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Statistical Analysis - Impact of Food Processing Industry on Indian Economy

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Abstract--The food industry of India is known for enormous growth and rising involvement to global food market every year. Indian food processing industry has achieved an extraordinary profit & growth due to its tremendous scope for value addition. In this study, the relationships between the food processing sector and the economic growth were studied using regression analysis. The regression model is made with combined information presented over the period of 2000 – 2017. The study examined the impact of several food processing indicators on growth of economy of India. It showed that there is positive and significant impact of Food Processing industry on Indian economy.

Keywords---food processing, Gross Domestic Product (GDP), regression, total capital, total emoluments, economic growth.

Introduction

In more developing countries (MDC) like India, the food processing sector, its growth, and production of processed foods have been regarded as dominant prerequisites for economic growth. Since 2000, the food processing sector has attracted huge amount of FDI and has witnessed technological reforms. The government has also implemented many strategies and schemes for growth of the sector to increase its production, export and to employment generation so that the whole process will lead to growth of Indian economy. As per the available data of food processing, it is important to increase the production of processed food and create several opportunities for employment in India. This will mean more sufficient processed food supplies and will lower the imports of the processed food in the country. Furthermore, more the processed food, extra foreign currency will be available for the service and industrial sector growth of the country. Certainly,

the economic growth of India will increase. Therefore, the main improvement in Indian performance of Indian economy can be stimulated by growth of food processing sector. An attempt has been made in this paper to study the impact of various economic food processing factors like Export, Total Employment, Net value added, Total Capital, Emoluments per persons and Factories on the indicators of Indian economy: GDP of the country.

Review of literature

A review of previous studies conducted in the sector have been collected to allow better awareness of the issues concerned with the objectives of the study.

Awan and Anum (2014) studied the main determinants of farming sector and the correlation between agricultural development and GDP. The study was conducted using 31 observations from time 1980-2010. The research concluded there is a positive and substantial correlation between GDP and agricultural development growth. Thus agricultural growth was quite important for the economic growth of the country.

Dhiresk Kul Shrestha (2019) studied the interrelations between agricultural and economic growth. An econometric model was designed with the help various data available over the time period of 1961-2017 using Johansen co-integration test and regression analysis. The paper studied the production in agriculture and its effect on economic growth in India.

Kannan and Sundaram (2011) studied the patterns and trends in the crop growth sector at national and state level. The study concluded that growth of crop output growth indicated a positive relationship between dependent and independent variables. *Lalit Vikram Basantwani et al (2021)* examined the ratios of public and private sector employment to total employment and public sector to private sector employment. The paper briefly discussed the results of summary statistics of employment, public and private sector employment, public expenditure, and gross national income. The paper further studied the time series of total employment, employment in private and public sectors, gross national income, and public expenditure of Indian economy with the help of by Random Walk Model and Dickey-Fuller test. The study concluded that the time series data of total, public and private sector employment approximate normal distribution with extremely low skewedness and concentration. *Lindsay M. Jaacks et al (2021)* aimed to study the effect of the COVID-19 lockdown on Indian food security, livelihoods, dietary diversity, agricultural production. Telephonic interviews were conducted across 12 states and 200 districts. The study tells that the COVID-19 lockdown in India has mainly affected the farmers' capability to trade their crops & livestock products and reduced daily earning.

Luke Muzur et al (2015) designed various models of Foreign Portfolio Investment (FPI) with the objective of observing patterns, finding potential inadequacies and to deliver prove for theories. The study used the regression coefficients and seven cross-sections of data for the years 2000-2006 to explain the correlation puzzle. The paper suggested that this correlation had no major effect on the decision of country's to invest. *Mapfumo (2013)* indicated a positive correlation between GDP and other explanatory variables in the Zimbabwe economy. *Neha Saini et al.*

(2020) studied and analyzed the production, performance of chili of time series period from 1951-2017. Trend analysis of was conducted and various curves were tried to fit like Linear, Growth and Quadratic. The study suggested that the arrival of red chili did not affect the price of chili in Guntur Mandi.

Shikha Singh et al (2021) in the paper analyzed and studied the trend in trade patterns and the growth in CAGR in terms of selected industries from the time period 1996 to 2015. The Indian trade pattern regarding selected industries like textiles & garments, gems & jewelry, chemicals, agricultural food processing & garments, engineering goods minerals, metals and metallic goods machinery under the HS code II is analyzed for ASEAN & EU countries. *Trang Thi-Huyen Dinh et al (2019)* analyzed and supplied additional and appropriate quantitative indication on the effect of foreign direct investment (FDI) on economic growth. The results showed that FDI aided to promote growth in the long run, although it had an undesirable impact in the short run for the countries. *Zoica dinca (2016)* studied the connection among the several variables of Foreign Direct Investment, which can be factorial, resultative and economic variable. The paper analyzed the econometric models that could be used to forecast economic trends.

Research Methodology

This study uses secondary data drawn from Annual Survey of Industries, reports of World Bank and RBI's Handbook of Statistics for the time period of 2000-2017. Multiple Linear Regression Using Backward Stepwise Selection Method is employed .Step wise regression which is a method to create a model by adding or eliminating predictor variables generally via a series of F test or T test. The variables which are to be included are basically picked on the test statistics of the expected coefficients. The study has used GDP as the indicator of Indian economy and Export of Food Processing Commodities , Factories in Food processing Industries, Total Capital in Food processing Industries Total Employment in Food processing Industries , FDI in Food Processing Industry , Net Value Added, Total Emoluments in Food Processing Industries as the (independent) explanatory variables.

Research objectives

- To study the impact of Food Processing Industry on Indian Economy

Research Hypothesis

The study assumes that food processing sector is of utmost importance in the Indian economy. Based on the assumption the following hypothesis have been framed to study the impact of FPI factors on India economy.

$H_0^1 =$ There is no significant impact of Factors of Food Processing Industry on GDP

$H_a^1 =$ There is significant impact of Factors of Food Processing Industry on GDP

Analysis of Data

To test the above-mentioned hypothesis the multiple linear regression analysis using stepwise backward elimination method was used. The dependent variables here are GDP which is one the indicators of Indian economy, and the independent variables are the factors of Food processing industries like Export, Total Employment, Net Value Added, Total Capital, Total Emoluments and Factories.

Multiple regression analysis was performed to study the relationship between GDP and the potential predictors like Export, Total Employment, Net Value Added, Total Capital, Total Emolument and Factories. The Adjusted coefficient of determination (R^2) is 0.887 . ANOVA test has been applied to test its significance. "F' ratio" was 680.885 and' value is equal to 0.001 which reflects its significance.

The result of final step of stepwise regression is shown below:

Table 1
Stepwise Regression Model of GDP per capita

Model 2: GDP per capita										
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
Method	Predictors	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
6th step of Stepwise backward regression	(Constant)	270.505	2038.446		0.133	0.896	-4074.339	4615.350		
	Total Capital	0.001	0.000	0.541	9.103	0.000	0.001	0.001	0.205	4.868
	Emolument per person (Rs PA)	0.316	0.039	0.481	8.094	0.000	0.232	0.399	0.205	4.868
Adjusted R sq. = 0.887 (F= 680.885, Sig = 0.001), Dependent Variable: GDP per capita (Rs) Predictors: (Constant), Export (Rs Lakh), Total Employment, FDI (In RS Lakh), Net Value Added in Rs. Lakh, Total Capital, Emolument per person (Rs PA), Factories										

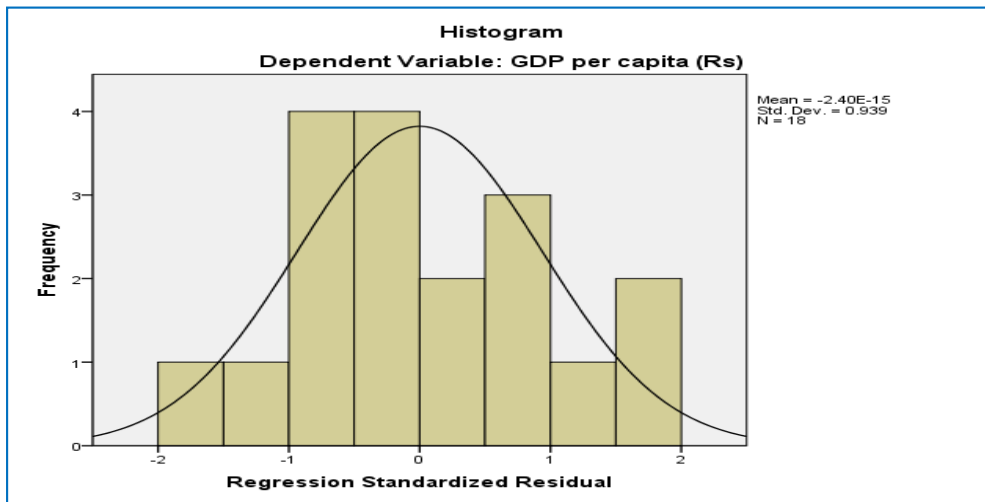


Figure 1. Histogram Dependent Variable: GDP per capita (Rs)

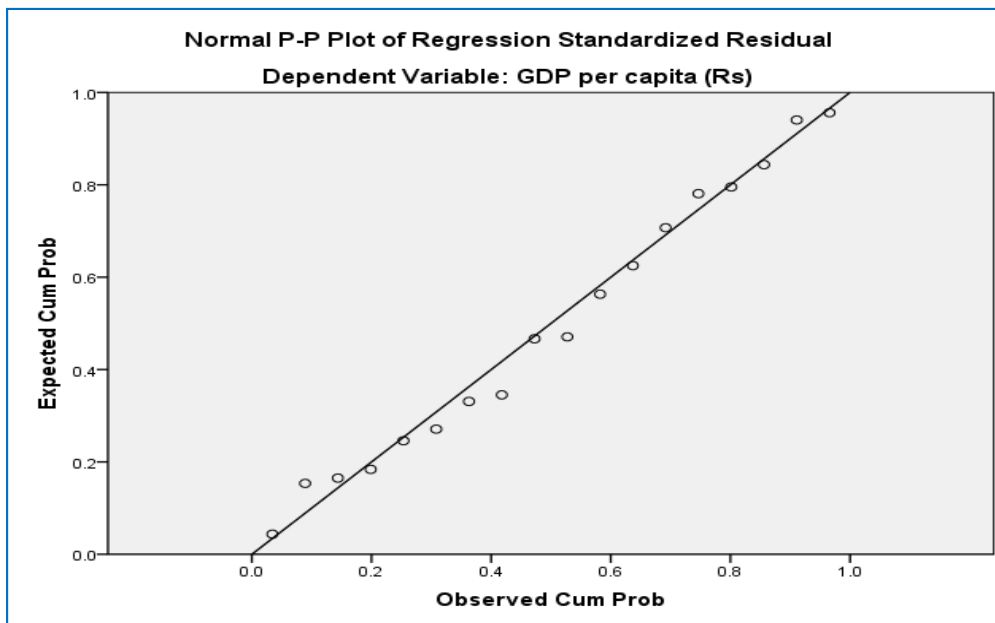


Figure 2. Normal P-P of Regression Standardized Residual Dependent Variable: GDP per capita (Rs)

Since null hypothesis was found rejected therefore it can be stated that there is substantial impact of independent variable Total Capital & Total Emoluments of FPI on GDP. Total Capital aims to improve the productivity of labor by allowing companies to be more productive and efficient. Establishment of a new factory or machinery results in production of more products this results in increased nationwide efficiency leading to higher economic growth for the entire country and thus a higher nationwide GDP.

The other factor which has a significant impact on GDP is Total emoluments. Emolument's growth can result in growth in productivity and demand of workers and thus it creates a vicious circle. Therefore, increase in employers' productivity leads to more production and results in economic growth of the country and GDP. Exceeding table likewise designates "Alpha and Beta coefficients" of multiple Regression model. The table replicates that for whole independent variables which are significant, regression coefficient is positive

Conclusion

It was discovered in the first test that out of all the FPI factors i: e Export, Total Employment, Net value added, Total capital, Total Emoluments and Factories only variable **Total Capital** and **Total Emolument** have a substantial impact on GDP growth in India. **Total Capital** which has a significant impact on GDP permits various factories to produce revenue for many years by either adding or upgrading production facilities and by increasing their operational efficiency. It also plays a role in encouraging more research and development by introducing new products and services. Total Capital aims to improve the productivity of labor by allowing companies to be more productive and efficient. Establishment of a new factory or machinery results in production of more products this results in increased nationwide efficiency leading to higher economic growth for the entire country and thus a higher nationwide GDP.

The other factor which has a significant impact on GDP was **Total Emoluments**. Total Emoluments are believed to have a positive macroeconomics dynamic since it is a major source of aggregate demand. Emolument's growth can result in growth in productivity and demand of workers and thus it creates a multifold impact. Therefore, increase in employers' productivity leads to more production and results in economic growth of the country and GDP.

Since the above test shows that there is significant impact of FPI factors on the Indian economy indicators thus we rejected the null hypothesis and can conclude that FPI of India is contributing to the growth of Indian economy. The study concluded that though FPI is on the way of confirmed growth and profitability, however it is still in a nascent stage. Since the study of different variables and factors shows that very few factors of FPI have a direct impact on Indian economy due to its miniscule share as compared to other industries in India such as manufacturing, service etc. The FPI sector is reported as a high priority sector by the Indian government, supported by various policies and schemes. However, despite of high focus, there exists various bottlenecks like long disjoint supply chain, lack of competitiveness of Indian food products, lack of infrastructure and cold storage and lack of availability of skilled workforce. Thus, to completely capture the growth potential of the sector, these identified challenges need to be systematically addressed.

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