

HOW REAL ARE THE CHANGES IN SECTORAL GDP SHARES IN THE INDIAN ECONOMY?

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Abstract

Based on input-output transactions tables, our study decomposes the cause for change in sectoral shares in GDP into three components – the final-demand effect, input-structure effect and reallocation effect – and makes an empirical assessment of these components. It is observed that apart from final-demand effect, input-structure and reallocation effects played very important roles in determining sectoral shares of all major sectors of the Indian economy during the three decades – 1974-2004. In the absence of these two effects, tertiary sector's share in GDP of India over the three decades would be smaller by more than six percentage points compared to what it was in 2003-04. Distinctive behaviour of Community, Social and Personal Services vis-à-vis the rest of the tertiary sector is an important finding of the study.

Keywords: real value added, decomposition of causes, tertiary sector, intermediate and final demand, reallocation effect.

JEL Classifications: L8, O14.

Relative growth of the service sector vis-à-vis the commodity (material goods) sector, when we keep the GDP in perspective, seems to be a fact of life in almost all developing economies. While the measurement of real (or the volume of) services is an anathema to the purists among economists and statisticians, the task being viewed as impossible at worst and a Herculean one at best (Heston and Summers, 1992), we confine our present discussion to what our national accounts statisticians have in fact been doing. The apparent trend of growing importance of services has roused the economists and other observers to find out its causes and implications. Measurement problems have left their marks on productivity measurement also. It seems the measured productivity growth in the sector is smaller than that in the non-agricultural commodity (material goods) producing sector (Griliches, 1992) in the US. There has been a heart-searching about whether the observation is due to underestimation of real growth in the service sector caused by service-measurement problems or due to overestimation of productivity

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growth in the other sector caused by improper accounting of service inputs.² While the issues are, doubtless, genuine we do not seem to have a clear answer yet.³ In fact, while corrections often lead to revision of quantity and value estimates, that does not lead to correction of growth estimates significantly (Siegel and Griliches, 1992). Uncertainties in the measurement (in real terms) of economic activities in general and services in particular definitely apply to Indian national accounts statistics as well. As we will discuss below, any study involving the service sector must be very careful about constant price conversion for inter-temporal comparison.

The study by Summers and Heston (1992) in the UN International Comparison Project, however, produces results contrary to commonly accepted wisdom. They find for large cross-sections of countries no rise in the share of services in GDP when relative price of services in different countries is taken into account meticulously, though still leaving scope of error because of the very nature of the project, as per-capita GDP goes up.⁴ Viewed in conjunction with the secular growth of service-share in GDP the finding seems to support Baumol's (1967, 1984) hypothesis of secular rise in the price of services vis-à-vis commodities and failure to take account of this fact fully in constant price estimates due to measurement difficulties. One of the principal findings of the present paper relates to the extent to which the existing national accounts measurements may be viewed to support the hypothesis.

The present paper looks at the Indian scenario over three decades up to 2003-04 for which year we had had the last published input-output transactions table (IOTT) for the Indian economy until very recently when the IOTT for the year 2006-07 came to be published by the CSO. Obviously, when we look at the structure of the economy three decades apart the question of comparability of data becomes very important. We consider nine-sector IOTTs with sectoral classification similar to that provided by the Central Statistical Organization of India (CSO) in National Accounts Statistics (NAS). This makes possible the use of the sectoral price and quantity indices provided by the CSO.

While a country's GDP can be viewed as both the aggregate value added (VA) in domestic production as well as the aggregate value of final goods and services constituting aggregate final expenditure, GDP originating in a sector, say mining or distributive trade, is by no means the value of product of the sector going to final use. A sector may produce only intermediate input and in that way make important contribution to the GDP. So, when we consider sectoral contribution to GDP our attention is on VA, not the final use of products. For intertemporal comparisons of sectoral GDP the question arises: what constitutes the price deflator for sectoral value-added?

The growth of an economy is always associated with all sorts of changes – not only the change in the scale of activities but also changes in relative sizes of activities broadly defined, the

² Banga and Goldar (2004) has attempted to measure the contribution of services to the growth and productivity of manufacturing in India.

³ If, indeed, the service sector has been growing faster and its productivity growth is slower than that in the manufacturing sector, it is cause for concern regarding the overall productivity and, so, GDP growth. Verdoorn's law is often referred to in this context. Verdoorn made a cursory empirical study, published in 1949 in Italian, to claim long range invariance in the elasticity between growth rates of labour productivity and the growth of product of manufacturing (Thirlwall, 1980). Apparently, from this invariance, a slow growth of manufacturing would imply a slow growth in productivity.

⁴ Indeed, this result is supported for all the cross-sections belonging to 1970, 1975 and 1980.

underlying technology and market conditions governing the undertaking of the activities. These all-round changes cause changes in relative prices; real changes remain concealed in the observed values. The behaviour of VA may be quite complex. With the rise in real product of a sector the price (and cost) might fall so much that VA might even fall. In fact, structural change in the economy has many dimensions that are factored into the value added structure. So, the concept of real VA needs to be distinguished from the quantity index in the official statistics. We address this problem in section 2 of the study in the context of discussion of changes in sectoral value added structure over the period concerned. Section 3, entitled "Intermediate and Final Services" discusses classification of services according to their dominant type of use and groups together three major sub-sectors as service-1 leaving community, social and personal (CSP) services as the other category of services. Then section 4 presents the analytical structure of decomposition of the sources of change in sectoral value added. Here we define the final demand effect, the input-structure effect and the reallocation effect on sectoral VA. Section 5 presents the empirical results of decomposition of the influences on sectoral shares and analyzes them. Finally, section 6 draws the conclusion of the study.

2. Sectoral Relative Shares

The question that motivates us is how the service (or, the tertiary) sector grows so fast, or alternatively, how the relative share of the service sector grows so much?⁵ Table-1 presents the relative GDP-shares of the three major sectors and their sub-sectors for the years 1973-74, 1993-94 and 2003-04⁶ based on the IOTTs for the respective years, and also the corresponding CSO national accounts estimates. The IOTT estimates do not perfectly tally with the corresponding national accounts estimates given by the CSO. There are several reasons for this. One point of difference is that value added as per the IOTTs are adjusted for indirect tax and subsidy incorporated in intermediate inputs of sectors as the underlying calculations are made at factor costs. As a result, sectoral estimates based on IOTTs are different from the corresponding estimates of the NAS, which makes adjustments only at the level of output. The other major reason for the difference is our method of deflation, as discussed below, of current price value added given by the IOTTs.

In obtaining the constant price VA the Central Statistical Organization of India (CSO) does not follow a uniform procedure for all the sectors. It adopts ad hoc procedures depending on the availability of data (CSO, 2007); the focus of the estimates being quantum indices.⁷ Such an approach inevitably makes drastic conceptual compromises particularly in the case of services where the very concept of quantity is vague to a great extent (Hill, 1977; Summers and Heston,

⁵ The question has been discussed in the Indian perspective by several authors, most notably by Gordon and Gupta (2004), and Rakshit (2007).

⁶ IOTTs are presented at factor cost. For consistency of input-output analysis we have included indirect tax incorporated in intermediate inputs in the value added of the using sector. This causes the estimates presented here to deviate a bit from the corresponding estimates in the NAS. Other major reasons for difference with the NAS estimates are discussed in the text.

⁷ The CSO, indeed, factors the current price value added into price and quantum indices (statement 3, CSO, 2008).

1992).⁸ But more than imperfection of estimates, as most estimates always are, what is unacceptable is that the aggregate VA obtained in this way (in National Accounts Statistics) is, theoretically, not equal to the aggregate value of final goods and services at constant prices. This violates the fundamental national accounts identity. It is for this reason we do not accept the indexation of real value added by the quantum of goods and services in respective sectors.⁹

Value added is an accounting entity defined as the difference between the value of output and the value of intermediate inputs used. Obviously, it has a residual character and that makes it difficult to be factored as price and quantity. However, aggregate VA at current prices is equal to the aggregate value of sectoral final products, giving the identity between the production and the expenditure approaches to GDP. Aggregate VA has a real representation; that is the vector of final products. This fundamental national accounts concept should be taken as a guiding principle for constant price estimates also (assuming that services can somehow be represented in real terms). But, unlike aggregate VA, sectoral VA does not have a separate real representation; it can only be viewed as a share of the GDP, and sectoral real VA can only be a share of the real GDP. From this point of view sectoral real VA may be obtained by deflating the current-price VA by the GDP deflator obtained as the ratio of aggregate value of final uses (of goods and services) at current and constant prices.¹⁰ Estimates in the first three columns of table-1 have been arrived at by this approach. One implication of this procedure is that the sectoral relative shares in GDP will be the same at current and at constant prices making constant price estimates redundant so long as we are interested in relative shares. We have presented the CSO constant price estimates in table-1 for the purpose of comparison while our focus is on our estimates based on the IOTTs.

Table-1 shows a steep fall in the share of the primary sector, by almost the same extent in the two estimates. The secondary sector and the three service groups taken together to form the category named service-I (viz., transport, trade and the group banking, finance, real estate and business services abbreviated as BaFinReBs.) have increased their shares in GDP. The extents of increment by the two estimates are more or less comparable. But the big difference in the extent of increase between the two estimates shows up in the case of the remaining service group – CSP. The reason behind this is that the CSO cooks up some sort of a quantum index that discounts for big change in relative price of CSP; so, it does not really give CSP's share in GDP. Our estimates based on IOTTs are obtained, as explained above, by using a uniform GDP deflator for all sectors; so, these estimates reflect sectoral GDP shares. Herein lies a big story that we tell in the subsequent sections.

⁸ Nevertheless, for quantitative analyses undertaken in the present paper the price indices referred to here are probably the best available to researchers. We have used these indices for estimation of real products, in spite of the limitations.

⁹ Since the CSO strictly follows the UN guidelines outlined in the UN System of National Accounts (SNA, 1993), the problem dealt with here has relevance for many countries other than India.

¹⁰ The vector of final goods and services can be evaluated at constant prices as the relevant price indices can be made available if the need is realized (Datta, 2010b).

Table 1. Sectoral Shares in GDP at 1993-94 Prices (at factor cost)

	Based on IOTTs (converted to constant prices)			CSO Estimates		
	1973-74	1993-94	2003-04	1973-74	1993-94	2003-04
Primary	0.476	0.279	0.188	0.440	0.315	0.219
Mining	0.009	0.024	0.025	0.019	0.025	0.023
Manufacturing	0.164	0.167	0.181	0.134	0.161	0.165
Construction	0.047	0.053	0.068	0.056	0.052	0.058
Elect., Gas, Water	0.010	0.025	0.016	0.013	0.024	0.023
Secondary	0.230	0.270	0.290	0.222	0.262	0.269
Transport	0.052	0.081	0.086	0.051	0.065	0.091
Trade	0.108	0.139	0.154	0.111	0.127	0.152
BaFinReBs	0.050	0.103	0.112	0.063	0.115	0.131
Service-I	0.210	0.323	0.352	0.225	0.307	0.374
CSP	0.084	0.128	0.170	0.112	0.120	0.139

Source: IOTTs for the respective years, CSO; National Accounts Statistics of India, *EPWRF*, 2004 and National Accounts Statistics, CSO, 2008. Some columns do not add up to unity due to rounding up error.

Note: BaFinReBs refers to banking, finance, real estate and business services.

3. Intermediate and Final Services

When we look at the IOTT, the column showing the sectoral total final expenditures on GDP is also looked upon as the vector of final demand or final products giving an equilibrium interpretation to transactions. While the sum of the elements of the vector gives the GDP, an element of the vector does not represent the size of the corresponding sector because the total product of a sector caters to intermediate demand also. Contribution of a sector to GDP is its value-added which is related to the sector's total output; *and the relation is not unchanging*. Thus an understanding of the changes in sectoral shares needs an understanding of the input-output structure of the whole economy as well as its dynamics. Some services are basically intermediate inputs while there are others catering mainly to final demand.

To take a very prominent example, demand for distributive trade is basically an intermediate demand derived from demand for commodities distributed through traders; the IOTT, however, shows part of the service that is related to the distribution of final goods as final use of the service (Datta, 2010a). Also, transport is intimately related to trade, so a very large part of the demand for transport services is derived demand too.¹¹ The same point can be made regarding demand for a large part of financial services also (Singh, 2008). The three broad groups involving

¹¹ This is, of course, not to deny that demand for transport leads to demand for transport equipments which are treated as final goods. On another plane, rapidly evolving information and communication technology is giving rise to new products (mobiles and newer versions of computers) and services. An interesting example is that some telecommunications and internet service providers are now providing the associated equipments to the subscribers at lower or no cost (OECD, 2000). The equipments are prerequisites for the services. (But why should we forget the satellites constituting a prior requirement?) However, from the IOTT point of view, we are focused to the production process and utilization of products. The equipments concerned are either durable consumer goods or capital goods depending on use.

these services together (referred to as service-1 here) account for roughly three-fourths of value-added in the service sector of the Indian economy in recent times.

An important attribute of the structural change in the economy is increase in 'spread' and 'depth' of the production process, particularly manufacturing, in the sense that new production processes appear and gradually more and more production processes become interlinked to a chain of sub-processes. When we think about actual developments the case of food processing comes to mind readily as an example of 'spread' of activities. Milk dairy movement has led to value addition in the processing of milk. In the absence of processing, milk would be considered a product of animal husbandry and it would be distributed largely without the intermediation of traders, as it has been in the past. This spread has led to enormous value addition in trade and transport of milk and its products. Recently, spread of micro productive activities financed by micro-finance institutions is also well known.

At a more sophisticated level we can look at the ongoing global integration process. The multi-national companies strive at reducing their costs by de-verticalizing their activities – outsourcing certain functions and sub-contracting the production of numerous components (think of automobiles and electronics goods). Shift from single stage to multi-stage production process reveals the 'depth' of the process resulting in enormous increase in trade within industries.¹² Of course, vertical integration is known to be a means of cutting transactions costs but there are limits to such strategies in the face of growing competition and the contrary trend is strongly felt in East-Asian markets (Yusuf, 2004, p.2).¹³ The Indian economy, one presumes, is not free from such effects and these effects should affect the intermediate input coefficients of the relevant sectors.¹⁴ This development is akin to splintering of activities (discussed in the next section) but here we talk of division of commodity production resulting in rising demand for services, not shifting of activities from commodity to service production as we will discuss later. Though we have been talking about de-verticalization, it may easily be understood that depth of the production process may, and it is expected to, increase even without de-verticalization as industry grows more and more sophisticated leading to multiplication of service-I activities.

The above discussion makes it abundantly clear that trade and transport and, by the same logic, finance and business services, should not be discussed in the same strain as other services like public administration, education, health and personal services grouped together in national accounts as CSP, which is demanded mainly for direct gratification of personal and social needs while the former category of services, what we call *service-I*, is linked functionally to material goods or commodity production.¹⁵ The growth of service-I is very closely related to the growth of the primary and the secondary sectors. Since they provide a *sine qua non* for the

¹² Findings from econometric causality analysis by Balakrishnan and Parameswaran (2007) and Masih (2009) seem to be contrary to the intuition one gets from the above discussion.

¹³ Further, growing complexities lead to emergence of new problem resolution mechanism. Emergence of firms such as APL Logistics and Maersk Logistics now provide integrated logistics service like handling of congestions at ports and providing multi-modal transport facilities for time-sensitive items within and beyond the East-Asian region (Yusuf, 2004, p.27). This provides an example of 'spread' of service activity though not specifically belonging to but facilitating trade and transport.

¹⁴ Datta, 2001, chapter-III, noted this trend for the Indian economy and called it the "sophistication effect".

¹⁵ Question may arise as to where we should put telecommunications. Without joining the debate at this stage we may note that we have put it in service-I, as data are available in that way.

growth of industry, development of such services encourage growth of industry also. An important point to note in the present context is that services generally use relatively little material inputs¹⁶ and, therefore, their growth does not spur growth of industry through rising demand for material inputs in the way growth of industry spurs demand for service inputs.

It is interesting to observe in this context that several econometric studies have concluded that the causality of growth is most prominently directed from services to industry rather than the other way round (Balakrishnan, 2007; Masih, et.al., 2009). The logic of causality is generally not clearly and rigorously spelt out. It is quite understandable and undisputed, for example, that development of banking makes access to funds easier and this encourages industry. But it is quite possible and expected that development of banking is itself a response to prevailing or perceived demand from industry. While infrastructural constraint affects industry, the constraint is also a symptom of industrial development. Which comes prior to what is sometimes akin to the puzzle of chicken and egg.

4. Components of Sectoral Shares

Let us take an analytical view of sectoral value added. We use the following notations:

X = column vector of output measured in real terms;

F = the column vector of final uses measured in real terms and A = input-output coefficients matrix or the technology matrix.

Now, total output may be taken as the sum of its intermediate and final uses.

$$\text{So, } X = AX + F = (I - A)^{-1}F \quad \dots (1)$$

If we write V = diagonal matrix of value added per unit of output then the vector of sectoral value added,

$$\chi = VX = V(I - A)^{-1}F \quad \dots (2)$$

When we compare the production structure of two different periods the idea is to compare real quantities as distinct from values. Each variable must be represented at a base year price so that the constant price representations may be viewed as some sort of comparable quantities. In that case changes in the technology matrix reflect the technical and organizational changes. However, as pointed out in the previous section, one has to be cautious about the concept of constant price (or real) sectoral value-added. In equation (2) the V matrix converts quantities into values. When we compare between two periods the values must be comparable and this comparability is achieved by using the concept of real value added which is bound to real GDP.

Using subscripts 1 and 0 for current and base years respectively, we have the vector of change in sectoral real value added as:

$$\begin{aligned} \Delta\chi &= \chi_1 - \chi_0 = V_1 (I - A_1)^{-1} F_1 - V_0 (I - A_0)^{-1} F_0 \\ &= V_0 (I - A_0)^{-1} \Delta F + V_0 \Delta(I - A)^{-1} F_1 + \Delta V (I - A_1)^{-1} F_1 \end{aligned} \quad \dots (3)$$

¹⁶ While this point has been generally recognized in the literature (Datta, 2001, Gordon and Gupta, 2004; Rakshit, 2007), here we attempt at a measure of the extent to which the growth of different sectors are attributable to changes in intermediate input coefficients of the technology matrix

We may now define the first term of the expression, $V_0 (I-A_0)^{-1} \Delta F$, as the total direct and indirect **effect (on value added) due to change in the final demand**. This takes into account the direct additional demand and the indirect additional demand caused by the need to produce additional quantities. The final demand effect would represent the overall change in sectoral shares had there been no change in the input structure represented by the A-matrix and no change in sectoral value added per unit of output. In the context of rapid change, as in the case of the Indian economy, changes in A and V matrices are expected to play important roles.

The second term in (3), $V_0 \Delta(I-A)^{-1} F_1$, is the **effect due to change in input structure** reflected in the technology matrix A, which basically reflects supply side factors like possibilities of substitution of inputs, changes in organization of production and splintering of activities. It is well understood that technical change may cause changes through saving of intermediate inputs like energy or by making substitution among inputs leading to cost saving. But what causes a direct shift of value added from manufacturing to services is change in organization of production caused by specialization. Works that used to be performed by on-site workers of manufacturing units are increasingly being splintered off and outsourced. Examples include repair and maintenance, accounting and legal services (Bhagwati, 1984; Datta, 2001). Further, there is increasing tendency of separation of activities between operating manufacturing establishments (OME) that produce manufacturing output and the central administrative office (CAO) that performs clerical, administrative, managerial and technical services for the multiple units of the company. In the complex reality of classification of activities CAOs may be put in the service sector. Siegel and Griliches (1992) cite evidence of rise in the ratio of CAO to OME employment in the USA over the quinquennium 1977 and 1982. One presumes globalization has made this trend to be felt in the developing economies as well accentuating the relative share of the service sector.¹⁷

The last term in (3), $\Delta V(I-A_1)^{-1} F_1$, is the **effect due to change in value added per unit of output (or reallocation of value added)** caused by a complex interaction of demand and supply side factors. The reallocation effect represents the fact that value added need not bear any one-to-one correspondence with the quantity produced. Technical progress in the economy may lead to a drastic reduction in cost as well as value added per unit of volume of output. Further, changes in market structure leads to changes in the degree of monopoly over time (Datta, 2010) with the same effect as above. Particularly, labour intensive service sector is often supposed to be less amenable to technical progress.¹⁸ However, requirement of skill in rendering services may well lead to rise in wages in the sector in tandem with that in manufacturing. This may cause unlimited rise in the relative cost of relevant services (Baumol, 1967; Baumol, et. al., 1984; Griliches, 1992) raising VA per unit of output and putting upward pressure on the real GDP share of the services sector as a whole. In the real economy this process is widely believed to favor public servants.

¹⁷ Mohr (1992) shows that the share of intermediate input cost accounted for by commodity-producing industries declined by 3.2 percentage points between 1977 and 1985 and that the share from services-producing industries rose by 2.9 percentage points in the USA.

¹⁸ Verdoorn's law related growth rates of productivity and output in manufacturing only.

5. Measurement of the Components of Sectoral Shares

We have condensed three IOTTs for 1973-74, 1993-94 and 2003-04, published by the Central Statistical Organization of India (CSO), into nine-sector input-output tables with sectors matching the nine-sector classification in the National Accounts Statistics.¹⁹ Four of the nine sectors belong to the tertiary sector; the first three of which have been grouped by us as service-I, as discussed above, and the last one is CSP.

Tables 2, 3 and 4 present the actual changes in sectoral shares, as obtained from the IOTTs, and the decomposition of the change into the three components – the final demand, input-structure and reallocation effects. It is seen that, in the aggregate, the input-structure effect and the reallocation effect are close in magnitude and opposite in sign. The insight for this comes from the consideration that aggregate output is the sum total of aggregate intermediate input use and aggregate value added while the aggregate value added is identically equal to aggregate final uses. If, with an unchanged final uses vector (and, therefore, the GDP), there is an increase in output caused by increase in intermediate input intensity, there must be an offsetting change in value added per unit of output.²⁰ For example, it is easy to think of splintering of, say, accounting work to the service sector from manufacturing leaving manufacturing output unchanged but increasing the output and VA of the service sector. This process will at the same time lead to a fall in value added per unit of manufacturing output. There may, of course be more complicated adjustments through productivity and price changes.²¹

Table-2 gives estimates of changes in sectoral shares over the three decades under study. The magnitude of change (difference between columns 3 and 2) is divided into three components. Column-4 shows what the sectoral shares would be had there not been any input-structure or reallocation effects. We note that agriculture's share declined sharply, by almost 29 percentage points. Roughly three-fourths of the decline can be explained in terms of decline in the sector's weight in aggregate final demand; nevertheless, the input-structure effect and the reallocation effect had quite significant roles in the sector's decline. Tables 3 and 4 show the input structure effect to be negative during the first two decades, but that was insignificant during the last.²² The reallocation effect was negative during both the sub-periods,²³ though rather subdued during the last decade. Thus, the change in the primary sector's share in GDP during the last decade was practically wholly due to the final demand effect, though this is not at all true of the earlier period.

¹⁹ This allows us to use the sectoral price deflators provided by the CSO to express all the IOTTs at 1993-94 prices. Several authors, however, have compared technical coefficients over time without going through the deflation procedure (Sastry, et.al., 2003; Gordon and Gupta, 2004)

²⁰ Unchanged final demand vector means unchanged GDP and unchanged final demand effect. The sum total of the three effects must be zero and GDP is unchanged. But sectoral allocation of GDP will change due to input-structure effect and reallocation effect.

²¹ Rise in productivity in manufacturing may cause a fall in price in the sector and a corresponding rise in the service sector if its relative cost rises due to stagnant productivity but wage parity with manufacturing (Baumol, 1967). This may cause change in value added per unit of output in the two sectors.

²² Presumably, industrialization was relatively slow in the agro-based industries during the first two decades.

²³ It should be noted that the three effects do not add-up over the two sub-periods because of necessarily discrete nature of data and long length of the sub-periods.

Table 2. Decomposition of Sectoral Shares (1973-74 to 2003-04)

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6
	1973-74	2003-04	Col. 1 + Final Demand Effect	Input-structure effect $V*\Delta(I-A1)^{-1}*F_1$	Reallocation effect $\Delta V*(I-A1)^{-1}*F_1$
Primary	0.476	0.188	0.260	-0.029	-0.043
Mining	0.009	0.025	0.007	0.010	0.008
Manufacturing	0.164	0.181	0.200	0.046	-0.066
Construction	0.047	0.068	0.053	0.000	0.016
Elect., Gas, Water	0.010	0.016	0.019	0.005	-0.008
Secondary	0.230	0.290	0.280	0.061	-0.050
Transport	0.052	0.086	0.094	0.018	-0.027
Trade	0.108	0.154	0.137	0.010	0.007
BaFinReBs	0.050	0.112	0.095	0.020	-0.003
Service-I	0.210	0.352	0.326	0.048	-0.022
CSP	0.084	0.170	0.130	-0.001	0.040
Col. Total	1.000	1.000	0.996	0.079	-0.075

Table 3. Decomposition of Sectoral Shares (1973-74 to 1993-94)

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6
	1973-74	1993-94	Col. 1 + Final Demand Effect	Input-structure effect $V*\Delta(I-A1)^{-1}*F_1$	Reallocation effect $\Delta V*(I-A1)^{-1}*F_1$
Primary	0.476	0.279	0.392	-0.053	-0.059
Mining	0.009	0.024	0.007	0.008	0.009
Manufacturing	0.164	0.167	0.186	0.038	-0.058
Construction	0.047	0.053	0.044	-0.001	0.010
Elect., Gas, Water	0.010	0.025	0.011	0.015	-0.001
Secondary	0.230	0.270	0.249	0.060	-0.039
Transport	0.052	0.081	0.059	0.017	0.005
Trade	0.108	0.139	0.118	0.002	0.019
BaFinReBs	0.050	0.103	0.076	0.030	-0.002
Service-I	0.210	0.323	0.253	0.049	0.021
CSP	0.084	0.128	0.098	0.012	0.018
Col. Total	1.000	1.000	0.992	0.068	-0.060

The secondary sector gained in relative share over the whole period (table-2) more than what can be explained by the direct and the indirect effects caused by the change in the final demand vector. The input structure effect over the first two decades (table-3) was so strong that it overcame quite a significant negative reallocation effect. During the last decade (table-4) both the effects were strong but they were opposite in sign and roughly balanced each other. It may be noted that the input-structure effect had a positive role to play in both the sub-periods indicating a deepening of the industrial structure as discussed in section 3. Significantly, the reallocation effect was negative in both the sub-periods. It is consistent with the hypothesis of splintering of activities away from of industry to services but that need not be the only explanation, as explained

in section 4. Technical change leading to change in the market structure may have played a significant role though we cannot elaborate on this in the present study.

As for category-I services, the input-structure component was, as expected, very strong and positive in both the sub-periods and, so, for the whole three decades, similar to the secondary sector. Thus, it is consistent with our analysis in section 3 above. The reallocation effect for service-I was also positive, though relatively weak, in the first two decades. But it was strongly negative in the later decade, so much so that it more than washed out the positive input structure effect. Thus, category-I services would claim a smaller share of GDP during the two decades to 1993-94 if that share were determined only by the change in the structure of final demand (column-4, table-3) in isolation from input-structure and reallocation effects. However, during the last decade strong negative reallocation effect restrained substantially the rapidly growing share of the sector. This probably suggests technical progress and increased competition in service-I.

Table 4. Decomposition of Sectoral Shares (1993-94 to 2003-04)

Col.1	Col.2 1993-94	Col.3 2003-04	Col.4 Col.1 + Final Demand Effect	Col.5 Input-structure effect $V^*\Delta(I-A1)^{-1}*F_t$	Col.6 Reallocation effect $\Delta V^*(I-A1)^{-1}*F_t$
Primary	0.279	0.188	0.198	0.000	-0.010
Mining	0.024	0.025	0.017	0.006	0.002
Manufacturing	0.167	0.181	0.190	0.025	-0.034
Construction	0.053	0.068	0.057	0.000	0.010
Elect., Gas, Water	0.025	0.016	0.027	-0.003	-0.007
Secondary	0.270	0.290	0.291	0.028	-0.029
Transport	0.081	0.086	0.106	0.009	-0.029
Trade	0.139	0.154	0.148	0.009	-0.003
BaFinReBs	0.103	0.112	0.110	0.003	-0.002
Service-I	0.323	0.352	0.364	0.021	-0.034
CSP	0.128	0.170	0.147	-0.007	0.031
Col. Total	1.000	1.000	0.992	0.042	-0.042

If the strong negative reallocation effect for category-I services observed during the later decade is contrary to general perceptions then it has to be noted that the general perception is shaped principally by public administrative services (grouped with CSP). Our findings regarding *CSP are distinct in that it had substantial positive reallocation effects during both the sub-periods in full conformity with Baumol's hypothesis referred to at the beginning.*

During the last decade the positive reallocation effect for CSP counterbalanced the negative effect for category-I; so, the tertiary sector as a whole gained only marginally (table-4) from the input-structure and reallocation effects taken together. By contrast, during the previous two decades the reallocation effect was positive and the input-structure effect was positive too for

both category-I services and CSP. The tertiary sector as a whole gained enormously (table-3) from the two effects.²⁴

6. Summary and Conclusion

It is useful to classify the diverse types of services in two categories – one having predominantly intermediate use, what we called service-1, and the other having basically final use. The latter category is CSP services. Data provided by the IOTTs of the Indian economy over the three decades up to 2003-04 show increase in relative shares of both service-I and CSP services, as also that of the secondary sector, at the cost of the primary sector. But the big difference in the extent of increase shows up in the case of CSP. This study attempts to throw light on the phenomenon.

We decompose forces for change in sectoral shares into three components – the final-demand effect, input-structure effect and reallocation effect – and make an empirical assessment of the three components. Focus on the service sector as a whole conceals distinct behaviours of service-I vis-à-vis CSP services. The distinct behavior of CSP and similarities in the behaviours of the secondary and service-I sectors are important findings of the study.

It is observed that apart from final-demand effect, input-structure and reallocation effects played very important roles in determining sectoral shares of all major sectors of the Indian economy during the whole period under study. While the input-structure effect was negative for agriculture, it was positive for the secondary sector and service-I. The reallocation effect was negative for the primary and the secondary sectors, but for category-I services the effect was positive in the earlier two decades and strongly negative in the last decade.

The point that bears emphasis is that each sub-sector of service-I had substantial and positive input-structure effect, as one would expect, during both the sub-periods. In this respect this service category resembles the sub-sectors mining and manufacturing. But for CSP services this effect was significant only over the first two decades but not so when the whole period is considered. Our study further brings out the distinct behavior of CSP in that it had substantial positive reallocation effects during both the sub-periods, again, in full conformity with expectations from our discussions in sections 3 and 4. This underscores why talking about the tertiary sector as a whole without distinguishing between service-I and CSP may not always be enlightening. This realization is not prominently reflected in discussions on the tertiary sector of the Indian economy.

It may be clearly pointed out that positive reallocation effect is not the story of the entire tertiary sector but it is very much the big story for the sharp rise in relative share of CSP services during the whole period of three decades as well as both its sub-periods. On the other hand, positive input-structure effect was all pervasive in the service-1 category; it held for all the sub-sectors of the service-I category over each sub-period.

If we look at the whole period of three decades, tertiary sector's share in GDP of India would be smaller by more than six percentage points²⁵ in the absence of input-structure and

²⁴ Our finding is consistent with World Bank (2004) and Rakshit (2007) in that the growth in relative share of the tertiary sector over the last decade is primarily due to growth of final demand with notable contributions from export of services.

²⁵ See footnote 23.

reallocation effects, compared to what it was in 2003-04. But the story of the last decade was distinct from that of the earlier two decades in that the reallocation effect played substantially different roles in the tertiary sector in general and service-1 category in particular.

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