

ECONOMIC GROWTH IN ODISHA: SECTORAL ANALYSIS

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INTRODUCTION

Economic growth is commonly measured as the annual rate of increase in a country's Gross Domestic Product (GDP). It relates to increase in real per capita income over the long period. It determines the material well being of billions of people. Kaldor has enlisted six stylized facts that characterize the process of economic growth, viz. (a) per capita output grows overtime and its growth rate does not tend to diminish, (b) physical capital per worker grows over time, (c) the rate of return to capital is nearly constant, (d) the ratio of physical capital to output is nearly constant, (e) the share of labour and physical capital in national income are nearly constant and (f) the growth rate of output per worker differs substantially across countries. Simon Kuznets has incorporated other characteristics of modern economic growth. He notes the rapid rate of structural transformation which includes shift from agriculture to industry to services. This process involves urbanization, shift from home work to employee status and an increasing role for formal education. He also argues that modern growth involves an increased role for foreign commerce and that technological progress implies reduced reliance on natural resources. Finally he stresses the growing importance of Govt., the spread of modern economic growth placed greater emphasis on the importance and need for organization in national sovereign units. The sovereign state unit was of critical importance as the formulator of the rules under which economic activity was to be carried on as a referee and as provider of infrastructure.

OBJECTIVES

Firstly to examine growth rate of per capita NSDP across the states Secondly to analyse POLI ranking of major states in 2001 and 2011. Thirdly to estimate linears, compound growth rate and secular growth rate of GSDP, NSDP per capita NSDP of Odisha from 1950-51 to 2012-13. Fourthly, to estimate time series exponential trend of sectoral composition of GSDP of Odisha.

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METHODOLOGY

Compound growth rate formula $P_n = P (I + r)^n$ and time series exponential trend formula $y = ab^x$ formula have been applied for estimation of growth rate and trend values. Data on GSDP, NSDP per Capita NSDP and sectoral composition of GSDP have been elicited from Economic survey Govt. of Odisha, Economic Survey Govt. of India and Economic and Political Weekly relevant issues.

II. Per Capita NSDP growth rate of states for the period 1993-2009 has been reflected in the below table.

Table 1
Growth Rate of per capita NSDP of States (%)

States	1993-2001	2001-2009	1993-2009	2001-07 pre-crisis	2007-2009 crisis Years
1	2	3	4	5	6
Andhra Pradesh	4.33	6.43	5.38	7.11	4.38
Assam	0.40	3.53	1.97	2.90	5.42
Bihar	1.41	5.86	3.64	5.01	8.43
Chhattisgarh	0.89	5.87	3.38	5.89	5.80
Delhi	3.47	7.35	5.41	7.29	7.53
Gujarat	3.36	8.19	5.77	8.65	6.81
Haryana	3.50	6.98	5.24	6.84	7.43
HP	5.24	5.15	5.20	5.82	3.14
J.K	1.55	3.50	2.52	3.29	4.12
Jharkhand	0.83	4.73	2.78	5.15	3.46
Karnataka	4.09	5.57	4.83	6.69	2.20
Kerala	4.05	7.54	5.80	7.57	7.48
MP	2.13	3.37	2.75	2.61	5.63
Maharashtra	2.38	8.13	5.26	8.71	6.39
Orissa	2.05	6.58	4.32	6.98	5.39
Punjab	2.09	4.92	3.50	4.67	5.67
Rajasthan	4.34	3.75	4.04	3.80	3.60
TN	3.99	6.75	5.37	7.03	5.92
UP	1.31	3.88	2.59	3.64	4.58
Uttarkhand	2.23	9.18	5.71	9.94	6.93
WB	5.04	5.00	5.02	4.78	5.67
Av. growth rate of main states	2.79	5.82	4.31	5.92	5.52
Other States					
A & N Islands	1.10	8.15	4.62	8.59	6.83
Arunchal Pradesh	2.46	5.34	3.90	3.79	10.00
Chandigarh	5.67	8.49	7.08	9.13	6.57
Goa	4.40	7.28	5.84	6.61	9.29
Meghalaya	4.22	3.01	3.61	2.97	3.13
Pondicherry	10.56	3.13	6.85	2.99	3.58
Sikkim	2.88	6.19	4.53	6.05	6.60
Tripura	6.81	5.85	6.33	5.47	6.98
Av. Growth of all states	3.34	5.85	4.59	5.86	5.83

Source: CSO, EPW Jan 21, 2012, P 49.

The above table reveals that average growth across 21 states doubled from 2.8% in 1990's to 5.8% in 2000's. The largest improvements were posted by Uttarkhand (7.0% points), Maharashtra (5.8% points) and Chhatisgarh (5% points) with Gujarat, Orissa, and Bihar not far behind.

III. PQLI Ranking of Major States - PQLI is simple average of literacy rate, infant mortality and life expectancy at age 1. Rank of 17 major states on the basis of PQLI has been reflected in Table No. 2

Table 2
PQLI Ranking of 17 major States

States	PQLI Ranking in	
	2001	2011
1	2	3
Andhra Pradesh	11	11
Assam	14	15
Bihar	13	13
Gujarat	7	7
Haryana	8	10
H.P.	2	4
J.K.	10	9
Karnatak	9	8
Kerala	1	1
M.P.	15	17
Maharashtra	3	2
Odisha	16	14
Punjab	4	5
Rajasthan	12	12
Tamil Nadu	5	3
U.P.	17	16
West Bengal	6	6

Source: EPW Sept. 28, 2013, P 41.

The above table reveals that position of AP, Bihar, Gujarat, Kerala, Rajasthan and W.B. remains unchanged. Kerala tops the rank and MP bottoms the rank. There is divergence between Gujarat's economic performance and its social development. Prof. Raj Krishna observed the fact that Gujarat had a low PQLI illustrates a general point. Economic backwardness is generally associated with a low level of social service development, but it is possible for particular regions to be economically better off and socially backward or vice-versa Gujarat has a high industrial development status but remains backward in social service development.

Table 3
(2004-05 Base Price)
Growth Rate of GSDP of Odisha

Year		X	X ²	Y (Rs. in lakhs)	Log Y	X x Log Y
1950.	1951.	-31	961	1214404	6.0844	-188.6153
1951.	1952.	-30	900	1337100	6.1262	-183.7849
1952.	1953.	-29	841	1389570	6.1429	-178.1435
1953.	1954.	-28	784	1410756	6.1495	-172.1847
1954.	1955.	-27	729	1414510	6.1506	-166.0664
1955.	1956.	-26	676	1454936	6.1628	-160.2339
1956.	1957.	-25	625	1473823	6.1684	-154.2111
1957.	1958.	-24	576	1327936	6.1232	-146.9563
1958.	1959.	-23	529	1486122	6.1721	-141.9573
1959.	1960.	-22	484	1558979	6.1928	-136.2425
1960.	1961.	-21	441	1629344	6.2120	-130.4523
1961.	1962.	-20	400	1730608	6.2382	-124.7640
1962.	1963.	-19	361	1896208	6.2779	-119.2798
1963.	1964.	-18	324	2097198	6.3216	-113.7895
1964.	1965.	-17	289	2219314	6.3462	-107.8857
1965.	1966.	-16	256	1996854	6.3003	-100.8055
1966.	1967.	-15	225	2156193	6.3337	-95.0053
1967.	1968.	-14	196	2113188	6.3249	-88.5491
1968.	1969.	-13	169	2393389	6.3790	-82.9272
1969.	1970.	-12	144	2314175	6.3644	-76.3728
1970.	1971.	-11	121	2391075	6.3786	-70.1645
1971.	1972.	-10	100	2205962	6.3436	-63.4360
1972.	1973.	-9	81	2206726	6.3437	-57.0937
1973.	1974.	-8	64	2556490	6.4076	-51.2612
1974.	1975.	-7	49	2270753	6.3562	-44.4932
1975.	1976.	-6	36	2605717	6.4159	-38.4956
1976.	1977.	-5	25	2494468	6.3970	-31.9849
1977.	1978.	-4	16	2863092	6.4568	-25.8273
1978.	1979.	-3	9	3046091	6.4837	-19.4512
1979.	1980.	-2	4	2677693	6.4278	-12.8556
1980.	1981.	-1	1	3019766	6.4800	-6.4800
1981.	1982.	0	0	3041237	6.4831	0
1982.	1983.	1	1	2898300	6.4621	6.4621
1983.	1984.	2	4	3433353	6.5357	13.0714
1984.	1985.	3	9	3261593	6.5134	19.5403
1985.	1986.	4	16	3646900	6.5619	26.2477
1986.	1987.	5	25	3694728	6.5676	32.8379
1987.	1988.	6	36	3592204	6.5554	39.3322
1988.	1989.	7	49	4214647	6.6248	46.3733
1989.	1990.	8	64	4535081	6.6566	53.2527
1990.	1991.	9	81	3883162	6.5892	59.3027
1991.	1992.	10	100	4263824	6.6298	66.2980

1992.	1993.	11	121	4188390	6.6220	72.8425
1993.	1994.	12	144	4496557	6.6529	79.8346
1994.	1995.	13	169	4728488	6.6747	86.7714
1995.	1996.	14	196	4923531	6.6923	93.6919
1996.	1997.	15	225	4684672	6.6707	100.0602
1997.	1998.	16	256	5311965	6.7253	107.6041
1998.	1999.	17	289	5462975	6.7374	114.5363
1999.	2000.	18	324	5932446	6.7732	121.9182
2000.	2001.	19	361	5830376	6.7657	128.5482
2001.	2002.	20	400	6110766	6.7861	135.7219
2002.	2003.	21	441	6105838	6.7857	142.5006
2003.	2004.	22	484	6889860	6.8382	150.4406
2004.	2005.	23	529	7772943	6.8906	158.4835
2005.	2006.	24	575	8214472	6.9146	165.9499
2006.	2007.	25	625	9270083	6.9671	174.1771
2007.	2008.	26	676	10284562	7.0122	182.3168
2008.	2009.	27	729	1108178	6.0446	163.2045
2009.	2010.	28	784	11585113	7.0639	197.7892
2010.	2011.	29	841	12456658	7.0953	205.7636
2011.	2012.	30	900	13066866	7.1162	213.4851
2012.	2013.	31	961	14260674	7.1541	221.7783
		Total	$\Sigma x^2 = 20832$		$\Sigma \log y =$ 410.2245	$\Sigma x \log y =$ 290.3668

$$\text{Log } a = \frac{\Sigma \log y}{N} = \frac{410.2245}{63} = 6.5115$$

$$A = \text{AL of } 6.5115 = 3247000.0$$

$$\text{Log } b = \frac{\Sigma x \cdot \log y}{\Sigma x^2} = \frac{290.3668}{20832} = 0.0139$$

$$b = \text{AL of } 0.0139 = 1.032$$

Growth rate of GSDP is 1.032

IV. Growth Rate of GSDP of Odisha for the period 1950-51 to 2012-13 by the application of exponential trend method has been estimated at 1.032 (regression coefficient).

Table 4
(2004-05 Base Price)
Growth Rate of NSDP of Odisha

Year	X	X ²	Y (Rs. in Lakhs)	Log y	X. Log y	
1950.	1951.	-31	961	918011	5.9628	-184.8483
1951.	1952.	-30	900	1018265	6.0079	-180.2358
1952.	1953.	-29	841	1042238	6.0180	-174.5210
1953.	1954.	-28	784	1099323	6.0411	-169.1515

contd. table

Year		X	X ²	Y (Rs. in Lakhs)	Log y	X. Log y
1954.	1955.	-27	729	1101762	6.0421	-163.1364
1955.	1956.	-26	676	1150948	6.0611	-157.5875
1956.	1957.	-25	625	1167163	6.0671	-151.6783
1957.	1958.	-24	576	1029180	6.0125	-144.2998
1958.	1959.	-23	529	1175848	6.0704	-139.6181
1959.	1960.	-22	484	1242442	6.0943	-134.0741
1960.	1961.	-21	441	1307121	6.1163	-128.4426
1961.	1962.	-20	400	1400285	6.1462	-122.9243
1962.	1963.	-19	361	1553608	6.1913	-117.6355
1963.	1964.	-18	324	1668622	6.2224	-112.0024
1964.	1965.	-17	289	1791686	6.2533	-106.3055
1965.	1966.	-16	256	1632540	6.2129	-99.4058
1966.	1967.	-15	225	1720356	6.2356	-93.5343
1967.	1968.	-14	196	1722661	6.2362	-87.3068
1968.	1969.	-13	169	1929814	6.2855	-81.7118
1969.	1970.	-12	144	1920915	6.2835	-75.4021
1970.	1971.	-11	121	2004548	6.3020	-69.3222
1971.	1972.	-10	100	1828190	6.2620	-62.6200
1972.	1973.	-9	81	2012623	6.3038	-56.7339
1973.	1974.	-8	64	2149287	6.3323	-50.6584
1974.	1975.	-7	49	1878328	6.2738	-43.9164
1975.	1976.	-6	36	2188443	6.3401	-38.0408
1976.	1977.	-5	25	2080461	6.3182	-31.5908
1977.	1978.	-4	16	2420995	6.3840	-25.5360
1978.	1979.	-3	9	2587769	6.4129	-19.2388
1979.	1980.	-2	4	2238573	6.3500	-12.7100
1980.	1981.	-1	1	2554198	6.4073	-6.4073
1981.	1982.	0	0	2569037	6.4098	0
1982.	1983.	1	1	2429381	6.3855	6.3855
1983.	1984.	2	4	2923841	6.4660	12.9319
1984.	1985.	3	9	2756019	6.4403	19.3208
1985.	1986.	4	16	3108950	6.4926	25.9705
1986.	1987.	5	25	3145510	6.4977	32.4885
1987.	1988.	6	36	3039966	6.4829	38.8472
1988.	1989.	7	49	3611833	6.5577	45.9041
1989.	1990.	8	64	3899431	6.5910	52.7280
1990.	1991.	9	81	3282841	6.5162	58.6462
1991.	1992.	10	100	3625339	6.5593	65.59330
1992.	1993.	11	121	3539943	6.5490	72.0390
1993.	1994.	12	144	3816406	6.5817	78.9799
1994.	1995.	13	169	4009160	6.6031	85.8397
1995.	1996.	14	196	4164616	6.6196	92.6740
1996.	1997.	15	225	3913538	6.5926	98.8885
1997.	1998.	16	256	4464813	6.6498	106.3669

contd. table

Year	X	X ²	Y (Rs. in Lakhs)	Log y	X. Log y	
1998.	1999.	17	289	4592379	6.6620	113.2546
1999.	2000.	18	324	5372881	6.7302	121.1437
2000.	2001.	19	361	5223400	6.7180	127.6411
2001.	2002.	20	400	5448028	6.7362	134.7248
2002.	2003.	21	441	5432171	6.7350	141.4344
2003.	2004.	22	484	6078415	6.7838	149.2434
2004.	2005.	23	529	6798702	6.8325	157.1458
2005.	2006.	24	575	7100497	6.8513	164.4309
2006.	2007.	25	625	7984484	6.9022	172.5562
2007.	2008.	26	676	8669191	6.9280	180.3874
2008.	2009.	27	729	9320665	6.9644	188.1751
2009.	2010.	28	784	9395723	6.9729	195.2421
2010.	2011.	29	841	9949037	6.9978	202.9357
2011.	2012.	30	900	10190663	7.0083	210.2461
2012.	2013.	31	961	10946409	7.0393	218.2174
			$\Sigma x^2 = 20832$		$\Sigma \log y = 406.1136$	$\Sigma x. \log y = 329.8159$

$$\text{Log } a = \frac{\Sigma \log y}{N} = \frac{406.1136}{63} = 6.4462$$

$$a = \text{AL of } 6.4462 = 2794000.0$$

$$\text{Log } b = \frac{\Sigma x. \log y}{\Sigma x^2} = \frac{329.8159}{20832} = 0.0158$$

$$b = \text{AL of } 0.0158 = 1.037$$

$$\text{Growth rate of NSDP} = 1.037$$

Table 5
(2004-05 Base Price)
Growth Rate of Per Capita NSDP

Year	X	X ²	Y (in Rs.)	Log y	X. x Logy	
1950.	1951.	-31	961	6395	3.8058	-117.9811
1951.	1952.	-30	900	6953	3.8422	-115.2652
1952.	1953.	-29	841	6978	3.8437	-111.4682
1953.	1954.	-28	784	7220	3.8585	-108.0390
1954.	1955.	-27	729	7101	3.8513	-103.9856
1955.	1956.	-26	676	7282	3.8623	-100.4185
1956.	1957.	-25	625	7251	3.8604	-96.5099
1957.	1958.	-24	576	6281	3.7980	-91.1527
1958.	1959.	-23	529	7051	3.8483	-88.5098
1959.	1960.	-22	484	7323	3.8647	-85.0232

contd. table

Year		X	X ²	Y (in Rs.)	Log y	X. x Logy
1960.	1961.	-21	441	7564	3.8788	-81.4538
1961.	1962.	-20	400	7902	3.8977	-77.9547
1962.	1963.	-19	361	8555	3.9322	-74.7122
1963.	1964.	-18	324	8971	3.9528	-71.1511
1964.	1965.	-17	289	9410	3.9741	-67.5589
1965.	1966.	-16	256	8381	3.9233	-62.7727
1966.	1967.	-15	225	8636	3.9363	-59.0447
1967.	1968.	-14	196	8461	3.9274	-54.9839
1968.	1969.	-13	169	9278	3.9675	-51.5769
1969.	1970.	-12	144	9044	3.9564	-47.4763
1970.	1971.	-11	121	9239	3.9656	-43.6219
1971.	1972.	-10	100	8238	3.9158	-39.1582
1972.	1973.	-9	81	8879	3.9484	-35.5353
1973.	1974.	-8	64	9298	3.9684	-31.7471
1974.	1975.	-7	49	7955	3.9006	-27.3045
1975.	1976.	-6	36	9089	3.9585	-23.7511
1976.	1977.	-5	25	8481	3.9285	-19.6422
1977.	1978.	-4	16	9693	3.9865	-15.9458
1978.	1979.	-3	9	10185	4.0080	-12.0239
1979.	1980.	-2	4	8670	3.9380	-7.8760
1980.	1981.	-1	1	9745	3.9888	-3.9888
1981.	1982.	0	0	9641	3.9841	0
1982.	1983.	1	1	8956	3.9521	3.9521
1983.	1984.	2	4	10587	4.0248	8.0445
1984.	1985.	3	9	9804	3.9914	11.9742
1985.	1986.	4	16	10862	4.0359	16.1436
1986.	1987.	5	25	10792	4.0331	20.1655
1987.	1988.	6	36	10240	4.0103	24.0618
1988.	1989.	7	49	11943	4.0771	28.5398
1989.	1990.	8	64	12654	4.1022	32.8178
1990.	1991.	9	81	10452	4.0192	36.1728
1991.	1992.	10	100	11339	4.0546	40.5457
1992.	1993.	11	121	10887	4.0369	44.4060
1993.	1994.	12	144	11546	4.0624	48.7492
1994.	1995.	13	169	11938	4.0769	53.0001
1995.	1996.	14	196	1211	4.0868	57.2145
1996.	1997.	15	225	11305	4.0533	60.7991
1997.	1998.	16	256	12714	4.1043	65.6685
1998.	1999.	17	289	12898	4.1105	69.8789
1999.	2000.	18	324	14862	4.1721	75.0974
2000.	2001.	19	361	14263	4.1542	78.9300
2001.	2002.	20	400	14693	4.1671	83.3422
2002.	2003.	21	441	14485	4.1609	87.3793
2003.	2004.	22	484	16029	4.2049	92.5079
2004.	2005.	23	529	17650	4.2467	97.6751

contd. table

Year		X	X ²	Y (in Rs.)	Log y	X. x Logy
2005.	2006.	24	575	18194	4.2599	102.2383
2006.	2007.	25	625	20194	4.3052	107.6306
2007.	2008.	26	676	21640	4.3353	112.7167
2008.	2009.	27	729	22963	4.3610	117.7478
2009.	2010.	28	784	22846	4.3588	122.0467
2010.	2011.	29	841	23875	4.3779	126.9604
2011.	2012.	30	900	24134	4.3826	131.4789
2012.	2013.	31	961	25584	4.4075	136.6470
			Σx ² =		Σ log y =	Σx. x logy =
			20832		253.9988	166.8992

$$\text{Log a} = \frac{\Sigma \log y}{N} = \frac{253.9988}{63} = 4.0317$$

$$A = \text{AL of } 4.0317 = 10760.0$$

$$\text{Log b} = \frac{\Sigma x \cdot \log y}{\Sigma x^2} = \frac{166.8992}{20832} = 0.0008$$

$$b = \text{AL of } 0.0008 = 1.002$$

Growth Rate of per capita NSDP = 1.002

Table 6
(2004-05 Base Price)
Growth rate of primary sector (Agril. Animal husbandry Forestry and Fishing)

Year		X	X ²	Y (Rs. in lakhs)	Log y	X. Log y
1950.	1951.	-31	961	868589	5.9388	-184.1028
1951.	1952.	-30	900	977891	5.9903	-179.7090
1952.	1953.	-29	841	922486	5.9649	-172.9067
1953.	1954.	-28	784	916920	5.9623	-166.9444
1954.	1955.	-27	729	849466	5.9291	-160.0857
1955.	1956.	-26	676	832143	5.9202	-153.9252
1956.	1957.	-25	625	850203	5.9295	-148.2375
1957.	1958.	-24	576	708694	5.8505	-140.4120
1958.	1959.	-23	529	896594	5.9526	-136.9098
1959.	1960.	-22	484	863374	5.9362	-130.5964
1960.	1961.	-21	441	931656	5.9693	-125.3553
1961.	1962.	-20	400	995499	5.9980	-119.9600
1962.	1963.	-19	361	1107645	6.0444	-114.8436
1963.	1964.	-18	324	1256476	6.0992	-108.7292
1964.	1965.	-17	289	1298827	6.1136	-103.9312
1965.	1966.	-16	256	1099508	6.0412	-96.6592
1966.	1967.	-15	225	1305118	6.1156	-91.7340
1967.	1968.	-14	196	1176503	6.0706	-84.9884

contd. table

Year		X	X ²	Y (Rs. in lakhs)	Log y	X. Log y
1968.	1969.	-13	169	1693951	6.2289	-80.9757
1969.	1970.	-12	144	1345448	6.1289	-73.5468
1970.	1971.	-11	121	1440324	6.1585	-67.7435
1971.	1972.	-10	100	1275250	6.1056	-61.0560
1972.	1973.	-9	81	1365729	6.1354	-55.2186
1973.	1974.	-8	64	1468499	6.1669	-49.3352
1974.	1975.	-7	49	1225108	6.0882	-42.6164
1975.	1976.	-6	36	1454161	6.1641	-36.9846
1976.	1977.	-5	25	1274684	6.1054	-30.5270
1977.	1978.	-4	16	1571233	6.1962	-24.7848
1978.	1979.	-3	9	1645879	6.2164	-18.6492
1979.	1980.	-2	4	1332407	6.1246	-12.2492
1980.	1981.	-1	1	1579254	6.1985	-6.1985
1981.	1982.	0	0	1616236	6.2085	0
1982.	1983.	1	1	1448876	6.1610	6.1610
1983.	1984.	2	4	1810567	6.2578	12.5156
1984.	1985.	3	9	1568219	6.1954	18.5862
1985.	1986.	4	16	1805705	6.2566	25.0264
1986.	1987.	5	25	1729648	6.2380	31.1900
1987.	1988.	6	36	1563477	6.1941	37.1646
1988.	1989.	7	49	1813361	6.2585	43.8095
1989.	1990.	8	64	2021667	6.3057	50.4456
1990.	1991.	9	81	1419576	6.1522	55.3698
1991.	1992.	10	100	1597112	6.2033	62.0330
1992.	1993.	11	121	1468240	6.1668	67.8348
1993.	1994.	12	144	1665597	6.2216	74.6592
1994.	1995.	13	169	1646560	6.2166	80.8158
1995.	1996.	14	196	1664702	6.2213	87.0982
1996.	1997.	15	225	1476885	6.1693	92.5395
1997.	1998.	16	256	1771222	6.2483	99.9728
1998.	1999.	17	289	1737423	6.2399	106.0783
1999.	2000.	18	324	1623444	6.2104	111.7872
2000.	2001.	19	361	1515843	6.1807	117.4333
2001.	2002.	20	400	1739506	6.2404	124.8080
2002.	2003.	21	441	1473993	6.1685	129.5385
2003.	2004.	22	484	1771848	6.2484	137.4648
2004.	2005.	23	529	1825698	6.2614	144.0122
2005.	2006.	24	575	1886717	6.2757	150.6168
2006.	2007.	25	625	1923241	6.2840	157.1000
2007.	2008.	26	676	2012888	6.3038	163.8988
2008.	2009.	27	729	2050447	6.3118	170.4186
2009.	2010.	28	784	2209191	6.3442	177.6376
2010.	2011.	29	841	2251467	6.3525	184.2225
2011.	2012.	30	900	2148555	6.3321	189.9630

contd. table

Year	X	X ²	Y (Rs. in lakhs)	Log y	X. Log y	
2012.	2013.	31	961	2494591	6.3970	198.3078
			Σx ² = 20832		Σlogy = 381.4613	Σx.logy= 128.5217

$$\text{Log } a = \frac{381.4613}{63} = 6.0549$$

$$a = \text{AL of } 6.0549 = 1134000.0$$

$$\text{Log } b = \frac{128.5217}{20832} = 0.00062$$

$$b = \text{AL of } 0.00062 = 1.001$$

Growth Rate of Primary Sector = 1.001

Table 7
(2004-05 Base Price)
Growth rate of Secondary Sector (Mining, Quarrying, Manufacturing Regd. And Un-Regd. Electricity, Gas & Water supply & Construction)

Year	X	X ²	Y (Rs. in Lakh)	Logy	X. Logy	
1950.	1951.	-31	961	132489	5.1222	-158.7882
1951.	1952.	-30	900	158845	5.2010	-156.0300
1952.	1953.	-29	841	199974	5.3010	-153.7290
1953.	1954.	-28	784	230006	5.3617	-150.1276
1954.	1955.	-27	729	261682	5.4178	-146.2806
1955.	1956.	-26	676	299377	5.4762	-142.3812
1956.	1957.	-25	625	323096	5.5093	-137.7325
1957.	1958.	-24	576	350759	5.5450	-133.0800
1958.	1959.	-23	529	375655	5.5748	-128.2204
1959.	1960.	-22	484	418005	5.6212	-123.6664
1960.	1961.	-21	441	457508	5.6604	-118.8684
1961.	1962.	-20	400	556634	5.7456	-114.9120
1962.	1963.	-19	361	671639	5.8271	-110.07149
1963.	1964.	-18	324	708677	5.8504	-105.3072
1964.	1965.	-17	289	638655	5.8053	-98.6901
1965.	1966.	-16	256	562549	5.7502	-92.0032
1966.	1967.	-15	225	531360	5.7254	-85.8810
1967.	1968.	-14	196	521447	5.7172	-80.0408
1968.	1969.	-13	169	520695	5.7166	-74.3158
1969.	1970.	-12	144	526327	5.7213	-68.6556
1970.	1971.	-11	121	561404	5.7493	-63.2423
1971.	1972.	-10	100	662497	5.8212	-58.2120
1972.	1973.	-9	81	670399	5.8263	-52.4367
1973.	1974.	-8	64	685088	5.8357	-46.6856
1974.	1975.	-7	49	712149	5.8526	-40.9682
1975.	1976.	-6	36	830851	5.9195	-35.5170

contd. table

Year		X	X ²	Y (Rs. in Lakh)	Logy	X. Logy
1976.	1977.	-5	25	776375	5.8901	-34.4505
1977.	1978.	-4	16	843717	5.9262	-23.7048
1978.	1979.	-3	9	963957	5.9841	-17.9523
1979.	1980.	-2	4	749972	5.8750	11.7500
1980.	1981.	-1	1	692215	5.8402	-5.8402
1981.	1982.	0	0	785017	5.8949	0
1982.	1983.	1	1	874367	5.9417	5.9417
1983.	1984.	2	4	845847	5.9273	11.8546
1984.	1985.	3	9	903461	5.9560	17.8680
1985.	1986.	4	16	950458	5.9780	23.9120
1986.	1987.	5	25	977209	5.9900	29.9500
1987.	1988.	6	36	1240173	6.0935	36.5610
1988.	1989.	7	49	1219168	6.0861	42.6027
1989.	1990.	8	64	1438174	6.1578	49.2624
1990.	1991.	9	81	1377716	6.1392	55.2528
1991.	1992.	10	100	1415913	6.1510	61.5100
1992.	1993.	11	121	1460826	6.1646	67.8106
1993.	1994.	12	144	1415017	6.1508	73.8096
1994.	1995.	13	169	2079274	6.3179	82.1327
1995.	1996.	14	196	1539382	6.1873	86.6222
1996.	1997.	15	225	1701144	6.2307	93.4605
1997.	1998.	16	256	1744358	6.2416	99.8656
1998.	1999.	17	289	1991302	6.2991	107.0847
1999.	2000.	18	324	1915824	6.2824	113.0832
2000.	2001.	19	361	1834023	6.2634	119.0046
2001.	2002.	20	400	1944352	6.2888	125.7760
2002.	2003.	21	441	2159892	6.3344	133.0224
2003.	2004.	22	484	2652174	6.4236	141.3192
2004.	2005.	23	529	2722051	6.4349	148.0027
2005.	2006.	24	575	3304389	6.5191	156.4484
2006.	2007.	25	625	3880463	6.5889	164.7225
2007.	2008.	26	676	4084174	6.6111	171.8886
2008.	2009.	27	729	3976110	6.5994	178.1838
2009.	2010.	28	784	4247745	6.6282	185.5896
2010.	2011.	29	841	4553971	6.6584	193.0936
2011.	2012.	30	900	4553971	6.6584	199.7520
2012.	2013.	31	961	4691160	6.6713	206.8103
$\Sigma x^2 = 20832$					$\Sigma \log y =$ 377.0397	$\Sigma x \cdot \log y =$ 412.0235

$$\text{Log } a = \frac{377.0397}{63} = 5.9848$$

$$a = \text{AL of } 5.9848 = 965600.0$$

$$\text{Log } b = \frac{412.0235}{20832} = 0.0198$$

$$b = \text{AL of } 0.0198 = 1.047$$

Growth Rate of Secondary Sector = 1.047

Table 8
(2004-05 Base Price)
**Growth Rate of Tertiary and services sector (Trade, Hotel, Restaurant, Railways,
 Transport, Storage, Communication, Banking, Insurance, Real Estate, Public
 Administration and other services)**

Year		X	X ²	Y (Rs. in Lakh)	Logy	X. Logy
1950.	1951.	-31	961	213326	5.3290	-165.1990
1951.	1952.	-30	900	200364	5.3018	-159.0540
1952.	1953.	-29	841	267110	5.4267	-157.3743
1953.	1954.	-28	784	263830	5.4213	-151.7964
1954.	1955.	-27	729	303362	5.4815	-148.0005
1955.	1956.	-26	676	323416	5.5048	-143.1248
1956.	1957.	-25	625	300524	5.4779	-136.9475
1957.	1958.	-24	576	268483	5.4284	-130.2816
1958.	1959.	-23	529	223873	5.3500	-123.0500
1959.	1960.	-22	484	277600	5.4434	-119.7548
1960.	1961.	-21	441	240184	5.3805	-112.9905
1961.	1962.	-20	400	178475	5.2516	-105.0320
1962.	1963.	-19	361	116924	5.0679	-96.2901
1963.	1964.	-18	324	132045	5.1207	-92.1726
1964.	1965.	-17	289	281832	5.4500	-92.6500
1965.	1966.	-16	256	334797	5.5248	-88.3968
1966.	1967.	-15	225	319715	5.5048	-82.5720
1967.	1968.	-14	196	415238	5.6183	-78.6562
1968.	1969.	-13	169	178743	5.2522	-68.2786
1969.	1970.	-12	144	442400	5.6458	-67.7496
1970.	1971.	-11	121	312447	5.4948	-60.4428
1971.	1972.	-10	100	453328	5.6564	-56.5640
1972.	1973.	-9	81	370598	5.5689	-50.0201
1973.	1974.	-8	64	402903	5.6052	-44.8416
1974.	1975.	-7	49	333496	5.5231	-38.6617
1975.	1976.	-6	36	320705	5.5061	-33.0366
1976.	1977.	-5	25	443409	5.6468	-28.2340
1977.	1978.	-4	16	448142	5.6514	-22.6056
1978.	1979.	-3	9	436255	5.6397	-16.9191
1979.	1980.	-2	4	595314	5.7747	-11.5494
1980.	1981.	-1	1	748297	5.8741	-5.8741
1981.	1982.	0	0	639984	5.8062	0
1982.	1983.	1	1	575057	5.7597	5.7597
1983.	1984.	2	4	776939	5.8904	11.7808
1984.	1985.	3	9	789913	5.8976	17.6928
1985.	1986.	4	16	890737	5.9497	23.7988
1986.	1987.	5	25	987871	5.9947	29.9735
1987.	1988.	6	36	788554	5.8968	35.3808
1988.	1989.	7	49	1182118	6.0727	42.5089

contd. table

Year		X	X ²	Y (Rs. in Lakh)	Logy	X. Logy
1989.	1990.	8	64	1075240	6.0315	48.2520
1990.	1991.	9	81	1085870	6.0358	54.3222
1991.	1992.	10	100	1250799	6.0972	60.9720
1992.	1993.	11	121	1259324	6.1001	67.1011
1993.	1994.	12	144	1415943	6.1510	73.8120
1994.	1995.	13	169	1002654	6.0012	78.0156
1995.	1996.	14	196	1719447	6.2354	87.2956
1996.	1997.	15	225	1506643	6.1780	92.6700
1997.	1998.	16	256	1796385	6.2544	100.0704
1998.	1999.	17	289	1734250	6.2391	106.0647
1999.	2000.	18	324	2291108	6.3600	114.4800
2000.	2001.	19	361	2256847	6.3536	120.7184
2001.	2002.	20	400	2426908	6.3851	127.7020
2002.	2003.	21	441	2471953	6.3930	134.2530
2003.	2004.	22	484	2465838	6.3920	140.6240
2004.	2005.	23	529	3225194	6.5086	149.6978
2005.	2006.	24	575	3023366	6.4805	155.5320
2006.	2007.	25	625	3466379	6.5399	163.4975
2007.	2008.	26	676	4187500	6.6220	172.1720
2008.	2009.	27	729	5054621	6.7037	180.9999
2009.	2010.	28	784	5128177	6.7100	187.8800
2010.	2011.	29	841	5648220	6.7519	195.8051
2011.	2012.	30	900	6364340	6.8038	204.1140
2012.	2013.	31	961	7074923	6.8497	212.3407
			$\Sigma x^2 =$		$\Sigma \log y =$	$\Sigma x \log y =$
			20832		364.6082	507.1670

$$\text{Log } a = \frac{364.6082}{63} = 5.5874$$

$$a = \text{AL of } 5.7874 = 612800.0$$

$$\text{Log } b = \frac{507.1670}{20832} = 0.0243$$

$$b = \text{AL of } 0.0243 = 1.058$$

Growth rate of Tertiary & Services Sector = 1.058

Table 9
(2004-05 Base Price)
Time Series/ Secular growth rate of Odisha Economy (1950-51 to 2012-13)

Components	Regression Coefficient	Secular Growth Rate
1. GSDP	1.032	3.2%
2. NSDP	1.037	3.7%
3. Per Capita NSDP	1.002	0.2%
4. Primary	1.001	0.1%
5. Secondary	1.047	4.7%
6. Tertiary and & services Sector	1.058	5.8%

Computed by the application of
Y = ab^x exponential trend method of time series analysis

Table 10
Plan wise Average Annual growth rate of GSDP/ NSDP/ Per Capita
NSDP at 2004-05 Base (Figures in %)

<i>Plan Period</i>	<i>GSDP/ GNP</i>	<i>NSDP/ NNP</i>	<i>Per Capita/ NSDP/NNP</i>
1 ST	3.74 (3.7)	4.69 (4.2)	2.69 (2.4)
2 ND	2.55 (4.2)	2.94 (4.2)	1.12 (2.2)
3 RD	4.44 (2.8)	4.79 (2.6)	2.31 (0.3)
4 TH	1.52 (3.4)	2.39 (3.2)	0.26 (0.9)
5 TH	4.09 (4.9)	4.45 (4.9)	2.50 (2.6)
6 TH	4.45 (5.4)	4.77 (5.4)	3.01 (3.1)
7 TH	7.06 (5.6)	7.48 (5.5)	5.52 (3.3)
8 TH	2.00 (6.6)	1.67 (6.7)	0.07 (4.6)
9 TH	5.58 (5.7)	7.09 (5.5)	5.63 (3.5)
10 TH	8.82 (7.6)	8.07 (7.5)	6.69 (5.9)
11 TH	7.13 (8.0)	5.04 (7.8)	3.67 (6.3)

Source: Eco Survey, Govt. Odisha, 2012-13
 Eco Survey, Govt. of India, 2012-13.

Table 11
(2004-05 Base Price)
Dynamics of Composition of Odisha Economy 2004-05 to 2012-13 (Figures in %)

<i>Year</i>	<i>Agriculture</i>	<i>Industry</i>	<i>Service</i>
2004-05	23.49	23.71	52.80
2005-06	22.97	23.03	54.00
2006-07	20.75	25.33	53.92
2007-08	19.57	27.61	52.82
2008-09	18.50	27.24	54.25
2009-10	19.07	24.74	56.19
2010-11	18.08	25.07	56.86
2011-12	16.44	25.78	57.78
2012-13	17.49	24.22	58.28

Source: Economic Survey, Govt. of Odisha, 2012-13.

OBSERVATIONS & CONCLUSION

Tertiary and services sector register higher growth rate relative to secondary sector. Primary Sector growth rate has not been significant.

Demographic dividend symbolized by rapid expanding young population will save more and inject entrepreneurial vigour which will trigger the growth trajectory of Odisha economy.

The share of working age (economically active population in the age group of 15-59) has been increasing since late 1970's. The share is projected to increase from 58.6% in 2000 to 63.9% in 2035 which will have perceptible contribution to growth rate of not only Indian economy but also Odisha economy.

Gross rate of capital formation as percentage of GDP or GSDP having rising trend will expedite manufacturing sector growth rate.

Increased investment in agriculture sector will augment agricultural productivity and accelerate agricultural growth rate.

Growth of Rural Non-Farm Sector will generate income on the part of surplus of agriculture population in the primary sector which will expedite primary sector growth rate.

Requisite manpower planning through investment in human capital will improve marginal productivity of workers in large scale industries and MSME sector which will accelerate growth rate of secondary sector.

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