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Sub: **Research Article on ‘The Multiplier Effect of Primary Sector’**

Sir,

A researched article titled ‘The Multiplier Effect of Primary Sector’ is enclosed. In this article an attempt has been made to establish the multiplier linkages between primary sector and the other two sectors of the economy by way of introducing the concept of Primary Multiplier on the basis of the Indian Experience and the story of Maharashtra.

Dr.Sreehari Chava is a practicing Cost Accountant and Honorary Director of Shantiniketan Business School, Nagpur. Dr. Vinayak Deshpande is an economist and Director of Department of Business Management, RTM Nagpur University, Nagpur.

We shall be grateful, if you can publish the article in your esteemed Journal.

With Kind Regards

(Dr.Sreehari Chava)

(Dr.Vinayak Deshpande)

The Multiplier Effect of Primary Sector

Dr. Sreehari Chava & Dr. Vinayak Deshpande

(Dr.Sreehari Chava is a practicing Cost Accountant and Honorary Director of Shantiniketan Business School, Nagpur. He represents a unique combination of corporate expertise of over 35years with academic exposure of over25 years. Dr.Vinayak Deshpande is an economist and Director of Department of Business Management, RTM Nagpur University, Nagpur. He is an acclaimed researcher of about 30 years with detailed insights into economics and management.)

Abstract

In a dynamic economic scenario where sectoral changes are taking place very fast and tertiary sector is dominating the economy, the importance and relevance of primary sector cannot be overlooked and undermined. In this study an attempt has been made to establish the multiplier linkages between the primary sector and the other two sectors of the economy by way of introducing the concept of Primary Multiplier on the basis of the Indian Experience and the story of Maharashtra.

Primary Multiplier is the ratio of income of the other sectors to that of the primary sector. It may be inferred that in an economy of developing pattern, the income of Primary Sector bears a transition cum multiplier impact on the incomes of Secondary and Tertiary Sectors. The income multiplication takes place because of the impact of the Value Addition Chain of the Agro Products and Natural Resources on Consumption, Savings and Investment.

An implicit and significant inference could be that public welfare developmental spending infused by the state into primary sector would ultimately lead to generation of tax and other revenues to the state from secondary and tertiary sectors.

The Multiplier Effect of Primary Sector

Dr. Sreehari Chava & Dr. Vinayak Deshpande

1.00 The Concept

Primary Multiplier may be defined as the multiple that denotes the income of any sector with reference to one given unit of income of the primary sector. In other words, it is a ratio of income of the other sectors with that of the primary sector. Primary multiplier is indicative of the composition and sharing pattern of GDP. If the composition of GDP consists of 20% of income from primary sector, 20% from secondary sector and 60% from tertiary sector; the primary multiplier for secondary sector is one (20% / 20%) and that of tertiary sector is three (60% / 20%).

It may be evidenced that in an economy of developing pattern, the income of Primary Sector bears a transition cum multiplier impact on the incomes of Secondary and Tertiary Sectors. Assuming that the balanced level of composition of GDP consists of 20% of income from primary sector, 20% from secondary sector and 60% from tertiary sector; every increase of 20% in the income of Primary Sector can, ultimately, be transmitted into a value addition of 20% for Secondary Sector and 60% for Tertiary Sector.

Accordingly, given a capital output ratio of 4, every investment of Rs.80/- in Primary Sector can result in an immediate income of Rs.20/- for the Primary Sector; an income of Rs.20/- in the Secondary Sector during the transition period; and an income of Rs.60/- in the Tertiary Sector over a time frame of one business / economic cycle depending upon the rates of consumption, savings & investment, and pace of growth of the economy. In the process, every rupee infused into Primary Sector multiplies itself several times over a Business Cycle.

The income multiplication takes place because of the impact of the Value Addition Chain of the Agro Products and Natural Resources on Consumption, Savings and

Investment. The examples that may reveal the pattern could be many: like “Wheat – Atta – Bread – Pizza”; “Cotton – Yarn – Cloth – Garments”; “ Pulses & Nuts – Oil Processing – Food Processing”; “Sugar cane – Sugar – Confectionary”; “Coal – Power – Manufacturing”; “Lime Stone – Cement – Construction” ; and so on.

Citing practical aspects of it, infusion of investments into irrigation will enable conversion of dry farming / mono cropping into multiple and commercial cropping whereby inputs are produced for agro industries. Simultaneously, the levels of income, consumption and savings of agri population are also increased, in turn, leading to higher demand for the products of secondary and tertiary sectors. The higher demand, thus initiated through the agri sector, draws additional investments into secondary and tertiary sectors. Mining & quarrying, the other constituents of the primary sector, support the growth by means of natural endowments of raw material and other benevolence.

As a consequence, the growth and development of primary sector enables infusion of additional investments into secondary and tertiary sectors thereby propelling an overall growth of the economy and also by facilitating forward and backward linkages.

An onward reading of the theorem is that any investments infused into Primary Sector are bound to generate direct returns which are explicit for the sector itself and also would propel consumption, savings and investment that would lead to resultant indirect returns which are implicit for the Secondary and Tertiary Sectors. The theorem holds good till the point of optimum utilization of employable resources. The utility of the theorem lies in strategizing the prioritization and balanced distribution of investments amongst the competing sectors.

2.00 The Indian Experience

The theory of primary multiplier may be corroborated with the development experience of Indian Economy. Towards this end, Indian experience is analyzed on

the basis of the momentum & composition of GDP at factor cost with 1999-2000 as the base year. The relevant figures for the analysis have been drawn from 'The Economic Survey of India 2012'.

India has concentrated on primary sector during 1950s & 60s; nurtured industrial sector during 1960s & 70s; followed by phenomenal development of tertiary sector thereafter.

The figures for the primary sector consist of Agriculture and Related Services and Mining & Quarrying; the figures for the secondary sector include Manufacturing, Electricity, Gas & Water Supply and Construction; and the figures for tertiary sector cover Trade, Hotel, Transport & Communications, Finance, Insurance, Real Estate & Business Services, and Community, Social and Personal Services.

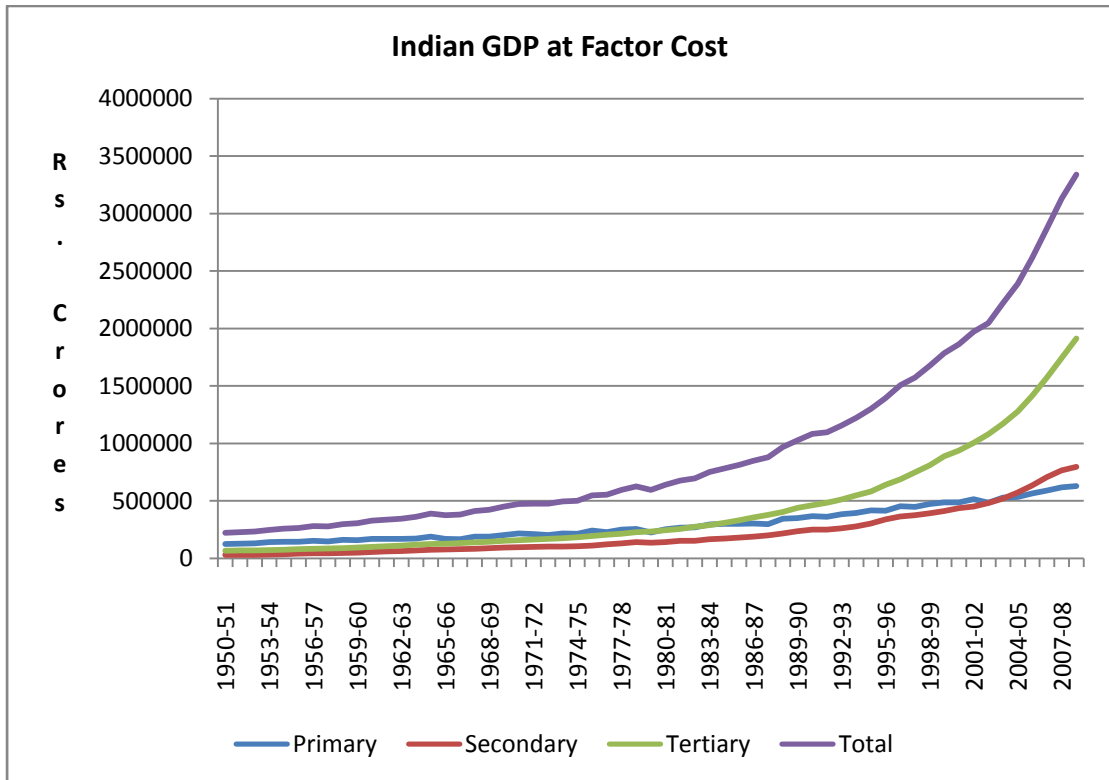
Table 1 shows the Indian GDP at factor cost for the years 1950-51, 1960-61, 1970-71, 1980-81, 1990-91, 2000-01 and 2008-09. Graph 1 depicts the year to year momentum.

Table 1
Indian GDP at Factor Cost with 1999-2000 as Base Year

Rs.Crores

Year	Primary Sector	Secondary Sector	Tertiary Sector	Total
1950-51	127062	36018	66418	224098
1960-61	172432	56142	99993	328567
1970-71	217862	96642	159087	473591
1980-81	256342	141419	244159	641920
1990-91	368907	251868	462797	1083572
2000-01	487992	438372	937937	1864301
2008-09	630289	796215	1912871	3339375

Graph 1



It may be observed that the GDP of primary sector grew from Rs.1,27,062 crores in 1950-51 to Rs.6,30,289 crores by 2008-09; that of secondary sector went up from Rs.36,018 crores in 1950-51 to Rs.7,96,215; and the figures for tertiary sector shot up from Rs.66,418 crores to Rs.19,12,871 crores. In the process the overall GDP multiplied from Rs.2,24,098 crores in 1950-51 to Rs.33,39,375 crores by 2008-09.

However, the rate and pace of growth are different for different sectors as also for different periods. Primary sector indicates stable momentum through-out; secondary sector posts moderate pace with an evident pick up in 1970s; whereas tertiary sector reveals a phenomenal multiplication with most of it coming in post 1990s.

As regards the composition of the GDP, Table 2 shows the sector-wise composition for the years 1950-51, 1960-61, 1970-71, 1980-81, 1990-91, 2000-01 and 2008-09 and Graph 2 depicts the year to year trends.

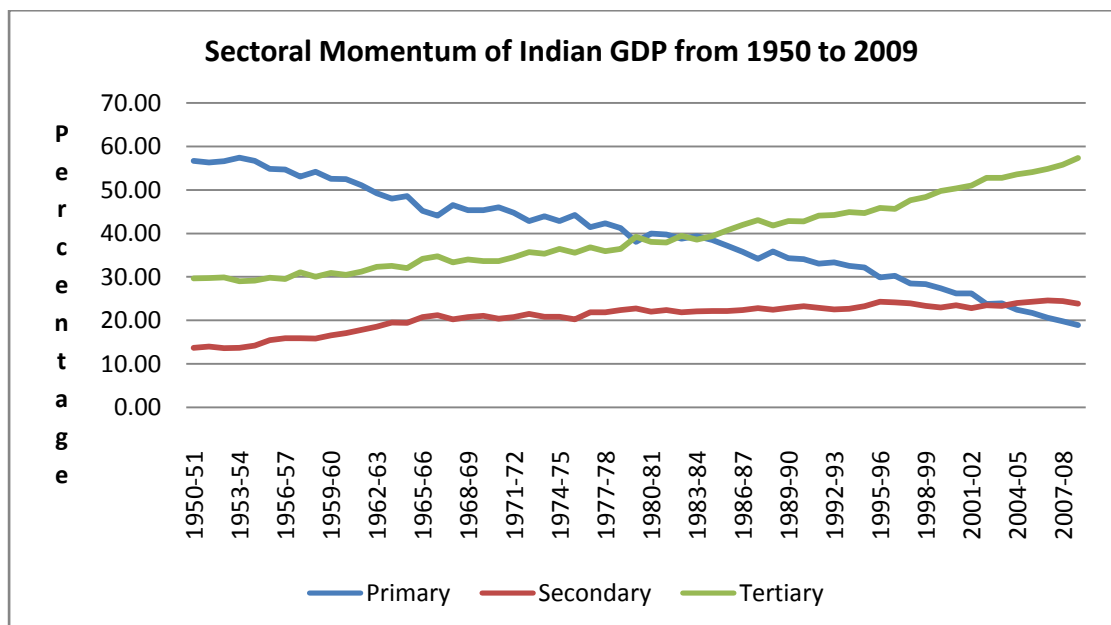
Table 2

Composition of Indian GDP at Factor Cost with 1999-2000 as Base Year

Percentage

Year	Primary Sector	Secondary Sector	Tertiary Sector	Total
1950-51	56.70	13.66	29.64	100.00
1960-61	52.48	17.09	30.43	100.00
1970-71	46.00	20.41	33.59	100.00
1980-81	39.93	22.03	38.04	100.00
1990-91	34.05	23.24	42.71	100.00
2000-01	26.18	23.51	50.31	100.00
2008-09	18.87	23.84	57.28	100.00

Graph 2



It may be observed that, in spite of specific growth in the absolute figures, the share of primary sector declined from a fabulous 56.70% in 1950-51 to a moderate 18.87% by 2008-09; that of secondary sector went up considerably from 13.66% in 1950-51

to 23.84%; and the figures for tertiary sector multiplied from a relatively low 29.64% to a high 57.28%. The changes in the composition of the GDP are, obviously, attributable to the process of development.

It may be recalled that in the Indian Experience, the economic development was initiated by infusing huge capital investments into the primary sector during 1950s and 60s. The State played a major role, here, by constructing dams & canals to create irrigation facilities; and by establishing a number of public sector undertakings in infrastructure sectors. It was in the nature of a welfare developmental spending initiated by the State towards creation of public goods. By 1970-71, the share of primary sector declined to 46% whereas those of the secondary and tertiary sectors improved to 20.41% and 33.59% respectively. The private sector was docile during this initial period of development.

The process of development initiated through the investments infused into the primary sector & the resultant multiplier effect has activated the private sector by 1970s. As a result, the country witnessed substantial growth in private sector. The growth mainly took place with reference to secondary and tertiary sectors. The major source of funding was facilitated through enterprising promoters, banks and financial institutions. By 1990-91, the share of primary sector declined considerably to 34.05% whereas those of secondary and tertiary sectors improved to 23.24% and 42.71% respectively. These two decades saw through an established public sector and an active private sector.

The Economic Reforms and the process of LPG (Liberalization Privatization Globalization) initiated in 1990s facilitated the competitive arms to both public and private sectors. The era witnessed huge infusions into private sector by means of public issues and considerable disinvestments from public sector. Thus, by 2008-09, the share of primary sector came down to the moderate 18.87%; that of secondary sector went up to a stable 23.84%; and the figures for tertiary sector pushed up to a relatively high 57.28%.

A visible effect of the experience is that the development initiated through infusions into primary sector by the state, over 60 years ago, having been supplemented by several other factors, is ultimately shaping up into a participative development wherein PPP (Public Private Participation) is the order of the day.

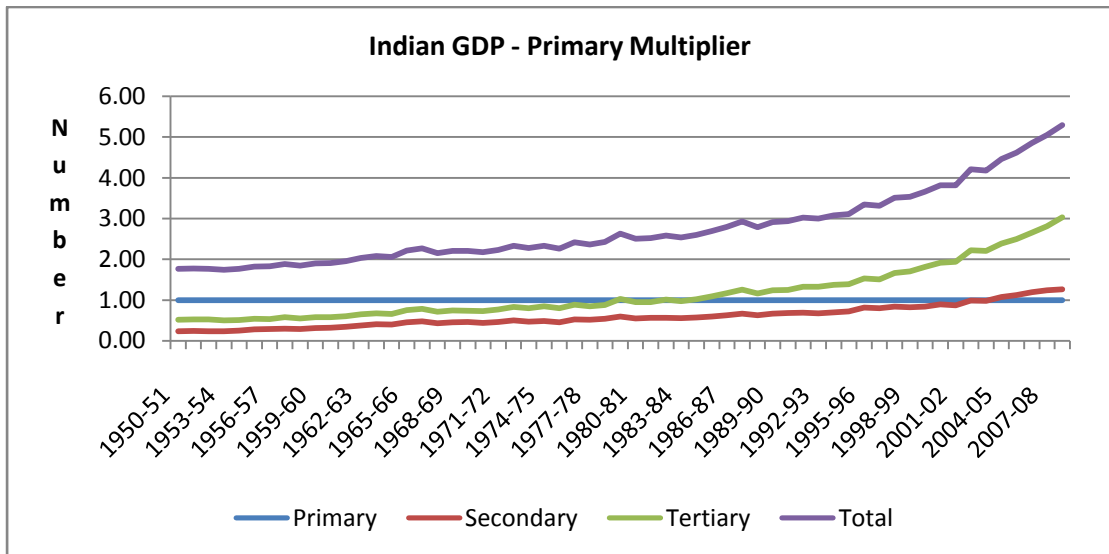
An interesting observation is that the revenue accrual to the state from primary sector is minimal and that maximum revenue for the state is generated by the secondary and tertiary sectors in the form of direct and indirect taxes. An implicit inference that could be drawn is that public welfare developmental spending infused by the state into primary sector would ultimately lead to generation of tax and other revenues to the state from secondary and tertiary sector.

Taking forward the analysis towards the behavior of primary multiplier, table 3 shows the primary multipliers for the years 1950-51, 1960-61, 1970-71, 1980-81, 1990-91, 2000-01 and 2008-09 and Graph 3 depicts the year to year momentum.

Table 3
Primary Multipliers of Indian GDP

Year	Primary Sector	Secondary Sector	Tertiary Sector	Total
1950-51	1.00	0.24	0.52	1.76
1960-61	1.00	0.33	0.58	1.91
1970-71	1.00	0.44	0.73	2.17
1980-81	1.00	0.55	0.95	2.50
1990-91	1.00	0.68	1.25	2.94
2000-01	1.00	0.90	1.92	3.82
2008-09	1.00	1.26	3.03	5.30

Graph 3



It may be observed that the primary multiplier of secondary sector went up from 0.24 in 1950-51 to a standard 1.26 by 2008-09; that of tertiary sector went up considerably from 0.52 to 3.03; and the figures for over all GDP from 1.76 to 5.30. The changes in the composition of the GDP are, obviously, attributable to the process of development. It is also evident that higher the level of growth, higher the multiplier.

An important observation that may be drawn from graph 3 is that in relation to a fixed trend line of primary sector, the primary multiplier for the secondary sector is semi fixed and that of tertiary sector is semi variable.

It is also relevant to remember that the impact of recession during the period 2008 thru 2010 could be absorbed by India in an effective manner because of its strong base spread across the primary sector.

3.00 The Story of Maharashtra

At the state level, an attempt has been made to test the theory of the primary multiplier with reference to the development story of the State of Maharashtra covering the period 1960-61 to 2007-08. The analysis of the Net State Domestic Product (NSDP) of Maharashtra is carried out at the constant prices of 1999-2000.

The relevant figures for the analysis have been drawn from 'The Statistical Abstract of Maharashtra State 2007-08'.

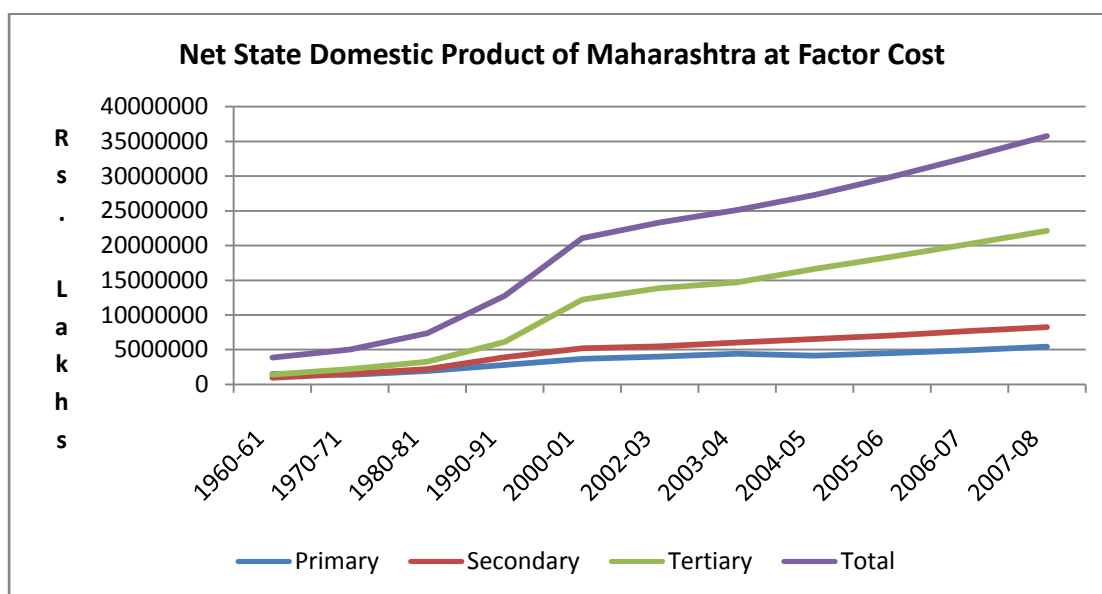
Table 4 shows the NSDP of Maharashtra, at factor cost with 1999-2000 as the base year, for the years 1960-61, 1970-71, 1980-81, 1990-91, 2000-01 and 2007-08. Graph 4 depicts the period to period momentum up-to 2001 and year to year momentum thereafter.

Table 4
NSDP of Maharashtra at Factor Cost with 1999-2000 as Base Year

Rs.Lakhs

Year	Primary Sector	Secondary Sector	Tertiary Sector	Total
1960-61	1525106	933386	1417200	3875692
1970-71	1391553	1474627	2178479	5044659
1980-81	1922992	2183777	3279689	7386458
1990-91	2805749	3880015	6095849	12781613
2000-01	3691054	5157866	12203711	21052631
2007-08	5423129	8215325	22101711	35740165

Graph 4



It may be observed that the NSDP of primary sector grew from Rs.15,25,106 lakhs in 1960-61 to Rs.54,23,129 lakhs by 2007 - 08; that of secondary sector went up from Rs.9,33,386 lakhs in 1960-61 to Rs.82,15,325 lakhs by 2007-08; and the figures for tertiary sector shot up from Rs.14,17,200 lakhs to Rs.2,21,01,711 lakhs. In the process the overall NSDP multiplied from Rs.38,75,692 lakhs in 1960-61 to Rs. 3,57,40,165 lakhs by 2007-08.

However, as is the observation for India, the rate and pace of growth are different for different sectors as also for different periods. Primary sector indicates stable momentum through-out; secondary sector posts moderate pace; whereas tertiary sector reveals a phenomenal multiplication.

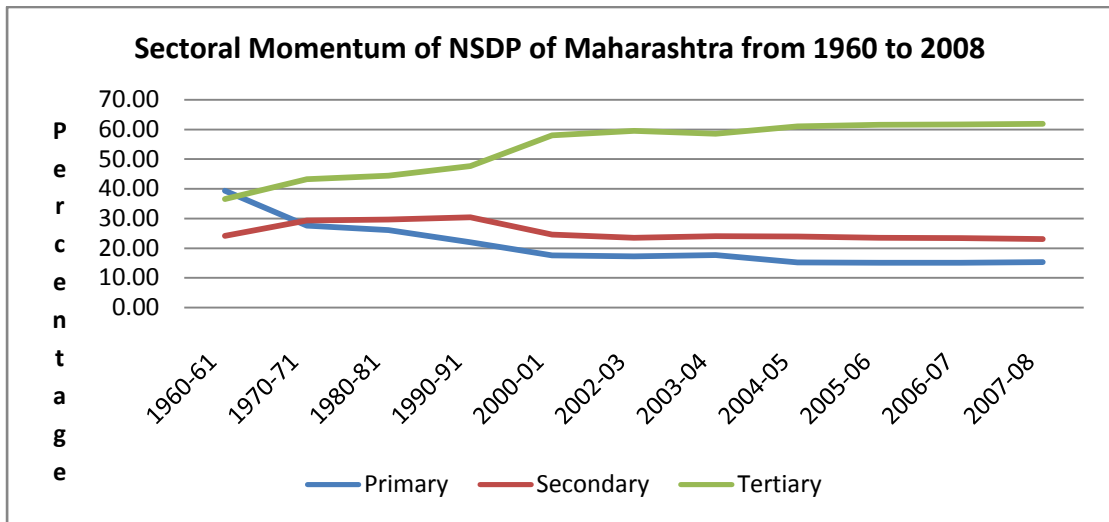
The data relating to sector-wise composition of NSDP of Maharashtra, for the years 1960-61, 1970-71, 1980-81, 1990-91, 2000-01 and 2007-08, are furnished in Table 5 and Graph 5 depicts the period to period trends up-to 2001 and year to year trends thereafter.

Table 5

Composition of NSDP of Maharashtra at Factor Cost with 1999-2000 as Base Year

Year	Percentage			
	Primary Sector	Secondary Sector	Tertiary Sector	Total
1960-61	39.35	24.08	36.57	100.00
1970-71	27.58	29.23	43.18	100.00
1980-81	26.03	29.56	44.40	100.00
1990-91	21.95	30.36	47.69	100.00
2000-01	17.53	24.50	57.97	100.00
2007-08	15.17	22.99	61.84	100.00

Graph 5



It may be observed that, in spite of growing absolute figures, the share of primary sector declined from a substantial 39.35% in 1960-61 to a normative 15.17% by 2007-08; that of secondary sector moved down marginally from 24.08% in 1960-61 to 22.99%; and the figures for tertiary sector went up from a relatively low 36.57% to a high 61.84%. The changes in the composition of the NSDP are, obviously, attributable to the changes brought in by the process of development.

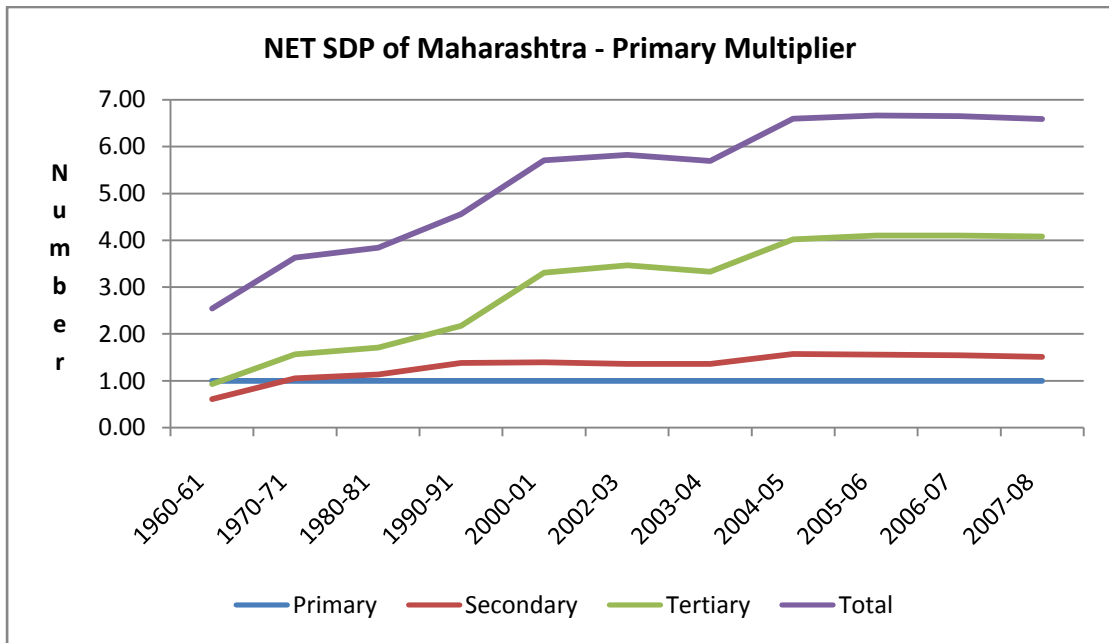
Moving onto the behavior of the primary multiplier with reference to Maharashtra, table 6 shows the primary multipliers for the years 1950-51, 1960-61, 1970-71, 1980-81, 1990-91, 2000-01 and 2007-08 whereas graph 6 depicts the period momentum up-to 2001 and year to year momentum thereafter.

Table 6

Primary Multipliers of NSDP of Maharashtra

Year	Primary Sector	Secondary Sector	Tertiary Sector	Total
1960-61	1.00	0.61	0.93	2.54
1970-71	1.00	1.06	1.57	3.63
1980-81	1.00	1.14	1.71	3.84
1990-91	1.00	1.38	2.17	4.56
2000-01	1.00	1.40	3.31	5.70
2007-08	1.00	1.51	4.08	6.59

Graph 6



It may be observed that the primary multiplier of secondary sector went up from 0.61 in 1960-61 to a standard 1.51 by 2007-08; that of tertiary sector went up considerably from 0.93 to 4.08; and the figures for over all GDP from 2.54 to 6.59. The changes in the composition of the NSDP are, obviously, attributable to the process of development. It is also evident that higher the level of growth, higher the multiplier.

The observations relating to the 'Development Story of Maharashtra' covering the period 1960-61 to 2007-08 are, thus, found in parlance with the observations drawn from the 'Indian Experience' of 1950-51 to 2008-09.

4.00 Inferences

The following inferences are drawn about the multiplier effect of primary sector with reference to the Indian Experience and the Story of Maharashtra:

- a. Primary Multiplier may be defined as the multiple that denotes the income of any sector with reference to one given unit of income of the primary sector.

- b. Any investments infused into Primary Sector are bound to generate direct returns which are explicit for the sector itself and also would propel consumption, savings and investment that would lead to resultant indirect returns which are implicit for the Secondary and Tertiary Sectors.
- c. The public welfare developmental spending infused by the state into Primary Sector would ultimately lead to generation of tax and other revenues to the State from Secondary and Tertiary Sectors.
- d. Higher the level of growth, higher would be the primary multiplier.
- e. In relation to a fixed trend line of primary sector, the primary multiplier for the secondary sector is semi fixed and that of tertiary sector is semi variable.
- f. The theorem holds good till the point of optimum utilization of employable resources.
- g. The utility of the theorem lies in strategizing the prioritization and balanced distribution of investments amongst the competing sectors.

References:

1. Government of India, Ministry of Finance, Economic Survey of India, 2012
2. Government of Maharashtra; Directorate of Economics And Statistics, Mumbai; Statistical Abstract of Maharashtra State, 2007-08