred that the export in post 2011 has been increased significantly (1% level of significance) from the pre 2011.

However, in order to see the difference in the composition of exports during 2004-2017 we have taken the export data for the several industries during this time period. Here we have considered Textiles, Handicrafts excl. handmade carpet, Cotton Yarn/ Fabs. /made-ups, Handloom Products etc., Jute manufacturing including floor covering, Fruits and vegetables as the traditional sector and in the modern sector Drugs & Pharmaceuticals, Engineering goods, Electronic goods, Petroleum products and Gems & Jewellery have been considered. Due to the unavailability of the data we can’t consider the same industry that we have taken under the traditional and modern sector for analysing the effect of FDI inflow on exports. Whatever, here the total time period has been divided into two parts as before i.e. pre 2011(2004-2010) and post 2011(2011-2017).

**Table 1.8: Mean Comparison Test for Exports from 2004-2010**

VARIABLES	NO. OF OBSERVATIONS	MEAN VALUE	MEAN DIFFERENCE
Export of Modern products	7	4281.066 (750.7802)	3190.543*** (674.1136)
Export of Traditional products	7	1090.523 (77.61377)	

Source: Author’s Estimation

From table 1.8 we can see that export of modern items is significantly (1% level of significance) increase than the exports of traditional items for pre 2011 period.

**Table 1.9: Mean Comparison Test for Exports from 2011-2017**

VARIABLES	NO. OF OBSERVATIONS	MEAN VALUE	MEAN DIFFERENCE
Export of Modern products	7	10789.03 (378.4729)	7586.886*** (256.4632)
Export of Traditional products	7	3202.149 (277.7346)	

Source: Author’s Estimation

Table 1.9 shows that the mean difference has been more than doubled for the post 2011 period i.e. the export of the modern products for post 2011 has been significantly (1% level of significance) increased than the export of the traditional products for the same time period. This shows a change in pattern of exports i.e. a trend towards modern items away from the traditional items.

Now for analysing the effects of export on India’s GDP we have built a Keynesian model where export has been established as a major factor of GDP along with the other variables.

5.2 *Estimable model 2*: India’s GDP mainly consists of four sector namely consumption, investment, Government Expenditure and Net Export. Here a Keynesian model has been developed where GDP is denoted by Y. The model is as follows:

$$Y = C((1-t)Y) + \bar{I} + G(Y) + X\left(\frac{P^*e}{p}; Y^*\right) - M\left(\frac{P^*e}{p}, Y\right) \dots \dots \dots (2.1)$$

In Eq. (2.1),  $Y \equiv$  GDP,  $Y^* \equiv$  foreign country’s GDP,  $t \equiv$  Direct tax rate.  $\bar{t} \equiv$  net ( of subsidy) indirect tax rate,  $e \equiv$  nominal exchange rate,  $I \equiv$  investment,  $p \equiv \left(\frac{P^*e}{p}\right)$ ,  $P^* \equiv$  foreign price in foreign currency,  $e \equiv$  nominal exchange rate,  $P \equiv$  domestic price level,  $a \equiv$  fiscal deficit target rate. We assume that  $P^*$  to be given in Indian context because India has a small share in the world market of production as a result it does not have impact on the price of the goods and services in the foreign country. By the same reason  $Y^*$  is also assumed to be given. So India does not make any impact on foreign country’s GDP through trading.

Here the consumption function of Eq. (2.1) is an increasing function of disposable income. The investment is largely determined by the interest rate (r) which is a policy variable of RBI (India’s central bank). Central bank can keep r at the targeted level. So we can write

$$r \equiv \bar{r}$$

Hence we assume that investment is highly autonomous and  $I \equiv \bar{I}$ . The Govt. expenditure in Eq. (2.1) is subject to the budget constraint. According to the New Economic Policy Govt.

expenditure depends on direct tax rate, net indirect tax rate and fiscal deficit target at which rate the Govt. can borrow.

In Eq. (2.1) the export is a function of  $\frac{P^* \bar{e}}{P}$  and  $Y^*$ . In India export is largely autonomous and highly import intensive i.e. crucial inputs have to be imported in order to manufacture the exporting goods and services. Hence,  $P^* \bar{e}$  is an important determinant of the average variable cost of production.  $P$  is set on the basis of cost (Theory of economic dynamics, Michal Kalecki, 1954). Therefore,  $P$  is a function of  $P^* \bar{e}$  and  $\tilde{t}$ .

An increase in  $P^* \bar{e}$  brings about a substantial increase in  $P$  so that  $\frac{P^* \bar{e}}{P}$  rises very slightly, if at all. Therefore, for all practical purposes we can regard  $\frac{P^* \bar{e}}{P} (=p)$  as a function of  $\tilde{t}$  alone so that  $p=p(\tilde{t})$ . So we can write  $X=X(p(\tilde{t}), Y^*)$ . In linear function it can be expressed as follows:

$$X = \bar{X} - \bar{x}\tilde{t}$$

Where  $\bar{X}$  denotes the autonomous export.  $\bar{x}$  represents the amount of export decreases due to one unit increase in indirect tax rate because an increase in indirect tax rate causes to rise the price of domestic goods and services compare to the price of foreign goods and services. As a result the domestic production will be relatively costly than foreign production of goods and services which in turn reduces the domestic export.

Similarly we can write import function as:  $M= m Y + \bar{m}\tilde{t}$

Where  $m$  denotes marginal propensity to import i.e. the amount of import that can be increased due to one unit increase in GDP and  $\bar{m}$  represents the amount of import increases due to one unit increase in indirect tax rate because an increase in indirect tax rate raises the cost of domestic goods and services as a result foreign goods and services becomes relatively cheaper than domestic production of goods and services which in turn increases the domestic import.

Hence by substituting all the assumption, Eq. (2.1) can be written as:

$$Y= C ((1-t) Y) + \bar{I} + (t + \tilde{t}) Y + a Y + \bar{X} - \bar{x}\tilde{t} - m Y - \bar{m}\tilde{t} \dots \dots \dots (2.2)$$

By solving Eq. (2.2) we get the equilibrium value of  $Y$ . Therefore,

$$Y= \frac{\bar{I} + \bar{X} - \bar{x}\tilde{t} - \bar{m}\tilde{t}}{1 - \{C(1-t) + (t + \tilde{t}) + a - m\}}$$

From the above equation it can be said that export, investment, direct tax rate, indirect tax rate, consumption, marginal propensity to import are the major determinant of GDP. Assuming consumption and marginal propensity to import is a stable function, our main objective is to see the effects of export, investment, direct tax rate and indirect tax rate on India's GDP. Due to the problem of multicollinearity, every explanatory variable is considered distinctly in this regression analysis frame work. This analysis is based on the data from 1991 to 2011 estimated on the base year 2004-05. The further data cannot be considered in this analysis as it is based on the base year 2011-12 more over the method of estimation is also different. Here, the log transformation of the data has been taken in order to see how one percent change in the explanatory variable affects the GDP.

**Table 2.1: Regression Analysis: dependent variable: lnGDP**

Explanatory Variable	Model 1	Model 2	Model 3	Model 4
lnExport	0.618967*** (0.0152347)			
lnInvestment		0.0690072*** (0.0018244)		
lnDirect tax rate			0.0370963*** (0.0007779)	
lnIndirect tax rate				-0.2241579*** (0.044769)
Cons	0.9581642*** (0.0333011)	1.695876*** (0.0162838)	2.053214*** (0.0054586)	1.756301*** (0.1108589)
No. Obs.	21	21	21	21
P>F	0.00	0.00	0.00	0.0001
R-Squared	0.9886	0.9869	0.9917	0.5689
Adj R Sqd	0.9880	0.9862	0.9913	0.5462
Root MSE	0.00438	0.0047	0.00374	0.02694

Source: Author's Estimation

In table 2.1, Model 1 gives the causal relationship between Export and GDP. Similarly Model 2, Model 3 and Model 4 gives the relationship between GDP and investment, GDP and direct tax rate, GDP and indirect tax rate respectively. Table 2.1 shows that all the four explanatory variables except indirect tax rate has a significant positive impact (1% level of significance) on GDP. This means that, one percent increase in export, investment, direct tax rate will increase the GDP significantly.

However indirect tax rate has a significant negative effect (1% level of significance) on GDP following the reason that we have discussed before.

## **6. CONCLUSION**

This paper estimates the impact of FDI inflow in traditional and modern sector on total export of India on the basis of the data from 2004 to 2017. The regression analysis shows that both the FDI inflow in traditional sector and modern sector have a positive significant effect on export. Traditional sector, based on medium and low technology, is traditionally India's major export items while modern sector, based on high technology, is not. This paper shows a significant shift in the movement of FDI inflow towards the modern sector away from the traditional sector along with the same change in the pattern of export. The Granger causality test shows that the causality runs from FDI inflow in modern sector to export and from export to the FDI inflow in traditional sector.

This paper also analyses the impact of export, investment, direct tax rate and indirect tax rate on India's GDP using the data for the period of 1991 to 2011. All these factor except indirect tax rate has significant positive impact on India's GDP whereas the indirect tax rate has a significant negative impact on GDP because one unit increase in indirect tax rate increases the cost of domestic production relative to the cost of foreign production as a result import becomes cheaper which in turn reduces the trade balance hence GDP falls. This study has confirmed that welcoming attitude of Indian government towards FDI has served to increase India's exports as well as India's GDP.

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**Other data sources**

- RBI handbook of statistics on Indian Economy
- Several annual issues of Department Of Industrial Policy and Promotion.
- Indiastat.com