

LIBERALIZATION POLICIES AND PRODUCTIVITY IN INDIA

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I. INTRODUCTION

IN India, the import-substitution strategy and five-year plans have been the cornerstone of development policies since 1947. However, from the view points of growth and efficiency, these policies have not necessarily been successful because too many regulations on the industry, trade, and finance largely hindered the private sector's economic activities [1] [4] [5] [23]. As a result, the growth rate of GNP per capita during 1960 to 1979 was only 1.4 per cent.¹

For example, industrial licensing severely restricted new expansion and diversification projects. The Monopoly and Restrictive Trade Practices (MRTP) Act also largely limited the activity of MRTP-registered firms. Even the exit-permission for unprofitable industries from the market was not automatically granted either. Moreover, the Phased Manufacturing Programs (PMP) required producers to gradually increase the ratio of local content regardless of the cost. As a result, many companies hesitated to increase their investment.

All proposals for foreign investment and technological collaboration were subjected to a long examination prior to clearance by the authority.² Import licensing strongly limited imports of new technology and industrial inputs.³ Moreover, many imported products were under the control of the "canalizing" agencies, such as State Trading Corporation, Jute Corporation of India, Food Corporation of India, SAIL International Ltd., Minerals and Metals Trading Corporation, and so on.

In contrast, the NIEs and ASEAN countries have been able to achieve a remarkably high economic growth by adopting outward-looking development strategies as many trade restrictions were eased or abolished. Moreover, business activities are mainly controlled by the private sector, while resource allocation is basically regulated by the market forces. In other words, the government exerts mainly an indirect control through the price mechanism. Their success stories are now widely referred to as the "East Asian miracles" [17] [6] [26].

¹ For example, the corresponding values for the Philippines, Indonesia, Thailand, Malaysia, and the Republic of Korea were 2.6%, 4.1%, 4.6%, 4.0%, and 7.1%, respectively. See [27, 1981 edition].

² Foreign equity participation above 40 per cent was generally not approved.

³ Chief Controller of Imports and Exports is in charge of the administration of foreign trade. In addition, there is an indirect control by the so-called Sponsoring Authorities. There are two types of licenses, Open General License and Individual License. The former procedure is relatively not restrictive.

Based on these achievements by East Asian economies, the Indian government has been undertaking policy reforms since 1980. These reforms mainly aimed at enhancing the efficiency and international competitiveness of the manufacturing sector.⁴

(1) Liberalization of foreign trade and investment: The rupee has been depreciated in order to expand exports.⁵ At the same time, many capital goods have been added to the list of products where imports do not need to be cleared by the government authorities. Moreover, import-license restrictions for a wide range of industrial inputs have been either eased or lifted while the maximum rate of import duties has been lowered. The "canalization" system has been liberalized too. Finally, foreign investment has been liberalized. As a result, direct foreign investment up to 51 per cent equity participation in high priority industries is now automatically authorized.⁶

(2) Liberalization of domestic market: Industrial licensing has been liberalized or abolished. Moreover, the Monopolies and Restrictive Trade Practices Act and Phased Manufacturing Programs have been largely deregulated. The number of activities reserved for the public sector enterprises (PSE) has been reduced too.

In taking account of these reforms, the main purpose of the present paper is to evaluate the effectiveness of the liberalization policies in India.

II. LIBERALIZATION POLICIES AND PRODUCTIVITY

A. *Effects of Liberalization Policies*

The market generally becomes more competitive after liberalization policies are enacted. First, the loosening of various domestic restrictions (i.e., industrial licensing, MRTP, PMP, and so on) promotes competition among local enterprises. Second, the deregulation of foreign investment restrictions promoted competition between local and multinational enterprises. Third, trade liberalization promotes competition between the local and foreign enterprises.

In addition, new technologies are generally introduced along with the liberalization policies. First, due to domestic competition, R&D expenses of local enterprises increase. Second, as a result of foreign direct investment, new technologies are directly introduced by the multinational enterprises. Third, new technologies embodied in the imported goods are introduced by the trade liberalization.

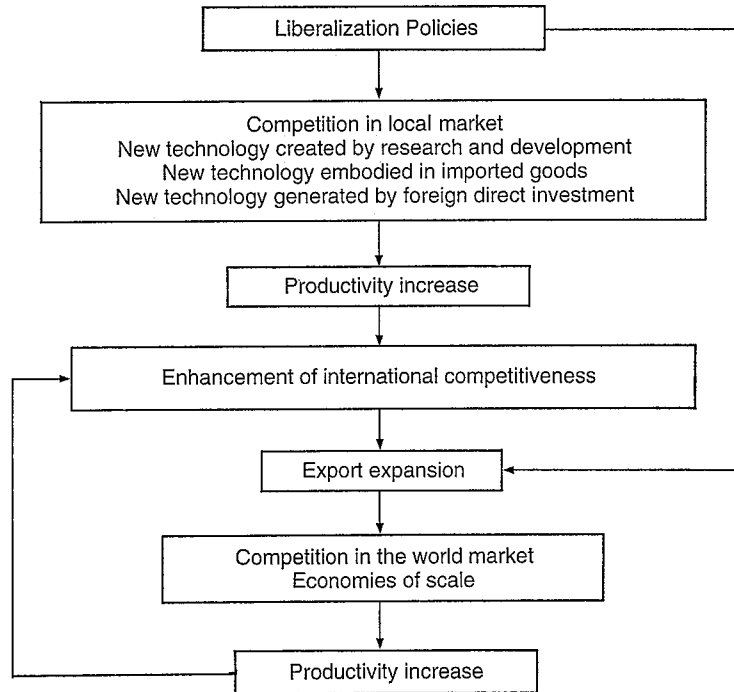
The competition and new technologies generally enhance the productivity and reduce the production costs of industries with comparative advantage. As a result, exports begin to increase. Then, the competition with foreign enterprises in the world market enhances the productivity of export industries again. Moreover,

⁴ The survey of liberalization policies in India in this section was mainly based on reports from [3, 1992 edition] [13] [15] [16] [18].

⁵ The real effective exchange rate (ten country-index) decreased from 100 to 52 during the period 1985 to 1991.

⁶ For these reforms, amendment of the Foreign Exchange Regulation Act is under consideration.

Fig. 1. Various Effects of Liberalization



since the world market is very large, economies of scale can be achieved, which improves the productivity (see Figure 1).

B. Estimation of Productivity

In the previous section, it was shown that the productivity improvement was one of the major results of liberalization policies. Against this background, the total factor productivity growth (TFPG) rates of manufacturing industries for the period between 1981/82 and 1987/88 were estimated in this section.⁷ Annual data relating to value added, capital stock, employment, wages, etc. were collected for the organized manufacturing sector from the *Annual Survey of Industries (ASI)* [12] during the period from 1981/82 to 1987/88 while the price deflators were taken from the *Index Number of Wholesale Prices in India* [11]. The results are summarized in Table I.⁸

⁷ As for the references in the productivity measurement of the Indian manufacturing sectors, see, for example, [2] [9] [20].

⁸ The estimation method is basically the same as that used by Ahluwalia [2]. However, the base year of the price index adopted here is 1981/82. Also, the data of net capital formation were not estimated but directly obtained from *ASI*. (According to Ahluwalia, data on capital stock are on a gross basis inclusive of depreciation, and capital stock is measured at replacement cost at constant prices using the perpetual inventory accumulation method.)

TABLE I
KEY INDICATORS

| | Growth Rates (%) | | | | K/L |
|------------------------------|------------------|-------|---------|-------|------|
| | Value Added | Labor | Capital | TFPG | |
| Food | 9.42 | -4.20 | 8.50 | 5.82 | 0.21 |
| Beverages | 10.35 | -0.02 | 12.35 | -3.08 | 0.07 |
| Cotton | 1.88 | -3.02 | 7.52 | 1.09 | 0.22 |
| Wool | 7.88 | 4.15 | 15.65 | -3.15 | 0.49 |
| Jute | 0.91 | -3.35 | 8.17 | 3.35 | 0.09 |
| Other textiles | 12.07 | 4.35 | 11.28 | 3.39 | 0.13 |
| Wood | 2.30 | -1.68 | 14.36 | -5.06 | 0.20 |
| Paper | 1.82 | 0.26 | 13.88 | -5.55 | 0.75 |
| Leather | 10.87 | 3.85 | 9.62 | 4.10 | 0.18 |
| Rubber | 17.59 | 2.83 | 16.80 | 3.78 | 1.24 |
| Chemicals | 8.81 | 1.86 | 8.66 | 2.17 | 1.19 |
| Nonmetallic mineral products | 10.84 | 2.40 | 18.34 | -1.52 | 0.57 |
| Basic metal | 1.71 | 0.76 | 12.14 | -5.99 | 1.65 |
| Metal products | 5.66 | 0.81 | 9.25 | 0.00 | 0.23 |
| Machinery | 6.19 | 0.85 | 11.56 | -0.82 | 0.41 |
| Electrical machinery | 11.83 | 3.09 | 13.57 | 2.37 | 0.44 |
| Transport equipment | 4.41 | -0.53 | 10.95 | -0.43 | 0.58 |
| Other manufacturing | 16.28 | 2.46 | 13.09 | 7.67 | 0.34 |
| Electricity | 4.61 | 2.95 | 12.07 | -4.11 | 3.40 |
| Gas & steam | 25.40 | 3.32 | 21.27 | 10.42 | 0.89 |
| Water works and supply | -1.57 | 0.28 | 1.52 | -2.51 | 0.51 |
| Storage and warehousing | 3.87 | 0.82 | 2.78 | 1.80 | 0.44 |
| Repair services | 7.17 | 0.86 | 9.05 | 4.84 | 0.10 |
| Total | 6.87 | 0.02 | 11.82 | -0.16 | 0.86 |

Source: [12, various years].

1. *Growing industries*

The TFPG rates of other manufacturing industries including food products, leather products, rubber products, textile products, jute textiles, beverage and tobacco products, electrical machinery, chemicals, and cotton textiles gave positive values. Most are "light" industries except for electrical machinery and chemicals.

The electronics industry, which is included in the electrical machinery group, has been one of the core industries for the liberalization program since 1980. For the purpose of national defense, this sector had been a typical public industry strongly protected by the government during the 1970s. However, the liberalization was initiated under the Indira Gandhi government in 1980. Moreover, the computer industries were liberalized by the Rajiv Gandhi government in 1985 [8].

Thus, it would be interesting to determine whether the TFPG of the electronics group was positive or not. For this purpose, data were obtained for the electrical machinery group at the three-digit (*ASI* Industrial Code) level of disaggregation. The estimation results are shown in Table II.

According to this calculation, the TFPG rates of "electronic computers, control instruments, and other type of equipment" (No. 366) gave negative values while those of "electronic components and accessories not elsewhere classified" (No. 367)

TABLE II
GROWTH RATES OF ELECTRICAL MACHINERY INDUSTRY, 1981/82

| | Value Added | Labor | Capital | TFPG | Share of Value Added (%) |
|-------|-------------|-------|---------|--------|--------------------------|
| 360 | 10.02 | 2.11 | 8.28 | 4.31 | 41.1 |
| 361 | 10.86 | 0.38 | 8.65 | 4.54 | 13.9 |
| 362 | 9.25 | 1.02 | 11.93 | 0.61 | 6.2 |
| 363 | 3.51 | -2.12 | 13.70 | -3.32 | 6.9 |
| 364 | 22.54 | 10.06 | 24.15 | 4.69 | 18.8 |
| 365 | — | — | — | — | 0.3 |
| 366 | 9.46 | -4.08 | 26.74 | -5.19 | 5.6 |
| 367 | 39.60 | 18.72 | 22.75 | 18.73 | 5.5 |
| 369 | 0.46 | 0.46 | 24.09 | -13.44 | 1.6 |
| Total | 11.83 | 3.09 | 13.57 | 2.37 | 100.0 |

Source: [12, various years].

Note: The code numbers are cited from National Industrial Classification. No. 360: electrical industrial machinery and apparatus and parts. No. 361: insulated wires and cables. No. 362: dry and wet batteries. No. 363: electrical apparatus, appliances and other parts such as lamps, sockets, etc. No. 364: radio and television transmitting and receiving sets. No. 365: radio-graphic x-ray apparatus and tubes and parts. No. 366: electronic computers, control instruments and other types of equipment. No. 367: electronic components and accessories n.e.c. No. 369: electrical machinery, apparatus, appliances and supplies and parts n.e.c.

were positive. These findings suggest that the liberalization policy enhanced the productivity of labor-intensive industries.

2. Stagnating industries

The TFPG rates of metal products, transport equipment, general machinery, nonmetallic mineral products, wool textiles, wood products, paper products, and basic metal industries which are capital-intensive industries showed zero or negative values.

Steel, which is classified under the group of basic metal industries, has been one of the typical industries where the share of public sector enterprises (PSE) was very large. Moreover, prices and distribution were strongly controlled by the government until recently [14]. In other words, the pace of liberalization was very slow.⁹

Thus, it would be interesting to determine whether the TFPG rates of iron and steel were negative or not. For this purpose, data were obtained for the basic metal group at the three-digit (*ASI* Industry Code) level of disaggregation. The estimation results are shown in Table III.

Based on these data, the TFPG rates of "steel" (No. 330) and "foundries for casting and forging iron and steel" (No. 331) have negative values. These findings suggest that the government intervention hindered the productivity.

⁹ However, the government removed price and distribution controls on iron and steel on January 16, 1992. Import duty on steel melting scrap was reduced from 35 to 10 per cent, on pig iron from 55 to 35 per cent and billet and HR coils from 65 to 45 per cent.

TABLE III
GROWTH RATES OF BASIC METAL PRODUCTS

| | Value Added | Labor | Capital | TFPG | Share of Value Added (%) |
|-------|-------------|-------|---------|-------|--------------------------|
| 330 | -0.30 | 1.45 | 10.11 | -7.03 | 61.6 |
| 331 | 0.75 | -1.10 | 8.18 | -3.51 | 21.7 |
| 332 | 16.08 | 13.10 | 12.60 | 3.39 | 3.5 |
| 333 | 5.89 | 0.52 | 7.55 | 2.22 | 1.4 |
| 334 | 0.79 | -3.08 | 3.76 | -0.09 | 0.9 |
| 335 | 18.68 | 1.51 | 20.86 | 6.98 | 7.7 |
| 336 | 12.57 | 14.30 | 6.02 | 4.42 | 1.9 |
| 339 | 6.63 | -0.81 | 6.03 | 2.85 | 1.3 |
| Total | 1.52 | 0.76 | 10.74 | -5.33 | 100.0 |

Source: [12, various years].

Note: The code numbers are cited from National Industrial Classification. No. 330: iron and steel industries. No. 331: foundries for casting and forging iron and steel. No. 332: ferro-alloys. No. 333: copper. No. 334: brass. No. 335: aluminum. No. 336: zinc. No. 339: other nonferrous metal industries.

To conclude, the productivity growth rates of most labor-intensive industries appeared to be high while those of capital-intensive industries were low. Moreover, those of liberalized industries also were relatively high. Thus, it was deemed interesting to test quantitatively the relationships among the TFPG rates, liberalization policies, and factor intensities.

C. Productivity Growth and Liberalization

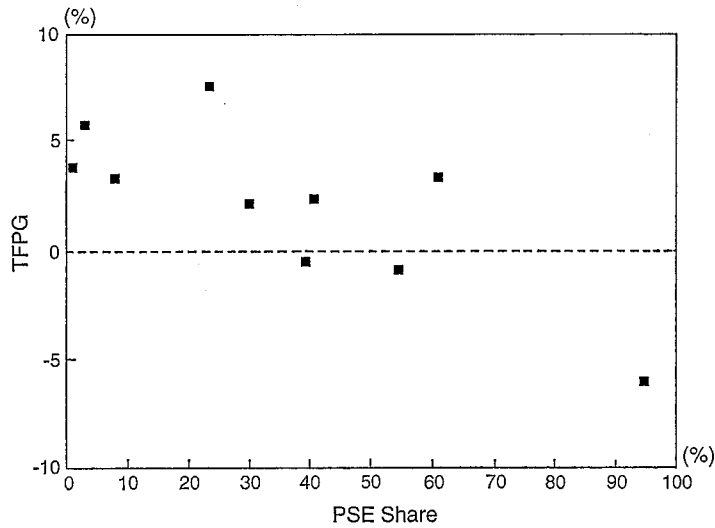
In the previous section, the productivity growth rates of manufacturing sectors were measured. According to the results, they appeared to be affected by the liberalization policies. Therefore, we first attempted to test the hypothesis according to which there is a positive association between the productivity growth and the liberalization policies.

For this purpose, it is necessary to quantitatively express the degree of liberalization. Among the indices which express the degree of liberalization, the effective rate of protection (ERP) and the share of public sector are commonly used. It is generally recognized that the degree of liberalization shows a negative correlation with these parameters. The share of the public sector enterprises (SPUB) in value added was utilized in this section since the latter calculation requires relatively few data.

The value added of PSE derived from the *Public Enterprises Survey* [10] is presented in Appendix Table I.¹⁰ By using these data and those of *ASI*, the relationship between TFPG and SPUB was estimated by OLS:

¹⁰ Although the *Public Enterprises Survey* reports the value added of coal and lignite, power, and petroleum, these industries were excluded from Appendix Table I. Moreover, the industries listed in "consumer goods" were reclassified. (For example, that of Hindustan Vegetable Oils Corporation Ltd. was included in the food sector.)

Fig. 2. TFPG and Government Intervention



Sources: [12, various years] [10].

$$TFPG = 5.78 - 0.10SPUB,$$

$$(-3.56)$$

$$R^2 = 0.61$$

where the figure in parentheses is the t value.

As anticipated, a negative relationship was obtained (see Figure 2). In other words, the high TFPG rate was correlated with low *SPUB*. Thus, although this conclusion was derived from a small sample,¹¹ it is suggested that the productivity improved by the liberalization.

D. Productivity Growth and Comparative Advantage

Industries with comparative advantage are expected to benefit from trade liberalization and conversely, comparatively disadvantageous industries are expected to lose. As a result, capital and labor tend to shift from the latter to the former, making the former's market more competitive. Moreover, since the former's R&D expenses increase, productivity is generally enhanced by the liberalization.

Therefore, the second hypothesis according to which the productivity growth rates of industries with comparative advantage (i.e., labor-intensive) are higher

¹¹ The classification of the *Public Enterprises Survey* is different from that of *ASI*. Thus, a highly aggregated classification was utilized here (including industries such as food, jute, other textiles, rubber, chemicals, basic metals, machinery, electric machinery, transportation equipment, and other manufacturing industries.) In this sense, the results can be interpreted as an accessory evidence.

TABLE IV
INDIA'S EXPORTS OF MAJOR COMMODITIES

| Commodity | (Rs. 10 Million) | | | |
|--------------------------------|------------------|---------|---------|---------|
| | 1987-88 | 1988-89 | 1989-90 | 1990-91 |
| Gems & jewellery | 2,612 | 4,391 | 5,296 | 5,210 |
| Ready-made garments | 1,823 | 2,118 | 3,224 | 4,042 |
| Engineering goods | | | | 3,221 |
| Leather & manufactures | 1,252 | 1,522 | 1,951 | 2,554 |
| Cotton yarn/fabrics/madeup | 1,131 | 1,134 | 1,480 | 2,065 |
| Drugs, pharm. & fine chemicals | | 1,187 | 1,997 | 2,330 |
| Manmade yarn/fabrics/madeup | 102 | 165 | 310 | 406 |
| Carpet manmade | 391 | 474 | 586 | 608 |
| Electronic goods | | | | 342 |
| Handicrafts | 248 | 324 | 402 | 429 |
| Natural silk products | | 185 | 205 | 219 |
| Jute manufactures | 241 | 235 | 298 | 299 |
| Plastic & linoleum products | | 109 | 161 | 198 |
| Carpet millmade | 24 | 91 | 114 | 136 |
| Rubber products | | | | 261 |
| Sports goods | | 74 | 81 | 92 |
| Paint/varnishes, etc. | | | | 211 |
| Paper/wood products | | | | 89 |
| Iron & steel bar/rod, etc. | | | | 114 |
| Residual chemicals & products | | | | 205 |
| Glass, glassware, etc. | | | | 107 |
| Ferro-alloys | | | | 61 |
| Project goods | | | | 157 |
| Petroleum products | 649 | 505 | 697 | 938 |

Source: [7].

was tested. For this purpose, the capital-labor ratio (K/L) recorded in 1987/88 was selected as an explanatory variable (see Table I).¹² Moreover, since it is generally recognized that $TFPG$ is positively correlated with the scale of output, the growth rate of value added (GV) was added to the explanatory variable.¹³ The relationship was as follows:

$$TFPG = -1.61 - 1.98K/L + 0.50GV,$$

$$(-2.56) \quad (5.53)$$

$$R^2 = 0.65$$

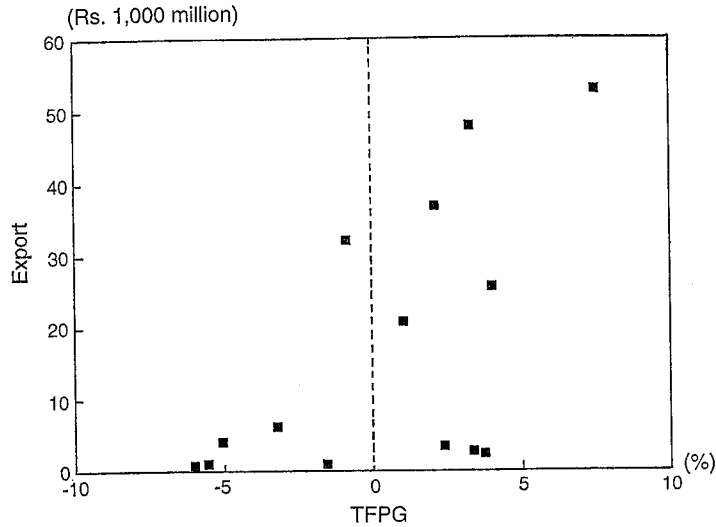
where figures in parentheses are the t value.

As anticipated, a negative association between $TFPG$ and K/L and a positive association between $TFPG$ and GV were obtained. The former relationship suggests that the high $TFPG$ rate is correlated with high labor-capital ratio. In other words, the $TFPG$ rates of industries with comparative advantage are higher.

¹² The value of capital is expressed in Rs. lakhs (1 lakh=100,000) at 1981/82 constant price.

¹³ The positive association between output growth and productivity change has been referred to as Verdoorn's Law. This law is based on economies of scale. See [25] [19].

Fig. 3. Export and TFP Growth



Sources: Same as Fig. 2.

E. Productivity Growth and Exports

As mentioned previously, the enhancement of productivity generally brings about the reduction of production costs in industries with comparative advantage. As a result, exports may increase in the future. However Table IV shows that compared with the export structure of the 1980s, that of the 1990s was complex.

Therefore, we tested the third hypothesis according to which there was a positive association between manufacturing exports in the 1990s and the productivity growth rates in the 1980s. For this purpose, the relationship between the TFPG rates and manufacturing exports in 1990/91 (*EXP*) for the period between 1981/82 and 1987/88 was estimated by OLS:

$$EXP = 1,586.3 + 276.3 TFPG,$$

(2.69)

$$R^2 = 0.38$$

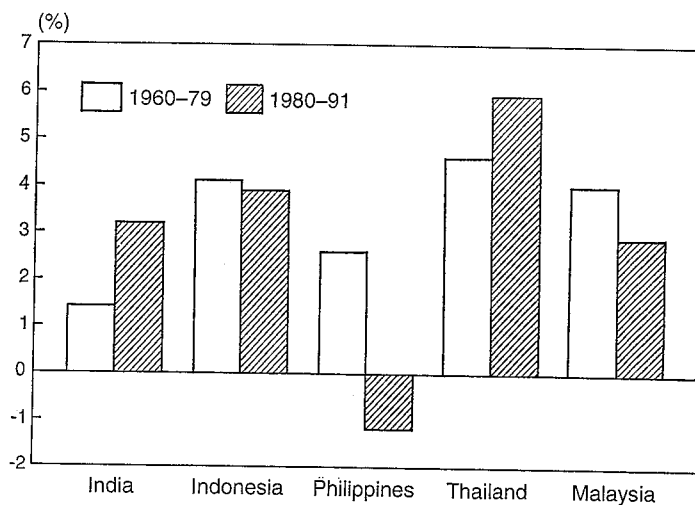
where the figure in parentheses is the *t* value.

As expected, a positive relationship was obtained (see Figure 3). Thus, although this conclusion was derived from a small sample,¹⁴ the improvement of the productivity was found to lead to the expansion of exports in future.¹⁵

¹⁴ Since the classification of the *ASI* and that of trade statistics in the *Economic Outlook* [7] are different, sectors were aggregated into fourteen. (For example, since the latter does not report the export of food processed products, this sector was excluded from the sample.)

¹⁵ Since the R^2 value is comparatively low, the TFPG is not the dominant factor to account for the exports. For example, the export of cotton drastically expanded in the early 1990s although the TFPG of this sector was relatively low. Some other factors such as devaluation of the rupee, etc. must be taken into account.

Fig. 4. GDP per Capita Growth Rates



Source: [27, 1993 edition].

III. SUMMARY AND CONCLUSION

A. Summary

The Indian government has been undertaking policy reforms since 1980. These reforms mainly aimed at enhancing the efficiency and international competitiveness of the manufacturing industries. As a result, the growth rate of GDP per capita during the 1980s reached a value of 3.2 per cent, exceeding the values for the Philippines and Malaysia (see Figure 4). Against this background, the TFPG rates of manufacturing industries for the period between 1981/82 and 1987/88 were measured by using the *ASI*.

Based on the results, the TFPG rates of most labor-intensive industries were relatively high while those of most capital-intensive industries were relatively low. Moreover, the rates of liberalized industries were also higher. Therefore, the following three hypotheses were tested.

(1) Hypothesis 1: The positive association between productivity and liberalization was tested by using the TFPG rate and the share of the public-sector enterprises. According to the regression analysis, the TFPG rate decreased with the increase of the share of the public sector which usually reflects restrictions in attempts at liberalization. Thus, although this conclusion was only an accessory evidence derived from a small sample, it is suggested that the productivity improved by the liberalization.

(2) Hypothesis 2: The negative association between productivity and comparative advantage was tested by using the TFPG rate and the capital-labor ratio. According to the regression analysis, the TFPG rate increased with the increase

of the labor-capital ratio. Thus, the TFPG rates of industries with comparative advantage (i.e., labor-intensive) were higher than those of industries with comparative disadvantage (i.e., capital-intensive).

(3) Hypothesis 3: The positive association between the export manufactured products in the 1990s and the productivity growth rates in the 1980s was tested by using the trade statistics and the TFPG rate. According to the regression analysis, the exports of manufactured products increased with the increase of the TFPG rate. Thus, the improvement of the productivity was found to lead to the expansion of exports.

B. Conclusion

By using cross-country data, Nishimizu and Page [21, pp.259–60] reached the following conclusions: (1) Export growth in industry is positively associated with TFP performance under the trade liberalization regimes. (2) Import competition appears to lead to a recovery of TFP performance. (3) Industries protected primarily by quantitative barriers to trade seem to have a difficulty in adjusting to external shocks.¹⁶

By using India's cross-section data, the present paper confirmed these conclusion as follows: The liberalization policies improved the productivity of the manufacturing industries, and the improvement of the productivity led to the expansion of the export of manufactured products. In addition, it was shown that the improvement of the productivity involved mainly the labor-intensive industries.

However, as illustrated in Figure 1, the effects of liberalization require further analysis. As a result of export expansion, the competition with foreign enterprises in the world market may increase the productivity of export industries. Moreover, since the world market is very large, economies of scale can be achieved, which in turn should improve the productivity.

Unfortunately, these topics were not analyzed in this paper because of the limitation in the availability of data. However, it appears that most of the sectors of the Indian economy continue to respond positively to a major program of structural reforms even after 1990. In other words, the process of structural adjustment is still continuing.¹⁷ Thus, these topics should be analyzed in future research.

¹⁶ As for the other references about this topic, see, for example, [24] and [22].

¹⁷ See, for example, [26].

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APPENDIX TABLE I

VALUE ADDED OF PUBLIC SECTOR ENTERPRISES IN 1987/88

| (Rs. 10 million) | |
|--|-------------|
| Name of the Company | Value Added |
| Steel | |
| Ferro Scrap Nigam Ltd. | 11.63 |
| IISCO Ujjain Pipe & Foundry Co. Ltd. | 3.54 |
| Maharashtra Elektros melt Ltd. | 10.00 |
| Mishra Dhatu Nigam Ltd. | 13.55 |
| Sponge Iron India Ltd. | 3.48 |
| Steel Authority of India Ltd. | 2,156.19 |
| The Indian Iron & Steel Co. Ltd. | 160.03 |
| Subtotal | 2,358.42 |
| Minerals and metals | |
| Bharat Aluminium Co. Ltd. | 78.13 |
| Bharat Gold Mines Ltd. | 18.47 |
| Bharat Refractories Ltd. | 13.33 |
| Hindustan Copper Ltd. | 207.62 |
| Hindustan Zinc Ltd. | 130.81 |
| India Firebricks & Insulation Co. Ltd. | 3.93 |
| Indian Rare Earths Ltd. | 20.02 |
| Kudremukh Iron Ore Co. Ltd. | 31.26 |
| Manganese Ore (India) Ltd. | 22.25 |
| National Aluminium Company Ltd. | 56.50 |
| National Mineral Development Corporation Ltd. | 23.90 |
| Pyrites Phosphates & Chemicals Ltd. | 16.66 |
| Uranium Corporation of India Ltd. | 20.60 |
| Subtotal | 643.48 |
| Fertilizers | |
| Hindustan Fertilizer Corpn. Ltd. | 49.75 |
| Madras Fertilizers Ltd. | 16.26 |
| National Fertilizers Ltd. | 202.71 |
| Paradeep Phosphates Ltd. | 42.72 |
| Rashtriya Chemicals and Fertilizers Ltd. | 407.23 |
| The Fertilizer Corpn. of India Ltd. | 112.29 |
| The Fertilizers & Chemicals (Travancore) Ltd. | 140.61 |
| Subtotal | 971.57 |
| Chemicals and pharmaceuticals | |
| Bengal Chemicals & Pharmaceuticals Ltd. | 3.38 |
| Bengal Immunity Ltd. | 1.87 |
| Cement Corpn. of India Ltd. | 71.87 |
| Hindustan Antibiotics Ltd. | 25.60 |
| Hindustan Fluorocarbons Limited | -0.08 |
| Hindustan Insecticides Ltd. | 20.88 |
| Hindustan Organic Chemicals Ltd. | 40.93 |
| Hindustan Salts Ltd. | 1.24 |
| Indian Drugs & Pharmaceuticals Ltd. | 36.03 |
| Indian Medicines Pharmaceutical Corpn. Ltd. | 0.58 |
| Indian Petro-Chemicals Corpn. Ltd. | 249.67 |
| Karnataka Antibiotics & Pharmaceuticals Ltd. | 2.76 |
| Maharashtra Antibiotics & Pharmaceuticals Ltd. | 0.63 |

APPENDIX TABLE I (Continued)

| Name of the Company | Value Added |
|--|-------------|
| Orissa Drugs & Chemicals Ltd. | 0.59 |
| Rajasthan Drugs & Pharmaceuticals Ltd. | 1.07 |
| Sambhar Salts Ltd. | 1.87 |
| Smith Stanistreet & Pharmaceuticals Ltd. | 2.95 |
| Southern Pesticides Corporation Ltd. | 0.91 |
| U.P. Drugs & Pharmaceuticals Company Ltd. | 1.77 |
| Subtotal | 464.52 |
| ----- | |
| Heavy engineering | |
| Bharat Bhari Udyog Nigam Ltd. | 0.00 |
| Bharat Heavy Electricals Ltd. | 840.44 |
| Bharat Heavy Plate & Vessels Ltd. | 47.91 |
| Bharat Process & Mechanical Engineers Ltd. | 0.82 |
| Bharat Wagon & Engg. Co. Ltd. | 8.29 |
| Bharat Yantra Nigam Ltd. | 0.44 |
| Braithwaite & Co. Ltd. | 18.55 |
| Bridge & Roof Co. (India) Ltd. | 32.94 |
| Burn Standard Company Ltd. | 43.09 |
| Heavy Engineering Corpn. Ltd. | 148.51 |
| Jessop & Co. Ltd. | 30.60 |
| Mining & Allied Machinery Corpn. Ltd. | 34.09 |
| The Lagan Jute Machinery Co. Ltd. | 1.46 |
| Triveni Structurals Ltd. | 15.31 |
| Tungabhadra Steel Products Ltd. | 6.50 |
| Weighbird (India) Ltd. | 0.35 |
| Subtotal | 1,229.30 |
| ----- | |
| Medium and light engineering | |
| Andrew Yule & Company Ltd. | 42.78 |
| Balmer Lawrie & Co. Ltd. | 32.14 |
| Bharat Brakes & Valves Ltd. | 1.23 |
| Bharat Dynamics Ltd. | 17.61 |
| Bharat Electronics Ltd. | 170.20 |
| Bharat Pumps & Compressors Ltd. | 10.26 |
| Biecco Lawrie Ltd. | 2.05 |
| Central Electronics Ltd. | 5.75 |
| Electronics Corpn. of India Ltd. | 76.84 |
| H.M.T. Ltd. | 198.44 |
| Hindustan Cables Ltd. | 89.85 |
| Hindustan Teleprinters Ltd. | 10.51 |
| H.M.T. Bearings Ltd. | 2.98 |
| Indian Telephone Industries Ltd. | 290.28 |
| Instrumentation Ltd. | 32.21 |
| Intelligent Communication Systems India Ltd. | 0.00 |
| National Instruments Ltd. | 3.67 |
| Praga Tools Ltd. | 15.78 |
| Rajasthan Electronics and Instruments Ltd. | 1.48 |
| Richardson & Cruddas (1972) Ltd. | 9.28 |
| Semi-Conductor Complex Ltd. | 2.79 |
| Vignyan Industries Ltd. | 0.00 |
| Subtotal | 1,015.87 |

APPENDIX TABLE I (Continued)

| Name of the Company | Value Added |
|--|-------------|
| Transportation equipment | |
| Bharat Earth Movers Ltd. | 172.81 |
| Central Inland Water Transport Corpn. Ltd. | 6.94 |
| Cochin Shipyard Ltd. | 19.54 |
| Cycle Corporation of India Ltd. | 0.41 |
| Garden Reach Shipbuilders & Engineers Ltd. | 29.77 |
| Goa Shipyard Ltd. | 11.49 |
| Hindustan Aeronautics Ltd. | 350.03 |
| Hindustan Shipyard Ltd. | 31.50 |
| Hooghly Dock and Port Engineers Ltd. | 4.23 |
| Maruti Udyog Ltd. | 107.67 |
| Mazagon Dock Ltd. | 145.74 |
| National Bicycle Corporation of India Ltd. | -0.21 |
| Scooters India Ltd. | 1.70 |
| Subtotal | 881.62 |
| Consumer goods | |
| Bharat Ophthalmic Glass Ltd. | 0.09 |
| Birds, Jute & Exports Ltd. | 0.00 |
| Brushware Ltd. | 0.11 |
| Hindustan Latex Ltd. | 11.46 |
| Hindustan Newsprint Ltd. | 27.66 |
| Hindustan Paper Corporation Ltd. | -3.72 |
| Hindustan Photofilms Mfg. Co. Ltd. | 32.71 |
| Hindustan Vegetable Oils Corpn. Ltd. | 46.57 |
| Hooghly Printing Company Ltd. | 0.31 |
| Modern Food Industries (India) Ltd. | 14.01 |
| Nagaland Pulp & Paper Company Ltd. | -1.48 |
| National Jute Manufactures Corporation Ltd. | 25.86 |
| Rehabilitation Industries Corpn. Ltd. | 6.17 |
| Tannery & Footwear Corpn. of India Ltd. | 2.94 |
| The Mandya National Paper Mills Ltd. | -0.96 |
| The National Newsprint & Paper Mills Ltd. | 19.03 |
| Tyre Corporation of India Ltd. | 6.00 |
| Subtotal | 186.76 |
| Agro-based industries | |
| Andaman & Nicobar Isl. Forest & Plant. Dev. Corp. Ltd. | 6.86 |
| Hindustan Packaging Co. Ltd. | 2.05 |
| National Seeds Corpn. Ltd. | 7.58 |
| North Eastern Regional Agri. Marketing Corp. Ltd. | 0.01 |
| State Farms Corporation of India Ltd. | 10.50 |
| Subtotal | 27.00 |
| Textiles | |
| Cawnpore Textiles Ltd. | 2.49 |
| National Handlooms Development Corporation Ltd. | 1.09 |
| National Textile Corpn. Ltd. | 3.39 |
| NTC (A. Pradesh, Karnataka, Kerala & Mahe) Ltd. | 30.81 |
| NTC (Delhi, Punjab & Rajasthan) Ltd. | 15.32 |
| NTC (Gujarat) Ltd. | 18.03 |
| NTC (Madhya Pradesh) Ltd. | 15.69 |

APPENDIX TABLE I (Continued)

| Name of the Company | Value Added |
|---|-------------|
| NTC (Maharashtra North) Ltd. | 20.86 |
| NTC (South Maharashtra) Ltd. | 33.77 |
| NTC (Tamilnadu & Pondicherry) Ltd. | 43.57 |
| NTC (Uttar Pradesh) Ltd. | 12.80 |
| NTC (West Bengal, Assam, Bihar & Orissa) Ltd. | 13.02 |
| The British India Corporation Ltd. | 21.74 |
| The Elgin Mills Company Ltd. | 7.81 |
| Subtotal | 240.39 |

Source: [10].