ECONOMIC REFORMS AND PRODUCTIVITY OF INDIAN MANUFACTURING: A STUDY OF FOOD PRODUCT SECTOR

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ABSTRACT

India started economic reforms by liberalising its economy in general and its industrial sector in particular during 1991. Economic reforms have affected its industrial sector competitiveness. Since, Productivity plays a key role in determining competitiveness of the industrial sector, estimation of productivity is vital in understanding the relative performance of the sector. In this study an attempt is made to estimate total factor productivity for food product and beverages industry at two digit level. By using Solow method to measure total factor productivity higher growth of total factor productivity has been found during post-reforms period besides exports growth is also found higher during post-reforms period in comparison to pre-reforms period.

JEL Classification: F13, O14, D24

Keywords: Trade Liberalisation; Manufacturing; Productivity

INTRODUCTION

India is world’s second largest producer of food products and has the potential to become first. Food product industry is one of the largest and of great importance in India. The food & beverage industry has a unique role in expanding economic opportunity because it is universal to human life and health. The industry operates at multiple levels of society: families grow crops for their own consumption, community’s trade fresh produce and home-processed goods, local companies transform domestic crops for local markets, and international corporations purchase commodities globally to deliver products across geographies.

Food processing sector covers activities such as agriculture, horticulture, plantation, animal husbandry and fisheries. It also includes other industries that use agriculture inputs for manufacturing of edible products. The food-processing sector employs about 13 million persons directly and about 35 million persons indirectly.

Since, “Productivity” plays a key role in determining competitiveness of the sector, estimation of productivity is vital in understanding the relative performance of the sector. Food processing sector is crucial to the economy as it provides employment to about 48 million people. In this study an attempt is made to estimate total factor productivity for food product and beverages industry at two digit level.

Productivity growth is a key factor in determining the growth of the industry. The need for studying productivity growth arises due to intimate link between productivity growth and economic growth (Mahambare, Vidya and V.N. Balasubramanyam, 2004).

Productivity growth is the basis of efficient economic growth. Economic growth has been defined as the process of a sustained increase in the production of goods and services with the aim of making available a progressively diversified basket of consumption goods to population. Scarcity of resources, which includes physical, financial and human resources, has been recognized as a limiting factor on
the process of economic growth. While output expansion based on increased use of resources is feasible, it is not sustainable. Therefore, efficiency or productivity of resources becomes a critical factor in economic growth. Economic growth has traditionally been associated with industrialization. But industrialization in the initial stages has the effect of making resource scarcities more acute, making it all the more necessary that available resources are utilized more productively (Mongia, Puran and Jayant Sathaye 1998).

Economic growth of a country requires transformation from a state of the dominance of the agriculture sector to that of the industrial sector. Economies have always realized the need for structural changes with the process of economic development. Friedrich List (1856) in the 19th century postulated a process of development proceeding from an agricultural stage through an agricultural-industrial stage to an agricultural-commercial stage.

The interrelationship between trade and growth in a theoretical perspective has been very fragile. From Adam Smith’s discussion of specialization and the extent of the market, to the debates about import substitution versus export led growth, to recent work on increasing returns and endogenous technological progress, economies interested in the determination of standards of living have also been interested in trade. But despite the great effort that has been devoted to studying the issue, there is little persuasive evidence concerning the effect of trade (Fredric, G. Jayme Jr., 2001).

India has a colonial past and since independence it has gone through various policy changes. Feared from its colonial past earlier strategies were based on self-reliance and import substitution. Later India has to liberalized its economy. In present study an attempt has been made to evaluate the impact of economic reforms on total factor productivity of Food and Beverages products industry’s performance.

REVIEW OF STUDIES

The principal reforms initiated in the year 1991 were in the form of reduction in import tariffs on most goods other than consumer goods, removal of quantitative restrictions and liberal terms of entry for foreign investors. Although reforms were piecemeal, they do appear to have promoted growth and productive efficiency of the manufacturing sector (Ahuwalia, 1991). There is, therefore, sufficient reason to believe that the manufacturing sector does respond to liberalization and the high growth rate of Indian economy during the nineties was, “in part, due to continued structural reform, including trade liberalization, leading the efficiency gains.”(WTO 2002, p 1) this view is supported by Krishna & Mitra (1998) and Unel(2003) who found that growth of labour productivity and total factor productivity was substantially higher in the nineties compared to the period up to 1990-91. Das (2002) reported that a positive impact of the lowering of non-tariff barriers (NTBs) on the manufacturing as well as intermediate goods sector promoted industrial productivity. A number of studies, however, contradict this view. Several studies [Das (2003), Kumari (2001)] found that TFP growth worsened during the nineties compared with that during eighties. Srivastava (2001) reported that TFP growth rate in Indian manufacturing was 3.6 per cent per annum in the period 1980-81 to 1990-91 but had declined to 2 per cent per annum during the period 1990-91 to 1997-98. Although Goldar and Kumari (2003) reported a deceleration of TFP growth in Indian manufacturing in the 1990s, their analysis indicates that the lowering of effective protection to industries promoted productivity growth during the period 1991-98.

Economic reforms improved or worsened has long been the subject of controversy among economists. Although there are a number of theoretical and empirical studies on the impact of trade and productivity, it is as yet a controversial issue. Further most of the studies carried are based on aggregated level analyzing total manufacturing sector. Present study is an attempt to find out the productivity performance of Food product and beverages industry at disaggregated level. Present study aims to analyse total factor productivity performance of Indian manufacturing sector during Pre-Reforms and Post-Reforms period.
OBJECTIVES OF THE STUDY

1. To estimate the total factor productivity of Food products industries of Indian manufacturing Sector.
2. To evaluate the impact of economic reforms on productivity performance of Food products industries.

METHODOLOGY AND DATA SOURCES

There are basically three approaches to estimate total factor productivity namely these are: Parametric Approach, Non-Parametric Approach and The accounting approach. The accounting approach has been used in present study and total factor productivity has been estimated by Solow methods which has several useful properties.

Solow Index

Solow’s measure of productivity growth for two input case is given by

\[ g^S_{t+1} = \left[ \frac{V_{t+1} - V_t}{V_t} \right] - \left[ \frac{L_{t+1} - L_t}{L_t} + \frac{K_{t+1} - K_t}{K_t} \right] \]

Where,

\[ V_t = \text{measure of output}, \]
\[ \alpha, \beta \text{ are shares of labour (L) and capital (K) in output.} \]

This measure is based on the general neo-classical production function. It assumes constant returns to scale, Hicks-neutral technical change, competitive equilibrium and factor rewards being determined by marginal products.

Under these conditions, the growth of total factor productivity is the difference between the growth of value added and the rate of growth of total factor inputs. The latter is in the form of a Divisia index number i.e. a weighted combination of the growth rates, the weights being the respective shares.

If we assumed specific Cobb-Douglas production function, with unit elasticity of output (unlike in the general functional form above) and took base year factor shares as weights, we would get Domar’s geometric index of TFPG.

Assuming \( A_1 = 1 \), a time series of Solow index of productivity \( (A_t) \) can be formed from the formula:

\[ A_{t+1} = A_t \cdot \left( 1 + g^S_{t+1} \right) \]

Measurement of Variables

Output (Q):–The Annual Survey of Industries provides data on both the output and the value added at the current prices. We have used gross value added as a variable for output. In this paper, the Wholesale Price Index (WPI) for manufactured products has been used to deflate the nominal values of gross value added.

Labour (L):- Total number of persons engaged is taken as the measure of labour input.

Capital (K):- Gross fixed capital stock at constant (1993-94) prices are taken as a measure of capital input. For constructing the capital stock for the sector, CSO’s data on fixed capital stock for 1973-74 has been considered as the benchmark year of capital stock. Capital stock series is then constructed by using perpetual inventory accumulation method.

Capital stock for the industrial sector in the subsequent years has been arrived at by adding the real investment figures to the stock of capital of the previous year. The relationship between gross fixed capital stock in year \( t \), denoted by \( K_t \), the benchmark capital stock, \( K_0 \). Following Goldar (1986) we
have uniformly applied 2% rate of obsolescence for each year. For year \( t \), the estimate of capital stock (\( K \)) is obtained by using the following equation

\[
K_t = K_{t-1} - 0.02 K_{t-1} + I_t
\]

This means that

\[
K_1 = K_0 + I_1 - 0.02 K_0
\]

\[
K_2 = K_1 - 0.02 K_1 + I_2
\]

and so on.

The investment figures were obtained using the formula:

\[
I_t = \frac{FC_t - FC_{t-1} + D_t}{WPIC_t} \times 100
\]

Where, ‘FC’ is the book value of fixed capital, ‘D’ is the depreciation, and ‘WPIC’ is an appropriate deflator for fixed capital. For ‘WPIC’, we have used the wholesale price index of machines and machine tools published by the CSO. The base of this index series has been converted to 1993-94 year to retain the consistency of single base year for all the price indices.

**Emoluments:** Total emoluments primarily constitute wages to workers, provident fund (PF) and other benefits and so on. To estimate real emoluments, the nominal value has been deflated by Consumer Price Index. In the present study, the share of emoluments in total value added is taken as the share of labour. Assuming constant returns to scale, the share of capital is one minus the share of labour.

TFP is measured for food products and beverages industry of India for the period 1975/76 to 2011-12. This period has been divided into two sub periods, namely, 1975/76 to 1989/90 (Pre-Reforms) and 1990/91 to 2011/12 (Post-Reforms). For the estimation of TFP index data on relevant variables are collected from various issues of “Annual Survey of Industries”, a publication of Central Statistical Organization (CSO), Government of India.

**Empirical Analysis of Performance**

Food products industry in India is a sunrise sector. It has gained prominence in the recent years and continues to doing so. Food products & beverages industry grew at a rate of 15.4 percent during 2011-12. Availability of raw materials, changing lifestyles of the people and appropriate fiscal policies has given a considerable push to the industry’s growth. This sector is crucial because it serves as a vital link between the agriculture and industrial sectors of the economy. India is a highly populous country. Food products & beverages industry plays an important role to reduce waste of agricultural raw materials and to improve the value of agricultural produce. Adequate focus on this sector could greatly alleviate our concerns on food security and food inflation. India already is a leading exporter of several food products.

To ensure that this sector gets the stimulus it deserves, Ministry of Food Processing Industries is implementing a number of schemes for Infrastructure development, technology upgradation & modernization, human resources development and R&D in the Food Processing Sector.

**Table 1.** Registered Manufacturing of Food Products & Beverages (20-21) All India (Value in Rs. Lakhs, Others in Numbers)

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<tbody>
<tr>
<td>Number Of Factories</td>
<td>18372</td>
<td>19721</td>
<td>22436</td>
<td>27480</td>
<td>35838</td>
<td>36875</td>
</tr>
<tr>
<td>Number Of Workers</td>
<td>1025496</td>
<td>864225</td>
<td>947637</td>
<td>1267359</td>
<td>1299467</td>
<td>1393265</td>
</tr>
<tr>
<td>Total Persons Engaged</td>
<td>1325832</td>
<td>1124366</td>
<td>1224581</td>
<td>1605954</td>
<td>1661597</td>
<td>1776732</td>
</tr>
<tr>
<td>Value Of Output at</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant Prices (1993-94=100)</td>
<td>2386082</td>
<td>5190625</td>
<td>9685290</td>
<td>25356181</td>
<td>29365168</td>
<td>37305676</td>
</tr>
</tbody>
</table>
Table 1. Registered Manufacturing of Food Products & Beverages (20-21) All India (Value in Rs. Lakhs, Others in Numbers) (Contd.…)

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<tbody>
<tr>
<td>GVA At Constant Prices (1993-94=100)</td>
<td>268163</td>
<td>620636</td>
<td>1294821</td>
<td>2943410</td>
<td>3268132</td>
<td>4232137</td>
</tr>
<tr>
<td>Fixed Capital at Constant Prices (1993-94=100)</td>
<td>314980</td>
<td>736085</td>
<td>1709741</td>
<td>1828190</td>
<td>1887197</td>
<td>2492642</td>
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Source: Computed from ASI, summary results for the Factory Sector, Various Issues.

The food-product sector comprises of organized and unorganized industries. Due to lack of reliable data on unorganized industries, an analysis of the organized factory sector has been undertaken to get an idea on the productivity scenario of the Indian food-product sector. Further, the structural constituents of the food processing sector may be understood from the analysis of organized factory sector that mainly consists of large-scale enterprises. Table 1 shows some of the characteristics of Indian food processing sector since 1981-82. Though the number of factories in the food-product sector has increased over the years, the number of workers as well as total persons engaged declined initially but increased latter on. However, Gross value added at constant prices increased substantially during this period.

Table 2. Growth Rate analysis of key characteristics in the Food Processing Sector (figures in percent)

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<tbody>
<tr>
<td>Number Of Factories</td>
<td>0.65</td>
<td>1.42</td>
<td>6.44</td>
</tr>
<tr>
<td>Number Of Workers</td>
<td>-2.12</td>
<td>0.71</td>
<td>4.70</td>
</tr>
<tr>
<td>Total Persons Engaged</td>
<td>-2.18</td>
<td>0.72</td>
<td>4.51</td>
</tr>
<tr>
<td>Value of output at Constant Prices (1993-94=100)</td>
<td>9.37</td>
<td>7.22</td>
<td>28.52</td>
</tr>
<tr>
<td>GVA at Constant Prices (1993-94=100)</td>
<td>12.42</td>
<td>4.52</td>
<td>22.69</td>
</tr>
<tr>
<td>Fixed Capital 1993-94=100</td>
<td>9.72</td>
<td>9.21</td>
<td>4.58</td>
</tr>
</tbody>
</table>

Source: Computed from ASI, summary results for the Factory Sector, Various Issues.

Growth rate analysis of the food-product sector shows that the sector has been growing constantly since 1981-82. The number of workers and the total persons engaged in food-processing sector reported a decaling growth during 1980-81 to 1991-92 however the second period decades reported positive growth and a significant improvement in recent decades (Table 2). It may be noted that all the factors considered during 1981-82 to 2011-12 reported positive annual growth rates since 1991-92 as compared to eighties. The highest growth rate was reported by the value of output at constant prices during 2001-02 to 2011-12 period value of output reported the highest annual growth rate.

Figure 1 shows trends in Food products & beverages industry’s share of labour, share of fixed capital and share of Gross Value added in Total Manufacturing Industry. Food products & beverages industry’s share in gross value added were 6.87 percent during 1973-74, now its share in gross value added of total manufacturing Industry has increased to 8.55 percent during 2011-12. It employed 14.93% labour of Total manufacturing sector during 1973-74. However, technology advancement making it to towards capital deepening industry but it stills employ 13.23 percent labour of total manufacturing sector during 2011-12. In case of fixed capital its share has increased from 4.38 percent during 1973-74 to 7.44 percent during 2011-12.
Figure 1: Share of Labour, Fixed Capital and Gross Value Added of Food products & beverages in Total Manufacturing Industry

Figure 2 shows TFPI trends using Solow method. It reflects that TFPI has improved in Post-Reforms period in comparison to Pre-Reforms period. There is a sharp increase in TFPI during the period 2003-04 to 2011-12. Estimated TFPI indices for figure 4.2 have been presented in table 2.1 in Appendix II for Food Products and Beverages.

Table 3. CAGR of Food Products & Beverages (figures in percent)

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<tr>
<td>Solow</td>
<td>1.99</td>
<td>3.35</td>
<td>8.30</td>
<td>1.85</td>
</tr>
<tr>
<td>Exports</td>
<td>2.31</td>
<td>10.52</td>
<td>16.43</td>
<td>8.72</td>
</tr>
</tbody>
</table>

Source: Author’s computations based on ASI data

Exports of Food products & beverages industry grew at a compound annual growth rate (CAGR) of 2.31 percent, 10.52 percent and 8.72 percent during Pre-reforms period, Post-reforms period and
Entire period respectively estimated as given in table 3. Food products & beverages industry’s export intensity as a ratio of exports to gross value added of total manufacturing industry has increased from 0.18 during 1975-76 to 0.26 during 2011-12.

Table 3 shows higher compound annual growth rate for total factor productivity during Post-reforms period in comparison to post-reforms period. It suggest that aggregate manufacturing sector saw a growth of 1.99 percent in the pre-reform period compared to 3.35 percent in the post reforms period. Beside CAGR is much higher during 2000-01 to 2011-12 reflects food product industry has gain competitively from completion during post reforms period. This higher growth result is the result of various factors but most important is inflow of foreign direct investment.

CONCLUSION

The protective role of import substitution, however, has an effect that is in the opposite direction. Bhagwati (1998) blames import substitution for India’s poor performance. The industrial licensing framework, established in 1951, has also been identified as a factor retarding productivity growth. The general argument is that by limiting the degree of foreign competition and sheltering domestic industry, import substitution prevents the introduction of new products and methods, lowers the incentive to reduce costs and productivity. Since imported inputs (intermediate as well as capital goods) would tend to embody technologies that are not available to domestic producers, any policies that limit the availability of such imports through tariff or quotas will tend to slow down the pace of productivity growth.

In this study, we have analysed the productivity performances of Food products sector in India based on a carefully constructed data set drawn from ASI for the period 1973-74 to 2011-12. By applying the Solow Index to estimate total factor productivity we have constructed total factor productivity series. Comparison of before and after economic reforms shows that total factor productivity has improved during post-reforms period in comparison to pre-reforms period.

REFERENCES

