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A study on the Sectoral Contribution: in the Development of the Indian Economy

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Abstract

The agriculture and industrial sectors are the major sectors to provide the major employment opportunities in India, but the statistics reveal the fact that the service sector is contributing more than 50 per cent of India's GDP. As India is the sixth largest economy by its nominal Gross Domestic Product and Third largest economy by its Purchasing Power Parity, after the adoption of a new economic policy of Liberalization, Privatization and Globalization in 1991 to overcome acute balance of payment crisis, achieved the annual average growth rate in GDP from 6 per cent to 7 per cent by the end of 20th century. There is major role of all individual sectors to achieve this growth rate and the new economic reforms not only led the growth in the major sectors but also a tremendous change in the different allied sectors like construction, textile, telecommunication and e-commerce etc. There a need to study about the role of individual sector contribution in the development the total GDP of India. The structure and their contribution were developed in the long-term development of the economy. This paper studies about sectoral contribution of all sectors in the development of the Indian Economy since 1991 to 2021. To examine the role of the individual sector for the development of the GDP of India, the relation between the variables to be studied by cointegration vector model. And the individual progress of the variables is studied by the descriptive statistics. This research paper also confines the impact of allied sectors growth in the development of the India's GDP.

Keywords: *Sectoral Contribution; New Economic Reforms; Impact Allied Sectors; Growth in GDP*

1. Introduction

The GDP of India is a measurement of the development of the economy. The different sectors lie Agriculture and Allied, Industry and Service sectors have their contribution for the development of the India's GDP. At the time of Independence, the contribution of primary sector is more than 55 per cent in the GDP of India. But thereafter the contribution of primary sector had been decreasing. The diversification of the economy from the primary sector to secondary sector, secondary sector to tertiary sector is showing a positive growth of the Indian Economy. Now the service sector is the biggest sector of India with the Gross Value Added at current price as 96 lakh crore in 2020-21 i.e., it accounts more than 55 per cent of the GVA. Continuously the industrial sector accounts for 25 per cent but the primary sector's share has been declined to 16.38 per cent of the GDP. The Primary Sector consists of agriculture, forestry and fishing while the secondary sector consists of industries like manufacturing, electricity, gas, water and other utility services. Tertiary sector consists of trade, hotels, transport, communication, financial services, real estate

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etc. The structure of the Indian Economy is going on to change after globalization since 1991. But the changing structure of the economy is favor to the industrial and service sectors only. In the industrial sector the consumer goods sector is showing at most growth and the service-oriented sector is growing up. The agriculture and allied sectors are not showing a long run share in the development of the economy. While India is the second larger producer of agriculture products. India accounts for 7.39 percent of total global agricultural output. But GDP of the Industry sector is $560.97 billion, and world rank is 6. India's world rank is eight in the Services sector, and its GDP is $1500 billion. The agriculture sector's contribution to the Indian economy is much higher than the world's average (6.4%). But development of the agriculture sector is poor. The impact of primary sector on the development of the economy will be revealed by the research results.

2. Review of Literature

D. V. S. Sastry, Balwant Singh, Kaushik Bhattacharya and N. K. Unnikrishnan in their paper Sectoral Linkages and Growth Prospects: Reflections on the Indian Economy examined the linkage of growth among the agriculture, industry and services sectors of the economy, using both an input-output (I-O) and a simultaneous equation framework. Despite the substantial increase in the share of the services sector in GDP over the years, the I-O tables suggested that the agricultural sector still played an important role in determining the overall growth rate of the economy through demand linkages with other sectors of the economy. Narvikar Singh University of California in his paper Services-Led Industrialization in India: Assessment and Lessons provided an integrated analyzed the role of the service sector in recent Indian economic development. It discusses the nature of services, their distinction from products, and their categorization. It provides an overview of India's overall growth experience, and a detailed examination of the contribution of the service sector to growth. It includes an examination of the potential for spillovers from IT, ITES and other service sectors such as financial services, to the rest of the economy, drawing on econometric work, as well as input-output analysis of linkages to understand these possible spillovers and growth potentials. K.J Joseph in his paper Chapter 7: Sectoral Innovation Systems in Developing Countries: The Case of ICT in India7 Sectoral innovation systems in developing countries: The cases of ICT in India K.J. Joseph 7.1 Introduction The last two decades have witnessed a major shift in the development strategy among developing countries. The change implied a move away off. In the paper constructing the Economy: The Role of Construction Sector in India’s Growth, Hrushikesh Mallick & Mantu Kumar Mahalik empirically examining the importance of construction sector in propelling economic growth rate in India, the study has found that in the presence of the dominant influence of capital stock, the impact of the construction sector gets blurred or neutralized. In the paper An empirical investigation on the inter-sectoral linkages in India Kaur, Gunjeet and Bordoloi, Sanjib and Rajesh, Raj examined in the research for a developing country like India where socio-economic problems such as poverty, unemployment and inequality influence policy decisions, it becomes important to study interlinkages among the constituent sectors so that positive growth impulses emerging among the sectors could be identified and fostered to sustain the growth momentum. An in-depth understanding of inter-sectoral dynamics becomes all the more important for policy makers so that effective monetary, credit and fiscal policies could be designed in order to be able to achieve the broader objective of inclusive development. In this backdrop, the present paper endeavors to study inter-sectoral linkages in the Indian economy both through input-output (I-O) approach and econometric exercises using co-integration and state-space models. Cointegration analysis is carried out both at sectoral and sub-sectoral levels since mid-1980s. At the broad sectoral level, primary, secondary and tertiary (excluding community, social and personal services) sectors display strong long-run equilibrium relationship amongst each other. These sectors also displayed strong long-run equilibrium relationship with one another in a bivariate framework. At the sub-sectoral level, existence of long-term equilibrium was found between ‘trade, hotels, transport & communication’ and ‘manufacturing’ sectors. Further, the financial sector activity in the ‘banking & insurance’ sector was found to be co-integrated with the ‘manufacturing’ and ‘primary’ sectors. The sectors, which displayed long-run equilibrium relationships, were re-estimated through state space model using Kalman filter. This also corroborated that variation in one sector influenced the other sector’s performance over time. In view of the prevailing

sectoral inter-relationships, the paper explores policy options so that positive growth impulses developing among the sectors are fostered.

3. Research Methodology

In this research paper the time series annual data is collected from 1991 to 2021 on five economic indicators as GNI in the current price in US dollar, Agriculture Forestry & Fishing, Mining and Quarrying as primary sector in value added % of GNI at real prices, Manufacturing, Construction, Electricity, Gas and water supply in secondary sector in value added % of GNI at real prices, Financing, Insurance & Real Estate Community Society & Individual Services in tertiary sector in value added % of GNI at real prices. This research paper studies the causal relationship between economic development and sectoral contribution and vice versa.

- **Model for Estimation**

GNI = C (1) + C (2)*AFM + C (3)*CSPS + C (4)*FIR + C (5)*MCE

AFM = Agriculture Forestry & Fishing, Mining and Quarrying

MCE = Manufacturing, Construction, Electricity, Gas and water supply

FIR = Financing, Insurance & Real Estate

CSPS = Community Society & Individual Services

The above study uses Johansen's method to estimate the cointegration between the sectoral contribution between the GNI and its contributing sectors. To know the causality between the variables the Engle-Granger causality technique is used through Vector Autoregressive framework is used. To adopt the cointegration model the stationarity in the variables is required to know the stationarity among the variables the graphic method, the correlogram method and unit root test under Augmented Dicky Fuller test is used. After getting the stationarity information the Cointegration test and the Least squares estimation are used to know the real contribution of the sectors in the GNI which indicates the Economic Development of India.

- **Hypothesis**

H_O: There is no cointegration between the variables.

H_1: $H_O$is rejected.

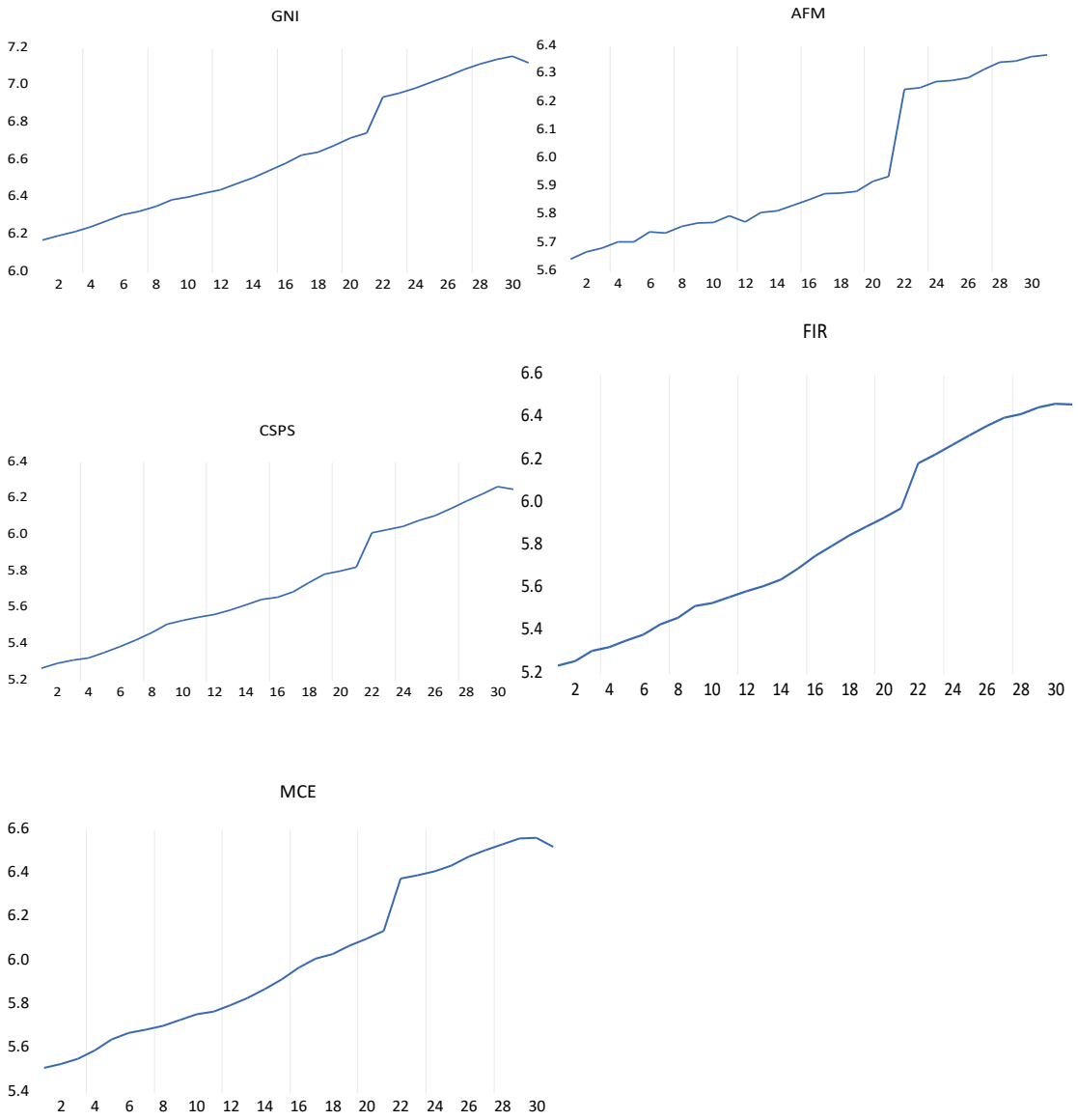
4. Explanation of the Study

A. Test for Stationary of the Variables

To test the stationary of the above said variable, the different tests are measured. Among such methods, the below figure i.e., figure – 1 indicates the graphic method to understand the stationarity of the variables. The figure shows that the study variables are non - stationary in their time series trends.

a) Graphic Method

Figure - 1

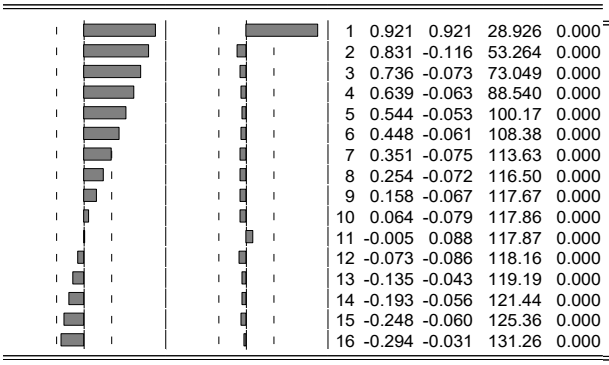


b) Correlogram

To examine stationarity of the variables the correlogram graph is measured. The below figure shows the information as the measuring variables are non-stationary because the values lay above the ¼ of the lag of the series. Then we conclude the variables are non – stationary.

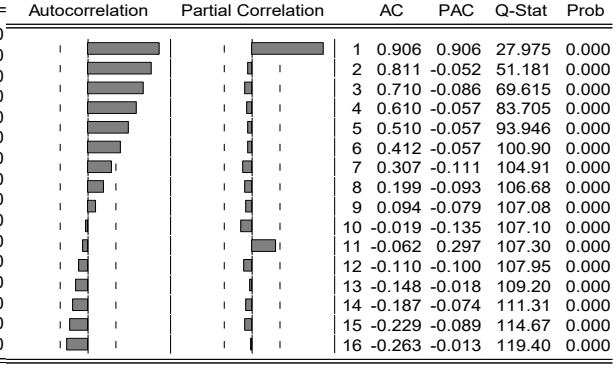
Figure - 2

Date: 01/16/22 Time: 20:46
Sample: 1 31
Included observations: 31



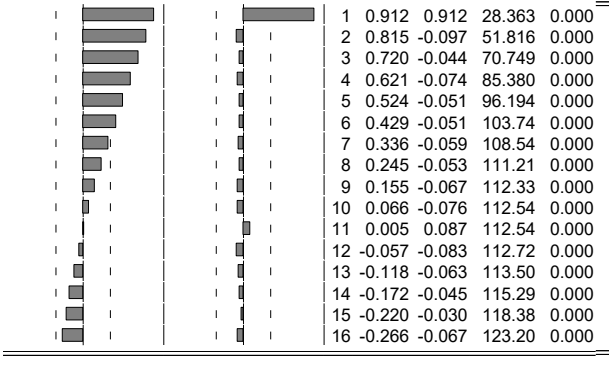
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.921	0.921	28.926	0.000
		2	0.831	-0.116	53.264	0.000
		3	0.736	-0.073	73.049	0.000
		4	0.639	-0.063	88.540	0.000
		5	0.544	-0.053	100.17	0.000
		6	0.448	-0.061	108.38	0.000
		7	0.351	-0.075	113.63	0.000
		8	0.254	-0.072	116.50	0.000
		9	0.158	-0.067	117.67	0.000
		10	0.064	-0.079	117.86	0.000
		11	-0.005	0.088	117.87	0.000
		12	-0.073	-0.086	118.16	0.000
		13	-0.135	-0.043	119.19	0.000
		14	-0.193	-0.056	121.44	0.000
		15	-0.248	-0.060	125.36	0.000
		16	-0.294	-0.031	131.26	0.000

Date: 01/16/22 Time: 20:47
Sample: 1 31
Included observations: 31



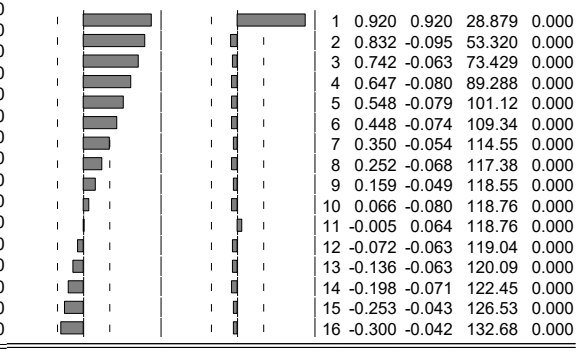
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.906	0.906	27.975	0.000
		2	0.811	-0.052	51.181	0.000
		3	0.710	-0.086	69.615	0.000
		4	0.610	-0.057	83.705	0.000
		5	0.510	-0.057	93.946	0.000
		6	0.412	-0.057	100.90	0.000
		7	0.307	-0.111	104.91	0.000
		8	0.199	-0.093	106.68	0.000
		9	0.094	-0.079	107.08	0.000
		10	-0.019	-0.135	107.10	0.000
		11	-0.062	0.297	107.30	0.000
		12	-0.110	-0.100	107.95	0.000
		13	-0.148	-0.018	109.20	0.000
		14	-0.187	-0.074	111.31	0.000
		15	-0.229	-0.089	114.67	0.000
		16	-0.263	-0.013	119.40	0.000

Date: 01/16/22 Time: 20:49
Sample: 1 31
Included observations: 31



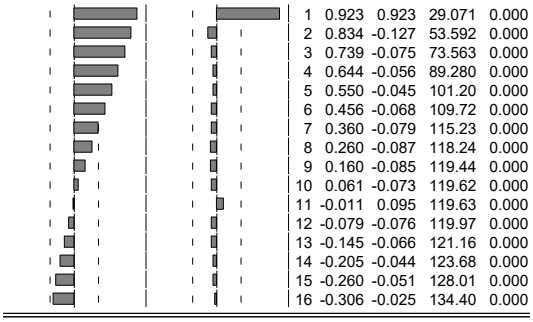
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.912	0.912	28.363	0.000
		2	0.815	-0.097	51.816	0.000
		3	0.720	-0.044	70.749	0.000
		4	0.621	-0.074	85.380	0.000
		5	0.524	-0.051	96.194	0.000
		6	0.429	-0.051	103.74	0.000
		7	0.336	-0.059	108.54	0.000
		8	0.245	-0.053	111.21	0.000
		9	0.155	-0.067	112.33	0.000
		10	0.066	-0.076	112.54	0.000
		11	0.005	0.087	112.54	0.000
		12	-0.057	-0.083	112.72	0.000
		13	-0.118	-0.063	113.50	0.000
		14	-0.172	-0.045	115.29	0.000
		15	-0.220	-0.030	118.38	0.000
		16	-0.266	-0.067	123.20	0.000

Date: 01/16/22 Time: 20:49
Sample: 1 31
Included observations: 31



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.920	0.920	28.879	0.000
		2	0.832	-0.095	53.320	0.000
		3	0.742	-0.063	73.429	0.000
		4	0.647	-0.080	89.288	0.000
		5	0.548	-0.079	101.12	0.000
		6	0.448	-0.074	109.34	0.000
		7	0.350	-0.054	114.55	0.000
		8	0.252	-0.068	117.38	0.000
		9	0.159	-0.049	118.55	0.000
		10	0.066	-0.080	118.76	0.000
		11	-0.005	0.064	118.76	0.000
		12	-0.072	-0.063	119.04	0.000
		13	-0.136	-0.063	120.09	0.000
		14	-0.198	-0.071	122.45	0.000
		15	-0.253	-0.043	126.53	0.000
		16	-0.300	-0.042	132.68	0.000

Date: 01/16/22 Time: 20:50
Sample: 1 31
Included observations: 31



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.923	0.923	29.071	0.000
		2	0.834	-0.127	53.592	0.000
		3	0.739	-0.075	73.563	0.000
		4	0.644	-0.056	89.280	0.000
		5	0.550	-0.045	101.20	0.000
		6	0.456	-0.068	109.72	0.000
		7	0.360	-0.079	115.23	0.000
		8	0.260	-0.087	118.24	0.000
		9	0.160	-0.085	119.44	0.000
		10	0.061	-0.073	119.62	0.000
		11	-0.011	0.095	119.63	0.000
		12	-0.079	-0.076	119.97	0.000
		13	-0.145	-0.066	121.16	0.000
		14	-0.205	-0.044	123.68	0.000
		15	-0.260	-0.051	128.01	0.000
		16	-0.306	-0.025	134.40	0.000

It is also concluded with the results below as the polynomial characterizes of roots indicate as no root lies outside the unit circle. VAR satisfies the stability condition.

Figure - 3

Roots of Characteristic Polynomial
Endogenous variables: GNI AFM CSPS FIR MCE
Exogenous variables: C
Lag specification: 1 1
Date: 01/16/22 Time: 01:15

Root	Modulus
0.960893 - 0.078897i	0.964127
0.960893 + 0.078897i	0.964127
0.847206	0.847206
0.280627	0.280627
0.130759	0.130759

No root lies outside the unit circle.
VAR satisfies the stability condition.

Figure - 4

VAR Residual Serial Correlation LM Tests
Date: 01/16/22 Time: 01:21
Sample: 1 31
Included observations: 30

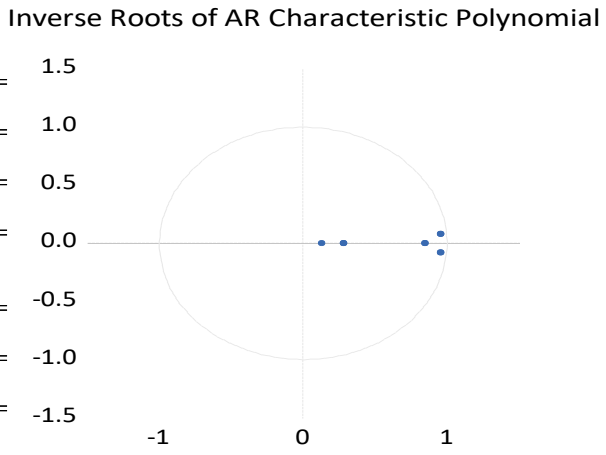
Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	30.33833	25	0.2119	1.270288	(25, 57.2)	0.2249

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	30.33833	25	0.2119	1.270288	(25, 57.2)	0.2249

*Edgeworth expansion corrected likelihood ratio statistic.



c) Unit Root Test

When the graphic method and the correlogram indicated as the study variables are non – stationary, to test the stationarity of the variables the third method in cointegration, the Unit Root Test is used. To test the Augmented Dicky Fuller Test the lag length criteria is decided on the information lag intervals of the below mentioned results of the lag estimation. According to the ADF test the first difference of the variable have shown the stationarity of the variables. Which the information is based on the lag length of the difference between the critical values to the maximum Eigen value linear intercept with no trend is selected. The information is revealed by the figure – 5.

B. Lag Length Criteria

Figure - 5

Date: 01/15/22 Time: 21:43
Sample: 1 31
Included observations: 29
Series: GNI AFM CSPS FIR MCE
Lags interval: 1 to 1

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	1	2	2	1	1
Max-Eig	0	0	0	1	1

*Critical values based on MacKinnon-Haug-Michelis (1999)

Information Criteria by Rank and Model

Data Trend:	None	None	Linear	Linear	Quadratic
Rank or No. of CEs	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
	Log Likelihood by Rank (rows) and Model (columns)				
0	409.9951	409.9951	414.4358	414.4358	417.5341
1	423.9719	424.6604	428.5047	434.5940	437.2833
2	434.2013	437.3124	439.5585	446.7513	449.4381
3	438.7136	445.2570	445.5680	455.8257	458.3900
4	441.4178	449.7563	449.7936	460.6658	462.8364
5	442.0009	452.4354	452.4354	464.8693	464.8693
	Akaike Information Criteria by Rank (rows) and Model (columns)				
0	-26.55139	-26.55139	-26.51282	-26.51282	-26.38166
1	-26.82565	-26.80417	-26.79343	-27.14441	-27.05402
2	-26.84147	-26.91810	-26.86611	-27.22423*	-27.20263
3	-26.46301	-26.70738	-26.59089	-27.09143	-27.13034
4	-25.95985	-26.25905	-26.19266	-26.66660	-26.74734
5	-25.31041	-25.68520	-25.68520	-26.19788	-26.19788
	Schwarz Criteria by Rank (rows) and Model (columns)				
0	-25.37268*	-25.37268*	-25.09837	-25.09837	-24.73148
1	-25.17547	-25.10683	-24.90750	-25.21134	-24.93235
2	-24.71980	-24.70213	-24.50870	-24.77253	-24.60948
3	-23.86986	-23.97279	-23.76201	-24.12109	-24.06571
4	-22.89522	-23.00583	-22.89229	-23.17764	-23.21123
5	-21.77430	-21.91335	-21.91335	-22.19029	-22.19029

C. Augmented Dicky – Fuller Test Statistic

The collected data of the variable are converted into natural logarithmic form and tested with level form and the first difference under ADF test the level results showed that the variables are non – stationary but the first differences of the variables are shown the stationarity of the variables. Then the residuals are also tested for the stationarity. The information is revealed by the Table – 1 and figure – 6 below.

Table: 1

Variables	P – value of level 5%	P – value at I(I)	Justification
GNI	0.9344	0.0004	Stationary
AFM	0.9403	0.0001	Stationary
CSPS	0.9709	0.0001	Stationary
FIR	0.9636	0.0010	Stationary
MCE	0.9020	0.0005	Stationary

D. Residual stationary

Figure - 6

Null Hypothesis: RESID06 has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on AIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.650263	0.0000
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID06)
Method: Least Squares
Date: 01/15/22 Time: 22:04
Sample (adjusted): 2 31
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID06(-1)	-0.865774	0.186177	-4.650263	0.0001

R-squared	0.427026	Mean dependent var	-9.13E-05
Adjusted R-squared	0.427026	S.D. dependent var	0.006066
S.E. of regression	0.004592	Akaike info criterion	-7.896297
Sum squared resid	0.000611	Schwarz criterion	-7.849590
Log likelihood	119.4444	Hannan-Quinn criter.	-7.881355
Durbin-Watson stat	1.889794		

E. Decision Criteria

a) Johannes Cointegration Test

The Decision Criteria on the results of the Johannes Cointegration Test, the trace value is greater than the critical value, then the null hypothesis is rejected and it reveals the information as there is a long term cointegration between the variables. The information is produced below Figure number 7 & 8.

Figure - 7

Sample (adjusted): 4 31
Included observations: 28 after adjustments
Trend assumption: Linear deterministic trend
Series: GNI AFM CSPS FIR MCE
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.772086	88.20926	69.81889	0.0009
At most 1	0.510906	46.80329	47.85613	0.0626
At most 2	0.437218	26.77766	29.79707	0.1072
At most 3	0.226672	10.68148	15.49471	0.2318
At most 4	0.116999	3.484010	3.841465	0.0620

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Figure - 8

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.772086	41.40597	33.87687	0.0053
At most 1	0.510906	20.02563	27.58434	0.3394
At most 2	0.437218	16.09618	21.13162	0.2193
At most 3	0.226672	7.197473	14.26460	0.4660
At most 4	0.116999	3.484010	3.841465	0.0620

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

F. Vector Autoregressive Estimates

After the test of the stationarity under ADF Vector Autoregressive Estimates (VAR) results are examined. According to the results below the vector autoregressive estimates reveal the information that the autoregressive values of the variables mutually. The t – statistic values can indicate the amount of regression of the variables. The VAR estimates are given in the figure – 7.

Figure - 7

Vector Autoregression Estimates
Date: 01/16/22 Time: 21:33
Sample (adjusted): 2 31
Included observations: 30 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GNI	AFM	CSPS	FIR	MCE
GNI(-1)	0.382852	-0.352255	0.594800	0.317883	0.118237
	(1.18494)	(2.16760)	(1.20963)	(1.29276)	(1.52617)
	[0.32310]	[-0.16251]	[0.49172]	[0.24590]	[0.07747]
AFM(-1)	-0.283143	0.578835	-0.253208	-0.333466	-0.367393
	(0.11055)	(0.20223)	(0.11285)	(0.12061)	(0.14238)
	[-2.56126]	[2.86233]	[-2.24373]	[-2.76489]	[-2.58031]
CSPS(-1)	-0.479606	-0.607962	0.215517	-0.590555	-0.813999
	(0.39716)	(0.72652)	(0.40543)	(0.43330)	(0.51153)
	[-1.20760]	[-0.83682]	[0.53157]	[-1.36294]	[-1.59131]
FIR(-1)	0.799095	1.051616	0.506789	1.256577	0.960324
	(0.46077)	(0.84288)	(0.47037)	(0.50269)	(0.59345)
	[1.73427]	[1.24765]	[1.07743]	[2.49969]	[1.61819]
MCE(-1)	0.256539	-0.055670	-0.255042	0.167453	0.746596
	(0.63464)	(1.16094)	(0.64786)	(0.69239)	(0.81740)
	[0.40423]	[-0.04795]	[-0.39367]	[0.24185]	[0.91338]
C	2.363238	2.563005	0.668260	0.795455	2.030575
	(1.58372)	(2.89710)	(1.61672)	(1.72783)	(2.03979)
	[1.49221]	[0.88468]	[0.41334]	[0.46038]	[0.99548]
R-squared	0.993343	0.964174	0.992716	0.995094	0.990749
Adj. R-squared	0.991956	0.956710	0.991199	0.994071	0.988822
Sum sq. resids	0.020155	0.067444	0.021003	0.023989	0.033434
S.E. equation	0.028979	0.053011	0.029583	0.031616	0.037324
F-statistic	716.2291	129.1793	654.1944	973.5061	514.0740
Log likelihood	67.01462	48.89668	66.39593	64.40198	59.42254
Akaike AIC	-4.067641	-2.859779	-4.026395	-3.893465	-3.561502
Schwarz SC	-3.787402	-2.579539	-3.746156	-3.613226	-3.281263
Mean dependent	6.655899	5.965575	5.745662	5.845599	6.037621
S.D. dependent	0.323105	0.254783	0.315330	0.410608	0.353025
Determinant resid covariance (dof adj.)		3.25E-19			
Determinant resid covariance		1.07E-19			
Log likelihood		442.4422			
Akaike information criterion		-27.49615			
Schwarz criterion		-26.09495			
Number of coefficients		30			

b) Granger – Causality Test

To estimate the Granger Causality test, the study variables should not be serial correlated. In the figure – 7, lag 4 length indicate that there is no serial correlation between the variables. The autocorrelation structure among the variables is also displayed by the figure – 8. And the figure – 9 indicates the causality of the variables mutually reveal information as the independent variables cointegrate with the dependent variable. Hence, the null hypothesis is rejected.

Figure - 7

VAR Residual Serial Correlation LM Tests
Date: 01/17/22 Time: 08:45
Sample: 1 31
Included observations: 30

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	30.33833	25	0.2119	1.270288	(25, 57.2)	0.2249
2	20.42977	25	0.7239	0.792398	(25, 57.2)	0.7345
3	18.75425	25	0.8087	0.718181	(25, 57.2)	0.8168
4	33.38291	25	0.1218	1.431513	(25, 57.2)	0.1317

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	30.33833	25	0.2119	1.270288	(25, 57.2)	0.2249
2	51.34465	50	0.4208	1.000064	(50, 49.0)	0.5003
3	65.70896	75	0.7695	0.661873	(75, 28.2)	0.9191
4	381.8742	100	0.0000	57.39139	(100, 4.7)	0.0002

*Edgeworth expansion corrected likelihood ratio statistic.

Figure –8

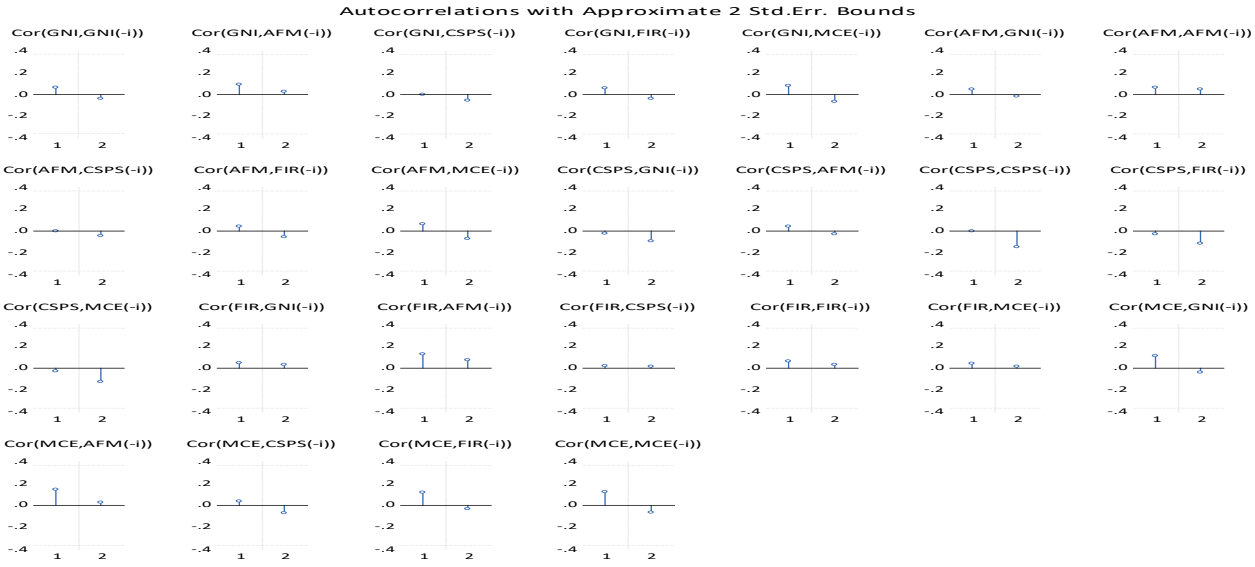


Figure –9

Pairwise Granger Causality Tests
Date: 01/17/22 Time: 08:47
Sample: 1 31
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
AFM does not Granger Cause GNI	30	5.94556	0.0216
GNI does not Granger Cause AFM		5.09242	0.0323
CSPS does not Granger Cause GNI	30	1.43157	0.2419
GNI does not Granger Cause CSPS		2.61528	0.1175
FIR does not Granger Cause GNI	30	4.08582	0.0533
GNI does not Granger Cause FIR		0.83268	0.3696
MCE does not Granger Cause GNI	30	0.72120	0.4032
GNI does not Granger Cause MCE		0.11249	0.7399
CSPS does not Granger Cause AFM	30	3.44306	0.0745
AFM does not Granger Cause CSPS		1.87932	0.1817
FIR does not Granger Cause AFM	30	5.95166	0.0216
AFM does not Granger Cause FIR		6.54100	0.0165
MCE does not Granger Cause AFM	30	5.46701	0.0270
AFM does not Granger Cause MCE		7.06392	0.0131
FIR does not Granger Cause CSPS	30	4.75461	0.0381
CSPS does not Granger Cause FIR		2.66819	0.1140
MCE does not Granger Cause CSPS	30	1.85404	0.1846
CSPS does not Granger Cause MCE		0.81048	0.3759
MCE does not Granger Cause FIR	30	0.00035	0.9853
FIR does not Granger Cause MCE		0.94879	0.3387

G. Linear Deterministic Trend

The linear relation between the variables GNI and its independent variables AFM, CSPS, FIR, MCE is determined with the estimation method of least squares. The results indicate the information as the except the AFM the other sectors have been shown a greater impact on the GNI for its development. The coefficient of variation is 0.01 in AFM which is very least in the comparison of other study variables. The figure – 10 below reveals the information. Figure – 11 indicate that the regression relation between the independent variables and dependent variables followed by figure – 12 & 13.

H. Model Estimation

GNI = C (1) + C (2)*AFM + C (3)*CSPS + C (4)*FIR + C (5)*MCE

GNI = 1.25341532504 + 0.0107998985421*AFM + 0.236182244514*CSPS + 0.195566258752*FIR + 0.470018001406*MCE

Figure –10

Dependent Variable: GNI
Method: Least Squares
Date: 01/15/22 Time: 21:59
Sample: 1 31
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.253415	0.090697	13.81983	0.0000
AFM	0.010800	0.017760	0.608114	0.5484
CSPS	0.236182	0.044859	5.265037	0.0000
FIR	0.195566	0.062750	3.116582	0.0044
MCE	0.470018	0.053521	8.781919	0.0000

R-squared	0.999808	Mean dependent var	6.640287
Adjusted R-squared	0.999779	S.D. dependent var	0.329352
S.E. of regression	0.004899	Akaike info criterion	-7.653067
Sum squared resid	0.000624	Schwarz criterion	-7.421779
Log likelihood	123.6225	Hannan-Quinn criter.	-7.577673
F-statistic	33897.27	Durbin-Watson stat	1.710941
Prob(F-statistic)	0.000000		

Figure - 11

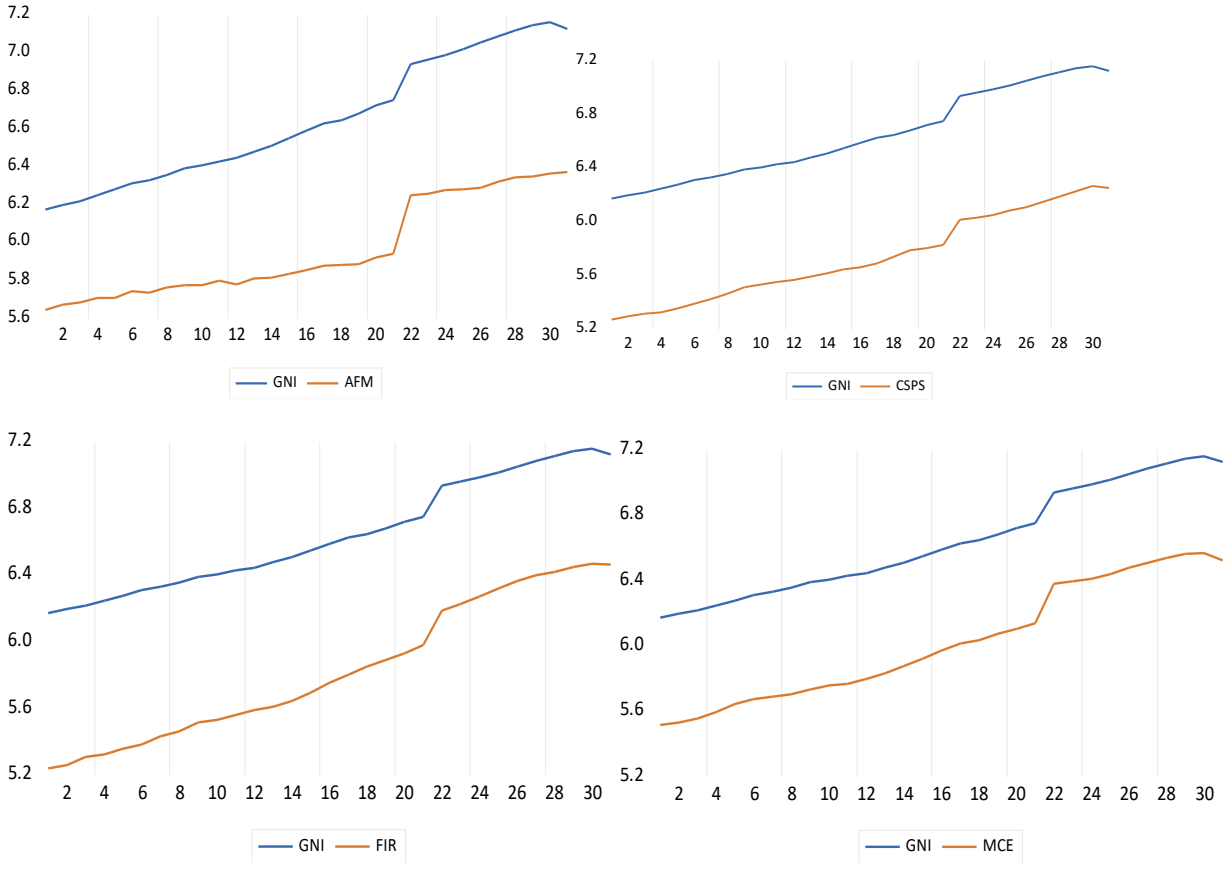


Figure - 12

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

GNI	AFM	CSPS	FIR	MCE
-161.5053	-3.519142	68.97748	-90.36896	194.7070
86.86988	-27.18500	-31.41926	-28.05406	-1.793871
336.2609	4.776615	-44.66386	-100.0762	-156.0168
196.4098	-3.235017	-104.9090	-19.08283	-62.65317
160.7883	-11.14539	-33.82573	-29.26512	-71.78455

Unrestricted Adjustment Coefficients (alpha):

D(GNI)	-0.001632	0.014314	-0.012292	-0.000412	0.001819
D(AFM)	-0.003630	0.023108	-0.015158	-0.001338	0.008949
D(CSPS)	-0.000813	0.014316	-0.009948	0.003732	0.002427
D(FIR)	0.002920	0.018042	-0.009048	-0.001071	0.002329
D(MCE)	-0.006095	0.019173	-0.013588	-0.002152	0.001920

Figure –13

1 Cointegrating Equation(s): Log likelihood 442.3132

Normalized cointegrating coefficients (standard error in parentheses)

GNI	AFM	CSPS	FIR	MCE
1.000000	0.021790	-0.427091	0.559542	-1.205576
	(0.02490)	(0.06292)	(0.10619)	(0.10697)

Adjustment coefficients (standard error in parentheses)

D(GNI)	0.263552
	(1.12508)
D(AFM)	0.586210
	(1.92246)
D(CSPS)	0.131312
	(1.09795)
D(FIR)	-0.471593
	(1.19660)
D(MCE)	0.984434
	(1.40141)

5. Conclusion

The contributing sectors of the Gross National Income have long term impact the development for the Indian Economy. India has a land mark in many dimensions of its progress in different sectors since independence. Thereafter the New Economic Policy implementation since 1991 India got the boost up for the development in all the dimensions. Agriculture and allied sectors like forestry, logging and fishing accounted more in GDP, employed 60% of the total workforce and despite a steady decline of its share in the GDP, is still the largest economic sector and plays a significant role in the overall socio-economic development of India. The agriculture and allied sector are the major sector in the Indian Economy. It contributes in the provision of livelihood to the majority of people and employment opportunity but like the remaining sectors the primary sector is not showing much cointegration with the GNI. The secondary and tertiary sectors have a positive cointegration with the GNI of India in the long run but not the primary sector. And also, the regression between the primary sector and the Gross National Income is very low. According to this analysis, it is concluded that the structural change of the Indian economy has no positive impact on the primary sector. Much contribution is needed to get empirical change in the agriculture and allied sectors. But the improvements

in irrigation, technology, application of modern agricultural practices, provision of agricultural credit and subsidies are more needed for the development of the sector.

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