A Lesson on Production Structural Changes and Sector-Wise Performance among Indian States

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Abstract

Main focus of the present study is to investigate the overall performance of different sector of Indian states during the post reforms period. It is found that the production structure of Punjab, U.P. and Bihar had remained transitional during 2015 to 2020 as in these economies the contribution of service sector is higher than agriculture share and agriculture share is higher than their industry contribution. It indicates these states are legged behind in their industrial production. But there are eleven states such as Chhattisgarh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Orissa, Rajasthan and T.N. which have entered into modern stage of transformation as revealed by sectoral share in the period 2015-20. It means these states are enjoying better services and more industrial production. W.B., A.P. and M.P. fall under transitional stage. It may be pointed out that first five ranks are mainly occupied by the states such as Punjab, Haryana, A.P., U.P. and W.B. these states had common feature of their dominance are in agriculture production, and developed agriculture sector. The states like Maharashtra, Gujarat, Chhattisgarh, Karnataka, A.P. and Haryana are the achiever of top rank in industrial advancement comparison other remaining states. Two states namely Haryana and A.P. were identified for better performance in both agriculture and industry sector. In case of service sector most dominating states were Maharashtra, T.N., Karnataka, Goa, and A.P. It needs to be highlighted that Maharashtra state stands for 1st place in both industry and service sector performance.

Keywords: *Composite index, sector performance, structural changes, economic development.*

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Introduction

The structural composition has great significance for economic growth and development of a country. The past experiences of today's developed countries indicate that the structural changes take place in sequence of shift from agriculture to industry and then to services. Such dynamics keeps the economy moving upward in its development process under development to high development (Papola, 2005). However, the structural composition of India has witnessed a different path than that of developed countries, it"s the economy that used to had predominance of agriculture sector but shifted very fast to the services sector in its growth journey. The share of the primary sector in GDP at factor cost had declined from 55 per cent in 1950-51 to 28 per cent in 1999-00 while share of the secondary sector was 16 per cent in 1950-51 and had increased to 26 per cent in 1999-00 (Dasgupta and Chakraborty, 2005). Meanwhile, the share of service sector had outpaced other sectors and reaches to 62 per cent of its gross value-added growth in 2016-17 (Economic Survey, 2019-20). From this point of view, Indian economy has seen a shift from agrarian economy to become services led economy.

Agriculture sector plays a vital role in Indian economy as it absorbs around 50 percent population of India and amounting 13 percent of total GDP of the country (Economic Survey, 2019-20). Number of studies has discussed the dynamics of Indian agriculture sector at the aggregate level however fewer attempts have been conducted to understand the agriculture advancements with reference to different states. Present section extends the existing literature in terms of understanding the agricultural advancements in context of Indian states. For the purpose, study refers to extensive literature and accordingly selects six important indicators to measure the performance of agriculture sector for Indian states. The index is compiled by using the multiple performance indicators of agriculture sector such as growth rate in agriculture net state domestic product at constant price (%), agriculture share in state gross domestic product (%), food grain production per hectare (in kg.), consumption of fertilizer per hectare (kg), cropping intensity (%), bank credit by schedule commercial banks as ratio to agriculture gross state domestic.

Industry sector also plays an important role in the rapid economic development of an economy. It unleashes dynamic and competitive economic forces that generate employment and income, facilitate international trade, and enable efficient use of resources. It is termed as a major driver of poverty alleviation and shared prosperity. The industrial expansion paves the way for increases in production efficiency and reduction in prices, thereby improving the purchasing power of consumers, and serves the purpose of welfare. The industrial expansion is also essential to serve the demand side of the economy. One of the estimates from household expenditure surveys revealed, on average more than half of the world's consumption spending goes to manufactured goods (UNIDO, 2018). With the importance of this sector, in an economy it is worth to understand the industrial development of India in terms of its various dimensions. Since the study has major thrust on state specific analysis, so the present section will deliberate on the industrial development of Indian states. In order to

measure the industrial development across Indian states, the multiple dimensions capturing the industrial expansion such as the relative size, growth in the industrial output, productivity, entrepreneurial aptitude, deployment of financial resources and expansion in productive capacities are considered. The relative size of industrial base is measured through the the contribution of industry sector in state gross domestic product. Productivity in the sector is quantified through the input-output ratio of the industry sector. The entrepreneurial aptitude is proxied and measured through the increase in number of factories in each state which accounts for the policy environment of the respective state also. The deployment of financial resources is proxied through the industrial bank credit as percentage of state GDP. Productive capacity of industrial sector is computed through the gross fixed capital formation as percentage of GSDP.

Finally, the services sector plays a vital services sector boosts the competitiveness of manufacturing activities also, a phenomenon known role in the growth and development of an economy through the creation of economic opportunities for enhanced income, productivity, employment, investment and trade. In fact, the s as "servicification"[4].Indian economy had experienced a notable contribution of service sector in the economic structure. In terms of output, the sector had contributed 55 per cent in India's gross value added in 2017-18 as compared to 28 per cent in 1950-51[5]. The sectors contribution towards employment creation had also remained impressive as employment share had increased from 17 per cent in 1950-51 to 31 per cent in 2019-20 (NSSO Survey, 2019-20). Various studies have been utilized to capture the services sectors evolution of India. The performance measurement for service sector within India across regions is also equally important so as to understand the economic structure of state economies. India's services sector covers various sub-sectors such as trade, hotel and restaurants, transport, storage and communication, financial sector, construction, etc. (IBEF, June 2018). Within financial sector the banking sector had its predominance as it accounts for three-fifths of the financial system's total assets (IBEF, June 2018). Keeping in view the multiple dimensions of services sector, this section presents the performance of Indian states for services sector. The performance of services sector is measured through detailed indicators representing the services economy with respect to the states. These indicators include- output composition of services in respective state GDP, expansion in services output, availability of transport facilities- both rails and roads and banking sector's operating activities and size including the rural banking. Output composition is measured through share of services sector in the total output of respective state. Expansion in services output is computed using the growth rate in real output of services sector for every state. In order to measure the performance of transport services, the length of roads and railways per-lakh population is considered. For financial services, the operating activities are computed using the bank credit per branch for both regional rural banks (RBs) as well as scheduled commercial banks (SCBs). For understanding the size of financial services, the bank credit of scheduled commercial banks as percentage of GSDP is taken into account. On

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[4] http://unctad.org/en/Pages/DITC/Trade-in-Services.aspx
[5] http://mofapp.nic.in:8080/economicsurvey/pdf/152-166_Chapter_09_Economic_Survey_2019-20.pdf

the financial front, the credit of regional rural banks (as percentage of GSDP) is also utilized to know the scale of rural financial services across states.

Review of literature

To get the insight of the present problem, an attempt is made to explore the existing prominent studies related to economic performances of different regions. As measurement of the performance of any economic system has been one the most coveted area for the economists, policy makers and professionals so there is vast literature available on it. The following are the some of the prominent studies which are reviewed for present study:

Ohlan (2013) constructed the study on the regional disparities on socio-economic development at district level in India. Socio-economic disparities were measured by the composite indices which are assessed by separately for agriculture, Industrial and infrastructural sectors. It is concluded that the Southern region of India is more and symmetrically developed as comparison of Northern and Central regions. In Central and Northern region of India, the agricultural development did not affect by the development of industry but socio-economic development affected by the agriculture development. It should be need to take steps like as provide irrigation facilities, chemical fertilizers and innovation for modern technology of cultivation for enhancing agricultural production in less developed districts. On the similar lines Dhingra (2019) stated that economic and social infrastructure have a very robust positive influence on the agricultural productivity and negative influence on rural poverty.

Singh (2015) analyzed the regional disparities of Indian states after the post reform period suggests that differences have increased between poor and rich states. The development index was measured by selecting the four indicators i.e., female literacy, rural non agriculture worker, urbanization and population above poverty line for each district. In India, with the highest development index of 180 was prominently district East Delhi followed by Chandigarh and West Delhi 175. About 200 districts in development map of India has showed that female literacy in case of south India, urbanization in western India, and economic well-being in Northern western India were main factors affecting the development levels.

Research gap

In fact, the stagnant share of industry sector in India has invited serious attention in the past decade to attain the stable growth momentum. The launching of New Manufacturing Policy in 2010 and very recently the Make in India witness the policy attention towards structural balance of the economy. Even the slower pace of agriculture sector in the recent past has remained an issue of discussion among stakeholders. In this background, it is worth investigating that how Indian states are placed in terms of structural composition. For the purpose, the study utilized the detailed components belonging to primary, secondary and tertiary sectors to understand the development level of respective sector for each state. This analysis can be helpful for understanding the sector specific developmental gap for Indian states so that the coordinated policy measures can be taken to bridge the required gap.

Objectives of the study

The present stud is an attempt to assess the development of Indian states in the post reform period. The broad objectives are:

1. To analyze the production structure changes among states of India.

2. To investigate the sector-wise performance of Indian states.

Research design and methodology

Sample

The present study is based on the secondary data. At present, in India there are 28 states and 9 union territories. These states are classified in two categories by Indian central government in the year 1969. First category includes eleven states that are classified as „Special Category Status" (SCS) or specific states. These states are characterized by poor resources, economic, infrastructural backwardness and non-viable nature of state finances. These states include Arunachal Pradesh, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Sikkim, Tripura and Uttarakhand. It is held that due to their circumstantial conditions, these states are not in a position to have enough resource to mobilize for their developmental requirements. To make the things comparable, the study excludes the first category states and covers 18 states which have uniformity in terms of resource, economic, infrastructure and state finance so that why these states are also known as non-specific states or general category states (GCS). A newly born state of Telangana is also excluded from the study due to non-availability of data. So finally, the study covers seventeen non-specific states of India (out of total 18) i.e.,Andhra Pradesh, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.

Data collection

The study is mainly based on the secondary data which has been collected from different sources such as MOSPI (Ministry of Statistics and Programme Implementation), GOI (Government of India), RBI (Reserve Bank of India), Economic and Political Weekly Research Foundation (EPWRF) , Niti Aayog, Budget Documents of states and union government, Economic Surveys, Ministry of Agriculture, National and State Human Development Reports, Ministry of Education and Human Resources Development Reports, and Census of India. The data relating to state-wise macro-economic and socio-economic variables are also sourced from the "Handbook on Indian States" 2019-20.

Period covered by the study

Indian economy has experienced a considerable growth since the beginning of 21st century, sparing the global crisis period. The achievement on this part of growth in general credited to the implementation of new economic reforms. The period of 1990's had seen major structural reforms and policy shifts in Indian economy. The attraction of present study lies in to investigate how Indian states have performed on socio-economic front in this new changed

environment. The choice of the post-reform period is based on the fact that during this period Indian states have also taken position to channelize the economic resources in relatively open economic environment. To get a meaningful comparison the overall time period is segregated into four time periods ranging from 2015-20.

Statistical techniques

Economic development is a multi -dimensional process so its change or direction cannot be fully captured by using any individual single indicator. Number of indicators when analyzed separately does not provide an integrated picture of reality. Hence, there is a need to construct a composite index of development based on combination of various development indicators[6]. To get more reliable and valid index, these indicators must be similar to each other and belong to a common environment. Some states might have faced situational factors in their development process which are unique to them along with their common and environmental factors. Indicators common to all the nonspecific states have been identified and included in the analysis for evaluating the level of development. For the purpose of constructing the index of development, the indicators used for the purpose are identified by taking clues from the existing literature.

<u>*Wroclaw Taxonomic Method*</u>

The study utilized the Wroclaw Taxonomic Method for constructing the composite index of development that is developed by Florek*et al.* (1952) to obtain a statistical method of determining homogenous units or types of things in an n-dimensional vectorial space. In 1967, the method of taxonomy was proposed to United Nation Educational Scientific and Cultural Organization (UNESCO) as a means of ranking and comparing countries" development by Professor ZygmuntHellwig (1967) of the Wroclaw School of Economics. A brief introduction of Wroclow Taxonomic method used in the study is in order.

This statistical method is used for calculating the Composite index which can include any number of indicators. Let $[X_{ij}]$ be the data matrix, $i = 1, 2, …, n$ (Number of unit) and $j = 1, 2, … k$ (number of indicators). $[X_{ij}]$ are transformed to $[Z_{ij}]$ as follows:

$$\overline{}$$
$$_{ij} \qquad _{j}$$

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[6] Commission on the measurement of economic performance and social progress – 'SURVEY OF EXISTING APPROACHES TO MEASURING SOCIO-ECONOMICPROGRES'"

$$[Z_{ij}] = \frac{(X - \overline{X})}{S_j}$$

$\overline{X}_j$= mean of the jth indicator, S_j = standard deviation of the jth indicator and $[Z_{ij}]$ is the matrix of standardized indicators. From $[Z_{ij}]$, identify the best value of each indicator, maximum value or minimum value depending upon the direction of the impact of indicator on the macro-economic development.

$$P_{ij} = (Z_{ij} - Z_{oj})^2 \text{ and } (C_i) = \sqrt{\sum_{j=1}^{k} \frac{p_{ij}}{cv_j}}$$

Where P_{ij}= pattern of development, Z_{oj}=Best value for indicator, and $(C.V.)_j$ is the coefficient of variation of the jth indicator in X_{ij}.

$$D_i \text{ (Composite Index)} = \frac{C_i}{C}$$

Where C = (Mean Value of C_i + 3* (Standard deviation of C_i)

Inter-sectoral performance in India: State-wise analysis

For overall period 2015-2020, Table 1 depicts the sector-wise performance among the selected Indian states. It may be pointed out that first five ranks are mainly occupied by the states such as Punjab, Haryana, A.P., U.P. and W.B. these states had common feature of their dominance are in agriculture production, and developed agriculture sector. The states like Maharashtra, Gujarat, Chhattisgarh, Karnataka, A.P. and Haryana are the achiever of top rank in industrial advancement comparison other remaining states. Two states namely Haryana and A.P. were identified for better performance in both agriculture and industry sector. In case of service sector most dominating states were Maharashtra, T.N., Karnataka, Goa, and A.P. It needs to be highlighted that Maharashtra state stands for 1st place in both industry and service sector performance.

Table 1: Sectoral performance composite index and rank among Indian states

State	API Index-2015-20	RANK	IPI Index-2015-20	RANK	SPI Index-2015-20	RANK
Andhra Pradesh	0.54	3	0.63	5	0.73	5
Bihar	0.68	6	0.98	17	0.92	16
Chhattisgarh	0.85	15	0.59	3	0.92	15
Goa	0.95	17	0.8	12	0.73	4
Gujarat	0.78	11	0.59	2	0.77	7
Haryana	0.48	2	0.67	6	0.74	6
Jharkhand	0.9	16	0.76	11	0.88	13
Karnataka	0.75	9	0.6	4	0.71	3
Kerala	0.76	10	0.97	16	0.85	11
Madhya Pradesh	0.74	8	0.9	15	0.89	14
Maharashtra	0.84	13	0.59	1	0.61	1
Odisha	0.85	14	0.75	10	0.85	10
Punjab	0.45	1	0.75	9	0.81	9
Rajasthan	0.79	12	0.75	8	0.8	8
Tamil Nadu	0.71	7	0.7	7	0.64	2
Uttar Pradesh	0.62	4	0.83	13	0.96	17
West Bengal	0.67	5	0.88	14	0.87	12

Source: Author"s calculation

Haryana and A.P. had shown highest performance in all the sectors. Maharashtra, Goa and Chhattisgarh which were better in industry and service sector but these states had need for lower performer in agriculture sector. Further, Orissa, Goa, Jharkhand and Chhattisgarh were noticed for lowest agriculture development. Three states namely U.P., M.P. and Bihar were facing lowest position.

Production structural changes among Indian states

After measuring the individual sector performance for agriculture, industry and service sector during different time span study tried to summarise state-wise sectoral transformation by using A. Houlb methodology (Table 2). In the Table the capital letters 'A', 'I' and 'S' denote the agriculture, industry and service sector respectively. As per the Houlb methodology the development of a country passes through three stages from traditional to transitional and then modern. In the traditional stage the agriculture sector is main economic deriver, where in

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transitional and modern stage it is the industrial sector and modern sector that play main economic role respectively. In term of the formation of GDP structure, in the process of development of a country, these stages can be expanded into six stages as given in Table 2. Under the traditional development the evolution passes through the structural transformation in the sequence of ASI-AIS-IAS-ISA-SIA. In another transformation which is common to majority of countries it moves from ASI to SAI and then directly to SIA.

Table 2: Criteria for measuring sectoral performance by A. Holub methodology

S. No.	Sector (%Age) share in GSDP	Type of output structure
1	Agriculture > Services > Industry	ASI – Traditional
2	Agriculture > Industry > Services	AIS – Traditional
3	Industry > Agriculture > Services	IAS – Transitional
4	Services > Agriculture > Industry	SAI – Transitional
5	Industry > Services > Agriculture	ISA – Modern
6	Services > Industry > Agriculture	SIA – Modern

Source: Kaur, 2008.

By using Houlb methodology the stages of Indian states are identified for different periods as presented in Table 3. It is found that the production structure of Punjab, U.P. and Bihar had remained transitional during 2015-20as in these economies the contribution of service sector is higher than agriculture share and agriculture share is higher than their industry contribution. It indicates these states are legged behind in their industrial production. But there are eleven states such as Chhattisgarh, Goa, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Maharashtra, Orissa, Rajasthan and T.N. which have entered into modern stage of transformation as revealed by sectoral share in the period 2015-20. It means these states are enjoying better services and more industrial production. W.B., A.P. and M.P. fall under transitional stage. Finally, Table 3 highlights that service sector had dominated among all selected Indian states during 2015-20 while agriculture had experienced phases of deceleration and stagnation. The share of service sector in state GDP had increased for all states except A.P. and Rajasthan. It may be happened due to the availability of educated workers at lower wage in the country. This scenario attracts foreign investors specially those who wants to start their business process outsourcing and information technology services. As a result, it is positive sign for Indian states that indicate more employability in service sector that has more share in GSDP.

http://annalsofrscb.r

Table 3: Production Structure among Indian states (on the basis of sector-wise percentage share in their state GSDP)

States	A	I	S	Structure
Andhra Pradesh	23.2	21.44	50.82	SAI -Transitional
Bihar	22.71	17.19	58.22	SAI -Transitional
Chhattisgarh	16.47	39.01	39.5	SIA - Modern
Goa	3.23	47.47	45.52	ISA – Modern
Gujarat	16.99	37.06	44.09	SIA - Modern
Haryana	18.93	26.94	52.84	SIA - Modern
Jharkhand	14.66	35.4	46.03	SIA - Modern
Karnataka	13.91	24.8	58.19	SIA - Modern
Kerala	11.23	20.91	65.11	SIA - Modern
M.P.	28.73	23.21	43.88	SAI -Transitional
Maharashtra	8.73	27.28	62.08	SIA - Modern
Orissa	16.37	34.04	46.56	SIA - Modern
Punjab	26.54	24.08	48.07	SAI -Transitional
Rajasthan	25.07	27.8	44.26	SIA - Modern
Tamil Nadu	10.12	28.1	60.24	SIA - Modern
Uttar Pradesh	26.34	20.12	51.06	SAI -Transitional
West Benghal	18.57	16.73	59.96	SAI -Transitional

Source: Author's calculation by using A. Holub methodology of production structure

Conclusion

In case of structural change in output, the first five ranks are mainly occupied by the states such as Punjab, Haryana, A.P., U.P. and W.B. these states had common feature of their dominance are in agriculture production. However, states such as Maharashtra, Goa and Orissa lack in agricultural development and required policies to bring their agriculture sector at par to other states. Further, performance of industry sector reveals that Maharashtra had also enjoyed the sustained industrial performance. Despite of various policy measures, the industrial development of Bihar, Kerala, Punjab, UP and WB could not pick up in relation to the industrial performance of counter-part states. Interestingly the smaller states had realized the improved rankings in the industrial performance which can be a guiding force for the poor performing states. It is also noticed two states namely Haryana and A.P. are identified for better performance in both agriculture and industry sector. Further, in case of service sector most performing states are Maharashtra, T.N., Karnataka, Goa, and A.P. It is also found that Maharashtra state stands for 1st place in both industry and service sector performance. Haryana and A.P. had shown highest performer in primary, secondary and service sectors. Maharashtra, Goa and Chhattisgarh which are better in industry and service sector but these states had observed lower performer in agriculture sector. Another, three states namely U.P., M.P. and Bihar are facing lowest position in all the three sectors during 2000-20. And, the

states such as Jharkhand, Punjab and Rajasthan had improved their rankings by 3-4 places against the losers that includes Chhattisgarh (17 position from 15th rank), Gujarat (10th position from 8th position) and Orissa (15th rank from 7th rank). For other states the ranking had remained stable with minor ups and downs. Finally, it can be argued that Indian economy had shifted from agrarian economy to services led economy.

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