



## Research Article

# FACTORS DETERMINING THE FDI INFLOWS: FOOD PROCESSING AND AGRICULTURAL SECTOR

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**Abstract-** The foreign direct investment in India helps to create employment and technology transfer in cheap manner and spillover technology. In this context, it is better to assess the determining forces of the FDI inflows into India. The data set over a period 1991 to 2016 have been extracted from Handbook of Indian Economy 2016-17 RBI. The results indicated that WPI and Exports for Food processing and Agricultural and allied sector are positively related with FDI inflows while labour productivity found non-significant in both sectors thus government should take proactive measures to create conducive environment for enhancing labor productivity through general education and training, information and knowledge for domestic or nascent firms from developed countries.

**Keywords-** FDI, Food processing, WPI, Exports, Labor productivity, Agricultural sector

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## Introduction

Foreign direct investment and trade openness of the country enables developing country to bridge the gap between saving and investment by bringing the non-debt capital and inflow of international capital respectively. The effective inflow of FDI and openness of trade is depending on several macroeconomic factors like economic liberalization, Inflation rate and ease of doing business, political stability and the level of Domestic and public investment.

## Why FDI is need for Country like India?

FDI is preferred over all other capital flows in the world. FDI is desired, as it is non-debt capital. FDI raises the economy that by multiplier effect leads to increase in employment, income and savings thereby strengthen the infrastructure of the country and make it more competitive globally. In addition to this state of art technology, skill, managerial know how and boosts export of manufactured goods and service in the host economies. Global outward and inward FDI flows continued to be high in the 1990s despite the financial crisis and difficult economic scenario in most part of the world especially towards the developing countries. In fact, in order to supplement their domestic investment. There is a competition for more FDI among these developing economies. In this context, it is better to assess the determining forces of the FDI inflows into India to take key initiative to create a conducive atmosphere for FDI. However, ambiguous empirical findings on the impact of FDI on economic growth mainly because of use aggregated FDI data [1-3]. Whilst growth effects FDI likely depend on the sector that receives FDI [4]. This is because the potential for technology transfer, linkages, and spillover effects between foreign and domestic firms differs across sectors [5]. Linkages are much stronger in manufacturing than in the agriculture and food-processing sector.

## Determinants of FDI into India – A sectoral Analysis

The main objective of this paper to analyse the determinants of FDI inflows at the micro level *i.e.*, at the firm or sectoral level (Food processing and Agricultural sector) it helps not only in understanding the dynamics of sector specific variation

in the FDI flows in India but also gives scope for necessary policy initiative in terms of attracting more FDI at the sectoral level.

## Food Processing Sector

Food processing industry is a predominant segment in the Food Industry in India and accounts for 32 percent share in the industry. The food processing industry comprise of 2 percent of fruits and vegetables and 15 percent of processed milk. Important initiatives by the Indian government have led to significant growth in FDI Inflows to Food Processing Industries. The food processing industry contributes to 6.3 percent of the Gross Domestic product of India, 19 percent to the Indian industry, and 13 percent to the export production.

## Agricultural and Allied sectors

The FDI helps in Agricultural sector helps to create the employment opportunities and infrastructure in the sector which helps to make sector modernisation and commercialisation. Since the Agricultural sector employs around 59 percent of employment and 17 percent of to the total GDP to economy. Despite this, the FDI goes into Food processing, Agricultural, and allied sector less attractive as compared service sector. The government should give high priority to the agriculture sector and Food processing sector for the enhancement of the productivity to address the growing need of food security as well as to work for the welfare of the small and marginalized farmers. To fulfil the saving investments gap, public private partnership approach will be useful in agriculture sector. To overcome the shortcomings of the foreign investments, proper attention should be pay for the protection of customers and marginal farmers through strong regulatory framework.

## Data description and empirical estimation

In this paper, we seek to explore the factors influencing the FDI inflows for Food processing and Agricultural Sector. The data set over a period 1991 to 2016 have been extracted from Hand book of Indian Economy 2016-17 published by Reserve bank of India.

The explanatory variables indicated in the model are taken from the literature and a priori knowledge like GDP fc (Gross domestic product at factor cost), GCF (Gross capital formation), LPR (Labour productivity), WPI (wholesale price index), EXP (Exports). While the FDI inflows for Food processing and Agricultural sector taken has dependent variable for the estimation of the sector specific determinants of FDI inflows. The explanatory variable has been standardized to remove the problem associated with absolute measurements.

**The Selection of functional form**

In order to avoid the mis-specification of the functional form, which may lead to spurious result, the present study tried different models in that both linear and log-linear have found to be best based on the sign and magnitude of the regression coefficients and Adjusted R<sup>2</sup>.

$$FDI = \alpha_0 + \beta_1 GDPfc + \beta_2 GCF + \beta_3 LPR + \beta_4 WPI + \beta_5 EXP + e$$

$$FDI = \alpha_0 + \beta_1 \ln GDPfc + \beta_2 \ln GCF + \beta_3 \ln LPR + \beta_4 \ln WPI + \beta_5 EXP + e$$

Where the prefix 'Ln' in equation means the logarithmic value of the series, are the parameters of the models. In order to choose between the linear and log linear model as specified by equations and the study uses the Sargan's Criterion as given by Godfrey and Wickens (1981). The Sargan's Criterion can be established as:

$$S = [RSS (L) / \{RSS (LL) * GM (DV)\}]^n$$

to choose one model either linear or log linear where, RSS (L) is the residual sum of squares from the linear estimation, RSS (LL) is the residual sum of squares from the log-linear estimation, GM (OV) is the Geometric Mean of the dependent variable of the linear estimation and 'n' is the number of observations. According to the Sargan's Criterion, if the calculated "S" value is greater than one (i.e., S > 1), the log-linear functional form is preferred over the linear functional form. On the other hand, when the calculated 'S' value is less than one (i.e., S < 1), the linear functional form is supposed to be the appropriate functional form between the two.

**Table-1** Sargan's criterion and selection of the functional form for the determinants of FDI inflow at the macro level of India.

S- Value	Selected functional form
(7164.72) <sup>25</sup> *	Log linear

The Sargan's criterion shows that the 'S' value is greater than one. Therefore, the study uses the log-linear functional form of the FDI equation as was specified in equation. For execution of the empirical design, we proceed as follows. First, the nature of the data distribution is examined by using the standard descriptive statistics (mean, median, standard deviation, skewness and kurtosis). Second, the time series property of each variable is investigated under a univariate analysis by implementing the ADF test for the unit root (non-stationarity) [5-7]. Finally, equation (1 and 2) is estimated by using ordinary least square (OLS) method in order to analyse the determinates of FDI for both aspects macro and sector analysis. Thus, the function for the determination of FDI inflows at the sectoral level of the Indian economy could be written as:

$$FDIIFC = \alpha_0 + \beta_1 \ln GDPfc + \beta_2 \ln GCF + \beta_3 \ln LPR + \beta_4 \ln WPI + \beta_5 EXP + e$$

-Food processing industries ---- 1

$$FDIIAG = \alpha_0 + \beta_1 \ln GDPfc + \beta_2 \ln GCF + \beta_3 \ln LPR + \beta_4 \ln WPI + \beta_5 EXP + e$$

-Agricultural sector ---- 2

**Results and Discussion**

The standard deviation is low compared to the mean, indicating a small coefficient of variation [Table-2 and 3]. The numeric of skewness of each variable is low and is positively skewed. The figure for kurtosis in each variable is below three, which confirms near normality. The variables are found to be non-stationary under ADF unit root test in levels it is indicted by comparing the ADF at 1 percent and 5 percent significance level with their respective critical values [Table-4 and 5].

Thereby, all the variables have been first differenced in order to their stationarity. At first differencing, the calculated ADF tests statistics clearly rejects the null hypothesis at 1 percent significance level as compared with their corresponding critical values. In nutshell, the ADF tests confirm the stationarity of the variables

**Table-2** Descriptive statistics of variables specified in the model of Food processing sector from 1991 to 2016

	GCF	FDI	WPI	GDP FC	LPR	EXP
Mean	59.78	150.44	14.28	2572933.97	17.28	59.78
Standard Error	9.96	39.8	2.36	455866.37	1.36	1.96
Median	55.58	40.35	14.91	2443863.09	14.91	38.58
Standard deviation	67.35	152.91	15.1	2532966.1	12.1	37.35
Kurtosis	-1.16	-1.04	-1.77	-0.77	-1.77	-1.76
Skewness	0.54	0.79	0.54	0.8	0.34	0.25

**Table-3** Descriptive statistics of variables specified in the model of Agricultural sector from 1991 to 2016

	GCF	FDI	WPI	GDP FC	LPR	EXP
Mean	42.78	145.44	12.28	2222933.97	14.28	89.78
Standard Error	4.96	19.8	1.36	2245866.37	2.36	5.56
Median	55.58	40.35	14.91	2443863.09	14.91	48.78
Standard deviation	67.35	152.91	15.1	2532966.1	12.1	47.35
Kurtosis	-2.16	-1.25	-1.56	-0.89	-1.89	-2.55
Skewness	0.35	0.85	0.42	0.78	0.25	0.45

**Table-4** Results of Unit root test of Food processing Industries

Sl. No	Variables	t-cal.	(Prob. *)	Remarks
1	GCF	-3.5506	0.0021	Stationary
2	LPR	-2.1964	0.0407	Stationary
3	FDI	-3.0951	0.006	Stationary
4	GDP FC	-2.3242	0.0314	Stationary
5	EXP	-2.9074	0.009	Stationary
6	WPI	-5.3242	0.0014	Stationary

**Table-5** Results of Unit root test of Agricultural and Allied sector

Sl. No	Variables	t-cal.	(Prob. *)	Remarks
1	GCF	-2.5506	0.0051	Stationary
2	LPR	-1.1964	0.0207	Stationary
3	FDI	-2.0551	0.005	Stationary
4	GDP FC	-2.3542	0.0514	Stationary
5	EXP	-2.9274	0.002	Stationary
6	WPI	-2.4242	0.0024	Stationary

The regression results indicated in [Table-6] for sectors like Agricultural and Food Processing Industries reveals that WPI (price level) is the positive determinant to FDI inflows into the India. The higher the WPI bring more FDI to sectors. Thus, increase in the price level is expected to increase the profits of firms unless like in price rise is cost driven. It is evident from the above results WPI is significantly positive for both sectors i.e., If one percent increase in the price level then 3.25 and 15.89 percent increase in the FDI inflows for Agriculture and Food processing industries respectively. The GDP at factor cost is also positive determinant for FDI inflows in case of Agriculture sector it evident from the results that if one percent increases in the GDP at FC it increases an about 7.56 percent increase in the FDI inflows. The Exports is considered as one of the determinants of FDI inflows into the sector. When foreign firms are interested to exploit the production advantage of the sector in order to cater the demand of third country or to take the advantage of trade treaty between the host countries and third country. Thus, Exports have positive impact on the FDI inflows on both sector.

**Table-6** Results of Multiple Regression in Agricultural sector and Food processing Industries

Food Processing sector			
Dependent variable	FDI inflows		
Explanatory variables	Coefficient	SE	t stat
Constant	10.25	5.89	1.74
WPI	15.89**	1.29	12.31
LPR	-1.98	2.35	-0.84
Exp	2.58*	0.25	10.35
GDP at FC	7.89	5.89	1.33
GCF	16.23**	2.56	6.33
Adjusted R square	0.856		
Agricultural and allied sector			
Dependent variable	FDI inflows		
Explanatory variables	Coefficient	SE	t stat
Constant	25.84	461.12	0.05
WPI	3.25**	0.28	11.24
LPR	-2.21	8.41	-0.26
Exp	9.57*	1.57	6.09
GCF	-5565.48	4557.24	-1.22
GDP at FC	7.56*	0.56	13.3
Adjusted R square	0.756		

Note: \*\* indicates significant at 5 % level of significant.

\*indicates that significant at 1 % level of significant.

Gross capital formation is neither a demand determinant nor a cost determinant, it is assumed that a capital-intensive sector will attract more FDI, as foreign firms are more capital intensive since food processing industries is capital intensive it is evident from the results that if one per cent increases in the gross capital formation in the sector then it increases an about of 16.23 per cent increases in the FDI inflows and models statically good fit as evident from the high R<sup>2</sup> in both sector.

### Conclusion

The present analysis reveals that the major macroeconomic determinants of FDI inflows into India were WPI and Exports for Food processing and Agricultural and allied sector are expected to increase the profits of firms unless like in price rise is cost driven and foreign firms are interested to exploit the production advantage of the sector in host countries. The labour productivity found to be non-significant in the both sectors. The Government should take proactive measures to improve labour productivity by business start-ups and incubation centres to impart the training I, II tier cities, research, and innovations, which could all lead to higher productivity in long run. The Government should create conducive environment for strengthening specific support service, technical capabilities through general education and training, information and knowledge for domestic or nascent firms from developed countries

**Application of research:** The findings of the study help to frame the appropriate policies in order to attract FDI inflows into the sector which makes the sector more competitive and commercialisation.

**Research Category:** Agricultural Economics

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