

The Productivity Growth and Performance Analysis of Indian Manufacturing sector

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Abstract

The present study endeavors to analyze the productivity growth and performance analysis of Indian manufacturing sector at inter-state level by taking into account the entire study period of 35 years from 1980-81 to 2014-15 and three distinct sub-periods. The comparison of partial productivities between pre-reforms and post-reforms periods reveals that the liberalization, privatization and globalization (LPG) process has failed to bring any significant dent in the performance of labour productivity and capital productivity growth of Indian manufacturing sector. Further, the results reveal that the manufacturing sector of India has not assumed the role of a major contributor in state's income over the last three decades as the contribution varies between 3 and 31 percent across the states during the period considered under study. Manufacturing sector in India still continues to be concentrated in a few states (like Gujarat, Haryana, Tamil Nadu and Maharashtra) despite successive changes in trade regimes. In case of employment, Tamil Nadu represents itself as the gainer as its share increases substantially while three states (Uttar Pradesh, Bihar and West Bengal) witnessing decline in their share in total manufacturing employment. In case of total investments, the reforms package planned to unshackle centrifugal forces to spread the actual investments to new destinations does not seem to have yielded the desired results in these states.

Introduction

The manufacturing sector in India is important for two reasons. First, it has crucial role and significant strengths to provide modern

employment to the growing unskilled or semi-skilled labour force of India and second its own healthy growth stimulates the growth of other

two sectors (i.e., agriculture and tertiary sector) of the economy. Since demand for and prices of primary products have been facing a long-run decline in the world market, the prospect for agriculture sector as a major employment creator and driver of growth are bleak in the context of India. On the other hand, if only tertiary sector is given more importance and develop more by ignoring industrial sector then there may be chances of more inflation in the economy and this may lead to deceleration in the economic growth. Thus, only a dynamic and outward oriented manufacturing sector can be seen as a key to India's future economic growth.

Manufacturing sector in India was characterized by extensive public sector participation, restricted foreign investment flows, high tariff and non-tariff barriers on imports, which ultimately restricted the growth of manufacturing sector in India. Therefore, the 1990s reforms announced in India were specifically targeted to the manufacturing sector. These reforms were launched in the year 1991 and still going on. It was considered that the free entry and removal of licensing barriers would automatically expose Indian industries to global competition and force them to enhance their efficiency and productivity levels. Ultimately all these efforts will force them to improve and introduce new technology for production. Further, removal of restrictions on imports and easy currency transactions would enable the industries to import better quality materials, components and technology. Similarly,

FDI inflows will bring productivity and technology spillover effects to improve performance of Indian manufacturing sector as a whole. "Any policy regime in the manufacturing sector, especially in terms of investment and technological up gradation, results into adjustments and re-adjustments of both industry and workforce in the short run and long run (Jain, 2015).

There has been a running debate on the role of economic reforms on productivity, employment and output in Indian manufacturing sector both as a whole and at regional level. Many studies in the literature finds that liberalization instead of helping the Indian industry has indeed rendered them in a helpless condition (Trivedi et al (2000); Balakrishnan et al (2000); Srivastava et al (2001); Das (2003); Goldar (2004) etc.). Contradicting this findings some studies also concluded the positive impact of reforms announced on growth and productivity of industrial sector (Unel (2003); TSL (2003) etc.). On this background, the present study makes an attempt to examine the impact of reforms on Indian manufacturing sector by analyzing the share and growth performance of various significant variables affecting Indian manufacturing sector before and after reforms both at aggregate and disaggregate state level. In order to present the discussion in a lucid manner, the whole chapter has been divided into three sections. Section- I provides methodological framework used for the analysis, the section- II discusses the partial productivity analysis, shares

and growth performance of significant determinants of the Indian manufacturing sector during entire period and three distinct sub-periods of the study. The final section concludes the discussion along with some relevant policy implications.

Section-I: Database and Methodology

The present study involves the partial productivity analysis and performance of Indian manufacturing Sector at state level confined to the period of 35 years from 1980-81 to 2014-15, which is further bifurcated into three sub-periods i.e., pre-reforms period (1980-81 to 1990-91), post reforms period phase-I (1991-92 to 2000-01) and post reforms period phase-II (2001-02 to 2014-15). The logic behind the idea of dividing the entire period into three sub-periods is that the reforms process was initiated in 1991 and still on. But later on many policies like EXIM Policy (2000), Foreign Trade Policy (2009), National Manufacturing Policy (NMP) (2011) etc. were announced to strengthen the reform process especially in later nineties and after 2000. The analysis is based on secondary data culled out from the various issues of "Summary Results of Annual Survey of Industries", a publication of Central Statistical Organization (CSO), Government of India, various reports of Centre for Monitoring Indian Economy (CMIE), Economic surveys, Reserve Bank of India Bulletins, National Accounts statistics. The present study considers one output i.e., Gross value added at constant prices and two inputs variables namely, gross fixed capital at constant prices and number of employees. Since price deflators were not available at state level, hence, all monetary data have been deflated using appropriate national price deflators. The current prices of output and inputs has been deflated by using 'Wholesale Price Index (WPI) of Manufactured Products' and

'Consumer Price Index (or implicit price index) of Industrial workers' with the base 2004-05=100, respectively.

First, the study investigates the compound annual growth rates of labour productivity, capital productivity and capital intensity (K/L).

Labour Productivity = Real Gross Value Added /
Number of workers employed

= Real GVA per worker

Capital Productivity = Real Gross Value
Added / Real Fixed Assets

= Real GVA per unit of Fixed Asset

Capital Intensity = Real Gross Fixed Assets /
Number of workers employed

Second, the percentage shares of Indian states in output, employment and investment have been analyzed.

Section-II: Results and Discussions

Table 4.1 presents the annual growth rate of partial productivities (i.e. labour productivity and capital productivity) and capital intensity (also known as capital-labour ratio) of Indian manufacturing sector over the period 1980-81 to 2014-15. Further to see the impact of reforms on the manufacturing sector, the compound annual growth rates of capital productivity, labour productivity and capital intensity has been calculated for the entire period (i.e. 1980-81 to 2014-15) and three distinct sub-periods; pre-reforms period (1980-81 to 1990-91); post-reforms period phase-I (1991-92 to 2000-01) and ; post-reforms period phase-II (2001-02 to 2014-15).

**Table 4.1 Partial- Productivity Analysis of Indian Manufacturing Sector
(1980/81 to 2014/15)**

Year	Capital Productivity	Labour Productivity	Capital Intensity
1980-1981	1.65	0.73	0.44
1981-1982	1.02	0.80	0.79
1982-1983	0.80	0.87	1.09
1983-1984	0.62	1.01	1.63
1984-1985	0.54	1.06	1.97
1985-1986	0.49	1.16	2.38
1986-1987	0.44	1.19	2.70
1987-1988	0.42	1.24	2.98
1988-1989	0.40	1.39	3.46
1989-1990	0.40	1.49	3.78
1990-1991	0.36	1.63	4.55
1991-1992	0.32	1.57	4.95
1992-1993	0.31	1.65	5.40
1993-1994	0.31	1.86	5.99
1994-1995	0.30	1.98	6.61
1995-1996	0.30	2.11	7.01
1996-1997	0.29	2.24	7.63
1997-1998	0.28	2.32	8.17
1998-1999	0.26	2.55	9.67
1999-2000	0.27	2.85	10.41
2000-2001	0.25	2.66	10.54
2001-2002	0.24	2.75	11.35
2002-2003	0.14	1.60	11.28
2003-2004	0.18	2.16	11.77
2004-2005	0.32	3.63	11.48
2005-2006	0.34	3.95	11.64
2006-2007	0.37	4.15	11.25
2007-2008	0.45	5.43	12.07
2008-2009	0.35	4.47	12.60
2009-2010	0.32	4.71	14.57
2010-2011	0.34	4.90	14.20
2011-2012	0.29	4.68	16.05
2012-2013	0.32	5.21	16.13
2013-2014	0.31	5.07	16.51
2014-2015	0.32	5.32	16.47
CAGR of Entire Period (1980/81 to 2014/15)	-2.64	5.92	8.79
CAGR of Pre-Reforms period (1980/81 to 1990/91)	-12.35	7.95	23.17
CAGR of Post- Reforms Period Phase-I (1991/92-2000/01)	-2.31	6.67	9.19
CAGR of Post- Reforms period Phase-I (2001/02 to 2014/15)	3.62	7.33	3.58

Source: Author's Calculation.

The compound annual growth rate of capital productivity of Indian manufacturing sector for the entire period of the study has been recorded to the tune of (-) 2.64 percent. Similarly, the negative trend of compound annual growth rate of capital productivity observed to the tune of (-) 12.35 percent in the pre-reforms period. The comparative analysis of capital productivity growth during first and second phase of reforms considered under study indicates that the compound annual growth rate of capital productivity growth of Indian manufacturing sector remained negative viz. (-)2.31 percent in the first phase of reforms which turned out to be positive, i.e. 3.62 percent in the second phase of reforms. In case of labour productivity, it has been observed that the labour productivity of Indian manufacturing sector has grown at the compound annual growth rate of 5.92 percent during the entire study period. However, this figure turned out to be 7.95 percent, 6.67 percent and 7.33 percent during pre-reforms period, post-reforms period phase –I and post – Reforms period phase –II respectively. The higher growth of labour productivity during pre- reforms period may be attributed due to increase in capital intensity in the same reference period, because the CAGR of capital intensity has been observed to the tune of 23.17 percent in the pre-reforms period as compared to the post reforms period Phase-I and Phase –II, where the same has been observed to the tune of 9.91 percent and 3.58 percent respectively. As it is assumed that

labour productivity has direct relation with the capital intensity, the deceleration in the labour productivity in the post reforms period as compared to the pre reforms period is attributed to fall in capital intensity in the post-reforms period.

Thus the comparison of partial productivities between pre-reforms and post- reforms periods reveals that the liberalization, privatization and globalization (LPG) process has failed to bring any significant dent in the performance of labour productivity and capital productivity growth of Indian manufacturing sector.

Table 4.2 presents the share of manufacturing sector in the states domestic product during different time-periods. Results reveal that the manufacturing sector of India has not assumed the role of a major contributor in state's income over the last three decades, more or less following the national pattern. The contribution varies between 3 and 31 percent across the states during the period considered under study. There are some states (Gujarat, Haryana, Punjab, Bihar) which have witnessed a continuous increase in the share of manufacturing sector in state's income while there are some states (Andhra Pradesh, Assam, Rajasthan) that have maintained a continuous share. Three states namely, Maharashtra, West Bengal and Tamil Nadu have reported a consistent decline in the share of manufacturing sector in State's income.

Table 4.2.Share of Manufacturing Sector in National State Domestic Product(NSDP)

States	1980/81	1990/91	2000/01	2014/15
Andhra Pradesh	8.0	11.5	11.4	12.1
Assam	9.5	9.9	8.2	10.1
Bihar	3.6	4.8	13.9	15.8
Delhi	5.6	6.2	5.1	8.6
Gujarat	16.5	24.5	25.1	26.4
Haryana	12.2	19.2	18.5	19.8
Karnataka	14.6	19.1	14.6	13.5
Kerala	10.5	11.5	11.6	9.4
Madhya Pradesh	9.2	13.6	14.0	11.9
Maharashtra	23.8	23.4	20.5	19.5
Odisha	6.8	9.2	9.1	12.3
Punjab	7.8	11.9	13.9	14.6
Rajasthan	11.6	11.6	12.6	13.1
Tamil Nadu	30.5	28.3	20.8	22.0
Uttar Pradesh	7.9	12.8	11.6	11.6
West Bengal	19.5	17.5	16.5	14.4
Average	12.4	14.7	14.2	14.7

Source: National Accounts Statistics.

Tables 4.3, 4.4 and 4.5 examines the regional dispersal of three main parameters i.e. gross value added, employment and total investments in manufacturing sector of India during the entire period and three sub- periods of the study. As revealed by the table 4.3, the share of three states namely, Maharashtra, Gujarat and Tamil Nadu remained the highest in gross value added in manufacturing sector. The combined share of

these three states in gross value added has remained constant (around 46 percent) in the last 35 years. Therefore, the geographical spread of industrial activity reveals no major change during the last three decades of the study indicating that the economic reforms and trade liberalization policies introduced in India have not been able to change the regional dimension of industrialization.

Table 4.3.Average percentage share of states in Value Added in Indian manufacturing sector (1980/81 to 2014/15)

States	I	II	III	IV
Andhra Pradesh	5.1	6.4	6.3	5.5

Assam	1.6	1.5	1.3	1.1
Bihar	6.4	4.3	4.5	3.7
Delhi	1.2	1.0	1.0	1.4
Gujarat	10.3	11.2	14.3	15.4
Haryana	3.2	3.6	4.2	4.6
Karnataka	4.5	5.4	6.8	6.8
Kerala	2.7	2.4	1.7	1.6
Madhya Pradesh	5.3	5.6	5.6	4.6
Maharashtra	23.0	22.3	21.5	23.0
Odisha	1.9	1.5	2.3	2.6
Punjab	3.6	3.4	2.4	3.1
Rajasthan	2.2	2.8	3.2	3.5
Tamil Nadu	10.8	10.5	9.1	10.8
Uttar Pradesh	6.2	8.4	7.8	7.4
West Bengal	8.3	5.6	3.5	5.8

Source: Author's Calculations.

Note: 'I', 'II', 'III', 'IV' indicate entire period (1980-81 to 2014-15), pre reforms period (1980-81 to 1990-91), post reforms period phase-I (1991-92 to 2000-01) and post reforms period phase -II (2001-02 to 2014-15).

Further, the states which assumed the status of early movers in the reforms implementation (such as Andhra Pradesh) does not seem to have significant results. On the other hand, results of the state West Bengal seems to be a compelling need to accelerate the process of industrialization as it witnessed a declining share in overtime. Therefore, the results of the study reveal that manufacturing sector in India still continues to be concentrated in a few states (like Gujarat, Haryana, Tamil Nadu and Maharashtra) despite successive changes in trade regimes. To provide further insights on concentration of

manufacturing activity, table 4.4 examines the regional dispersal of employment in Indian manufacturing sector. The combined share of top three states (Maharashtra, Tamil Nadu and Andhra Pradesh) in total manufacturing sector has increased slightly overtime. Seven out of sixteen states have reported erosion in their share in total manufacturing employment. Results of the study find Tamil Nadu as the gainer as its share increasing substantially while three states (Uttar Pradesh, Bihar and West Bengal) witnessing decline in their share in total manufacturing employment.

**Table: 4.4 Average percentage share of states in Employment of Indian manufacturing sector
(1980/81 to 2014/15)**

States	I	II	III	IV
Andhra Pradesh	9.4	10.3	10.0	9.9
Assam	1.5	1.4	1.3	1.6
Bihar	4.3	3.8	2.2	3.4
Delhi	1.2	1.9	1.5	1.4
Gujarat	9.2	9.5	9.4	9.6
Haryana	2.1	3.6	4.1	4.0
Karnataka	5.8	5.1	6.0	6.2
Kerala	3.4	3.7	3.3	3.6
Madhya Pradesh	4.2	4.2	3.7	4.2
Maharashtra	17.4	15.0	14.1	15.3
Odisha	1.5	1.9	1.5	1.9
Punjab	3.3	4.2	4.2	4.5
Rajasthan	2.6	2.1	3.4	3.1
Tamil Nadu	11.1	13.1	15.8	14.5
Uttar Pradesh	9.0	8.3	7.3	8.9
West Bengal	11.8	8.8	6.1	7.9

Source: Author's Calculations.

Note: 'I', 'II', 'III', 'IV' indicate entire period (1980-81 to 2014-15), pre reforms period (1980-81 to 1990-91), post reforms period phase-I (1991-92 to 2000-01) and post reforms period phase -II (2001-02 to 2014-15).

Maximum decline in the total manufacturing employment is recorded with the manufacturing sector of West Bengal. A one to one relationship between output share and employment share holds good for majority of the states except Gujarat, Kerala, Tamil Nadu and Uttar Pradesh.

Table 4.5 In case of total investments, two states namely Maharashtra and Gujarat accounted for nearly 35 percent of total investments in the manufacturing sector for the entire period of the study. Even prior to reforms both states accounted for nearly 34 percent of total investments in the manufacturing sector which remains same even after the introduction of reforms. However

**Table 4.5.Average percentage share of states in total investment of Indian Manufacturing Sector
(1980/81 to 2014/15)**

States	I	II	III	IV
Andhra Pradesh	6.2	7.1	10.3	7.1
Assam	2.3	0.3	2.4	0.9
Bihar	1.4	1.8	2.3	4.0
Delhi	0.3	1.4	0.6	0.4
Gujarat	10.5	19.1	19.8	18.4
Haryana	2.8	3.5	4.5	3.5
Karnataka	4.3	7.3	7.1	7.1
Kerala	1.9	1.2	0.3	1.3
Madhya Pradesh	8.5	5.8	2.7	6.4
Maharashtra	23.4	17.0	11.3	16.3
Odisha	8.3	1.3	13.4	6.8
Punjab	2.2	2.4	3.3	2.3
Rajasthan	4.1	5.5	1.3	3.2
Tamil Nadu	9.4	9.5	10.1	10.2
Uttar Pradesh	12.5	10.0	6.1	7.7
West Bengal	4.3	3.8	2.7	4.5

Source: Author's Calculations.

Note: 'I', 'II', 'III', 'IV' indicate entire period (1980-81 to 2014-15), pre reforms period (1980-81 to 1990-91), post reforms period phase-I (1991-92 to 2000-01) and post reforms period phase -II (2001-02 to 2014-15).

The reforms package planned to unshackle centrifugal forces to spread the actual investments to new destinations does not seem to have yielded the desired results. In fact two states namely, Uttar Pradesh and Maharashtra which had major share in investment in the pre-reforms period seem to have lost out to Gujarat and Andhra Pradesh in the post-reforms period. Similarly, the investment level in the manufacturing sector seems to remain same in both pre and post reforms period in some states like Assam, Punjab and Tamil Nadu.

Section-III: Conclusion and Policy implications

The comparison of partial productivities between pre-reforms and post-reforms periods reveals that the liberalization, privatization and globalization (LPG) process has failed to bring any significant dent in the performance of labour productivity and capital productivity growth of Indian manufacturing sector. The results of the study indicate that manufacturing sector in India still continues to be concentrated in a few states

(like Gujarat, Haryana, Tamil Nadu and Maharashtra) despite successive changes in trade regimes. In case of employment, Tamil Nadu represents itself as the gainer as its share is increasing substantially while three states (Uttar Pradesh, Bihar and West Bengal) witnessing decline in their share in total manufacturing employment. In case of total investments, the reforms package planned to unshackle centrifugal forces to spread the actual investments to new destinations does not seem to have yielded the desired results in these states.

It has been observed that with the advancement of technology, although the productivity of labour has increased, yet it has not benefitted labour in terms of employment and wages. If the benefits of the increase in labour productivity are not passed on to them, there is likely to create severe aggregate demand deficiency sooner or later. Similarly, less restrictive labour legislation in the labour market have led to higher employment and huge re-allocative gains, notwithstanding the damping effect from the lower capital intensity. Even various studies in the literature have found inconsistency between the manufacturing output growth and employment. Therefore, there is need to design such appropriate policy measures each state can utilize its own resources to maximum level to enhance its industrial growth. In this context, the introduction of the appropriate technology, proper allocation and utilization of resources becomes imperative in manufacturing sector.

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