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CONVERGENCE OR DIVERGENCE IN THE MANUFACTURING SECTOR SINCE 1980's? EVIDENCE FROM THE INDIAN SUB NATIONALS

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ABSTRACT

Purpose: The objective of this study was to divulges into understanding the inter-state disparities across the sixteen major Indian states in the registered manufacturing sector by analyzing it's pattern and traversing over the years initiating from 1980-1981 to 2015-2016.

Theoretical framework: The Indian economic development pattern is not only unusual, but also rare, when one compares it to the economic development paths followed by other developing and developed countries. The countries such as Singapore, Taiwan, South Korea and China achieved economic growth by initially giving priority to the manufacturing sector. It was after producing tangible outputs and generating innovations in the manufacturing sector that in the above mentioned countries, the services sector emerged as the biggest and leading sector in economic growth. The economic literature also shows a strong correlation between the growth of the manufacturing output and the growth of GDP (Thirlwall, A. P. 1983). The growth of the manufacturing sector sucks labour resources from other sectors where disguised unemployment exist; which contributes to the growth of the capital employed in the industry, while the productivity of other sectors is not adversely affected (N. Marconi et. al,2016) In other words, a strong and growing manufacturing sector is necessary for economic growth and development. However, in India the services sector emerged as the biggest and fast growing sector in the very beginning, and the manufacturing sector's contribution to economic growth has been relatively small.

Design/methodology/approach: To bring about the pattern of the size of the manufacturing sector the data has been analyzed by tabulation, calculating averages, coefficients of variations, bar diagrams and line graphs so that a clear picture is exemplified. To look into the impact of geographical location the data has been divided into two regional schemes which have been analyzed using the dummy variable regression technique (ANOVA), and lastly to highlight if there exists convergence or divergence across the states over the aforementioned time period the technique of σ – convergence and β-convergence have been applied.

Findings: The results of σ – convergence based on coefficient of variation clearly show that the size of manufacturing sector, in terms of both the indicators of size, diverged among states over 1980-1981 to 2015-2016 period. At least it is sure that no convergence occurred over this period. Furthermore, the results of the β-convergence based on growth rates of the two indicators give conflicting conclusions. The value of gross output per-capita indicated divergence over the reference period; but SDP share indicator suggested convergence over the same period. Taking both σ- convergence and β-convergence together, one may suggest that these do not indicate to any tendency towards convergence over this period. Therefore the objective of this paper was to analyse the change in the size of manufacturing sector across the states over the 1980-81 /2015-16 period on the basis of two indicators; share of manufacturing sector in SDP and value of gross manufacturing output per capita. The analysis

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revealed that the pattern changed somewhat over this period. Some states improved their ranking e.g. Gujarat and H.P. and ranking of some others worsened e.g. Maharashtra, Bihar etc. The analysis also revealed that there was no significant difference in the SDP share and value of gross output per capita of manufacturing sector between coastal / non coastal and northern/southern states. The analysis of convergence / divergence across the states over the 1980-81/ 2015-16 revealed that convergence did not occur; rather there was some tendency towards divergence.

Research, Practical & Social implications: Future research should focus on the reducing the disparities among the Indian states via exploring other important variables in the manufacturing sector. It can be further extended by using panel data analysis. **Also,** Policy implication suggested for the laggard states has been to identify the caveats and implementation of policies for them should be at national level to bolster the overall growth of the manufacturing sector.

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CONVERGÊNCIA OU DIVERGÊNCIA NO SETOR MANUFATURIAL DESDE A DÉCADA DE 1980? EVIDÊNCIAS DAS SUBNACIONAIS INDIANAS

RESUMO

Objetivo: o objetivo deste estudo foi divulgar a compreensão das disparidades interestaduais entre os dezesseis principais estados indianos no setor de manufatura registrado, analisando seu padrão e percorrendo os anos que vão de 1980-1981 a 2015-2016.

Estrutura teórica: O padrão de desenvolvimento econômico da Índia não é apenas incomum, mas também raro, quando comparado aos caminhos de desenvolvimento econômico seguidos por outros países em desenvolvimento e desenvolvidos. Países como Cingapura, Taiwan, Coreia do Sul e China alcançaram o crescimento econômico inicialmente dando prioridade ao setor manufatureiro. Foi depois de produzir produtos tangíveis e gerar inovações no setor industrial que, nos países mencionados acima, o setor de serviços surgiu como o maior e principal setor de crescimento econômico. A literatura econômica também mostra uma forte correlação entre o crescimento da produção industrial e o crescimento do PIB (Thirlwall, A. P. 1983). O crescimento do setor manufatureiro suga recursos de mão de obra de outros setores onde existe desemprego disfarçado, o que contribui para o crescimento do capital empregado na indústria, enquanto a produtividade de outros setores não é afetada negativamente (N. Marconi et. al,2016). No entanto, na Índia, o setor de serviços surgiu como o maior setor e de crescimento rápido logo no início, e a contribuição do setor manufatureiro para o crescimento econômico tem sido relativamente pequena.

Projeto/metodologia/abordagem: Para obter o padrão do tamanho do setor manufatureiro, os dados foram analisados por meio de tabulação, cálculo de médias, coeficientes de variação, diagramas de barra e gráficos de linha, de modo a exemplificar um quadro claro. Para observar o impacto da localização geográfica, os dados foram divididos em dois esquemas regionais, que foram analisados por meio da técnica de regressão de variável fictícia (ANOVA) e, por fim, para destacar se há convergência ou divergência entre os estados durante o período de tempo mencionado acima, foi aplicada a técnica de σ-convergência e β-convergência.

Conclusões: Os resultados de σ - convergência com base no coeficiente de variação mostram claramente que o tamanho do setor manufatureiro, em termos de ambos os indicadores de tamanho, divergiu entre os estados no período de 1980-1981 a 2015-2016. Pelo menos, é certo que não houve convergência nesse período. Além disso, os resultados da convergência β com base nas taxas de crescimento dos dois indicadores fornecem conclusões conflitantes. O valor da produção bruta per capita indicou divergência durante o período de referência, mas o indicador de participação da SDP sugeriu convergência durante o mesmo período. Considerando a σ-convergência e a β-convergência juntas, pode-se sugerir que elas não indicam nenhuma tendência de convergência nesse período. Portanto, o objetivo deste artigo foi analisar a mudança no tamanho do setor manufatureiro nos estados no período de 1980-81 a 2015-16 com base em dois indicadores: participação do setor manufatureiro no SDP e valor da produção manufatureira bruta per capita. A análise revelou que o padrão mudou um pouco durante esse período. Alguns estados melhoraram sua classificação, como Gujarat e H.P., e a classificação de alguns outros piorou, como Maharashtra, Bihar etc. A análise também revelou que não houve diferença significativa na participação do SDP e no valor da produção bruta per capita do setor manufatureiro entre os estados costeiros/não costeiros e do norte/sul. A análise da convergência/divergência entre os estados no período de 1980-81/ 2015-16 revelou que não houve convergência, mas sim uma tendência à divergência.

Implicações sociais, práticas e de pesquisa: Pesquisas futuras devem se concentrar na redução das disparidades entre os estados indianos por meio da exploração de outras variáveis importantes no setor manufatureiro. Ela pode ser ampliada com o uso de análise de dados de painel. Além disso, a implicação política sugerida para os estados

mais atrasados foi identificar as ressalvas e a implementação de políticas para eles deve ser feita em nível nacional para impulsionar o crescimento geral do setor manufatureiro.

Palavras-chave: Setor Manufatureiro, Tamanho, Disparidades Interestaduais, Análise de Variável Dummy, B Convergência, Σ Convergência.

¿CONVERGENCIA O DIVERGENCIA EN EL SECTOR MANUFACTURERO DESDE LA DÉCADA DE 1980? DATOS DE LAS SUBNACIONALES INDIAS

RESUMEN

Objetivo: El objetivo de este estudio era ampliar la comprensión de las disparidades interestatales entre los dieciséis principales estados indios en el sector manufacturero registrado, analizando su patrón y recorriendo los años comprendidos entre 1980-1981 y 2015-2016.

Marco teórico: El patrón de desarrollo económico de la India no sólo es inusual, sino también poco común si se compara con las trayectorias de desarrollo económico seguidas por otros países en desarrollo y desarrollados. Países como Singapur, Taiwán, Corea del Sur y China lograron inicialmente el crecimiento económico dando prioridad al sector manufacturero. Fue después de producir productos tangibles y generar innovaciones en el sector manufacturero cuando, en los países mencionados, el sector servicios emergió como el mayor y principal sector de crecimiento económico. La literatura económica también muestra una fuerte correlación entre el crecimiento de la producción manufacturera y el crecimiento del PIB (Thirlwall, A. P. 1983). El crecimiento del sector manufacturero succiona recursos laborales de otros sectores en los que existe un desempleo encubierto, lo que contribuye al crecimiento del capital empleado en la industria, mientras que la productividad de otros sectores no se ve afectada negativamente (N. Marconi et. al,2016). Sin embargo, en la India, el sector servicios ha surgido como el sector más grande y de rápido crecimiento desde el principio, y la contribución del sector manufacturero al crecimiento económico ha sido relativamente pequeña.

Diseño/metodología/enfoque: Para obtener el patrón de tamaño del sector manufacturero, los datos se analizaron mediante tabulación, cálculo de medias, coeficientes de variación, diagramas de barras y gráficos lineales a fin de ejemplificar una imagen clara. Para observar el impacto de la localización geográfica, los datos se dividieron en dos esquemas regionales, que se analizaron mediante la técnica de regresión de variables ficticias (ANOVA) y, por último, para poner de manifiesto si existe convergencia o divergencia entre los estados durante el periodo de tiempo mencionado, se aplicó la técnica de σ-convergencia y β-convergencia.

Conclusiones: Los resultados de σ - convergencia basados en el coeficiente de variación muestran claramente que el tamaño del sector manufacturero, en términos de ambos indicadores de tamaño, divergió entre los estados durante el período 1980-1981 a 2015-2016. Al menos, es seguro que no hubo convergencia en este periodo. Además, los resultados de la convergencia β basados en las tasas de crecimiento de los dos indicadores ofrecen conclusiones contradictorias. El valor de la producción bruta per cápita indicaba divergencia durante el periodo de referencia, pero el indicador de la cuota de PDE sugería convergencia durante el mismo periodo. Considerando conjuntamente la σ-convergencia y la β-convergencia, puede sugerirse que no indican ninguna tendencia a la convergencia en este período. Por lo tanto, el objetivo de este trabajo era analizar el cambio en el tamaño del sector manufacturero en los estados durante el período 1980-81 a 2015-16 sobre la base de dos indicadores: la participación del sector manufacturero en el SDP y el valor de la producción manufacturera bruta per cápita. El análisis reveló que el patrón cambió un poco durante este período. Algunos estados mejoraron su clasificación, como Gujarat y H.P., y la clasificación de algunos otros empeoró, como Maharashtra, Bihar, etc. El análisis también reveló que no había diferencias significativas en la cuota del SDP y en el valor de la producción bruta per cápita del sector manufacturero entre los estados costeros/no costeros y norte/sur. El análisis de la convergencia/divergencia entre los estados durante el periodo 1980-81/ 2015-16 reveló que no había convergencia sino una tendencia hacia la divergencia.

Implicaciones sociales, prácticas y de investigación: La investigación futura debería centrarse en reducir las disparidades entre los estados indios explorando otras variables importantes en el sector manufacturero. Puede ampliarse con el uso de análisis de datos de panel. Además, la implicación política sugerida para los estados rezagados fue identificar las advertencias y la aplicación de políticas para ellos debe hacerse a nivel nacional para impulsar el crecimiento general del sector manufacturero.

Palabras clave: Sector Manufacturero, Tamaño, Disparidades Interestatales, Análisis de Variables Ficticias, Convergencia B, Convergencia Σ.

INTRODUCTION

The Indian economic development pattern is not only unusual, but also rare, when one compares it to the economic development paths followed by other developing and developed countries. The countries such as Singapore, Taiwan, South Korea and China achieved economic growth by initially giving priority to the manufacturing sector. It was after producing tangible outputs and generating innovations in the manufacturing sector that in the above mentioned countries, the services sector emerged as the biggest and leading sector in economic growth. The economic literature also shows a strong correlation between the growth of the manufacturing output and the growth of GDP[C]. The growth of the manufacturing sector sucks labour resources from other sectors where disguised unemployment exist; which contributes to the growth of the capital employed in the industry, while the productivity of other sectors is not adversely affected[D.] In other words, a strong and growing manufacturing sector is necessary for economic growth and development. However, in India the services sector emerged as the biggest and fast growing sector in the very beginning, and the manufacturing sector's contribution to economic growth has been relatively small.

Many economists have expressed doubts regarding the sustainability of this type of 'service-led growth'. This is because of two reasons: firstly, the formal service sector activities such as banking, insurance, finance have relatively low employment intensities and cannot absorb a huge workforce especially in a densely populated country like India; secondly, employment in manufacturing requires mainly on the job training, but employment in the formal service requires at least a college-level education. Hence, if a country follows a strategy that relies mainly on services as the engine of growth it must provide a minimum specified years of education to enable workers to shift directly from agriculture to the service sector. This is not a feasible strategy for the existing adult workers in agriculture in India. This underlines the fact that the development trajectory of the Indian economy cannot escape the industrialization stage. Industrialization is important for a country not only to provide large scale employment, and but also to provide capital goods.

The sectoral composition of an economy is broadly classified in terms of agriculture, industry, and services. Manufacturing, a major sub-sector of industry, plays a vital role in

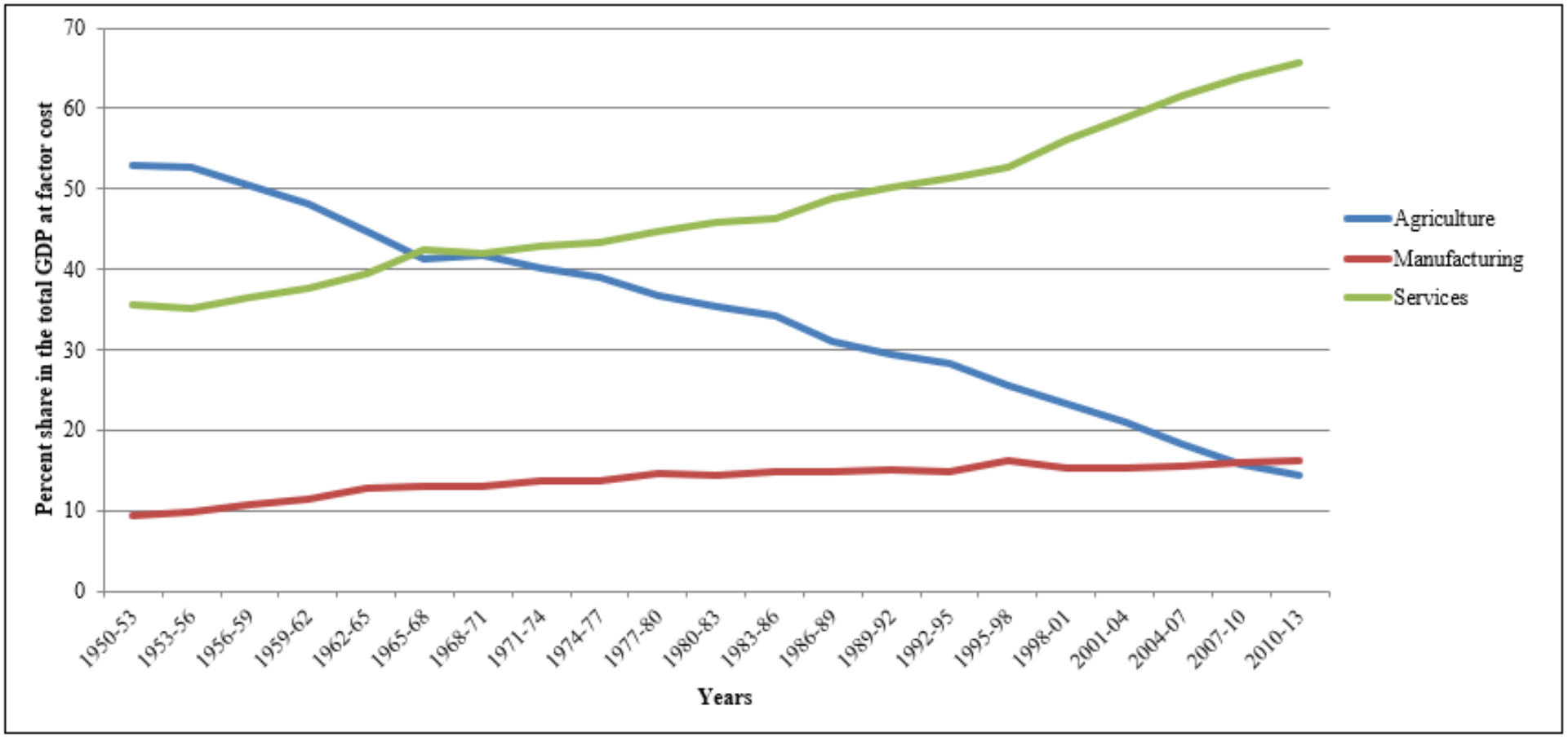
[C] *Thirlwall, A. P. (1983). A Plain Man's Guide to Kaldor's Growth Laws. Journal of Post Keynesian Economics, 5(3), 345–358. http://www.jstor.org/stable/4537750*
[D] *N. Marconi et. al, Manufacturing and Economic Development: The actuality of Kaldor's first and second Law, Structural Change and Economic Dynamics, Elsevier, 2016.*

the overall development of a country. However, in India with its contribution of approximately 15 per cent in gross domestic product (GDP), manufacturing is relegated to play a second-fiddle to the services sector that commands more than 60 per cent share in national GDP.

Attempts have been made to correct this anomaly and bring manufacturing at the forefront of economic development policies. The Central government brought the industrial policy into focus in the form of national manufacturing policy released by the government of India on November 4, 2011. This policy proposed to increase the share of manufacturing sector in GDP to 25 per cent and increase the absorption of labour to 150 million by 2022[E]. A more prominent focus on manufacturing by the Indian government has been witnessed since 25 September, 2014 when it launched its 'Make in India' initiative which aimed to make India a manufacturing hub by encouraging foreign companies to manufacture products in India. With the revival of these business sentiments and initiatives like 'Make in India' by the government, it is anticipated that the manufacturing sector will become the next growth engine of India. Thereby, it is evident that improving Indian manufacturing facilities is a key policy objective of the current Indian government wherein it estimates that manufacturing would grow at a rate 2-4 per cent higher than the aggregate economy and its share in GDP will be around 25 per cent by 2022[F].

[E] *National Manufacturing policy, annex to press note No. 2(2011 series), Department of Industrial Policy and Promotion, Government of India.*
[F] *Vijay Kumar Kaul, "India's diversity and Globalization: Unifying forces and Innovation", published by Emerging Economy Studies, Sage Publications, 2015.*

Graph 1: Shows the contribution of Agriculture and allied activities, Manufacturing and Services in the GDP (At factor cost)



Source: Central Statistics Office (CSO)

Graph 1 depicts that the share of the agriculture and allied activities in the GDP showed a downward trend (55 % to 15%) from 1950-53 to 2010-13, the manufacturing sector had a small share in GDP, which rose from about10% to 18 % by 2012-13. The Services sector was the biggest sector and it also showed a steep upward trend. Its share increased from 35% to 65% over the same period. The fast growth of services sector and its big share in GDP overshadowed the role of manufacturing sector in India's economic growth.

Owing to the enormous geographical, agro-climatic, social and political diversity of India, it is very unlikely that the size and development of manufacturing is similar if not the same across the states of India. Moreover, the role of manufacturing sector in the growth of state economies of India is more likely to be different from one another. It is, therefore, important to compare the size and growth of manufacturing sector in the major states of India. So, the main focus of this paper is to compare the size and growth of manufacturing sector across the major states of India. An attempt is also made to identify some important factors that explain the observed inter-state variations in the same.

RATIONALE OF THE STUDY/RESEARCH STATEMENT

This study plans to explore the pattern and determinants of the size of the manufacturing sector across the major Indian states from 1980-1981 to 2015-2016. The rationale for selecting this research topic is twofold; Firstly, that the historical timeline and empirical studies suggest that the manufacturing sector can be the potential driver of the Indian economy. In India many studies taking into account the manufacturing sector have been carried out, but not many comprehensive studies have examined this sector at a disaggregated state level. In other words, not many studies have been found pertaining to the interstate variations in the size and growth of the manufacturing sector, particularly for the recent post liberalization period. Moreover, most of the existing studies on manufacturing sector are largely descriptive in nature; not much econometric analysis has been done in these studies. The objective is to attempt a rigorous econometric analysis with the help of standard OLS regression to analyze the interstate variations in the growth and size of manufacturing sector across the major states of India.

Therefore, keeping in view these perspectives the following objectives have been formulated:

OBJECTIVES OF THE STUDY

1. To study and analyze the growth and pattern in the size of the manufacturing sector across the major states of India traversing from 1980-1981 to 2015-2016.
2. To analyze whether there is convergence or divergence among the various Indian states.

HYPOTHESES

To explore these objectives the following tentative hypothesis are used:

There are considerable interstate variations in the growth of the size of the manufacturing sector across the states since 1980-81to 2015-16.

1. There are considerable interstate variations in the size of the manufacturing sector from 1980-81 to 2015-16.
2. There is convergence in the growth of the manufacturing sector in India among the Indian states.

DATA AND METHODOLOGY

The proposed study is based on secondary data sources to attain the aforesaid objectives. All India and state wise data on the manufacturing sector is procured from the Annual Survey of Industries (ASI) conducted by the Central Statistical Office, Calcutta, Ministry of Statistics and Programme Implementation. The state domestic account data disaggregated sector wise form has also be used. The census of India, 2011 data has been used where relevant.

For the present study, as per the standard accepted practice in economics literature, 16 major states, over the time period 1980-81 to 2015-16, have been examined. The bifurcations of the states of Andhra Pradesh, Uttar Pradesh, Bihar and Madhya Pradesh forming Telangana, Uttarakhand, Jharkhand and Chhattisgarh respectively have been tackled by merging these states with the parent states. So, the sixteen states analyzed are in the form in which these existed in 1980-81. The north-eastern states, namely, Arunachal Pradesh, Mizoram, Manipur, Meghalaya and Tripura have been kept out of the purview. Lastly, the special status of state of Jammu and Kashmir has also not been included due to data unavailability.

To bring about the pattern of the size of the manufacturing sector the data has been analyzed by tabulation, calculating averages, coefficients of variations, bar diagrams and

line graphs so that a clear picture is exemplified. To look into the impact of geographical location the data has been divided into two regional schemes which have been analyzed using the dummy variable regression technique (ANOVA), and lastly to highlight if there exists convergence or divergence across the states over the aforementioned time period the technique of σ – convergence and β-convergence have been applied.

Data and Description of Variables

For computing the value of the gross manufacturing output per – capita data published by the Annual Survey of Industries under Ministry of Statistics and Programme Implementation (MOSPI) used, It provides data at two-digit level of classification of Industries:

1. Value of gross output per-capita =(Value of Manufacturing gross output in the state)/(Population of the state)

The percentage share of the manufacturing sector in domestic product of a state is the simple percentage share of this sector in state domestic product.

2. Percentage share of manufacturing in the state domestic product =(Manufacturing sector output in Rupees)/(State domestic product in Rupees) X 100

As can be seen that the value of these two variables (indicators) do not depend on the size of the state economy or on the size of the state population. These two indicate the size or extent of development of the manufacturing sector in a state.

The pattern of development of the size of the manufacturing sector across the sixteen major states is analyzed on the basis of point values at the four trienniums ending in 1982-83,1992-93,2002-03 and 2015-16. As the growth progresses over the years the major sixteen states of India tend to behave differently in the growth of their manufacturing sectors. Firstly, through the state domestic product originating in manufacturing sector as a proportion to the state domestic product. The values of this variable and the corresponding ranks of states which have been assigned for the four specified trienniums. These results are given in table 4.1and graphically displayed in graph 4.1that is for the early 1980s, early1990s, early 2000s and for the triennium ending 2015-2016 which is explained as follows in table 1.2.

On observing the percentage share of the manufacturing sector in the state domestic product across the four trienniums, it has been observed that for the first triennium the state

of Tamil Nadu secured the first rank with the highest percentage contribution in the manufacturing in SDP(27.92) followed by Maharashtra (21.95) and Orissa (18.24). In the second triennium the state of Orissa secured the first rank and maintained it's position across the next third triennium as well and thereafter this state depicted a significant decline by five ranks attaining the sixth rank in the last triennium. On analyzing the poor performers, it had been observed that the state of Bihar got the lowest rank in the last two decades namely the early 2000s and 2015-2016 and the state of Himachal Pradesh and Punjab ranked the lowest across the first two trienniums respectively. Moreover, looking at the state of Haryana and it's stationary ranking throughout the four decades, points out towards the stagnation in the growth of this state comparatively to the other states. Similarly, the states of Madhya Pradesh and Karnataka hovered about the same rank positions pointing out towards the similar pattern of slacked growth. Taking a composite view of the sixteen states, one finds that the share of the manufacturing sector in SDPin the following nine states declined from 1980-1981 to 2015-2016 period; Andhra Pradesh, Assam, Bihar, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu and West Bengal. On the other hand, the manufacturing sector's share in the SDP increased over this period in the following eight states; Gujarat, Haryana, Himachal Pradesh, Karnataka, Punjab, Rajasthan and Uttar Pradesh. Furthermore, taking a glance towards the mean share increased marginally over this period: from 12.9% in 1980-81 to 13.5% in 2015-16. The coefficient of variation declined slowly over the period; from 45.96% in 1980-81 to 42.36 % in 2015-16.The biggest increase in manufacturing sectors share in SDP is observed in the case Himachal Pradesh, from 4.23% in the 1980-81 to 24.81% in 2015-16, Punjab from 6.35% to 12.53% and Gujarat from 13.91% to 24.31 %. On the other, the biggest decline in the case of Tamil Nadu, from 27.92% in 1980-81 to 16.52% in 2015-16.

It may be mentioned that increase or decrease in the share of manufacturing sector in SDP of a state depends on its rate of growth compared to the others sectors of the state economy that is primary and tertiary sectors. If the manufacturing sector is growing at a slower rate than the other two sectors of the economy, then its share in SDP declines and reverse happens when is growing at higher rate than the other sectors of the state.

Table 1.1 Percentage share of manufacturing sector in state domestic product over the four trienniums from 1980-1981 to 2015-2016

States	Triennium 1		Triennium 2		Triennium 3		Triennium 4	
	Early 1980s		Early 1990s		Early 2000s		Early 2010s	
	Per cent Share	Rank	Per cent Share	Rank	Per cent Share	Rank	Per cent Share	Rank
Andhra Pradesh	8.99	13	12.85	8	12.57	8	8.07	14
Assam	13.60	7	12.35	10	10.75	13	10.04	11
Bihar	9.46	12	10.87	12	6.92	16	6.71	16
Gujarat	13.91	6	18.55	5	18.19	3	24.31	2
Haryana	14.41	4	19.14	4	19.61	4	17.50	4
Himachal Pradesh	4.23	16	8.95	15	17.65	6	24.81	1
Karnataka	13.92	5	18.23	6	15.66	7	14.31	7
Kerala	13.31	8	13.59	7	11.61	9	8.44	12
Madhya Pradesh	9.69	11	11.40	11	11.50	10	8.30	13
Maharashtra	21.95	2	23.09	2	18.08	4	18.60	3
Orissa	18.24	3	23.54	1	21.65	1	16.09	6
Punjab	6.35	15	8.86	16	9.39	14	12.53	8
Rajasthan	9.93	10	9.66	13	10.91	11	10.36	10
Tamil Nadu	27.92	1	22.96	3	18.00	5	16.52	5
Uttar Pradesh	8.85	14	12.81	9	10.89	12	12.07	9
West Bengal	11.16	9	9.18	14	8.90	15	7.57	15
Mean Share	12.90	-	14.80	-	13.90	-	13.50	-
Coefficient of Variation	45.96	-	36.13	-	32.04	-	42.36	-

Source: Author's own calculation using data from Annual Survey of Industries (2011-2012 base year)

The second parameter taken is the value of gross output per- capita in order to further understand the pattern of the size of the manufacturing sector over the span of thirty six years, sub classified into four trienniums. The results of the exercise are given in table 1.2.

The value of gross output per-capita which is calculated by dividing the value of gross output of registered manufacturing sector (in thousands) by the total population of the particular state is analyzed and the respective ranks,have been assigned to each of the state,on the basis ofperformance of each of the sixteen major states across the four trienniums. It may be noted that the state of Maharashtra has the highestvaluein the first triennium replaced by the state of Gujarat in the following three trienniums. The lowest

values per capita, states were:Assam and Bihar occupying the lowest ranks. It is also noteworthy to mention here that the state of Himachal Pradesh depicted a stellar performance relatively to the other states as it occupied the last rank in the first triennium and rose up to the second rank in the last triennium depicting a significant increase. The comparison of the value of gross manufacturing output per-capita of the sixteen states with all India average for the last triennium shows that the following states stand lower than the national average; Andhra Pradesh, Assam, Bihar, Kerala, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal. On the other hand,the following states stand higher than the national average; Gujarat, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Punjab and Tamil Nadu. A comparison of the ranking of states on this indicatorsin 1980-81 and 2015-16 shows that the following states improved their ranking among the sixteen states: Andhra Pradesh, Gujarat, Himachal Pradesh, Karnataka, Orissa and Rajasthan. On the other hand, the ranking of the following states worsened: Assam, Bihar, Kerala, Madhya Pradesh, Maharashtra, Punjab, Uttar Pradesh and West Bengal. The biggest improvement occurred in the case of Himachal Pradesh; from 16th rank in 1980-81 to 2ndrank in 2015-16. It may mentioned that the ranking of the states on this indicator changed over time due to the differences in their relative performance in the growth of the value of gross output of manufacturing sector per capita.

Table 1.2 Value of gross output per-capita for each of the state over the four trienniums from 1980-1981 to 2015-2016 (in thousands)

States	**Triennium 1**		**Triennium 2**		**Triennium 3**		**Triennium 4**	
	Early 1980s		**Early 1990s**		**Early 2000s**		**Early 2010s**	
	Per capita	**Rank**	**Per capita**	**Rank**	**Per capita**	**Rank**	**Per capita**	**Rank**
Andhra Pradesh	0.74	9	2.84	7	8.84	8	45.61	8
Assam	0.36	13	1.47	15	3.61	15	18.47	15
Bihar	0.43	14	1.27	16	2.52	16	11.49	16
Gujarat	2.52	2	7.46	1	29.45	1	186.46	1
Haryana	1.98	3	5.43	4	22.18	2	131.21	3
Himachal Pradesh	0.24	16	1.91	12	10.21	6	152.97	2
Karnataka	0.84	8	3.04	6	10.01	7	68.22	6
Kerala	0.90	7	2.53	8	8.03	9	36.68	9

Madhya Pradesh	0.58	10	2.27	9	5.78	10	27.35	14
Maharashtra	2.61	1	7.22	2	19.68	3	94.64	4
Orissa	0.44	15	1.82	13	3.69	14	28.87	11
Punjab	1.64	4	5.85	3	14.93	5	62.85	7
Rajasthan	0.48	12	1.96	11	5.42	12	30.28	10
Tamil Nadu	1.56	5	5.03	5	15.93	4	92.03	5
Uttar Pradesh	0.46	11	1.83	14	3.91	13	28.49	12
West Bengal	1.21	6	2.29	10	5.37	11	28.46	13
Mean Average	0.78	-	2.08	-	7.80	-	52.47	-
Coefficient of Variation	73.06	-	61.50	-	73.62	-	80.41	-

Source: Author's own calculation using Annual Survey of Industries data and Census data.

Comparing the ranking of sixteen states on these two indicators in the last triennium ending 2015-16 one finds that the ranking of the following states is almost the same on the two indicators: Bihar, Gujarat,Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan and Tamil Nadu. In the case of other states (Andhra Pradesh,Assam, Kerala,Orissa,Uttar Pradesh and West Bengal) the two indicators give quite different ranking i.e. the ranking of these states diverges considerably on these two indicators. The biggest divergence is observed in the case of Andhra Pradeshthat gets 14th rank on the basis of the share in SDP and 8th rank on the basis of value of gross output per capita.Similarly, Orissa gets 6th rank on the basis of SDP share and 11th rank on the basis of value of gross output per capita.

Variation in the Pattern of the Manufacturing Sector Across Regions

Many classical and neo- classical economists have listed out various factors causing differences across the states in the rate of growth of the manufacturing sector, be it climate or geographical location of the state, the thriftness of the people and capacity to work, the kind of institutions prevalent in each of the particular state etc. All these factors bring the changes in the manufacturing sector and subject to these differences emerge and may present intra- nationally (across the major states of India) in the size of the manufacturing sector. The geographical location, culture, religion, social values in India differ across different regions leading to variations among the states.So, it may be useful and important to compare the size of manufacturing sector between various regions of India.

To understand the pattern of the same the sixteen major Indian states have been classified into two regional schemes:

Regional scheme I: wherein the states have been divided into two sub-groups namely coastal and non- coastal states to bring about the variations in the pattern of the size of the manufacturing sector through the two important listed parameters.

Regional scheme II: wherein the states have been classified into northern (non- Dravidian) and southern states (Dravidian) to illustrate the impact of different linguistic and cultural patterns on each of the parameters that the percent SDP and value of gross output per-capita.

Description of the Dummy Variables Used Across the Two Regional Schemes to Bring About the Variations in Pattern of the Size of the Manufacturing Sector

The following dummy variables have been used as the independent variables to understand the impact of regional location of states on the size of the manufacturing sector as reflected by the percent share of SDP and value of gross output per-capita.

Dummy variable to analyze the impact of coastal and the non-coastal location ofstates

The sixteen Indian states have been classified into coastal and non- coastal states; The coastal states include Andhra Pradesh,Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu and West Bengal and the non- coastal states include Assam, Bihar, Haryana, Himachal Pradesh, Madhya Pradesh,Punjab, Rajasthan and Uttar Pradesh. The dummy variable takes value one for coastal states and value zero for the non- coastal states. The purpose of using this dummy variable is to find out as to whether the location of the coastal and non-coastal states impacts the dependent variables namely the percent SDP and value of gross output per- capita (determining the size of the manufacturing sector) significantly or not. The significant role of these dummy variables is brought about by the sign, size and the significance of these coefficients.

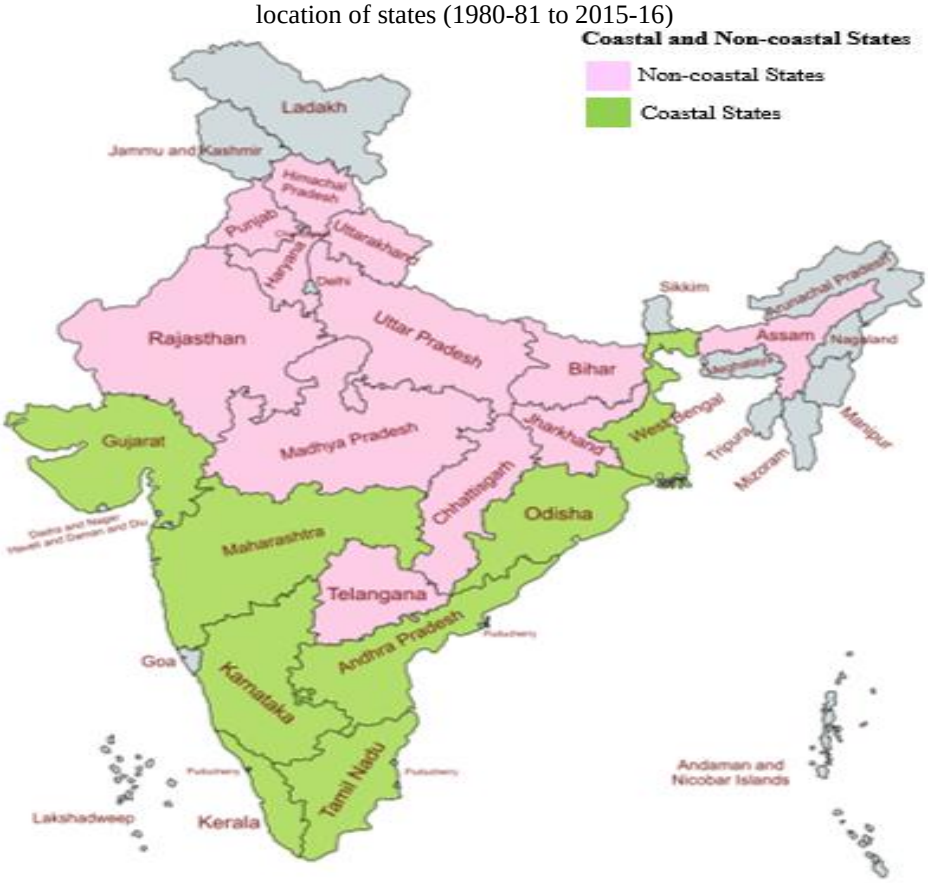
Dummy variable to understand the impact of northern and southern location of states:

To understand the pattern of the size of the manufacturing sector the sixteen major Indian states have been bifurcated into Northern and Southern regions respectively which is given as follows:

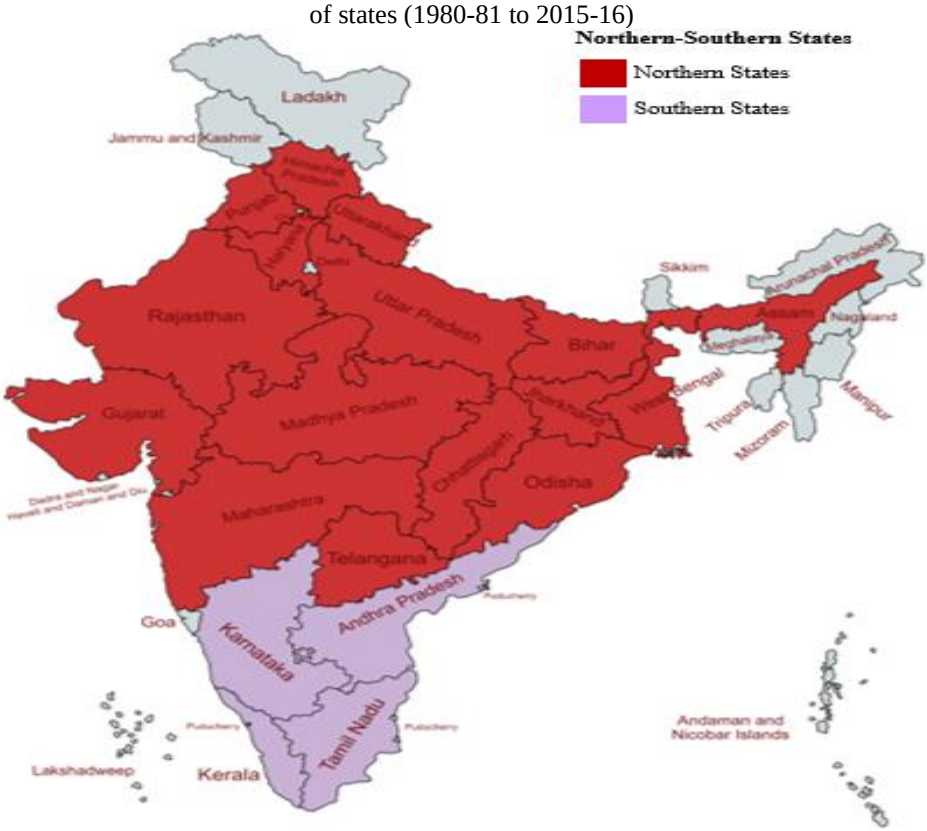
Northern Region: Haryana, Himachal Pradesh, Punjab, Madhya Pradesh and Uttar Pradesh, West Bengal, Assam, Bihar, Rajasthan, Maharashtra, Orissa and Gujarat.

Southern Region includes: Andhra Pradesh, Karnataka, Kerala and Tamil Nadu.

Map 1 Interstate variations in the pattern of the size of the manufacturing sector: Coastal and non-coastal location of states (1980-81 to 2015-16)



Map 2 Interstate variations in the pattern of the size of the manufacturing sector: Northern and southern location of states (1980-81 to 2015-16)



The dummy variable would take value one for the southern states and value zero for the northern states. The motive of using this dummy variable is to find out as to whether the locational and cultural differences among Southern and Northern states impact the dependent variables namely the percent SDP and value of gross output per- capita (determining the size of the manufacturing sector) significantly or not. The significant role of the dummy variable isbrought about by the size and the sign of the coefficients.

REGIONAL SCHEME I

To analyze the pattern of the size of the manufacturing sector across the coastal and the non-coastal states

In order to test as to whether the size of the manufacturing sector of the coastal states is impacted and is significantly different from that of the non-coastal states, the following dummy variable regression model has been estimated:

$$Y_i = a_1 + b_1 D_{4i} + u_i$$

Where, Y_{1i} = Percent share of SDP or value of gross output per-capita of the manufacturing sector for each of the sixteen states.
D_{4i} = Dummy variable takes value 0 for the non- coastal states and value 1 for the coastal states.
b_1 = Differential coefficient
u_i = Error term

The results of the mean share are presented in table 1.3(A) wherein a_1 represents the mean share of the non-coastal states and $(a_1 + b_1)$ for the coastal states respectively.

Table 1.3(A) Mean share of the manufacturing sector in SDP across the coastal and non-coastal states over the four trienniums

Decades	Mean share of coastal states	Mean share of non- coastal states
Triennium1	16.18	9.57
Triennium2	17.75	11.76
Triennium3	15.58	12.20
Triennium4	14.24	12.79

Note: From the regression equation $Y_i = a_1 + b_1 D_{4i} + u_i$

Table 1.3(A**)** depicts the mean share for the SDP of the manufacturing sector for the coastal and non- coastal states. The mean share for the coastal states came out to be higher than that for the non-coastal states across all the four trienniums, pointing out that the pattern of size of the manufacturing sector differs across the coastal and the landlocked states.In order to check if they are significantly different or not, their statistical significance is tested for across the

aforementioned bifurcation in the following table 1.3(B) with the help of the dummy variable regression model.

Table 1.3(B) Difference in the mean share of the manufacturing sector in SDP for the coastal and non- coastal states: Dummy variable regression
results for the four trienniums

Equation number	Share of the manufacturing sector SDP	Simple Intercept(a_1)	Differential Intercept(D_{4i})	R^2
1	**Triennium1**	9.56	6.61** (2.64)	0.33
2	**Triennium2**	11.75	5.99** (2.67)	0.34
3	**Triennium3**	12.20	3.38 (1.59)	0.15
4	**Triennium4**	12.79	1.45 (0.49)	0.02

Note:1. * signify that the variables are significant at 1% level of significance,** signify that the variables are significant at 5% level of significance.
2. Figures in the parentheses are the t-ratios of the estimates.
3. From the regression equation $Y_i = a_1 + b_1 D_{4i} + u_i$

The results presented in Table 1.3(B) clearly show that for the first two trienniums, namely 1980-1983 and 1990-1993, the differential intercept coefficient has a positive sign and is significant at five percent level of significance. It means in the early 1980's and early 1990's, the share of the manufacturing sector in the state domestic product of coastal states was significantly higher than that of the non-coastal states. For trienniums III and IV, however, the differential intercept coefficient is not significant even at ten percent level of significance. It means by 2002-2003 and 2013-2016 their was no significant difference in the share of the manufacturing sector in state domestic product of coastal and non-coastal states.

Table 1.4(A) Mean for the value of gross output per-capita (in thousands) of the manufacturing sector of the coastal and non- coastal states across the trienniums

Decades	Mean of Coastal states	Mean of Non- Coastal states
Triennium 1	1.40	0.80
Triennium 2	4.10	2.80
Triennium 3	12.70	8.60
Triennium 4	72.60	57.90

From the regression equation $Y_i = a_1 + b_1 D_{4i} + u_i$

Table 1.4 (A) depicts the meanvalue ofgross manufacturingoutput per-capita was higher across the coastal than the non-coastal states; for example for the last triennium it came out to

be 72.60 for the coastal states and 57.90 for the landlocked states . The pattern of size of manufacturing sectoris higher for the coastal states across all four trienniums. This difference is statistically significant or not is tested in the following table 1.4 (B) using the dummy variable regression model:

Table 1.4(B) Difference in the mean share of the manufacturing sector in the value of grossoutput per-capita for coastal and the non- coastal states for the trienniums

Value of grossoutput per-capita	Equation number	Intercept(a_1)	D_{4i}(Differential Intercept)	R^2
Triennium1	1	0.77	0.58 (1.57)	0.15
Triennium2	2	2.75	1.28 (1.25)	0.10
Triennium3	3	8.57	4.06 (1.04)	0.07
Triennium4	4	57.88	14.73 (0.59)	0.02

1. Figures in the parentheses are the t-ratios of the estimates.
2. From the regression equation $Y_i = a_1 + b_1 D_{4i} + u_i$

The results presented in table 1.4(B)show that the differential intercept coefficient is not significant even at ten percent level of significance in any of the four trienniums considered here. It means the value of the gross manufacturing output per capita did not differ significantlybetween coastal areas and non-coastal states in early 1980's and early 1990's or early 2000's or in the triennium ending in 2015-2016. It may be mentioned that the results in the case of these two indicators are not exactly on the same pattern , because of the state domestic product share indicates the condition of the whole manufacturing sector, but the value of gross output of per-capita indicate the condition of registeredmanufacturing sector.

REGIONAL SCHEME II

Analysis of the pattern of the size of the manufacturing sector across the northern and the southern states

The second regional scheme bifurcates the states into northern and southern states based on the geographical location and cultural and linguistic differences with a purpose to find out as to whether the percent SDP share and value of gross output per-capita indicators the pattern of the size of the manufacturing sector differ across these two divisions. The difference in the mean share across the two classifications are given in the following table 1.5(A) after estimating the following regression model:

$Y_i = a_2 + b_2 D_{5i} + u_i$

Where, $D_{5i} = 0$ for northern states
and $D_{5i} = 1$ for the Southern states

The dependent variable firstly considered is the SDP of the manufacturing sector and then the per capita value of gross output which basically would reflect the pattern of the structure of the manufacturing sector one by one.

a_2 = the intercept term (benchmark category)

b_2 = differential intercept term

Table 1.5(A) Meanshare of the SDP of the manufacturing sector across all the four trienniums for the northern and the southern states

Decades	Mean of northern states	Mean of southern states
Triennium1	11.82	16.04
Triennium2	14.03	16.91
Triennium3	13.70	14.46
Triennium4	14.07	11.84

From the regression equation $Y_i = a_2 + b_2 D_{5i} + u_i$

On observing table 1.5(A) it is clear that the mean share ofgross manufacturing output in SDP in the southern states came out to be higher than that for the northern states for the first three trienniums but lower in the last triennium. To find out whether the mean shareof manufacturing in SDP in southern and northern states are statistically different, the above given dummy variable regression was used and the results are reported in table 1.5(B).

Table 1.5(B) Difference in percentage mean share of state domestic product of the manufacturing sector for the northern and southern states

Equation number	Share of the manufacturing sector SDP	Simple Intercept(a_1)	Differential slope (D_{4i})	R^2
1	**Triennium1**	11.82	4.22 (1.26)	0.10
2	**Triennium2**	14.03	2.87 (0.93)	0.06
3	**Triennium3**	13.70	0.76 (0.29)	0.01
4	**Triennium4**	14.07	-2.24 (-0.66)	0.03

1 Figures in the parentheses are the t-ratios of the estimates.
2 From the regression equation $Y_i = a_2 + b_2 D_{5i} + u_i$

The results given in table 1.5(B) shows that the differential intercept coefficient for southern states is not statistically significant even at ten percent level of significance over any of the four trienniums. It means that the share of the manufacturing in SDP in southern and

northern states was not statistically significantly different throughout the 1980-1981 to 2015-2016 time period.

Table 1.6(A) Mean value of grossoutput per-capita across all the four trienniums for the northern and the southern states

Decades	Northern states	Southern states
Triennium1	1.08	1.01
Triennium2	3.39	3.36
Triennium3	10.56	10.70
Triennium4	66.80	60.64

From the regression equation $Y_i = a_2 + b_2 D_{5i} + u_i$

A careful look at table 1.6(A) shows that the mean value of gross manufacturing output per capita, was lower in the southern states in triennium I, II and IV, butwas higher in the southern states in triennium III. To test the statistical significance of these differences the above mentioned dummy variables regression model was used and the results are reported in table 1.6 (B).

Table 1.6(B) Difference in the mean value of manufacturing grossoutput per-capita of the southern and northern states

Equation number	Per- capita value of gross output	Simple Intercept(a_1)	Differential slope (D_{4i})	R^2
1	**Triennium1**	1.07	-0.07 (-0.15)	0.01
2	**Triennium2**	3.40	-0.04 (-0.03)	0.00
3	**Triennium3**	10.56	0.14 (0.03)	0.00
4	**Triennium4**	66.79	-6.16 (-0.20)	0.01

1. Figures in the parentheses are the t-ratios of the estimates.
2. From the regression equation $Y_i = a_2 + b_2 D_{5i} + u_i$

The results given in table 1.6(B) reveal that the differential intercept coefficient was not significant even at ten percent level for any of the four trienniums. It means that the mean value of gross manufacturing output per-capita did not differ significantly between the southern and northern states throughout the 1980-1981 to 2015-2016 time period.

To sum up the results based on both the indicators suggest that the size of manufacturing sector in southern and northern states did not differ significantly in any of the four trienniums considered here.

SECTION III

Testing for Convergence in the Manufacturing Sector Among the Sixteen Major States from 1980-1981 to 2015-2016

In this section the issue of convergence in the size of manufacturing sector among the sixteen major states over the period 1980-1981 to 2015-2016 is analyzed. For this purpose two methods are used,namely σ- convergence and β- convergence. The methodology used for this purpose is explained at the relevant places in this section.

σ-Convergence

σ-convergence is used here to evaluate the change inthe dispersion across the sixteen states in the pattern of the size of the manufacturing sector from 1980-1981 to 2015-2016, through the indicators used for size that are the value of gross output per-capita and the percent share of SDP. The sixteen major Indian states tend to depict the presence of σ-convergence if the dispersion among them reduces over the stipulated time period taken into consideration. To study the σ-convergence, first an overall trend has been portrayed by calculating the coefficient of variation across the sixteen major Indian states for the time period 1980-1981 to 2015-2016, for each of the dependent variables, namely the per-cent share of the SDP and the value of gross output per-capita. The coefficient of variation (table 1.7) of the share of manufacturing in SDP declined marginally from 1980-1981 to 1988-1989, rose in the next segment upto 1998-1999, again declined upto 2001-2002,and rose thereafter upto 2015-2016. Almost a similar pattern is observed in the behavior of coefficient of variation of value of gross output per-capita. So, on the basis of visual inspection it is not possible to say anything definitive about the trend in Coefficient of variation of these two indicators over the 1980-1981 to 2015-2016 period.

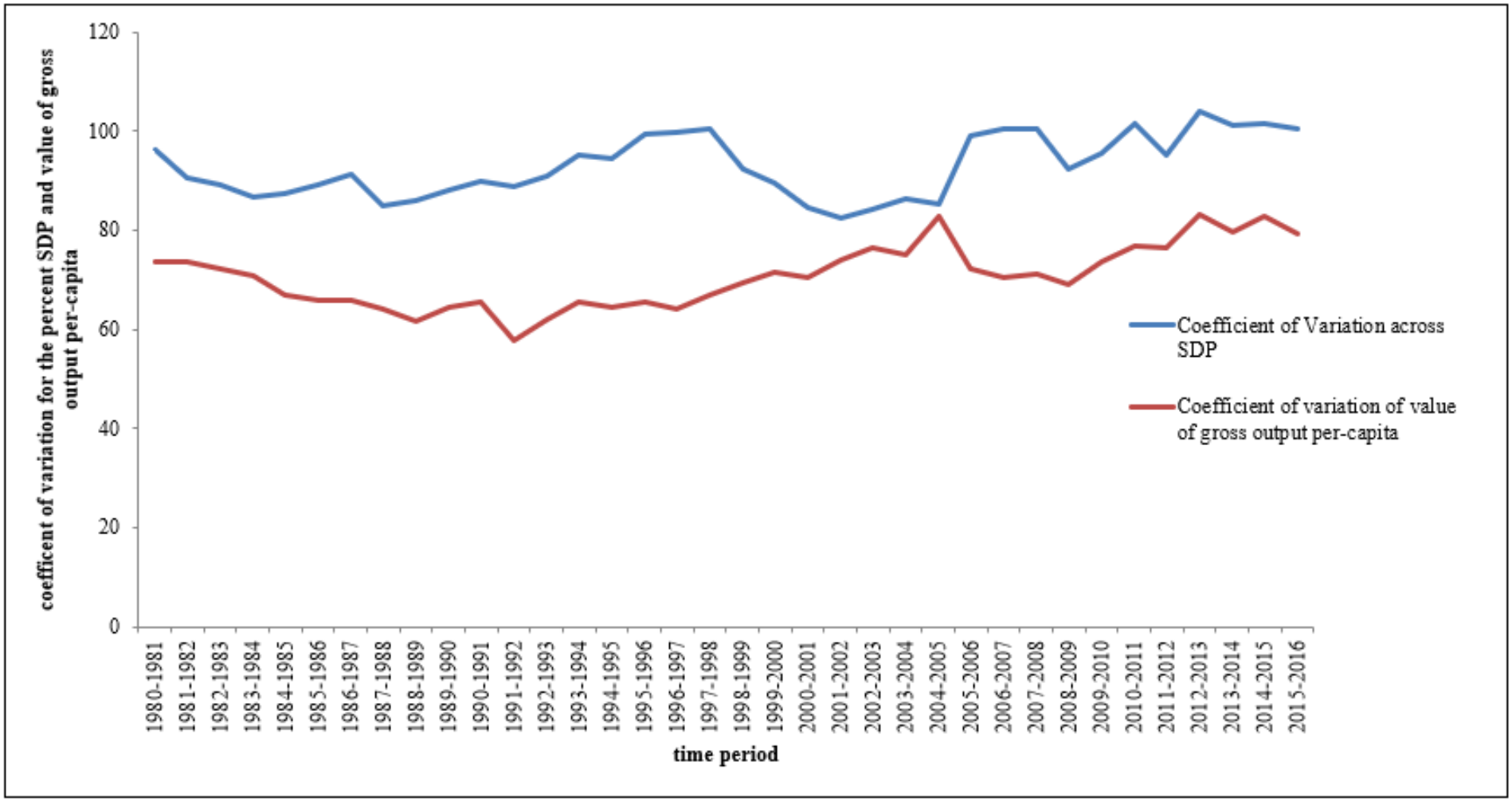
Table 1.7 Coefficient of variation ofState domestic product and the per – capita value of grossoutput

Years	Coefficient of variation across	
	SDP share	Value ofgross output per-capita
1980-1981	96.36	73.52
1981-1982	90.71	73.75
1982-1983	89.28	72.33
1983-1984	86.70	70.66
1984-1985	87.26	67.00
1985-1986	89.15	65.77
1986-1987	91.33	65.92
1987-1988	84.89	64.12
1988-1989	85.83	61.73
1989-1990	88.24	64.45
1990-1991	89.73	65.39
1991-1992	88.75	57.76

Years	Coefficient of variation across	
	SDP share	Value ofgross output per-capita
1992-1993	90.96	61.90
1993-1994	95.13	65.43
1994-1995	94.30	64.47
1995-1996	99.40	65.57
1996-1997	99.80	64.25
1997-1998	100.60	67.01
1998-1999	92.30	69.39
1999-2000	89.50	71.46
2000-2001	84.60	70.47
2001-2002	82.50	73.87
2002-2003	84.30	76.27
2003-2004	86.40	74.94
2004-2005	85.40	82.61
2005-2006	99.10	72.26
2006-2007	100.40	70.49
2007-2008	100.50	71.05
2008-2009	92.40	69.09
2009-2010	95.60	73.50
2010-2011	101.50	76.88
2011-2012	95.30	76.54
2012-2013	103.90	83.16
2013-2014	101.20	79.54
2014-2015	101.40	82.64
2015-2016	100.60	79.22

Source: Author's own calculation using data from Annual Survey of Industries (2011-2012 base year)

Graph 3 Graphical presentation of the coefficient of variation of the SDP and the per-capita value of grossoutput of the manufacturing sector



After calculating the coefficient of variations over for each time period and analyzing the pattern graphically, a trend line is fitted on the per-cent share of the state domestic product and for the value of gross output per- capita across the sixteen major Indian states for the stipulated time period initiating from 1980-1981 to 2015-2016. The slope coefficients are analyzed; wherein a inverse relationship or a negative slope coefficient would illustrate convergence across states and a direct relationship or positive slope coefficient would signal divergence among the states. The slope coefficients have been calculated using the following regression model.

$C.V = a_1 + b_1 T$

Where, C.V = Coefficient of variations of the percent share of SDP of the manufacturing sector and the value of gross output per-capita across the sixteen major Indian states (Dependent variable)
a_1= Intercept term, b_1= Slope Coefficient for time
T = Time period (1980-81 to 2015-16)

The result of this regression exercise is given in table 1.8 andthe slope coefficient indicate trend over 1980-1981 to 2015-2016 In both the equations it hasa positive sign and is significant at one percent level of significance. It means that coefficient of variation of both SDP share and value of gross output per-capita increased over the time period; that means divergence rather than convergence occurred. The result given in table 1.8 strongly suggests that over the 1980-1981 to 2015-2016 periodat least convergence in the size of the manufacturing sector did not occur.

Table 1.8 Estimated linear trend equations for the coefficient of variations of the per-capita value of gross output and SDP of the manufacturing sector across the sixteen major Indian states, 1980-1981 to 2015-2016

Dependent Variables	Intercept(a_1)	Slope Coefficient (b_1)	R^2
Coefficient of variation of the value of gross output per-capita	63.65* (37.60)	0.38* (4.77)	0.40
Coefficient of variation of the percent share of SDP	87.23* (47.38)	0.31* (3.55)	0.28

Note:1. * signify that the variables are significant at 1% level of significance,** signify that the variables are significant at 5% level of significance.
2. Figures in the parentheses are the t-ratios of the estimates.
3. From the regression equation $C.V = a_1 + b_1 T$

β – CONVERGENCE

To further explore the issue of convergence, β- convergence method is used to find out whether the trend in the value of two indicators of size of the manufacturing sector are positively or inversely related to their respective initial size in 1980-1981.

The methodology to calculate β-convergence in illustrated in the following regression model:

Regression Equation

$$Y\_t = \alpha + \beta t$$

Where, $\mathbf{Y_t}$ = Value of gross output per-capita, and percentage share of the SDP (Dependent Variable)
α = Intercept and β = Slope coefficient
t = Time consisting for thirty six years from 1980-1981 to 2015-2016 (Independent Variable)
The trend coefficients (β's) so obtained for each of the sixteen states are then regressed on time using the following regression model:

$$\beta_t = a + c\, X_{1980\text{-}1981}$$

Where β_t= Value of the trend coefficient of each of the sixteen states, $X_{1980\text{-}1981}$ = Value of each of the two indicators of size for respective states in the initial year 1980-1981.

The results of these two exercises are reported in table 1.9 and table 1.10.

All the estimated trend coefficients given in table 1.9 were regressed on the initial value of 1980-1981 for each of the variable namely the value of gross output per-capita, absolute SDP and percent SDP of the manufacturing sector. The slope coefficients so obtained, reflecting the occurrence of either convergence or divergence across the sixteen major Indian states depending upon the sign, size and the significance of these coefficients, are depicted in the table 1.10. For the value of gross output per-capita a positive and significant slope coefficient has been obtained, signaling divergence across the states in terms of size of manufacturing sector.

Table 1.9 Trend coefficients across the states for the value of gross output per-capita, SDP in absolute terms and percent share of SDP from 1980-1981 to 2015-2016

Dependent Variables	**Value of gross output per-capita**			**Percent share State Domestic Product**		
States	**Intercept (α)**	**Trend coefficient (β)**	**R^2**	**Intercept(α)**	**Trend coefficient (β)**	**R^2**
Andhra Pradesh	-9.04* (-3.91)	1.15* (10.59)	0.74	11.62* (15.84)	-0.01 (-0.02)	0.00
Assam	-3.48* (-4.51)	0.48* (13.17)	0.86	14.27* (34.30)	-0.13* (-6.62)	0.56
Bihar	-1.94* (-3.78)	0.29* (12.26)	0.82	11.45* (18.06)	-0.17* (-5.67)	0.49
Gujarat	-40.89* (-4.10)	4.73* (10.08)	0.75	13.42* (10.10)	0.26* (4.19)	0.34
Haryana	-26.76* (-4.07)	3.15* (10.16)	0.75	18.15* (27.78)	0.02 (0.60)	0.01
Himachal Pradesh	-37.06*	3.68*	0.64	2.52*	0.62*	0.94

Dependent Variables	Value of gross output per-capita			Percent share State Domestic Product		
States	Intercept (α)	Trend coefficient (β)	R^2	Intercept(α)	Trend coefficient (β)	R^2
	(-3.74)	(7.88)		(4.46)	(23.28)	
Karnataka	-14.99* (-4.27)	1.75* (10.56)	0.76	16.12* (29.38)	0.01 (0.05)	0.00
Kerala	-8.16* (-3.66)	1.05* (9.89)	0.74	14.75* (36.80)	-0.16* (-8.52)	0.68
Madhya Pradesh	-5.17* (-4.13)	0.71* (12.09)	0.87	10.91* (17.53)	-0.01 (-0.12)	0.l0
Maharashtra	-18.40* (-4.23)	2.50* (12.20)	0.89	23.55* (45.11)	-0.13* (-5.13)	0.46
Orissa	-6.28* (-3.79)	0.74* (9.49)	0.73	20.86* (9.50)	0.08 (0.77)	0.02
Punjab	-11.85* (-4.19)	1.69* (12.64)	0.86	6.40* (26.27)	0.17* (15.08)	0.87
Rajasthan	-5.93* (-3.91)	0.75* (10.4)	0.76	10.08* (26.65)	0.03 (1.57)	0.07
Tamil Nadu	-19.29* (-4.06)	2.36* (10.56)	0.77	28.14* (49.26)	-0.36* (-13.33)	0.84
Uttar Pradesh	-5.59* (-3.79)	0.69* (9.87)	0.74	11.35* (21.85)	0.02 (0.73)	0.02
West Bengal	-5.34* (-3.59)	0.73* (10.39)	0.76	10.49* (56.78)	-0.07* (-8.31)	0.67

Note: 1. * signify that the variables are significant at 1% level of significance,** signify that the variables are significant at 5% level of significance.

2. Figures in the parentheses are the t-ratios of the estimates.

Table 1.10 Regression results for testing for convergence or divergence across the percentage share of the SDP of the manufacturing sector and the value of gross output per-capita

Dependent Variables	Intercept (a)	Slope(*c*)	R^2
Value of gross output per-capita	0.54 (1.20)	1.24* (3.04)	0.39
Percent share SDP	0.25** (2.39)	-0.02** (-2.55)	0.28

Note: 1.* signify that the variables are significant at 1% level of significance,** signify that the variables are significant at 5% level of significance.

2. Figures in the parentheses ate the t-ratios of the estimates.

3. From the regression equation $\check{\beta} = a + c\, X_{1980\text{-}1981}$

It may be seen that for the percent share of the SDP a negative and significant slope coefficient has been obtained signaling β-convergence across the states. This result suggests that the states that had a higher share of manufacturing sector in SDP in 1980-81, experienced a slower growth of this share over 1980-81. And the reverse happened in the case of states that had a lower share of manufacturing sector in SDP in 1980-81.

The two indicators of the size of manufacturing sector, therefore, give opposite results. Whereas the value of gross output per-capita indicator shows a significant trend to divergence

among sixteen states over 1980-1981 to 2015-2016 time period, the SDP share indicator shows a tendency towards convergence over the period. One reason for the difference in the results of the two indicators can be that SDP share takes into account both registered, as well as, unregistered manufacturing, but value of gross output per-capita is of registered manufacturing only. The conflicting results of the two indicators suggest the need for further research in this matter, which of course, cannot be undertaken here for obvious reason. It is possible that gross manufacturing output as a whole (registered plus unregistered) grew in the sixteen states in a pattern that resulted in convergence, as shown by SDP share indicator. But, the value of gross output per capita changed in pattern across these states that indicates divergence in the growth of registered manufacturing sector across the states.

CONCLUSIONS AND POLICY IMPLICATIONS

The conclusion and policy implication of this section now are summed up: The results of σ – convergence based on coefficient of variation clearly show that the size of manufacturing sector, in terms of both the indicators of size, diverged among states over 1980-1981 to 2015-2016 period. At least it is sure that no convergence occurred over this period. Furthermore, the results of the β-convergence based on growth rates of the two indicators give conflicting conclusions. The value of gross output per-capita indicated divergence over the reference period; but SDP share indicator suggested convergence over the same period. Taking both σ-convergence and β-convergence together, one may suggest that these do not indicate to any tendency towards convergence over this period. Therefore the objective of this paper was to analyse the change in the size of manufacturing sector across the states over the 1980-81 /2015-16 period on the basis of two indicators; share of manufacturing sector in SDP and value of gross manufacturing output per capita. The analysis revealed that the pattern changed somewhat over this period. Some states improved their ranking e.g. Gujarat and H.P. and ranking of some others worsened e.g. Maharashtra, Bihar etc. The analysis also revealed that there was no significant difference in the SDP share and value of gross output per capita of manufacturing sector between coastal / non coastal and northern/southern states. The analysis of convergence / divergence across the states over the 1980-81/ 2015-16 revealed that convergence did not occur; rather there was some tendency towards divergence.

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