

## CONTRIBUTION OF THE MANUFACTURING SECTOR IN THE AGGREGATE NSDP FOR EACH MAJOR INDIAN STATE: A STUDY OF ITS DISTRIBUTION PATTERN AND VARIABILITY

*Sakshi Arora*

*Research Scholar (UGC-JRF), Department of Economics, Panjab University, Chandigarh, India*

---

**Received: 22 May 2018**

**Accepted: 28 May 2018**

**Published: 31 May 2018**

---

### **ABSTRACT**

*This study assesses the quantum of disparities in the manufacturing sector among the seventeen major Indian states by studying the distribution of the Net State Domestic Product of the manufacturing sector of each state in the aggregate NSDP for the pre-reform period (1973-74 to 1991-92) and the post-reform period (1992-93 to 2013-14). 'Independent samples t-test' has been employed to study whether or not there exists a statistically significant difference in the average shares of manufacturing sector's NSDP across the two time periods under study. The statistical tool of quartile deviation has been used to analyze the extent of variability in the shares of manufacturing sector's NSDP for each major Indian state. The maximum increase in the average share of manufacturing sector's NSDP from the pre reform in the post-reform period has been recorded by Himachal Pradesh followed by Bihar, the results of both being statistically significant at the 1% level. The analysis further revealed the presence of maximum variability in the share of the manufacturing sector in the aggregate NSDP as depicted by quartile deviation for the state of Odisha both in the pre-reform period and the post-reform period, whereas the lowest variability in the pre-reform period has been witnessed for Himachal Pradesh and in the post reform period for West Bengal.*

**KEYWORDS:** *Major Indian States, Manufacturing Sector, NSDP, Quartile Deviation, Variability*

### **INTRODUCTION**

The manufacturing sector is said to be the fabric of each developing economy, whereby in the transition phase, each country has to develop this particular sector and grow further. Over the last seventy years, the Indian economy has witnessed many structural sizeable changes, wherein the industrial sector has played a prime role. Furthermore, considerable attention has been paid to this sector over the recent years through the National Manufacturing Policy (NMP) which came forward in November, 2011 and the "Make in India" initiatives very recently. However, research evidence pointed out that widespread disparities exist in the growth of the manufacturing sector at the regional level in India (Das, 2007). This also has been pointed out by Myrdal's (1957) theory of "Cumulative Causation" which offers an appropriate reasoning behind the existence of variations in the size and structure of the manufacturing sector which is triggered by the process of urbanization and rural to urban migration. The centers of low economic activities (backward regions) witness favorable conditions on one hand in terms of better market conditions, expanding demand and technology transfer in terms of advanced machinery and techniques of production, etc, and the unfavorable effects on the other hand in terms of flight of capital, transfer of skilled labor to the centers of high economic activities, respectively. This generates a circular process

whereby the weak unfavorable effects outweigh the spread effects, and therefore regional imbalances arise (Meier & Rauch, 1995). In the course of the development of the manufacturing sector every economy undergoes sizeable changes, whereby some states perform in a better manner and the others lag behind due to differences in the natural endowments, geographical conditions etc, thereby leading to imbalances in a particular country. These Imbalances among the states in the manufacturing sector can be expressed in terms of variations in the distribution of different variables like the size of output, fixed capital, Net State Domestic Product (NSDP), number of productive units, total number of employees, salaries and wages etc. Therefore, in the present study an attempt has been made to analyse the contribution of the manufacturing sector in the aggregate NSDP for each major Indian state and the statistical tool of Quartile Deviation has been employed for assessing the disparities among the states.

## OBJECTIVES OF THE STUDY

The present research attempts to study the extent of the distribution of Net State Domestic Product (NSDP) of the manufacturing sector in the aggregate NSDP across major Indian states in the pre-reform (1973-74 to 1991-92) and post reform period (1992-93 to 2013-14). The study further aims to assess the extent of dispersion of the shares of manufacturing sector' NSDP for each major Indian state across the two time periods under study.

## METHODOLOGY

The secondary data pertaining to the Net State Domestic Product (NSDP) of the manufacturing sector and the aggregate NSDP of the economy has been collected from "Handbook of Statistics on Indian Economy" published by the Reserve Bank of India and from the time series data available on the website of "Economic and Political Weekly Research Foundation (EPWRF)", which has been compiled by the said foundation from various government sources. In order to study the extent of the distribution of Net State Domestic Product (NSDP) of the manufacturing sector in the aggregate NSDP, the average shares of the manufacturing sector's NSDP has been computed for each of the 17 major Indian states of the two time periods, i.e., for pre-reform (1973-74 to 1991-92) and post reform period (1992-93 to 2013-14). 'Independent samples t- test' has been employed to study whether or not there exists a statistically significant difference in the average shares (Field, 2005) of manufacturing sector's NSDP across the two time periods under study for each major Indian state. The procedure for employing the 'Independent samples t-test'(Gupta & Gupta, 1997) has been described below:

$$\text{Independent samples } t \text{ test} = \frac{\bar{S}_1 - \bar{S}_2}{S E_{\bar{S}_1 - \bar{S}_2}}$$

Where,

$\bar{S}_1$  Refers to mean of the first independent group (pre- reform period)

$\bar{S}_2$  Refers to mean of the first independent group (post- reform period)

$S E_{\bar{S}_1 - \bar{S}_2}$  Refers to the standard error of the difference between the two groups (two time periods)

Further, the statistical tool of quartile deviation has been used to analyse the extent of variability in the shares of

manufacturing sector' NSDP for each major Indian state across the two time periods under study.

## ANALYSIS AND RESULTS

**Table 1: Distribution of the NSDP of the Manufacturing Sector in the Aggregate NSDP for Each Major State**

States	Average % Share in Pre - Reform Period (1973-1991)	Average % Share in Post -Reform Period (1992-2014)	Change in the Average % Share	Independent Samples t -test
Andhra Pradesh	9.59	12.57	2.97	5.35 (0.00*)
Assam	12.60	11.03	-1.57	-2.57 (.014*)
Bihar	9.30	18.93	9.63	6.17 (0.00*)
Gujarat	15.85	18.52	2.67	2.08 (0.046*)
Haryana	16.07	19.00	2.93	3.83 (0.001*)
Himachal Pradesh	5.45	17.14	11.70	11.78 (0.00*)
Jammu & Kashmir	6.36	7.20	0.84	1.69 (0.098**)
Karnataka	14.63	16.49	1.86	3.14 (0.003*)
Kerala	12.70	11.32	-1.38	-2.81 (0.003*)
Madhya Pradesh	9.84	15.38	5.54	8.56 (0.00*)
Maharashtra	22.12	20.65	-1.48	2.84 (0.007*)
Odisha	22.64	23.62	0.98	0.49 (0.621)
Punjab	6.71	10.46	3.75	9.22 (0.00*)
Rajasthan	10.48	10.82	0.34	1.02 (0.316)
Tamil Nadu	25.14	19.34	-5.79	-7.01 (0.00*)
Uttar Pradesh	9.88	13.45	3.56	-5.815 (0.00*)
West Bengal	10.78	8.77	-2.01	7.77 (0.00*)

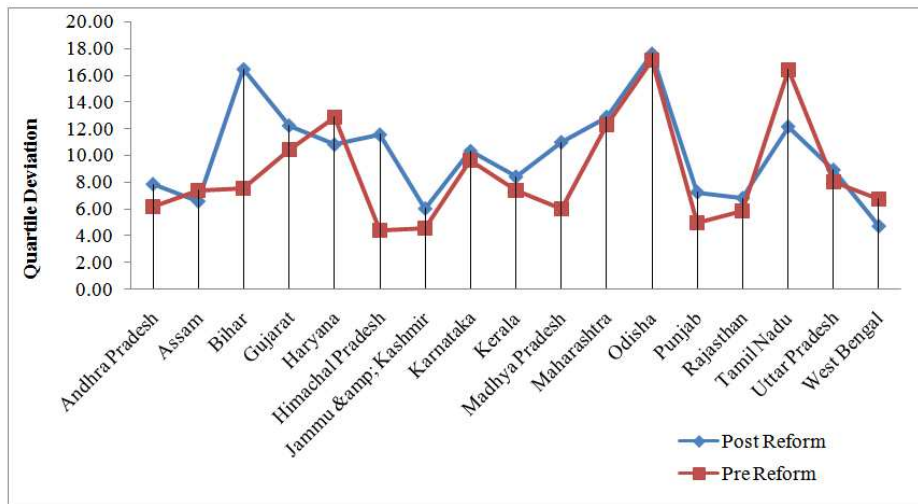
**Note:** Values in the parentheses indicate p-values

\* refers to 1% level of significance

\*\* refers to 5% level of significance

**Source:** Computed from data procured from ASI reports (several years)

Table 1 depicts the average percentage share of the manufacturing sector's NSDP in the aggregate NSDP for each of the seventeen major Indian states in the pre and the post reform period along with the change in the average share over the two aforementioned time periods. Independent sample t-test has been used to assess whether or not there exists a significant difference in the average shares of the manufacturing sector's NSDP between the two time periods for each state. In the pre- reform period, Tamil Nadu recorded the maximum average percentage share (25.14%) of the manufacturing sector's NSDP in the total NSDP whereas in the post reform period Odisha recorded the highest share (23.62%). Furthermore, the maximum incremental change from the pre reform in the post reform period in the average share of manufacturing sector's NSDP has been recorded by Himachal Pradesh (11.70%) followed by Bihar ( 9.63% ) which were both statistically significant at the 1% level. Whereas, a maximal detrimental change has been registered for Tamil Nadu (-5.79%) followed by West Bengal (-2.01%) in the average share which were also statistically significant at the 1% level.



**Figure 1: Quartile Deviation in the Share of the Manufacturing Sector in the Aggregate NSDP for Each Major Indian State**

The graph depicts the Quartile Deviation (QD) in the share of the manufacturing sector's NSDP in the aggregate for each of the seventeen major Indian states in the pre-reform and the post reform period, wherein Himachal Pradesh, Bihar and Madhya Pradesh have exhibited a maximal increase in the quartile deviation in the post – reform period as compared to the pre- reform period. However, for Haryana, Tamil Nadu, Assam and West Bengal the quartile deviation in the post reform period was lower than in the pre- reform period.

**Table 2: The Extent of Dispersion of the Share of Manufacturing Sector in Pre and Post Reform Period (%)**

States	Pre-Reform Period			Post Reform Period		
	Quartiles		QD	Quartiles		QD
	Q <sub>1</sub>	Q <sub>3</sub>		Q <sub>1</sub>	Q <sub>3</sub>	
Andhra Pradesh	8.4	10.4	6.2	11.7	13.7	7.86
Assam	12.9	13.9	7.45	10.2	11.7	6.58
Bihar	6.9	11	7.55	13.4	23.2	16.48
Gujarat	13.9	17.4	10.45	18.1	21.3	12.25
Haryana	13	19.4	12.9	18.1	19.9	10.83
Himachal Pradesh	3.9	6.4	4.45	15.1	19.1	11.58
Jammu & Kashmir	5.2	7.2	4.6	5.6	8.8	6.03
Karnataka	13	16.2	9.7	15.2	17.9	10.34
Kerala	11.9	13.4	7.45	9.4	13.1	8.41
Madhya Pradesh	8.9	10.5	6.05	13.5	17.7	11.00
Maharashtra	21.3	23	12.35	18.7	22.3	12.90
Odisha	18.7	26.5	17.15	17.1	26.2	17.64
Punjab	5.6	7.8	5	9.4	12.0	7.25
Rajasthan	9.8	10.8	5.9	9.8	11.7	6.81
Tamil Nadu	22.4	27.6	16.4	17.7	21.0	12.18
Uttar Pradesh	7.8	12	8.1	11.8	14.8	8.93
West Bengal	9.9	11.7	6.75	8.6	9.0	4.71

**Source:** Computed from data procured from ASI reports (several years)

Table 2 depicts the extent of dispersion in the manufacturing sector through the quartile deviation represented by QD which has been calculated through Q<sub>1</sub> and Q<sub>3</sub> for the pre and the post- reform period.

The maximum dispersion in the pre-reform period and the post reform period has been observed for Odisha with 17.15% and 17.64%, respectively, whereas the lowest variability in the pre-reform period has been witnessed for Himachal Pradesh (4.45%) and in the post reform period for West Bengal (4.71%).

## **CONCLUSIONS**

In the course of the development of the manufacturing sector, sizable variations are recorded whereby some states perform better than the other due to differences in the natural resources, geographical conditions etc, thereby leading to imbalances in a particular country. In the present study these imbalances among the states in the manufacturing sector can be expressed in terms of variations in the distribution of Net State Domestic Product (NSDP) for each major Indian state. It was observed that the maximum increase in the average share of manufacturing sector's NSDP from the pre-reform in the post-reform period was recorded by Himachal Pradesh followed by Bihar, which were both statistically significant. In addition to this, Himachal Pradesh, Bihar and Madhya Pradesh have exhibited a maximal increase in the quartile deviation in the post --reform period as compared to the pre--reform period. However, for Haryana, Tamil Nadu, Assam and West Bengal, the quartile deviation in the post-reform period was observed to be less than in the pre- reform period. In the light of these results, it can be deduced that the variability in the distribution of percentage share of NSDP of the manufacturing sector exist both in the pre and post-reform periods whereby it has accentuated in some states and decreased in the others.

## **REFERENCES**

1. Das, P. (2007). *Economic reform, output and employment growth in manufacturing: Testing Kaldor's hypothesis. Economic and Political Weekly*, 42(39), 3978-3985.
2. *Economic and Political Weekly Research Foundation. (several years). EPWRF India Time Series. Mumbai: Sameeksha Trust.*
3. Field, A. (2005). *Discovering Statistics using SPSS. SAGE Publications: London.*
4. Soni, Archana, And Arvind Mittal. "Energy Analysis Of Indian Manufacturing Sector."
5. Gupta, S. P., & Gupta, M. P. (1997). *Business Statistics. New Delhi, Sultan Chand.*
6. Meier, G. M., & Rauch, J. E. (1995). *Leading issues in economic development (Vol. 6). New York: Oxford University Press.*
7. Reserve Bank of India. (several years). *Handbook of Statistics on Indian Economy. New Delhi. Reserve Bank of India. Retrieved from [www.rbi.org](http://www.rbi.org).*

