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STRUCTURAL CHANGES IN THE STATE ECONOMY OF GUJARAT

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ABSTRACT

Gujarat is an important partner in the economic and social development of India. It is the seventh largest state of India in terms of area and ninth largest in terms of population. With a population of about 5% of India's total population, Gujarat contributes 8.3% to India's GDP and 33% of India's total merchandise exports. The present paper makes an analytical study of this important journey of structural change in the state of Gujarat during 1987-88 to 2021-22 and attempts to understand how the share of production of primary, secondary and tertiary sectors in the GDP and employment of the state has changed and based on the data of changes in these shares, two indices of structural change, Norm of Absolute Value Index and Modified Lilien Index, have been calculated to measure the structural change that has taken place in the state economy of Gujarat. The current study of structural changes in the economy of Gujarat in the present paper clearly shows that there is a decline of about 21% points in the share of primary sector in GSDP during the study period, while the contribution of secondary and tertiary sector represents an increase of 18% points and 3% points respectively in 1984-85 to 2021-22. On the basis of the above data, by computing the Norm of Absolute Value Index and Modified Lilien Index of structural change and performing a t-test on their 5-year moving average, both the indices prove the occurrence of structural change in the economy. Likewise the employment share of primary sector had decreased by 17.4 percentage points while that of secondary and tertiary sectors shares had increased by 8.7 and 8.6 percentage points respectively during 1987-88 to 2021-22. Similar results are shown by t test on the two structural change indices calculated for employment as well. Hence, it is concluded that significant structural changes have taken place in both output and employment in the economy of Gujarat during the above period.

INTRODUCTION

Gujarat is the seventh largest state of India in terms of area and ninth largest in terms of population. The area of Gujarat is 1,96,244 square kilometers and according to the 2011 census, its population was 6,04,39,692 people. Thus, Gujarat is an important partner in the economic and social development of India. According to the data released by the Reserve Bank of India, the Gujarat has overtaken Maharashtra to become the largest manufacturing state in India with a gross value added of Rs. 5.11 lakh crore in the manufacturing sector in the financial year 2019-20.

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With a population of about 5% of India's total population, Gujarat contributes 8.3% to India's GDP and 33% of India's total merchandise exports. Along with this, the state government of Gujarat has set a target of taking the state's economy to the level of Rs. 500 million by 2026-27.

How has the state of Gujarat changed the structure of its production since 1987-88 to 2021-22 and what changes have been observed in the share of primary, secondary and tertiary sectors in it, i.e. what structural changes have been experienced in the economy of Gujarat? This fact has been studied in the presented research paper. Changes in the distribution of production among the primary, secondary and tertiary sectors not only indicate structural changes in the economy of the state but also reflect the economic development of the state when the means of production move from the primary sector to the secondary and tertiary sectors. . Due to this

transfer of means of production, structural changes are also observed in the quantity of goods available in the economy, i.e. primary sector production like grains, oilseeds, cotton etc. is replaced by machine tools, textiles and manufactured goods. There is increase in supply of chemicals, means of transport, communication equipment, capital goods, scientific instruments and various services like scientific, educational, medical, financial, insurance, transport and communication etc. All the above changes are essentially fundamental changes for human development, which not only provide new and better income generating employment opportunities to the population but also provide a wide and diverse consumption bundle of goods for consumption. Ultimately the result of this entire change is seen in the form of better human life.

The present paper makes an analytical study of this important journey of structural change in the state of Gujarat during the above period and attempts to understand how the GDP shares as well as employment distribution of primary, secondary and tertiary sectors in the state economy have changed and based on the data of changes in these shares, two structural change indices- Norm of Absolute Value Index and Modified Lilien Index, have been calculated to measure the structural change that has taken place in the state economy of Gujarat.

REVIEW OF LITERATURE

Bagchi et al (2005) studied the structural change and growth in the economy of Gujarat during 1970–71 to 2000–01 and found that organized sector employment did not increase in the 1990s. Also, employment in the primary sector, especially the agricultural sector, remained stagnant or saw a decline. In contrast, the secondary and tertiary sectors achieved significant and high growth rates throughout the study period. During the study period, growth rates varied across sectors and the state's economy witnessed unbalanced and volatile growth.

Dixit (2009), while studying economic growth and non-agricultural employment in Gujarat, found that while there is a continuous decline in employment in the agricultural sector at the all-India level, on the contrary, employment in the agricultural sector remains stable in the state of Gujarat. According to her, employment related decisions at the household level are income-dependent. She concluded that while in the lower income group, diversification of employment is determined by inadequate means of agricultural production, whereas in the higher income group, the diversification of employment is determined by the ownership of non-agricultural assets and higher education level.

Cortuk and Singh (2010) studied structural change and economic growth in India for the period 1951–2007. They found no significant relationship between economic growth and structural change for the entire period sample. But when the entire study period was divided into two parts, a significant positive relationship was observed between economic growth and structural change for the period 1988-2007.

According to Thind and Singh (2018), the contribution of service sector in the economy of Gujarat was 44% in the year 2002-03, which increased to 57% in the year 2014-15. In contrast, during the same period, the contribution of agriculture and allied activities declined from 28% to 18% and the share of manufacturing declined from 17% to 8%. The Norm of Absolute Value Index for Gujarat was calculated as 0.180 for the year 1980-81 to 2014-15 and the value of the said index for the year 1993-94 to 2014-15 was 0.045.

Sanyal and Singh (2020) studied structural change and economic growth in relation to Punjab and found that structural change has promoted economic growth. It had also been observed that structural changes induced by economic growth also occur in the economy- which create a positive feedback loop in the economy. The authors noticed that the value of index of structural change for Punjab is lower than other states of India like Gujarat etc. and the Productivity Change Decomposition methodology also confirms relatively less structural change in Punjab compared to other states of India.

METHODOLOGY AND DATA

In the present research paper, structural changes in the economy have been studied using the concept of three sectors i.e. primary, secondary and tertiary sectors. The data of percentage shares of primary, secondary and tertiary sector out of Net State Domestic Product at Constant Prices for Gujarat state economy has been calculated from the data released by the Directorate of Economics and Statistics, Government of Gujarat, Gandhinagar in its report NO. DES/2018-19/8-Compendium of Selected Indicators Gujarat State (1960-61 to 2016-17) August 2018 and Socio-Economic Review 2023-24, Gujarat State. The definitions of primary, secondary and tertiary sectors are accepted as-it-is as by national accounts division in India for output analysis and as by National Statistical Office previously NSSO for employment analysis. Using the above data, two indices of structural change namely, Norm of Absolute Value Index and Modified Lilien Index, has been calculated as per the formula given by Dietrich (2012) and their obtained values have been examined for occurrence of structural changes using t test. Kolmogorov-Smirnov test and Shapiro-Wilk test have been used to test normality of the data.

Since the original values of Norm of Absolute Value Index and Modified Lilien Index were not normally distributed, so for data transformation, 5-year moving averages of the above index values were computed and based on the data of the 5-year moving average thus obtained, structural changes in the economy have been examined using t test. The null hypothesis that the value of the index of structural change in the economy is not different from zero has been tested by calculating the probability of the calculated t statistic using 5% level of significance and one tailed t test. The alternative hypothesis used states that the value of the index of structural change is greater than zero. Formula for Norm of Absolute Value (NAV) was as follow-

$$NAV_{s,t} = 0.5 \sum_{i=1}^{n} \left| x_{[it]} - x_{[is]} \right|$$

Where x_{it} is the share of the sector $i= 1,2,3,4…n$ at time $s= 1,2,3,4…n$ and $t=2,3,4…t$. Formula for Modified Lilien Index (MLI) is as follows –

$$MLI_{s,t} = \sqrt{\sum_{i=1}^{n} x_{[is]} \cdot x_{[it]} \cdot \left(ln \frac{x_{[it]}}{x_{[is]}} \right)^2}$$

Where x_{it} is the share of the sector $i= 1,2,3,4…n$ and at time $s= 1,2,3,4…n$ and $t=2,3,4…t$ Likewise, formula for t statistic used is

$$t = \frac{x-\mu}{(s/\sqrt{n})}$$

where μ is hypothesized mean taken as zero; s is standard deviation calculated from sample and n is the number of observations.

Data on workers employed in the three sectors in Gujarat has been obtained from the reports of socio-economic surveys on employment and unemployment conducted by National Statistical Office (NSO) and published in NSS Survey report Survekshana special number report on 43rd round, 381, 386, 397, 400, 422, 455, 481,490, 515, 522, 531, KI 66/10 and 554, PLFS Annual Survey Reports 2017-18, 2018-19, 2019-20, 2020-21 and 2021-22. Most of the surveys on employment and unemployment conducted by NSO had the reference period of July to June and some surveys had the reference period of January to December. Similarly, in the reports published by NSO, the data of working labour in the three sectors were presented in the ratio of per thousand separately for males and females on the basis of rural and urban areas. For estimating the working labour in the three sectors at state level, it was necessary to sum per thousand data of rural and urban areas for males and females.

In order to add this disaggregated data to get state level data, an estimate of population was required. Keeping in view the above requirement, the projected populations of Gujarat has been estimated for different survey periods as per the procedure adopted by NSO. Population estimation for the period between 1981 and 2001 has been done using the data published in the Report of the Expert Committee on Population Projections Census of India 1981, and for population estimation for the period of 2001 to 2011, the data presented in the Report of the Technical Group on Population Projections 2006 has been used. Likewise for population estimation for the survey years after 2011, the data published in the Report of the Technical Group on Population Projections July 2020 were utilized. The interpolation method used by the NSO for the estimation of population at the midpoint of the survey period was adopted without any change. On the basis of the population data thus obtained, the number of workers employed in the primary, secondary and tertiary sectors at the state level were estimated.

Hypothesis

- H_0 SCI = 0

That is, there has been no structural change in the economy both in Output and Employment

- H_a SCI > 0

That is there has been a structural change in the economy both in Output and Employment

RESULT DISCUSSION AND ANALYSIS

- **Structural changes in Output distribution in Gujarat**

Structural changes in production and employment, rapid capital formation and technological progress are essential for rapid economic development in any economy. Structural changes in employment mainly refer to the changes in the distribution of the economy's workforce i.e. workers in the primary, secondary and tertiary sectors with time and economic development. Generally, with economic development or economic growth, the share of labour employed in the primary sector in an economy decreases and the share of labour employed in the secondary and tertiary sectors increases. Especially in backward and underdeveloped economies, the total production volume is relatively low due to the old production technology in the primary sector and that's why the productivity i.e. the production volume per unit quantity of productive factors is quite low. Compared to the primary sector, capital equipments are used in relatively more quantity in the secondary sector and tertiary sector i.e. their technologies are more advanced than that of the primary sector and due to this, the production volume per unit quantity of productive factors i.e. productivity is generally higher than that of the primary sector.

In such a situation, when the resources of production are removed from the primary sector and transferred to the secondary and tertiary sectors, the total production volume in the overall economy increases and this in turn increases the national income and productivity of the economy. Because the movement of labor force from the primary sector to the secondary and tertiary sectors is a booster for economic development in an economy, therefore, to understand the process of economic development of an economy and to accelerate it, it becomes essential to study the structural changes.

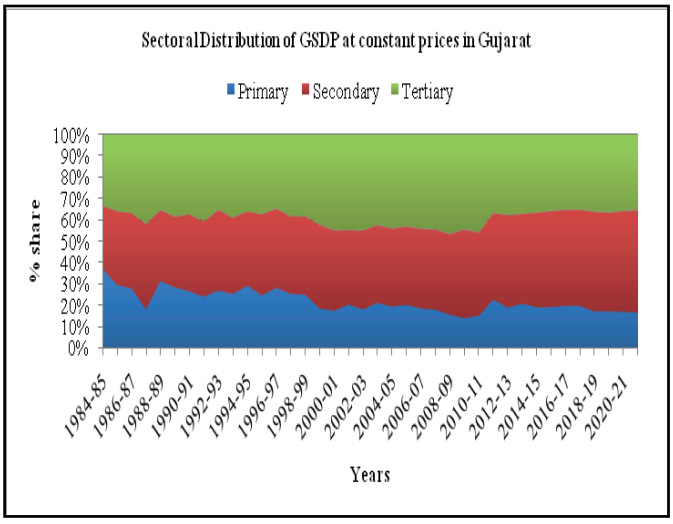
The shares of primary, secondary and tertiary sectors in the Gross State Domestic Product (GSDP) at constant prices in the state of Gujarat has been analyzed during the years 1984-85 to 2021-22. This analysis indicates that the share of primary sector was 37.23% in the year 1984-85, which decreased to 18.28% in the year 1987-88, but due to the tremendous growth in agricultural production, the contribution of the primary sector again increased to 31.50% in the year 1988-89. After that, it declined with some fluctuations in the 1990s to 18.62% in the year 1999-2000. In the coming years, the contribution of agriculture sector continuously decreased to 14.06% in 2009-10 and then with some increase it remained at 19.80% in the year 2017-18 but after that the contribution of primary sector

became stable in the range of 16-18 percent.

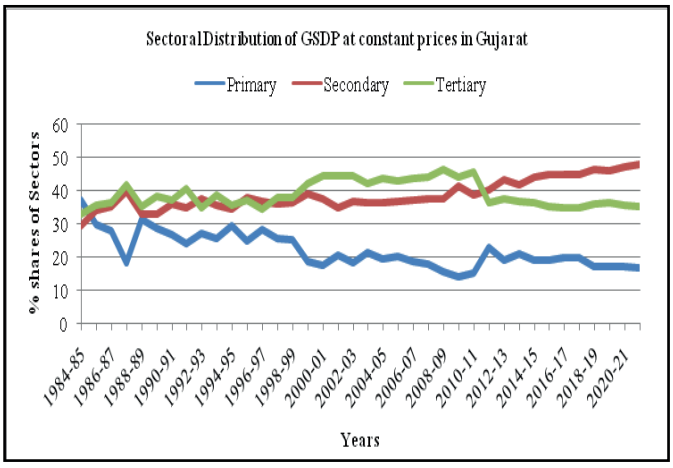
Table 1 Structural Changes in Output (GSDP) composition of three sectors in Gujarat

		Percentage shares of GSDP at constant prices						
Base year	**Year**	**Primary**	**Secondary**	**Tertiary**	**NAV (Norm of Absolute Value)**	**5 Yr Moving Average NAV**	**MLI**	**5 Yr Moving Average MLI**
1980-81	1984-85	37.23	29.63	33.14	-	-	-	-
	1985-86	29.76	34.44	35.81	7.478	-	9.268	-
	1986-87	28.02	35.39	36.59	1.730	-	2.123	-
	1987-88	18.28	39.88	41.84	9.744	7.0395	11.884	8.7076
	1988-89	31.50	33.23	35.27	13.224	6.1354	16.057	7.5879
	1989-90	28.58	33.13	38.29	3.022	6.4756	4.207	8.0329
	1990-91	26.68	36.09	37.24	2.957	5.6414	3.670	7.0206
	1991-92	24.17	35.16	40.67	3.432	3.7324	4.347	4.7124
	1992-93	27.07	37.83	35.09	5.573	3.9085	6.822	4.8677
1993-94	1993-94	25.46	35.77	38.77	3.679	4.2291	4.516	5.2764
	1994-95	29.36	34.82	35.81	3.902	4.2393	4.984	5.2940
	1995-96	24.80	37.97	37.23	4.560	3.8239	5.713	4.8304
	1996-97	28.28	37.10	34.62	3.483	3.1747	4.436	4.0432
	1997-98	25.54	36.34	38.12	3.496	3.6926	4.504	4.6467
	1998-99	25.11	36.72	38.17	0.433	3.2935	0.580	4.1351
1999-00	1999-00	18.62	39.21	42.17	6.491	3.1863	8.001	4.0715
	2000-01	17.55	37.72	44.73	2.565	2.9482	3.155	3.8152
	2001-02	20.49	34.84	44.67	2.947	3.4807	4.118	4.5015
	2002-03	18.19	37.09	44.72	2.305	2.5320	3.223	3.3863
	2003-04	21.28	36.48	42.24	3.096	2.2253	4.011	3.0172
2004-05	2004-05	19.54	36.54	43.92	1.748	1.9693	2.425	2.6072
	2005-06	20.30	36.82	42.89	1.031	1.6263	1.309	2.1100
	2006-07	18.63	37.41	43.96	1.667	1.4696	2.068	1.9358
	2007-08	18.04	37.61	44.35	0.591	1.8839	0.737	2.3885
	2008-09	15.73	37.80	46.47	2.312	2.1981	3.140	2.7654
	2009-10	14.06	41.62	44.31	3.819	3.6757	4.689	4.7241
	2010-11	15.21	39.02	45.77	2.602	4.3127	3.194	5.5499
2011-12	2011-12	22.81	40.48	36.71	9.055	4.2323	11.861	5.4075
	2012-13	19.03	43.45	37.52	3.776	3.9171	4.865	5.0405
	2013-14	20.94	42.03	37.03	1.909	3.5705	2.427	4.6449
	2014-15	19.27	44.27	36.46	2.243	1.8940	2.854	2.4404
	2015-16	19.25	45.14	35.61	0.869	1.1792	1.217	1.5173
	2016-17	19.92	44.92	35.16	0.672	1.3206	0.838	1.6795
	2017-18	19.80	45.12	35.08	0.202	0.9580	0.250	1.2219
	2018-19	17.18	46.77	36.05	2.616	0.9566	3.238	1.2034
	2019-20	17.25	46.34	36.41	0.430	1.0110	0.566	1.2670
	2020-21	17.09	47.20	35.71	0.862	-	1.124	-
	2021-22	16.61	48.15	35.25	0.944	-	1.156	-
			Sample Size		37	33	37	33
			Sample Mean		3.283	3.2101	4.151	4.0742
			Sample SD		2.81786681	1.602975	3.466809	1.975281
			Hypothesized Mean		0	0	0	0
			Sample Statistic t		7.08640726	11.50399	7.282698	11.84880
			P Value		0.000000	0.00000	0.000000	0.000000

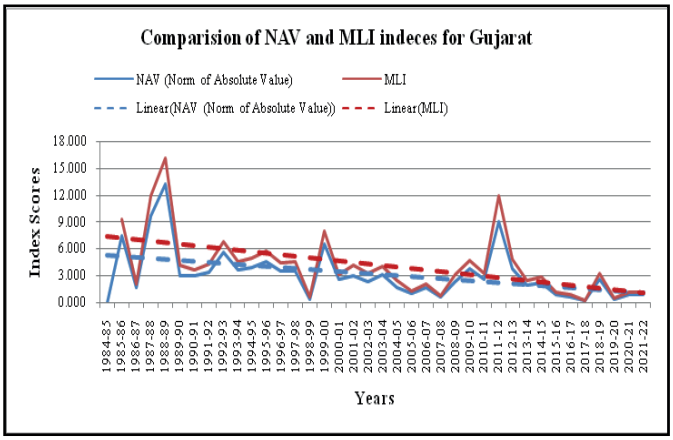
Source: Author calculations based on data from DES Report NO. DES/2018-19/8 and Socio-Economic Review 2022-23



During the study period, the contribution of the secondary sector was 29.63 percent in the year 1984-85, which increased to 39.88 percent in the year 1987-88, but thereafter it decreased to 36.34 percent in the year 1997-98. The contribution of the secondary sector remained in the range of 34 to 38 percent during the years 2001 to 2009 and thereafter increased to 48.15 percent in the year 2021-22.



Similarly, the contribution of tertiary sector was 33.14 percent in the year 1984-85, which increased to 41.84 percent in the year 1987-88 and further increased to 44.73 percent in the year 2000-01 and then reached the highest level of 46.47 percent in the year 2008-09, but after that the contribution of the tertiary sector continued to decline and was 35.25 percent in 2021-22.



The above analysis concluded about the state economy of Gujarat that the contribution of primary sector had decreased after 1988-89 till 2009-10 but after 2009-10 it had increased for two years and later it became stable in the range of 17-20 percent while the contribution of tertiary sector had increased

till 2008-09 and afterwards it started declining. But meanwhile the contribution of the secondary sector had been continuously increasing. During 1984-85 to 2021-22, primary sector's share shrunk by 20.63 percentage points but secondary and tertiary sectors' shares expanded by 18.52 and 2.11 percentage points respectively in the SGDP.

In order to assess the level of structural change the Norm of Absolute Value index of structural change was calculated using the shares of the primary, secondary and tertiary sectors in net state domestic product. The index value reflected the pace of structural changes in the state economy. The highest value of this index was 13.224 during the year 1988-89 and the value of the index decreased to 0.433 in 1998-99. After that the value of this index increased to 9.055 in 2011-12 but after that the value of this index continuously decreased to 0.862 in the year 2020-21. The average of index values for the entire period was 3.283. The above distribution of Norm of Absolute Value Index did not follow normal distribution. Therefore, a 5-year moving average of these index values was calculated.

The 5-year moving average of Norm Absolute Value Index followed normal distribution at 5 percent level of significance as per Lilliefors test. The mean of the 5-year moving average of the Norm Absolute Value Index for the entire period was 3.210. The t test for the above mean proved that it was significantly different from zero. Because the p value for the calculated value of the t test was much smaller than the 5 percent level of significance. For this reason, the null hypothesis that the value of the norm of absolute value index is not significantly different from zero was rejected and the alternative hypothesis that the value of the norm of absolute value index is significantly different from zero was accepted. Thus the result of t test proved that structural change had occurred in the state economy of Gujarat.

t Test results for NAV and MLI of Employment in Gujarat		
	NAV	MLI
Sample Size	18	18
Sample Mean	3.642	4.639
Sample SD	2.440716171	3.020015264
Hypothesized Mean	0	0
Sample Statistic t	6.33078591	6.516808219
P Value	0.000003763611	0.0000026364254

Similarly, Modified Lilien index of structural change was also calculated for the Gujarat economy based on the share of primary, secondary and tertiary sectors in Gross State Domestic Product (GSDP) at constant prices for the period 1984-85 to 2021-22. The value of Modified Lilien Index was 9.268 for the year 1985-86 and thereafter rising to 16.057 for

Table 2 Structural Changes in Labour distribution among three sectors in Gujarat					
	Percentage Share in workers employed				
Years	**Primary**	**Secondary**	**Tertiary**	**NAV**	**MLI**
1987-88	55.664	24.291	20.045	-	-
1989-90	60.083	20.773	19.144	**4.420**	**5.718**
1990-91	56.706	19.534	23.760	**4.616**	**5.845**
1992	59.517	20.597	19.887	**3.873**	**4.898**
1993 Jan-June	60.976	19.608	19.417	**1.459**	**1.824**
1993-94	58.823	19.762	21.415	**2.153**	**2.940**
1999-2000	58.973	17.133	23.893	**2.629**	**3.614**
2001-02	54.190	24.413	21.397	**7.279**	**9.029**
2003	54.248	21.400	24.352	**3.013**	**4.217**
2004-05	54.852	22.070	23.078	**1.274**	**1.561**
2005-06	51.918	23.089	24.994	**2.934**	**3.648**
2007-08	52.677	23.074	24.249	**0.759**	**1.064**
2009-10	52.714	19.864	27.423	**3.210**	**4.511**
2011-12	49.290	25.875	24.835	**6.011**	**7.371**
2017-18	39.081	28.851	32.068	**10.209**	**12.831**
2018-19	39.866	28.556	31.577	**0.785**	**0.972**
2019-20	43.222	26.362	30.416	**3.355**	**4.173**
2020-21	41.221	27.496	31.283	**2.001**	**2.457**
2021-22	38.256	33.072	28.672	**5.576**	**6.827**
		Sample Size		**18**	**18**
		Sample Mean		**3.642**	**4.639**
		Sample SD		**2.440716171**	**3.020015264**
		Hypothesized Mean		**0**	**0**
		Sample Statistic t		**6.33078591**	**6.516808219**
		P Value		**0.000003763611**	**0.0000026364254**
Source: Authors calculations based on data from various NSS employment – unemployment Survey reports.					

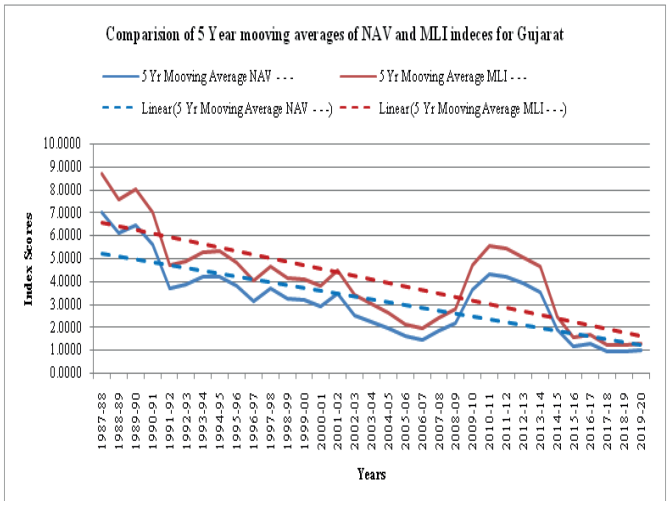
the year 1988-89. After that, the value of the index increased to 0.580 in 1998-99 but in the next year 1999-2000 it increased to 8.001 and after that it decreased to 3.194 till the year 2010-11 and after increasing to 11.861 in the next year, it continued to decrease. In the year 2020-21 its value became 1.124. The mean of the Modified Lilien Index for the entire study period was 4.151. The values of Modified Lilien Index determined for the entire study period did not follow normal distribution at 5 percent level of significance as per Lilliefors test. Therefore, the 5-year moving average of the Modified Lilien Index was worked out which followed normal distribution at 5 percent level of significance as per Lilliefors test.

The mean of the 5-year moving average of the Modified Lilien Index for the entire period was 4.074. Applying the t test on the values of 5-year moving average of the Modified Lilien Index, it was found that the value of the index was significantly different from zero as the p value was much smaller than the 5 percent level of significance. For this reason, the null hypothesis that the modified Lilien index of structural change was not significantly different from zero was rejected and the alternative hypothesis that the modified Lilien index of structural change was significantly different from zero was accepted.

t Test results for NAV and MLI of Output in Gujarat				
	NAV	**5 Year Moving average of NAV**	**MLI**	**5 Year Moving average of MLI**
Sample Size	37	33	37	33
Sample Mean	3.283	3.2101	4.151	4.0742
Sample SD	2.81786681	1.602975	3.466809	1.975281
Hypothesized Mean	0	0	0	0
Sample Statistic t	7.086407266	11.50399	7.2826985	11.848803
P Value	0.000000	0.00000	0.0000000	0.0000000

Thus, the analysis of change in the shares of primary, secondary and tertiary sector in the Gross State Domestic Product of Gujarat state using both indices of structural change namely Norm of Absolute Value Index and Modified Lilien Index confirmed the occurrence of structural change in the output space

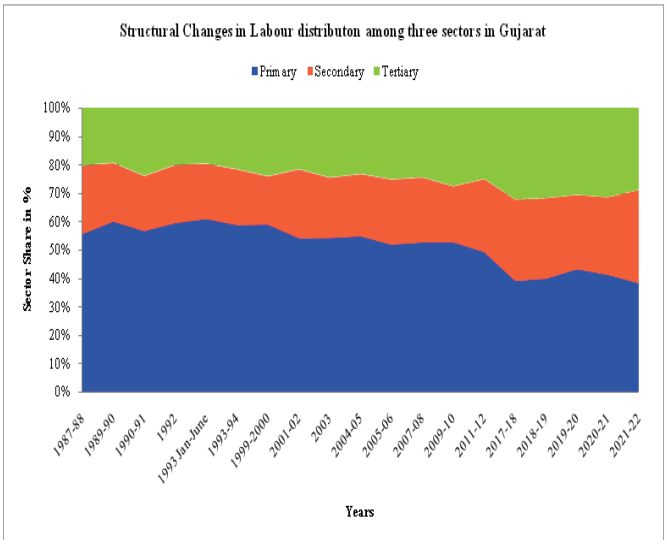
of state economy, although the trend lines of the two indices shown the falling pace of structural change.



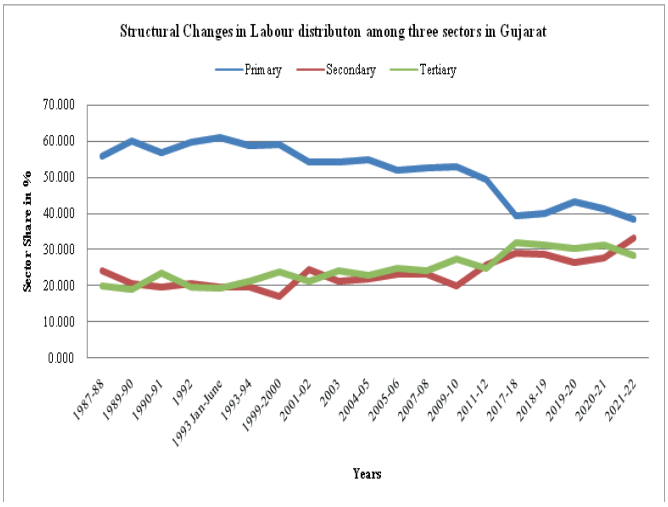
- **Structural changes in labour distribution in Gujarat**

After analyzing the structural changes in the output space of the state economy, now in this section structural changes that occurred in the labor force in the state of Gujarat during the period from the year 1987-88 to the year 2021-22 have been investigated. For this investigation, data obtained from various surveys conducted by the National Sample Survey Office for employment and unemployment have been used. Due to similarity in the concepts used by the NSSO during various surveys, the data of different rounds of surveys are comparable.

An overview of the allocation of labour between primary, secondary and tertiary sectors shows that in the year 1987-88, 55.67 percent of the labour force was employed in the primary sector, 24.29 percent in the secondary sector and 20.04 percent in the tertiary sector. The proportion of workers employed in the primary sector had been continuously declining with some fluctuations during the period under reference. In the primary sector, 58.82 percent workers were employed in 1993-94, which remained same at 58.97% in 1999-2000, after which it continuously decreased to 51.92% in 2005-06 and 39.08 percent as per the Periodic Labour Survey of 2017-18 and finally it came down to 38.26% in 2021-22. Thus, during the year 1987-88 to 2021-22, there has been a decline of about 17 percentage points in the share of workers employed in the primary sector. During the same period, the share of the secondary sector fluctuated from 19.76% in 1993-94 to 17.13% in 1999-2000 and to 28.85% in 2017-18 and finally reached 33.07% in 2021-22. Thus, the share of labour force employed in the secondary sector witnessed an increase of about 8 percentage points during the period under reference. Similarly, during that period, the share of the employed persons in tertiary sector was 21.42% in 1993-94, which remained at 23.89% in 1999-2000, increased to 32.07% in 2017-18 and decreased to 28.62% in 2021-22. Thus, the share of the tertiary sector had seen fluctuations and after crossing the highest level of 30% in the year 2017-18, there had been a slight decline in it, the main reason for which had been the expansion of the secondary sector and the increase in the labor force employed in it and the negative impact of COVID-19 on the service sector.

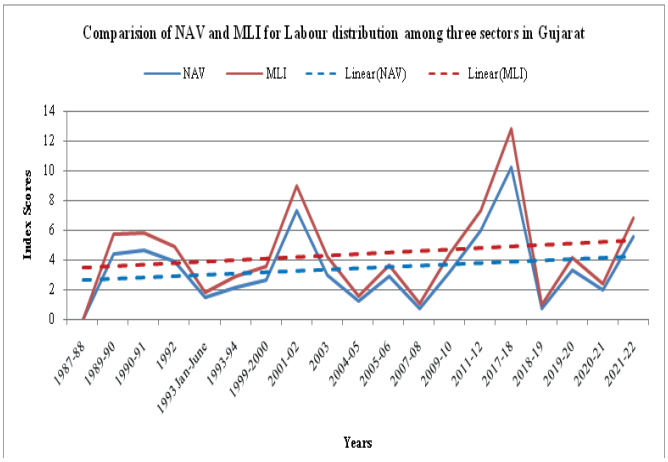


On looking at the graph of changes in the proportions of the workforce employed in the three sectors of the economy, it becomes clear that there had been a decline in the amount of workforce employed in the agricultural sector, but the rate of decline in it was very less and at a slow rate and accordingly, the increase in the share of labor force employed in the secondary and tertiary sectors was very less. This slow change indicates a low level of structural change in the economy.



Using the percentage data of workforce employed in the three sectors, two indices of structural change - Norm of Absolute Value Index and Modified Lilien Index have been calculated. During the said period, the value of Norm of Absolute Value Index was 4.42 during the year 1987-88 to 1989-90. During the year 1999-2000 to 2001-02, the value of the index was of 7.28, after which the value of the index decreased to 1.27 during 2003 to 2004-05. Similarly, during the year 2007-08 to 2009-10, the value of the index was 3.21 and after this, during the year 2011-12 and 2017-18, the value of the index was at the highest level of 10.21. After this, during the year 2020-21, the value of this index decreased to 2.00. But, for the year 2021-22, the value of the index increased to 5.58. The average value of the index for the entire period was 3.77. T test has been used to test the hypothesis whether the value of the norm of absolute value index is greater than 0 or not for the said period. Since the distribution of the values of the index followed a normal distribution, the result of the t test was acceptable. The

result of the t test proved that at 5% level of significance the null hypothesis that the value of the index is equal to zero was rejected and the alternative hypothesis that the value of the index is greater than zero was accepted.



To verify the structural change, another structural change index, Modified Lilien Index, had also been calculated. The value of the index was 5.72 during the year 1987-88 to 1989-90, which increased to 9.03 during 1999-2000 to 2001-02, after which the value of the index decreased to 1.56 in 2004-05, thereafter it increased to 12.83 in the year 2017-18 and decreased to 0.97 in 2018-19 and increases to 2.46 in 2020-21 and increased to 6.83 in the year 2021-22. The average value of the above index was 4.89 during 1987-88 to 2021-22. Since the distribution of this index also followed the normal distribution, therefore t-test had been used to test the hypothesis whether the value of the index is different from zero or not. The results of the t-test shown that at 5% level of significance, the null hypothesis that the value of the index is equal to zero was rejected and the alternative hypothesis that the value of the index is greater than zero was accepted. Both the indices showed the fluctuations in the structural changes taking place in the labour force. Structural changes in the labour force were seen at a rapid pace from 1999 to 2001-02 and a decline was recorded during 2005 to 2007-08, after which again rapid structural changes were seen till the year 2018 and after that less structural changes were seen during Covid-19 and finally the pace of structural change was high. Thus, both the indices of structural change proved the occurrence of structural change in the employment space of Gujarat along with the increasing pace of structural change in employment indicated by upward sloping trend lines.

CONCLUSION

The study of structural changes in the economy of Gujarat in the present paper clearly shows that there is a decline of 21 percentage points in the share of primary sector in GSDP during 1984-85 to 2021-22, while the contribution of secondary and tertiary sector shown an increase of 18 percentage points and 3 percentage points respectively in the said period. This indicated a structural change in the output of Gujarat economy. On the basis of the above data, by computing the Norm of Absolute Value Index and Modified Lilien Index of structural change and performing a t-test on their 5-year moving average, both the indices proved the occurrence of structural change in the economy. Likewise the employment share of primary sector had decreased by 17.4 percentage points while that of secondary and tertiary sectors shares had increased by 8.7 and 8.6 percentage points respectively during 1987-88 to 2021-22. The t test results for both the structural change indices computed for employment also confirmed the happening of structural change in labour employment in the economy. In Gujarat, the respective shares of primary, secondary and tertiary sectors in GSDP were 16.61%, 48.15% and 35.25% respectively while that in employment were 38.25%, 33.07% and 28.67% respectively in 2021-22. Hence, it is concluded that significant structural changes had taken place in the economy of Gujarat during the year 1987-88 to 2021-22 both in output and employment, although the structural changes had been much larger in output than in employment, as indicated by higher share of primary share in employment compared to its share in GSDP in 2021-22.

References

Bagchi A. K., P. Das and S. Chattopadhyay (2005), Growth and Structural Change in the Economy of Gujarat (1970-71 to 2000-01), Economic and Political Weekly, 40 (28), pp. 3039-3047.

Cortuk, O., & Singh, N. (2011). Structural change and growth in India. Economics Letters, 110(3), 178-181.

Dietrich, A. (2012). `Does Growth Cause Structural Change, or is it the Other Way Around? A Dynamic Panel Data Analysis for Seven OECD Countries', Empirical Economics, 43, pp. 915-944.

Dixit, Anita. (2009). Growth and Non-Farm Employment – the Case of Gujarat. Indian Journal of Labour Economics. 42. 519-536.

Sanyal, Anirban & Singh, Nirvikar. (2020). Structural Change and Economic Growth in India: A Comparative Study of Punjab. SSRN Electronic Journal. 10.2139/ssrn.3728335.

Thind, M., & Singh, L. (2018). Structural change and economic growth across major states of India. Millennial Asia, 9(2), 162-182.

Report NO. DES/2018-19/8- Compendium of Selected Indicators Gujarat State (1960-61 to 2016-17) August 2018 and Socio-Economic Review 2023-24, Gujarat State by Directorate of Economics and Statistics, Government of Gujarat, Gandhinagar.

NSS Survey report Survekshana special number report on 43rd round, 381, 386, 397, 400, 422, 455, 481,490, 515, 522, 531, KI 66/10 and 554.

PLFS Annual Survey Reports 2017-18, 2018-19, 2019-20, 2020-21 and 2021-22.

Reports of Expert committee / Technical Group on Population Projections 1981, 2001-10, 2006, 2011-22, 2011-36

https://indianexpress.com/article/india/gujarat-displaces-maharashtra-to-become-largest-manufacturing-hub-in-country-7650544/

https://www.census2011.co.in/facts/largestates.html#google_vignette

https://www.thehindu.com/news/national/gujarat-has-set-target-to-become-usd-500-billion-economy-by-2026-27-cm-patel/article67722233.ece