Structural Dynamics and Linkage Patterns of Tertiary Sector in India

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Abstract

The structural change is defined as a process of combining economic growth with changing share of different sectors in gross domestic product (GDP) and labour force. Historically, the most common pattern of structural change that has been observed in developed countries has followed a sequence of shift from primary to secondary and then to service sector. In this pattern, an underdeveloped country is characterized by a predominant share of primary sector, while with economic development the share of secondary sector increases and that of primary sector declines and subsequently after reaching a reasonably high level of development, the service sector attains importance by becoming the dominant sector of the economy. These structural changes have been observed both in the relative share of gross domestic product and workforce by many structural economists (Fisher, 1939; Clark, 1940; Kuznets, 1966, 1971; Chenery and Syrquin, 1975).

However, based on Leontief model an important observation of this research paper is that the outgrowth of service sector in India is not the natural outcome of growth of other two commodity producing sectors. It has a moderate backward and forward linkage with secondary sector, but it is poorly linked to the primary sector on the input side and output side. This implies that any growth of service sector will not affect much to the primary sector which is presently in a state of crisis. The paper suggests that in the long-run simultaneous growth of all the three sectors is desirable.

INTRODUCTION

Modern economic development cannot be explained satisfactorily in terms

of labour and capital alone. A large number of theories of economic development have been propounded in the recent past. Different factors have been identified as determinants of growth in different growth models. The modern economists emphasize the catalytic role that technological changes play in the growth of an economy. The technological changes bring about an increase in per capita income, either by reducing the amount of inputs per unit of output or by yielding more output for a given amount of input. Technological change in an economy, therefore, refers to change in the input-output relations of production activities. Consequently, as the economy moves from lower to higher stages of development, there occurs a shift from simpler to more modern and complicated techniques of production on the one hand and from primary to secondary and/or to tertiary sectors on the other. The excess growth of tertiary sector coupled with state-of-the-art technology has got its own implications for the future development patterns of the system.

In India, the share of tertiary sector in the gross domestic product has crossed the fifty four per cent mark. The nature and role of this excessive tertiarization has become a matter of concern. The paper is an attempt to analyze the structural dynamics and the linkage patterns of the tertiary sector growth in India and its implications for the future.

REVIEW OF LITERATURE

The studies available on tertiary sector may be classified into four broad categories. First, the nature, structure, characteristics and the growth of tertiary sector have been studied by most of the studies. (Sethi and Raikhy, 2000; Seema Bathla, 2003; Anju Bala, 2005; T.S. Popola, 2005 and Deepita Chakravarty, 2006). The second category of studies deals with the changing pattern of employment generation and labour productivity in tertiary sector (Bishwa Nath Singh, 2000; Suryanarayanan, 2000; Silvia Maria, 2000; Seema Joshi, 2004 and G.L. Gaur, 2006). Third set of studies relates to recent excessive and out-stretched growth of tertiary sector in some developing countries of world (Bhattacharya and Mitra, 1990; R. Nagraj, 1991; Krishna Mazumdar, 1995 and Satya Sundram, 2002). Another set of studies relates to Leontief's model wherein interrelatedness among different sectors has been studied (Singh, Sudama and Joshi, Yamini 1989; Inderjeet Singh, 2000; Rita Bhowmik, 2000 and Aditya Patra, 2007).

In the context of linkage analysis of Indian economy, there is a good deal of literature. The researchers have attempted linkage analysis techniques extensively. Dhawan and Saxena (1992) and Hansda (2001) used the I-0 approach. Both causality tests and econometric models have been used by a plethora of researchers

[Rangarajan, 1982; Ahluwalia and Rangarajan, 1989; Bhattacharya and Mitra, 1989, 1990 and 1997; Sastry *et al.*, 2003; Bathla, 2003].

The review of studies is indicative of the fact that most of the studies done, on Indian economy, so far are too aggregative or even if the desegregation has been achieved, the coverage is too small. Most of the studies have dealt with individual sub-sectors or the overall economy-wide aggregates and have failed to capture the underlying structure, dynamics and linkage pattern of the tertiary sector. A study fortified with disaggregated data going rigorously into structure, dynamics and linkage pattern of the tertiarization of Indian economy is need of the time.

OBJECTIVE OF THE STUDY

In this research paper it has been broadly hypothesized that the liberalization, characterized by excessive and skewed tertiarization of the Indian economy, has its own consequences in terms of structure, linkage pattern and macro dynamics of the system. From this point of view, the main objective of the present research paper is to analyze the backward and the forward linkage behaviour of the tertiary sector in India at a disaggregated level.

RESEARCH METHODOLOGY

To analyze the input-output structure and the inter sector-linkages, the Leontief input-output formalism is the straightforward approach. The database for this study consists of eight Input-Output Transactions Tables (IOTT) designed by Central Statistical Organization (CSO). These tables pertain to the years 1968-69, 1973-74, 1978-79, 1983-84, 1989-90, 1993-94, 1998-99 and 2003-04 respectively. The input-output table gives the inter-industry transactions in value terms at factor cost presented in the form of commodity x industry matrix where columns represent the industries and rows as group of commodities which are the principal products of the corresponding industries. Each row of matrix shows in the relevant columns the deliveries of the total output of the commodities to the different industries for intermediate consumption and final use. The entries read down as industry and columns show the commodity inputs of raw materials and services, which are used to produce outputs of particular industries.

ANALYSIS AND DISCUSSION

The analysis and discussion has been divided into two parts : The Part I deals with input and output structure, whereas Part II is related with

development of linkage patterns in the Indian economy.

(1) Input-Output Structure

Table 1 gives a synoptic view of Input-Output Transaction Table of Indian economy for the year 2003-04. This table is a four by four condensed form of 115x115 original table. The sectors are primary, secondary, tertiary, and others. Here the public administration sector appears as a final demand sector. Row-wise the table gives distribution of the output among intermediate sectors and final use and column-wise it gives the input side or the make side of a sector. This four by four IOTT has been used to derive the three by three IOTT table to analyze the input and output relations of the system. Following discussion is based on tables drawn from these three by three IOTT tables.

Table 1
Inter-Industry Transaction Table of India, 2003-04

(Rs. Crore)

Sector	Prim-ary	Secon-dary	Tertiary	Others	Public Adm.	Total Interm-ediate Input	Total Final Use	Total Output
Primary	151809	337170	34007	867	0	523853	336163	860016
Secondary	81742	886597	200577	59756	0	1228672	1098358	2327030
Tertiary	53348	299403	101047	34530	0	488328	547911	1036239
Others	8447	115675	50845	61456	0	236423	509740	746163
Total	**295346**	**1638845**	**386476**	**156609**	**0**	**2477276**	**2648329**	**5125605**
NIT	-44397	111550	25757	6002	0	98912	117161	216073
GVA	610110	591967	607716	583468	156157	2549418		
Total	**861059**	**2342362**	**1019949**	**746079**	**156157**	**5125606**	**2765490**	

Source : Input-output Transactions Table, 2003-04

Table 2 gives the input structure of the different sectors. The input structure means how much a sector gets from other sectors to produce one unit worth of output. The input structure matrix is also known as technology coefficient matrix, as it gives input-output relations at a point of time. The table is indicative of the fact that to produce one unit worth of output agriculture gets 0.177 units from itself; 0.095 from the secondary sector and 0.072 from the tertiary sector. This implies that for its input requirements primary sector is depending more on itself

Table 2

Technology Matrix of India in 2003-04

Sector	Primary	Secondary	Tertiary
Primary	0.177	0.145	0.020
Secondary	0.095	0.381	0.147
Tertiary	0.072	0.177	0.140

Source : Computed

and less on the other sectors. Its dependence on tertiary sector for input requirement is the least.

To produce one unit worth of output, the secondary sector gets 0.145 from primary sector; 0.381 from itself; and 0.177 from the tertiary sector. Thus, the secondary sector like agriculture depends more on itself for its input requirements, but it is almost equally dependent on primary and tertiary sectors. This implies that the dependence of secondary sector, for input requirements is more on tertiary sector as compared to dependence on primary sector for the same.

A look at the input structure of tertiary sector is indicative of the fact that it depends more on the secondary sector or itself and its dependence on agriculture is negligible. In quantitative terms, to produce one unit worth of output it gets 0.020 unit worth from the primary sector, 0.147 from secondary sector and 0.140 from itself.

On the whole, the table shows that primary sector and the tertiary sector in the Indian economy are poorly linked as far as the input structure is concerned. So the tertiary sector growth in Indian economy has a very little backward linkage effect on primary sector.

The emerging input structure of the Indian economy is characterized by : (a) for input requirements, primary sector is depending more on itself and less on the other sectors and its dependence on tertiary sector for input requirement

Table 3

Output Distribution Matrix of India in 2003-04

Sector	Primary	Secondary	Tertiary
Primary	0.177	0.392	0.041
Secondary	0.035	0.381	0.111
Tertiary	0.035	0.233	0.139

Source : Computed

is the least; (b) the dependence of secondary sector, for its input requirements is more on tertiary sector than dependence on primary sector for the same; and (c) the tertiary sector growth has a very little backward linkage with primary sector. Thus, the overgrowing tertiary sector has poor backward linkage with primary sector of the economy which is not a healthy sign.

Table 3 gives the output structure of the Indian economy. The output structure means the distribution of output across the sectors. One unit worth of primary sector output gets distributed among the sectors as 0.177 to itself, 0.392 to the secondary sector and 0.041 to the tertiary sector. That is to say the major chunk of the primary sector's output goes to the secondary sector and the primary sector itself; a very little goes to the tertiary sector. Likewise, out of one more unit worth of output of the secondary sector 0.035 goes to primary sector; 0.381 to itself and 0.111 to the tertiary sector. This implies that in the output distribution, the secondary sector is delivering more to itself and less to the other two sectors. Its dependence on primary sector for output distribution is the least.

A look at the output structure of tertiary sector is indicative of the fact that it depends more on secondary sector and itself and its dependence on primary sector is negligible, as far as the output distribution is concerned. Out of each one unit of output, it delivers 0.035 to the primary sector, 0.233 to the secondary sector and 0.139 to itself. On the whole, the table shows that primary sector and tertiary sector are poorly linked as far as the output distribution structure is concerned. Thus, the primary sector in Indian economy has very little forward effect on growth of tertiary sector.

(2) Linkage Patterns

From a traditional agro-economy till the 1970s, the Indian economy has transformed into a predominantly service-oriented economy, especially since the mid 1980s. Economic reforms initiated in the mid-eighties and their execution from early nineties has seen the share of tertiary sector in GDP rising continuously for the Indian economy. The shift in composition of GDP has brought about substantial changes in the inter-sectoral production and demand linkages. Further, with the growing tertiarisation of the economy, there has been a phenomenal growth in distributive, communication, consumer and financial services, which, in turn, drives from increased demand from the commodity producing sectors. This brings to fore the issue as to how the tertiary sector is linked up with the two other commodity-producing sectors of the economy. The study of sectoral inter-linkages is all the more important for a developing country like India so that positive growth stimuli among sectors could be identified and fostered to sustain the economic growth momentum.

Table 4

Backward Sectoral Linkages in India for Various Years

Year	Sector	Sector		
		Primary	Secondary	Tertiary
1968-69	Primary	0.18215	0.12710	0.01701
	Secondary	0.04365	0.33800	0.13398
	Tertiary	0.01646	0.13892	0.09878
1973-74	Primary	0.17114	0.12860	0.02802
	Secondary	0.05633	0.34409	0.12028
	Tertiary	0.01852	0.14612	0.09878
1978-79	Primary	0.16013	0.13010	0.03903
	Secondary	0.06902	0.35018	0.10658
	Tertiary	0.02058	0.15332	0.09878
1983-84	Primary	0.16313	0.08606	0.03703
	Secondary	0.10759	0.53948	0.14058
	Tertiary	0.03447	0.17338	0.14457
1989-90	Primary	0.16613	0.04203	0.03503
	Secondary	0.14616	0.37860	0.17458
	Tertiary	0.04836	0.19345	0.19037
1993-94	Primary	0.14612	0.03803	0.03703
	Secondary	0.14616	0.42833	0.23447
	Tertiary	0.02778	0.10393	0.18213
1998-99	Primary	0.11809	0.03303	0.02502
	Secondary	0.19793	0.42732	0.21417
	Tertiary	0.02984	0.10393	0.13583
2003-04	Primary	0.19616	0.02802	0.02902
	Secondary	0.18270	0.46183	0.21924
	Tertiary	0.04631	0.11113	0.13274

Source: Calculated

Considering inter-dependence among the sectors of the economy it may be presumed that demand for one sector in a closed economy is a function of outputs generated in the other sectors. To begin with, agriculture sector enjoys both production and demand linkages with industrial and service sectors. Similarly, there is a positive and significant association between manufacturing and service sectors, which becomes stronger at advanced stages of industrialization. Input-output approach has been attempted to examine whether there have been some broad changes or shifts in the production and demand inter-linkages amongst the sectors overtime.

As already said, an input-output table reflects inter-industry relations in an economy. It captures the dynamics of how output of one industry goes into another industry where it serves as an input, and thereby shows inter-dependence of the sectors, both as buyer of output and as supplier of inputs. Each column of the table reports monetary value of an industry's inputs, while each row represents value of an industry's outputs. Both production and demand linkages among the sectors can be examined from these input-output matrices.

Backward linkages or the production linkages can be derived from input-output coefficient matrix A. The backward linkages, among various sectors of the Indian economy basically arise from inter-dependence of sectors for meeting their productive input needs. The production linkages between the sectors have been illustrated through the available input-output tables for different years spaced evenly in the temporal dimension. These production linkages are presented in Table 4.

The primary sector, in the year 1968-69, to produce one unit worth of output, required 0.18215 unit worth of input from itself, 0.04365 from secondary sector and 0.01646 from the tertiary sector. That is to say primary sector for input requirements depended more on itself and secondary sector and its dependence on tertiary sector was the least. In 1978-79, backward linkage pattern of primary sector appeared as 0.16013, 0.06902 and 0.02058 for primary, secondary and tertiary sectors respectively. In the year 1989-90, backward linkage pattern of primary sector have been 0.16613, 0.14616 and 0.04836 for primary, secondary and tertiary sector respectively. In the terminal year, 2003-04, primary sector's per unit input requirement have been 0.19616 from itself, 0.18270 from secondary sector and 0.04631 from the tertiary sector. Thus, over a period of time, the primary sector's dependence on itself and the secondary sector for input requirements increased significantly. But it is important to note that backward linkage of primary sector with tertiary sector has slightly improved in the recent past.

In the year 1968-69, per unit input requirement of secondary sector have

been, 0.12710, 0.33800 and 0.13892 from primary, secondary and tertiary sector respectively. However, during 2003-04 these backward linkage parameters of secondary sector stood at 0.02802, 0.46183 and 0.11113 for primary, secondary and tertiary sector respectively. Historically, thus the secondary sector's dependence for input has been more on itself. Over a period of time the secondary sector has reduced its input dependence on primary and the tertiary sectors.

The table reveals that in the year 1968-69, to produce one unit worth of output tertiary sector required 0.01701 unit worth of input from primary sector, 0.13398 unit worth of input from secondary sector and 0.09878 from itself. It is observed that in the year 1968-69, input dependence of tertiary sector is more aligned with the secondary sector than with primary sector. Historically, the backward linkage pattern of tertiary sector has not changed much. In 1973-74, to produce one unit worth of output service sector required 0.02802, 0.12028 and 0.09878 unit worth of input from primary, secondary and tertiary sectors respectively. In the year 1978-79, the backward linkage of tertiary sector with other sectors stood at 0.03903, 0.10658 and 0.09878 for primary, secondary and tertiary sectors respectively. During the following years, 1983-84, 1989-90, 1993-94 and 1998-99, the pattern of backward linkages remained almost the same. In the year 2003-04, tertiary sector's per unit input requirement from primary, secondary and tertiary sector itself has been 0.02902, 0.21924 and 0.13274 respectively.

Thus, from the backward linkages analysis, it is clear that the structural change in the Indian economy is characterized by the following input patterns: (a) Over a period of time, the primary sector's dependence on itself and the secondary sector for input requirements has improved significantly, but its backward linkage with tertiary sector has also shown a tendency of improvement in the recent past; (b) Over a period of time the secondary sector has reduced its input dependence on primary and the tertiary sectors; and (c) Input dependence of tertiary sector is more aligned with the secondary sector than with the primary sector. Thus, the primary and secondary sectors of Indian economy have a poor backward linkage with the tertiary sector which at present is a growth engine of gross domestic product. This puts a question mark on the very viability of tertiary sector in India which has emerged not by the natural outgrowth of the system but as a foot loose sector.

The analysis of forward linkages or the sectoral demand linkages shows that the demand linkage of primary sector was found to be stronger with secondary sector than with tertiary sector. The analysis of forward linkages or the sectoral demand linkages in Table 5 shows that the demand linkage of the secondary sector with the primary sector declined from 0.24728 in 1968-69 to a mere 0.07706 in 2003-

Table 5

Forward Sectoral Linkages in India for Various Years

Year	Sector	Sector		
		Primary	Secondary	Tertiary
1968-69	Primary	1.23098	0.24720	0.05905
	Secondary	0.08831	1.58543	0.23345
	Tertiary	0.03602	0.24387	1.17409
1973-74	Primary	1.22298	0.25370	0.07106
	Secondary	0.11267	1.60522	0.21366
	Tertiary	0.04322	0.26034	1.17306
1978-79	Primary	1.21497	0.26021	0.08307
	Secondary	0.13703	1.62502	0.19387
	Tertiary	0.05042	0.27680	1.17203
1983-84	Primary	1.21797	0.18214	0.07856
	Secondary	0.23041	0.16899	0.28877
	Tertiary	0.09930	0.34626	1.26412
1989-90	Primary	1.22098	0.10408	0.07406
	Secondary	0.32379	1.75494	0.38367
	Tertiary	0.14818	0.41572	1.35622
1993-94	Primary	1.18995	0.09107	0.07406
	Secondary	0.33089	1.86557	0.50243
	Tertiary	0.07615	0.21918	1.22554
1998-99	Primary	1.15292	0.07506	0.05104
	Secondary	0.42630	1.85847	0.46386
	Tertiary	0.08952	0.22226	1.24200
2003-04	Primary	1.26601	0.07706	0.06105
	Secondary	0.47299	1.98737	0.50852
	Tertiary	0.12657	0.25416	1.24818

Source : Calculated

04. Demand linkage of tertiary sector with secondary sector improved significantly from 0.23345 in 1968-69 to 0.50852 in 2003-04, indicating rising importance of secondary for tertiary sector, though it remained almost static in case of primary sector. Forward linkage of primary sector has slightly improved with secondary sector, but is relatively poor with the tertiary sector.

CONCLUSION AND POLICY IMPLICATIONS

The main broad conclusion which emerges from the above analysis and discussion is that the outgrowth of service sector in India has so far not been the natural outcome of growth of other two commodity producing sectors. It has a moderate backward and forward linkage with secondary sector, but it is poorly linked to the primary sector on the input side and output side. This implies that any growth of tertiary sector will not affect much to the primary sector which is presently in a state of crisis. However, now the emerging structure of the Indian economy is characterized by greater integration of the sectors and sub-sectors. From final consumption-oriented system, the economy is shifting to rigor of processing as displayed by the rise in intermediate consumption. Inter-sectoral linkages are improving overtime, but the emerging tertiary sector is still loosely connected to rest of the sectors on the backward and forward front.

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