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Does FDI inflow have impact on agricultural and industrial sector in India?

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Abstract

The FDI inflows technological spill over benefits widens the scope of international competition and strengthens the supply side capabilities of a host country for producing and selling goods and services, which lead to higher economic growth. The Foreign Direct Investment helps to build up agricultural sector and industrial sector in India which improves their performance by creating necessary suitable infrastructures and by multiplier effect leads to increase in employment, income and savings thereby strengthen the infrastructure of the country and make it more competitive globally. 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 (Agricultural and Industrial sector). The data were taken from the Hand book of statistics on Indian economy, published by the RBI in 1993-94 and 2023-24 for spanning of 30 years. The findings reveals that sectors like Agricultural sector (12.65) and industrial sector (15.11) reveals that WPI (price level) is the positive determinant to FDI inflows into the India. however, the inflation rate equal to -3.170 which means if one percent in inflation rate would decrease of 3.170 per cent of FDI inflows in to agricultural sector and 4.980 per cent to industrial sector. The agricultural and industrial sector is an asset for any developing and high-density country because it causes economic growth provides income and food security and helps to reduce poverty. The policymakers taking business-friendly policies, make sure that FDI inflow into agriculture and industrial sector.

Keywords: FDI, Agriculture, Industrial, WPI, infrastructure

Introduction

The Foreign direct investment (FII) and trade openness of the country facilitates in marring down the gap between saving and investment by bringing the non-debt capital and inflow of international capital respectively. However, the FDI inflows into the any sectors depends on several factors like economic liberalization, gross domestic product of that sector, Inflation rate and ease of doing business, political stability and the level of Domestic and public investment. The FDI inflows technological spill over benefits widens the scope of international competition and strengthens the supply side capabilities of a host country for producing and selling goods and services, which lead to higher economic growth. In general FDI could be viewed as "composite bundle" which comprised of capital stock, new technologies, more advanced production practices, managerial expertise and innovative skills (Mello 1999 and Farrell, 2008) [13, 8]. The previous empirical evidence shows that of FDI on growth, employing either country wise specific or cross-country analysis, is rather mixed (Li and Liu, 2005; Carkovic and Levine, 2005) [11, 5]. However, depending on the countries resources and them polices have shown FDI on growth show a significant degree of positive relationship with human capital development quality of economic, political and social environment (Choe, 2003) [6] financial system penetration and development (Hermes and Lensink, 2003; Durham, 2004; Alfaro et al., 2006) [10, 7, 1]. Against this backdrop this present study

The FDI inflows play a vital role in India:

In recent time period, the Foreign Direct Investment (FDI) is an important issue in many aspects for a country. In developing countries like India, FDI plays a vital role since it the source of income and a possible lifeline for many developing countries, specifically where poverty, savings, and unemployment rates are high. According to government estimation, about 48 per cent of the are depends on agriculture for their livelihood. The Foreign Direct Investment helps to build up different sectors such as agricultural sector and industrial sector in India which improves their performance by creating necessary suitable infrastructures and 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 states of art technology, skill, managerial know how and boosts export of manufactured

goods and service in the host economies. (Kumar and Gopalsamy, 2019). The positive attributes of FDI are theoretically perfect, but when it comes to the ground realities these are partially true. FDI sometimes may neither bring latest technology nor create the promised employment. However, many economies are swayed over by the FDI's positive attributes. (Pandya and Sisombat, 2017) [16].

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 (Agricultural and Industrial 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.

Materials and Methods

The data regarding variables were taken from the Hand book of statistics on Indian economy, published by the RBI in 1993-94 and 2023-24 for spanning of 30 years. The explanatory variables indicated in the model are taken from the literature and a priori knowledge like WPI (wholesale price index); inf (inflation rate); exp (exports of agri/ industrial goods) GCF (gross capital formation); GVA (gross value added) ex rate (exchange rate); lap (labour productivity). While the FDI inflows into the different sectors of India are the dependent variable for the estimation of the sector specific determinants of FDI inflows.

Econometric tools

Unit root test

In order to conduct unit root test the Augmented Dickey-Fuller (ADF), used to examine the stationarity of a time series. The error term in DF test might be serially correlated. The possibility of such serial correlation is eliminated in the following Augmented Dickey-Fuller model.

$$\Delta y_t = \mu + \delta y_{t-1} + \sum_{i=1}^{k} \beta_i \Delta y_{t-i} + e_t$$

where $\delta = \alpha - 1$

The null hypothesis of ADF is $\delta = 0$ against the alternative hypothesis of $\delta < 0$. Non-rejection of the null hypothesis implies that the time series is non-stationary, whereas rejection means the time series is stationary.

Multiple linear regression models: At the sectoral level, FDI is viewed as a disaggregate entity. It implies that FDI inflows to India at the sectoral level could be considered as the function of the sector specific (firm level) variables of the Indian economy. The best function was selected on the following economic and statistical and econometric criteria i.e. the value of coefficient of multiple determinations (R2), significance level of individual regression coefficients, and the ability of the function to provide economically meaningful results (Arellano, M., & Bond, S. 1991). The log-log production function was found best fit for taken data keeping in the view of the significance, sign of explanatory variable and value of R2 for the determination of FDI inflows at the sector level (Agricultural and industry sector) of the Indian economy could be written as:

Ln FDII = α_0+ $\beta_1$ln wpi + $\beta_2$ln inf + $\beta_3$ln exp + β_4 ln gcf + β_5 gva + β_6 exc rate + β_6 lap

Where,

Y = FDI inflows (in Rs crores)

Xi = value of i^{th} explanatory used,

a = intercept term,

βi = partial regression coefficient of the ith explanatory to be estimated

μ = Random error distributed normally with zero mean and constant variance

e = base of natural log.

Results and Discussion

Table 1: Agriculture Sector wise FDI inflows equity inflows from 2000 to 2024

Sr. No	Agricultural sector	Amount of FDI Equity inflow	% age out of total FDI Equity inflow (in Crores)	CAGR
1.0	Food Processing Industries	82267.0	54.0	2.65**
2.0	Textiles	28304.1	18.6	1.25
3.0	Agriculture Services	18601.8	12.2	0.63
4.0	Agricultural Machinery	12154.8	8.0	1.52
5.0	Vegetable Oils And Vanaspati	6801.1	4.5	2.14
6.0	Fertilizers	4241.4	2.8	2.63
	Total	152370.3		1.78

Source: Department for promotion of Industry and internal trade, 2024

The Agriculture Sector wise FDI inflows equity inflows from 2000 to 2024 indicated in the table 1. The findings reveals that highest FDI inflows towards food processing sector of about 54 per cent with a CAGR of 2.65 per cent followed by textiles with 18.60 per cent to total FDI inflows with CAGR of 1.25 per cent at 5 per cent level of significance. The least towards fertiliers (2.80%) and vegetable oils (4.50%) mainly due to restrictive policies and higher import duty on these commodities however non-significant. The Industrial Sector wise FDI inflows equity inflows from 2000 to 2024 indicated in the table 2. The findings reveals that highest FDI inflows towards automobile sector of about 37.26 per cent with a CAGR of 3.14 per cent followed by Metallurgical Industries with 16.71 per cent to total FDI inflows with CAGR of 2.85 per cent at 5 per cent level of significance. The least towards machine tools (1.14%) and ceramics (0.07%) and vegetable oils (4.50%) with CAGR of 1.58 and 0.78 per cent respectively. In order to assess the unit root of the parameters by employing Augmented Dickey-Fuller (ADF) test with a unit root is non-stationary at the level from in the table 3 but turns stationary after being differenced, hence testing the stationary of these time series and following differencing, demonstrate that all of the variables are reliably stationary.

Table 2: Industrial Sector wise FDI inflows equity inflows from 2000 to 2024

Sr. No	Industrial sector	Amount of FDI Equity inflow	% age out of total FDI Equity inflow (in USD terms)	CAGR
1	Automobile Industry	235,286.81	37.26	3.14**
2	Metallurgical Industries	105,515.95	16.71	2.85**
3	Electrical Equipment's	82,004.69	12.99	1.265
4	Industrial Machinery	42,296.21	6.70	2.33**
5	Cement and Gypsum Products	36,012.15	5.70	0.95
6	Electronics	32,388.80	5.13	0.742
7	Fermentation Industries	27,567.79	4.37	0.362
8	Rubber Goods	22,803.90	3.61	3.85**
9	Prime Mover (Other Than Electrical Generators)	18,629.74	2.95	0.69
10	Soaps, Cosmetics & Toilet Preparations	15,755.83	2.49	1.52
11	Machine Tools	7,167.83	1.14	4.12**
12	Ceramics	5,610.25	0.89	1.58
13	Industrial Instruments	459.14	0.07	0.78
	Total	631,521.14		2.47

Source: Department for promotion of Industry and internal trade, 2024

Table 3: Unit root test

Dependent variable	Level		I Difference	
Explanatory variables	test stat	remarks	t stat	Remarks
Constant				
WPI	-0.036250	Non-stationary	-0.01240	Stationary
Inflation rate	-0.012450	Non-stationary	-0.02189	Stationary
Exports	-0.037400	Non-stationary	-0.01470	Stationary
GCF	-0.071330	Non-stationary	0.08740	Stationary
Total GVA	-0.036580	Non-stationary	-0.27780	Stationary
Exchange rate	-0.047800	Non-stationary	-0.14500	Stationary
Labour productivity	-0.036800			
Adjusted R square				

In order to check the validity of our estimated model, different diagnostic tests are employed. All the tests passed their conditions imply that means there is no omitted value, no heteroscedasticity, no autocorrelation, and no multicollinarity issues. Therefore, we can say that the dataset is fit for our model as indicated in the table 4.

Table 4: Diagnostic test for selected variables in the model

Diagnostic tests	
Name of tests	Value
Ramsey Reset test	Prob 0.325
BPG test	prob 0.125
Durbin Watson test	1.874
VIF	2.96

The FDI inflows and its influencing factors for agricultural and industrial sector by employing log-log model indicated in the table 5. The finding reveals that, the multiple determination model has yielded an R square value of 0.745 and 0.852 which implies that 74 and 85 percent of the total variation in FDI inflows is caused by the repressors involved in the model. The corresponding 'F' statistic is 145.36 and 121.35 with corresponding P value is 0.001. Hence it is significant at 5% LOS and implies that the model is a good fit for the data.

The sectors like Agricultural sector (12.65) and industrial sector (15.11) 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 per cent in increase in the price level then 12.65 and 15.11 per cent increase in the FDI inflows for Agriculture and Industrial sector respectively. The total GVA is also positive determinant for FDI inflows in case of Agriculture sector and industrial sector it evident from the results that if one per cent increases in the GVA it increases an about Rs 5678 and Rs 9578 crores of FDI inflows into sector respectively. The results are In line with this argument, a stable and business-friendly environment may positive impact on the spill overs from FDI since which affects the growth of the economy which have the potentially determine economic growth of the country (Meyer and Sinani, 2009 [14]; Prüfer and Tondl, 2008 [17] and. In line with this argument, a stable and business-friendly environment may support spillovers from FDI because it affects the business operating conditions and it can potentially determine how efficiently FDI resources are employed. Some studies suggest productivity-related positive spill overs from FDI conditional on host economies' institutional environment (Meyer and Sinani, 2009; Prüfer and Tondl, 2008 and Busse and Groizard,

2008) [14, 17].

The Exports is considered as one of the determinant 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 it is evident from the results that if one per cent increase in the exports of goods it lead to increase in the 6.580 and 5.32 per cent increases in the FDI inflows into the agricultural and Industrial sector. The regression coefficient of Inflation rate equal to -3.170 which means if one percent in inflation rate would decrease of 3.170 per cent of FDI inflows in to agricultural sector and 4.980 per cent to industrial sector the results were justified with A priori information since inflation makes the goods expensive so it results into lower FDI inflows into the sectors.

Table 5: Results of Linear Multiple Regression in Agricultural and industry sector

Agriculture and allied sector				**Industry sector**		
Dependent variable	**FDI inflows**					
Explanatory variables	**Coefficient**	**SE**	**T-Stat**	**Coefficient**	**SE**	**T-Stat**
Constant						
WPI	12.650	1.652	7.657	15.110	2.450	6.167
Inflation rate	-3.170	1.250	2.536	-4.980	2.110	2.360
Exports	6.580	2.780	2.367	5.320	1.980	2.687
GCF	2.740	6.140	0.446	1.780	6.320	0.282
Total GVA	5678.000	1245.000	4.561	9578.000	1147.000	8.350
Exchange rate	3.980	124.000	0.032	1.650	129.000	0.013
Adjusted R square	0.745			0.852		
F-Value	145.36			121.36		

Conclusion

The Foreign direct investment (FII) and trade openness of the country facilitates in narrowing down the gap between saving and investment by bringing the non-debt capital and inflow of international capital respectively. However, the FDI inflows into the any sectors depends on several factors like economic liberalization, gross domestic product of that sector; Inflation rate and ease of doing business, political stability and the level of Domestic and public investment. The FDI inflows technological spill over benefits widens the scope of international competition and strengthens the supply side capabilities of a host country for producing and selling goods and services, which lead to higher economic growth. The present study emphasis on agricultural and industrial sector and the findings reveals that reveals that WPI (price level) and exports value of that sector are the positive determinant to FDI inflows into the India. However, Inflation rate have negative impact on FDI inflows in to both agricultural and industrial sector in India. In India, the agricultural and industrial sector is an asset for any developing and high-density country because it causes economic growth provides income and food security and helps to reduce poverty. The policymakers taking business-friendly policies, make sure that FDI inflow into agriculture and industrial sector.

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