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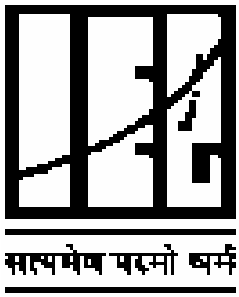

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Abstract: The paper analyses how productivity increase and changing sectoral composition in India have contributed to an accelerated economic growth in the post-1980 period. Productivity analysis reveals that a faster total factor productivity growth in the services sector in the post-1980 period has been an important contributor to accelerated economic growth. Within the services sector, the post-1980 hike in the growth rate of productivity is found to relatively higher in the trade, hotels and restaurants group and the public administration and other community, social and personal services group. Econometric analysis of the impact of different sectors on the rest of the economy brings out that the trade-transport sector and the secondary sector are important determinants of the growth of the economy. Variance decomposition analysis aimed at assessing the inter-sectoral growth linkages indicates that the causality runs from secondary sector to the trade-transport sector rather than in the revere direction. It is accordingly argued that though there has been a major shift in the composition of GDP towards services and this has contributed to the overall growth in India, it is the secondary sector which is the lead sector in the medium to long run, and the policy focus should therefore be on manufacturing.

JEL Code: O14, O47

Keyword: Tertiary Sector, Productivity, Inter-Sectoral Growth Linkages, Variance Decomposition Analysis

Productivity Increase and Changing Sectoral Composition: Contribution to Economic Growth in India

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1. INTRODUCTION

A number of studies undertaken in the last six years have noted that India's economic growth accelerated nearly a decade before the economic reforms began in India, i.e. the acceleration in India's economic growth took place around 1980 and not in the 1990s.[1] This has been noted, for instance, by Rodrick and Subramaniam (2005) who also argue that the transition in growth was grounded in an impressive increase in productivity. That 1980 or thereabout was the time when the growth transition took place in India has been pointed out by Williamson and Zagha (2002) and De Long (2003). This view has been empirically verified by the analysis of break point of growth rate undertaken by Rodrick and Subramaniam (2005) as also by similar analyses undertaken by Hausmann, Pritchett, and Rodrik (2004) and Wallack (2003).[2]

The analysis of source of growth undertaken by Bosworth, Collins and Virmani (2006) reveals that the increase in the economic growth rate in the post-1980 period was accompanied by a marked increase in the growth rate of total factor productivity (TFP), thus confirming the stand taken by Rodrick and Subramaniam (2005). An important question that arises here is whether the improved aggregate productivity performance since the 1980s was simply a consequence of reallocation of resources from low productivity (agriculture) to higher productivity (manufacturing and services) sectors, or was there a trend improvement in the performance of individual sectors. Rodrick and

[1] For a brief review of the literature, see Lal (2008).

[2] Using the methodology suggested by Bai and Perron (1998) to estimate and test for multiple structural breaks in a time series, Balakrishnan and Parameswaran (2007) have undertaken an analysis of break points in the growth rate of the Indian economy and its sectors/ sub-sectors. They find that the growth rate of aggregate GDP had only one shift; the shift was in 1978-79. But for individual sectors and sub-sectors, the break in the growth rate is found to have occurred at different points of time in the past. For agriculture, the break occurred in 1964-65. For manufacturing, there was a positive break in growth in 1982-83. For the various sub-sectors of services, Balakrishnan and Parameswaran find that the break occurred in the 1970s mostly prior to 1978-79.

Subramaniam (2005) seem to be of the view that though significant changes in sectoral shares have taken place in the Indian economy this would explain only a minor part of the post-1980 acceleration in aggregate-level productivity growth. By contrast, Bosworth, Collins and Virmani (2006) assess that resource reallocation contributed about one percentage point to the growth rate of output per worker in the post-1980 period. According to their estimates, the growth rate in output per worker at the aggregate level in the post-1980 period was 3.8 percent per annum. Thus, resource reallocation contributed about 25% of the growth in labour productivity in the post-1980 period. Evidently, going by the estimates of Bosworth, Collins and Virmani (2006), resource reallocation is an important factor in explaining the post-1980 acceleration in economic growth in India.[3]

This paper addresses two sets of issue. The first set is concerned with productivity growth in the services sector and how this has contributed to an accelerated economic growth in India. This part of the analysis is undertaken in the growth accountancy framework and is presented in section 2 of the paper. The second set of issues addressed in the paper are concerned with growth linkages – how growth in one sector of the economy promotes growth in other sectors. A critical question is, which sectors of the economy are playing a lead role and contributing to the growth of other sectors. For this component of the analysis, the growth accountancy framework is not suitable and we make use of a different framework and analytical methodology. This component of the analysis is presented in section 3 of the paper. The paper ends with a summary of findings and some concluding remarks, which are given in section 4 of the paper.

[3] Wallack (2003) concludes that much of India's post 1980s growth acceleration is attributable to resource movements. This view has been contested by Balakrishnan and Parameswaran (2007) on the ground that they find evidence of structural breaks in the growth rates of various sectors and sub-sectors of the economy.

2. PRODUCTIVITY INCREASE AND RESOURCE REALLOCATION EFFECTS

2.1 Contribution of Services Sector Productivity Increase to Economic Growth

Since Bosworth, Collins and Virmani (2006) and Bosworth and Collins (2007) have made estimates of output and productivity growth in the Indian economy and its three major sectors, namely agriculture, industry and services, we have not attempted to make a fresh set of productivity estimates at the economy and the broad sectoral level. However, for reasons that would be evident from the analysis presented later in the paper, it was felt that the services sector should be broken up into sub-sectors and productivity analysis should be carried out at the disaggregated level. Accordingly, productivity estimates have been made for four sub-sectors within services namely: (1) trade, hotels and restaurants, (2) transport, storage and communication, (3) financing, insurance, real estate and business services, and (4) public administration and other community, social and personal services. It may be mentioned in this context that Virmani (2004) has presented estimates of TFP growth in three sub-sectors of services for the period 1960-61 to 2003-04. He has considered separately 'transport, storage and communication' and 'trade, hotels and restaurants', and has clubbed all other services into one group. In our view, it is important to treat 'financing, insurance, real estate and business services' as a separate group, given its nature and important role in the development process and the high rate of growth it had been experiencing. We are therefore not able to use the productivity estimates of Virmani (2004) and have made our own estimates of productivity growth for the four sub-sectors of services listed above.

The estimates of growth rate in output, output per worker and TFP in the pre-1980 and post-1980 periods obtained by Bosworth, Collins and Virmani (2006) are reproduced in Table 1 below. The growth rates are shown for three major sectors (agriculture, industry and services) and the total economy.

It is evident from Table 1 that there was a marked increase in the growth rate of output (value added) in the economy in the post-1980 period. The growth rate increased from 3.4% per annum during 1960-1980 to 5.8% per annum during 1980-2004. Relatively more marked was the increase in the growth rate in output per worker (labour productivity), from 1.3% per annum during 1960-80 to 3.8% per annum during 1980-

2004. Equally marked is the increase in the growth rate of TFP from a meagre 0.2% per annum during 1960-80 to 2.0% per annum during 1980-2004.

For each of the broad sectors, agriculture, industry and services, acceleration in the growth rates of output, output per worker and TFP in the post-1980 period is seen from the table. It is relatively more marked in the case of services. Output and TFP growth rates of the services sector went up in the post-1980 period by about 2.5 percentage points and the growth rate of labour productivity by about 2 percentage points.

Table 1: Growth rates in Output and Productivity in the Indian Economy and Broad Sectors, Pre- and Post-1980 Periods

Sectors	**Growth rate (per cent per annum)**	
	1960-80	**1980-2004**
Agriculture		
- Output	1.9	2.8
- Output per worker	0.1	1.8
- Total Factor Productivity	-0.1	1.1
Industry		
- Output	4.7	6.4
- Output per worker	1.6	2.9
- Total Factor Productivity	-0.4	1.0
Services		
- Output	4.9	7.6
- Output per worker	2.0	4.0
- Total Factor Productivity	0.4	2.9
Total Economy		
- Output	3.4	5.8
- Output per worker	1.3	3.8
- Total Factor Productivity	0.2	2.0

Source: Prepared from Tables 3 and 4 of Bosworth, Collins and Virmani (2006).

An attempt is made in Table 2 to decompose the post-1980 increase in the rate of economic growth at the aggregate level into its various sources. It is seen from the table that the increase in the growth rate of total input accounted for only about a quarter of the increase in the growth rate of output of the economy; the balance was due to an increase in the growth rate of TFP. This contribution of aggregate TFP to output growth is further split into the contributions made by the three major sectors. It may be seen from Table 2

that the hike in the TFP growth at the economy level in the post-1980 period is mainly traceable to the increase that took place in the growth rate of TFP in the services sector. Further, it is evident that the acceleration in India's economic growth in the post-1980 period is attributable in a large measure to the hike in TFP growth in the services sector in this period. Of the 2.4 percentage point increase in the rate of economic growth that took place in India in the post-1980 period, about 40 percent is attributable to a faster growth in TFP in services. Given the importance of TFP growth in services in explaining acceleration in India's economic growth, a study of productivity performance of different sub-sectors of services will be instructive. This is taken up next in sections 2.2 through 2.4.

Table 2: Sources of Increase in the Growth Rate of the Economy: Decomposition Analysis

	Percentage point per annum	**Relative share (%)**
Change in the growth rate of the economy between pre- and post-1980 periods (5.8% - 3.4% pa)	2.4	100
Change in the growth rate of total input	0.6	25
Change in the growth rate of TFP	1.8	75
Contributions of changes in sector-wise TFP growth rates to change in aggregate TFP growth: sectoral contributions		
- Agriculture	0.5	20
- Industry	0.3	13
- Services	1.0	40

Source: Based on output growth and total factor productivity growth estimates made by Bosworth, Collins and Virmani (2006).

2.2 Growth in Output and Labour Productivity in Various Sub-sectors of Services

Growth rates in output (real gross value added) and output per worker in the four sub-sectors of services are presented in Table 3. Data on output (at 1993-94 prices) have been taken from the *National Accounts Statistics*. The period covered is 1960-61 to 2006-07. Data on employment are more difficult to get. The employment surveys of the NSSO are the basic source of data. Since employment estimates are available only for certain points

of time, these have been interpolated (and extrapolated) to work out a continuous annual series for the period 1960-61 to 2006-07.[4]

Table 3: Growth Rates in Output and Output per Worker: Sub-sectors of Services

Sub-sectors of Services	Growth in Output (% per annum)		Growth in Output per Worker (% per annum)	
	Pre-1980	Post-1980	Pre-1980	Post-1980
Trade, hotels and restaurants,	4.3	7.1	1.8	2.9
Transport, storage and communication,	5.6	8.0	2.6	3.3
Financing, insurance, real estate and business services	3.8	9.0	0.6	1.7
Public administration and other community, social and personal services.	4.4	6.2	1.9	4.2
Services sector (total)	4.5	7.2	1.9	3.6
Memo: Estimates of Bosworth, Collins and Virmani (2006) for aggregate services sector	4.9	7.6	2.0	4.0

Source: Authors' calculations based on *National Accounts Statistics* and NSSO data on employment
Note: Pre-1980=1960-61 to 1979-80, post-1980=1980-81 to 2006-07. Estimated trend growth rates shown.

Table 3 shows clearly that there was a step-up in the growth rate of output in the post-1980 period in the four sub-sectors of services considered. The increase was relatively modest in the case of public administration and other community, social and personal services. It was relatively more marked in the case of financing, insurance, real estate and business services — an increase from 3.8% per annum in the pre-1980 period to 9% per annum in the post-1980 period.

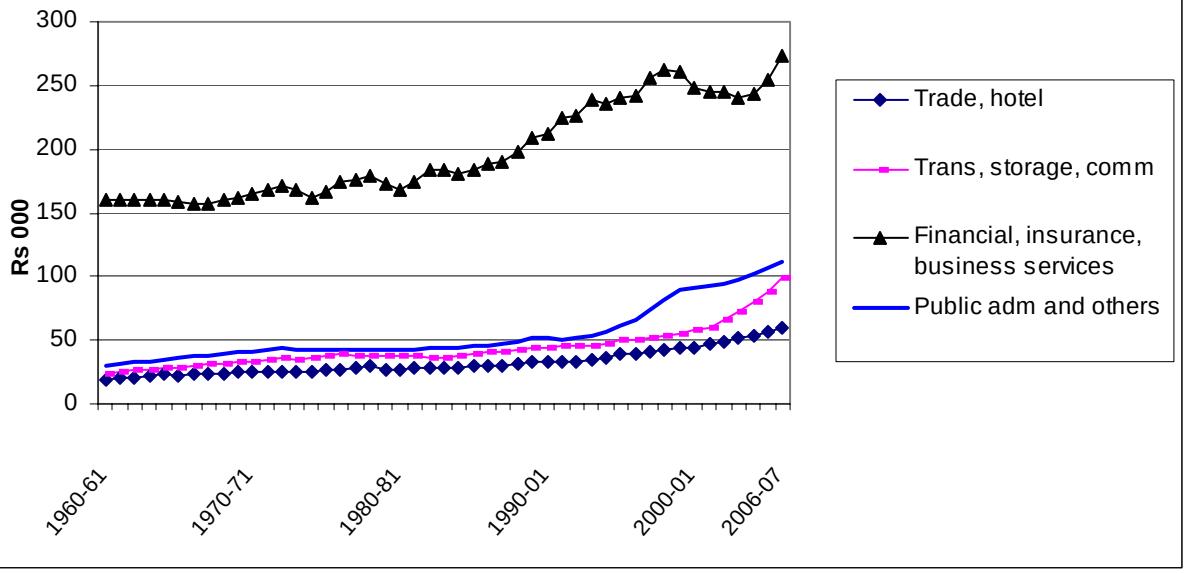
Similarly, there was an increase in the growth rate of labour productivity (output per worker) in the post-1980 period. For the services sector as a whole, the increase in the growth rate was from 1.9% per annum during the pre-1980 period to 3.6% per annum in the post-1980 period. In all the four sub-sectors of services, there was an increase in the

[4] The following papers have been utilized for making estimates of employment for the four sub-sectors of services: Mitra (2008), Sundaram (2001, 2007), and Papola (2007). For the estimate for 2004-05 (one of the benchmark estimates used for interpolation), employment in repair services has been taken out form the trade, hotels and restaurant group to ensure comparability with the estimates for earlier years.

growth rate of labour productivity in the post-1980 period. This was most marked in the case of public administration and other community, social and personal services. It is interesting to note that in this group of services, there was only a modest increase in the growth rate of output, but a marked acceleration in the growth rate of output per worker.

A graphic presentation of the inter-temporal changes in labour productivity is given in Fig. 1. The figure shows clearly that there has been an upward trend in labour productivity in the four sub-sectors of services, especially in the period after 1980. It is also remarkable to note that labour productivity in financing, insurance, real estate and business services is much higher than that in the other three sub-sectors. The share of financing, insurance, real estate and business services has increased over time and this has contributed to an increase the overall level of labour productivity in the services sector through reallocation of resources. It may be noted, however, that the resource reallocation effects within the services sector has been modest in comparison with the resource reallocation effects between agriculture and services.

Figure 1: Output per worker



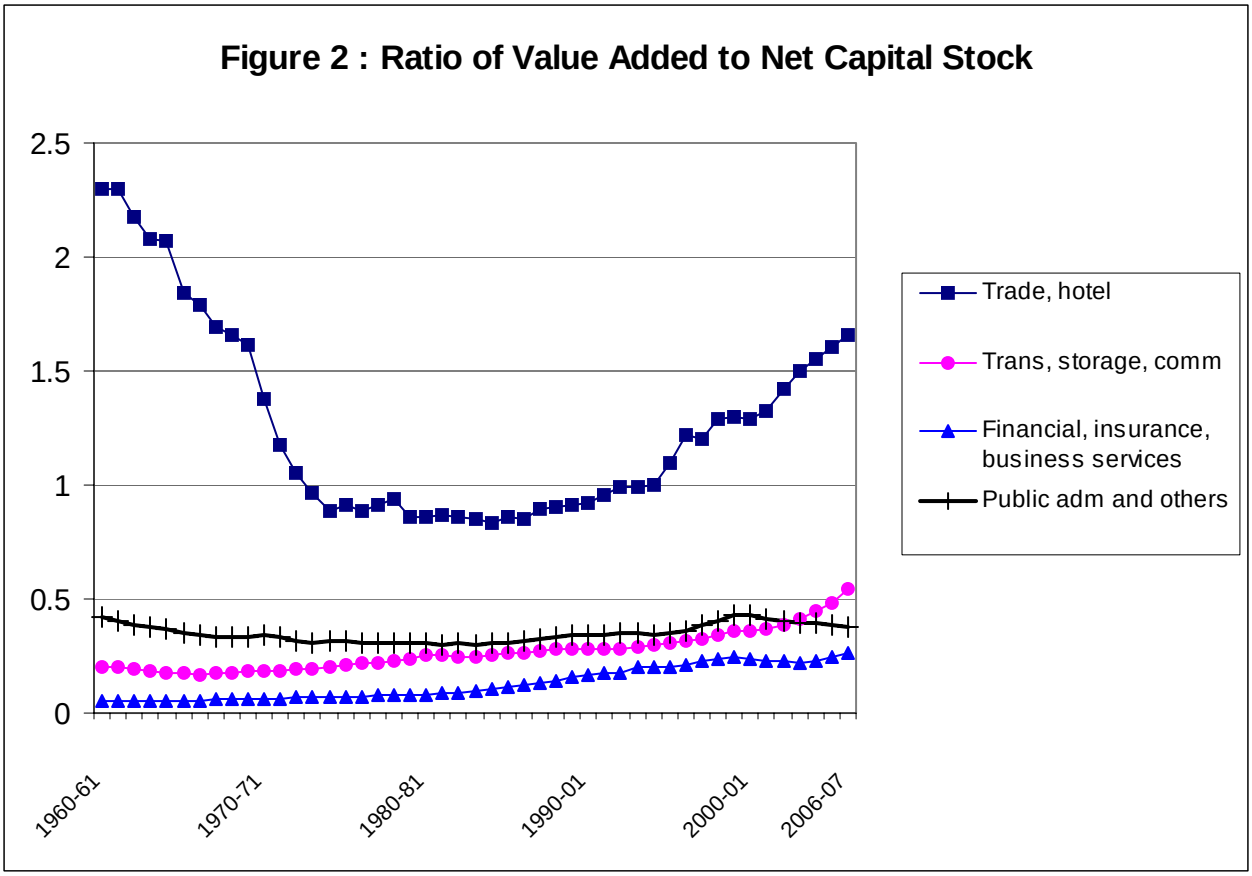
2.3 Trends in Capital Productivity

Ratio of output (value added) to net capital stock (both at 1993-94 price) is taken as the measure of capital productivity. The estimates of capital stock have been taken from the National Accounts Statistics.[5] There are some important data issues in the measure of capital stock used in the study. Bosworth, Collins and Virmani (2006) have called attention to the substantial increase that has taken place in the estimates of investment after shifting from the 1993-94 base to 1999-00 base. The estimate of investment for services has gone up by 46% with base revision. Bosworth, Collins and Virmani (2006) have, therefore, constructed their own series on capital stock instead of using the estimates provided in the *National Accounts Statistics*. For this study, the available capital stock series in the *National Accounts Statistics* has been used and the series available with different base have been spliced. In view of the concerns raised by Bosworth, Collins and Virmani (2006), there is probably some degree of inaccuracy in the estimated capital stock series so obtained (through splicing). This can be properly addressed only if a series on capital stock is built from the estimates of investment. If investment data could be obtained for different industries, cross-classified by type of assets (not available in the published data at present), the quality of the estimated capital input will go up further. This remains to be done and is a limitation of the capital stock series used for the analysis in this paper.

Trends in capital productivity are depicted in Fig. 2. A sharp downward trend in capital productivity in trade, hotels and restaurants is visible for the period 1960-61 to 1980-81. Subsequently, there was an upward trend in capital productivity in this group of services. In the transport, storage and communication group and the financing, insurance, real estate and business services group, there was an upward trend in capital productivity, especially in the post-1980 period. However, in public administration and other community, social and personal services, there was no clear trend in capital productivity. The pattern seems to be similar to that of trade, hotels and restaurants — a downward

[5] For the pre-1980 period, the estimates of net capital stock (including both fixed capital and inventories) are not available. Only the estimates of net fixed capital stock are available. For later years, estimates of both net fixed capital stock and net capital stock are available. Considering the ratio of inventories to fixed capital in the early 1980s, an adjustment factor has been computed for each category of services and this has been used to obtain estimates of net capital stock for years before 1981.

trend in capital productivity in the pre-1980 period and an upward trend in the post-1980 period.



2.4 Trends in Total Factor Productivity

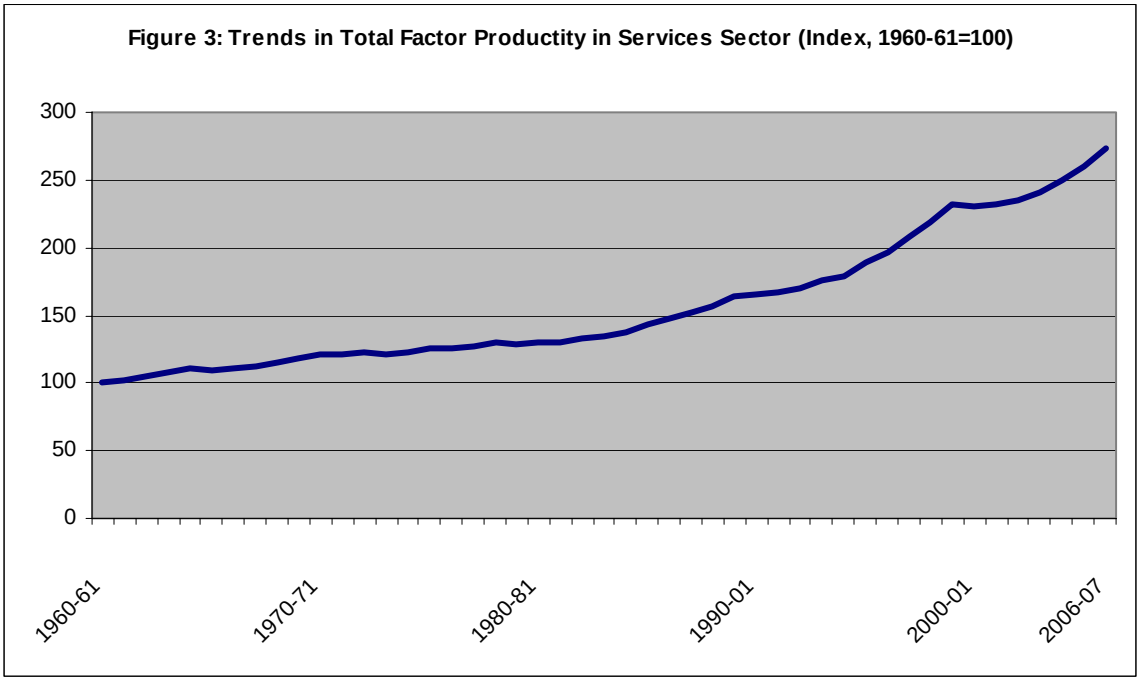
Total factor productivity indices have been constructed with the assumption of a two-input Cobb-Douglas production function and constant return to scale. The factor shares are assumed to be fixed and equal to the coefficients of labour and capital. In this regard, we follow the approach taken by Bosworth, Collins and Virmani (2006) and Bosworth and Collins (2007). Lack of time series data on factor income shares makes it necessary to assume a Cobb-Douglas production function.[6]

[6] The income shares of labour and capital in the four sub-sectors of services have been taken from the social accounting matrix constructed by Pradhan, Saluja and Singh (2006).

Bosworth, Collins and Virmani (2006) and Bosworth and Collins (2007) have included labour quality as an input in the specification of the production function. This aspect has been ignored in our estimates of TFP. But, even if this aspect were taken into account the results would not have been much different.

Trends in TFP in the services sector and the four sub-sectors are depicted in Figs. 3 and 4, respectively. The growth rates in TFP in the pre- and post-1980 periods are reported in Table 4. From the table and the graphs, it is seen that there was a marked increase in the growth rate of TFP in the services sector and the four sub-sectors. For the services sector as a whole, the growth rate of TFP increased from 1.3% per annum in the pre-1980 period to 3.0% per annum in the post-1980 period. This is broadly in agreement with the estimates of Bosworth, Collins and Virmani (2006). There is some difference in the TFP estimate for the pre-1980 period, which seems to be attributable to the factor income share weights used. The observed increase in the TFP growth in services by about 2 percentage points per annum is mostly attributable to the increase in the growth rate of TFP in the trade, hotels and restaurants group (from –3.4% p.a. to 2.9% p.a.) and in the public administration and other community, social and personal services group (from 1.1% p.a. to 3.5% p.a.).

Figure 3: Trends in Total Factor Productity in Services Sector (Index, 1960-61=100)



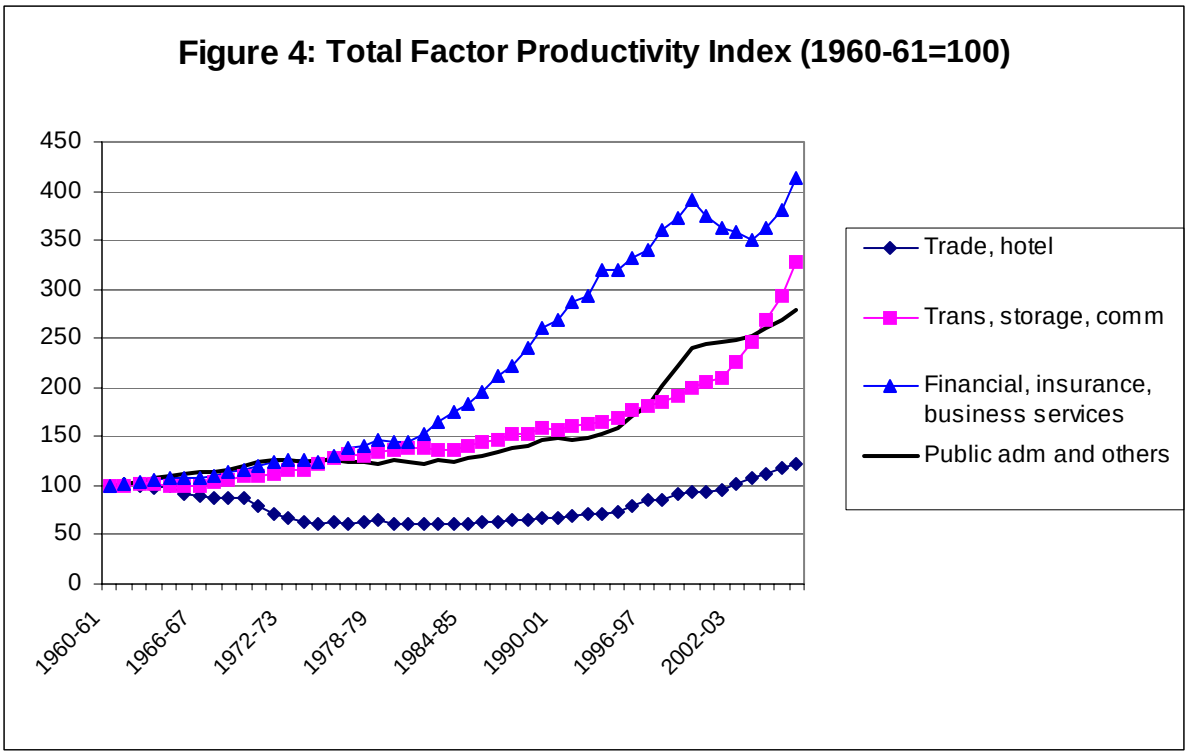


Table 4: Growth rates in TFP, Sub-sectors of Services

Sub-sectors of Services	Growth in TFP (% per annum)		
	Pre-1980	Post-1980	1960-61 to 2006-07
Trade, hotels and restaurants	-3.4	2.9	0.2
Transport, storage and communication	2.0	3.0	2.2
Financing, insurance, real estate and business services	2.0	3.9	3.5
Public administration and other community, social and personal services.	1.1	3.5	2.0
Services sector (total)	1.3	3.0	2.1
Memo: Estimates of Bosworth, Collins and Virmani (2006) for aggregate services sector	0.4	2.9	1.7

Source: Authors' calculations based on *National Accounts Statistics* and NSSO data on employment
Note: Pre-1980=1960-61 to 1979-80, post-1980=1980-81 to 2006-07. Estimated trend growth rates shown.

To check for a structural break in the TFP series for the services sector, the CUSUM and CUSUM squared tests have been carried out. This is based on the regression of logarithm of TFP index on time. The results are reported in Figs. 5 and 6. There are indications of a break in the growth rate of TFP around 1975, which is consistent with the results of Balakrishnan and Parameswaran (2007). Another break is indicated around 2000, which possibly arises from data incomparability (because of the shifting of the base year of *National Accounts Statistics* from 1993-94 to 1999-00 and the associated changes made).

Figure 5: CUSUM Test, Checking for Structural Break in TFP Growth

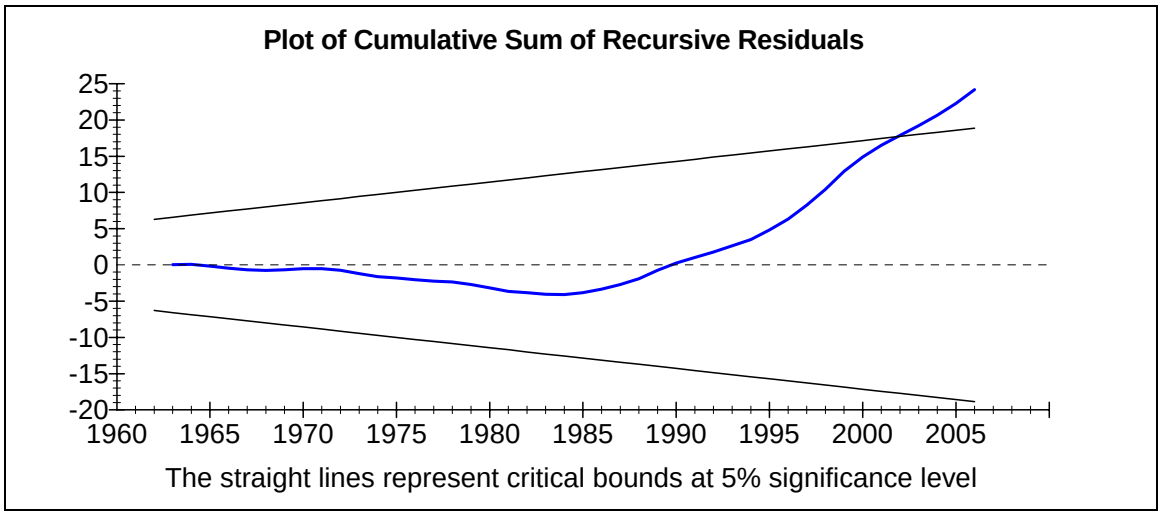


Figure 6: CUSUM Square Test, Checking for Structural Break in TFP Growth

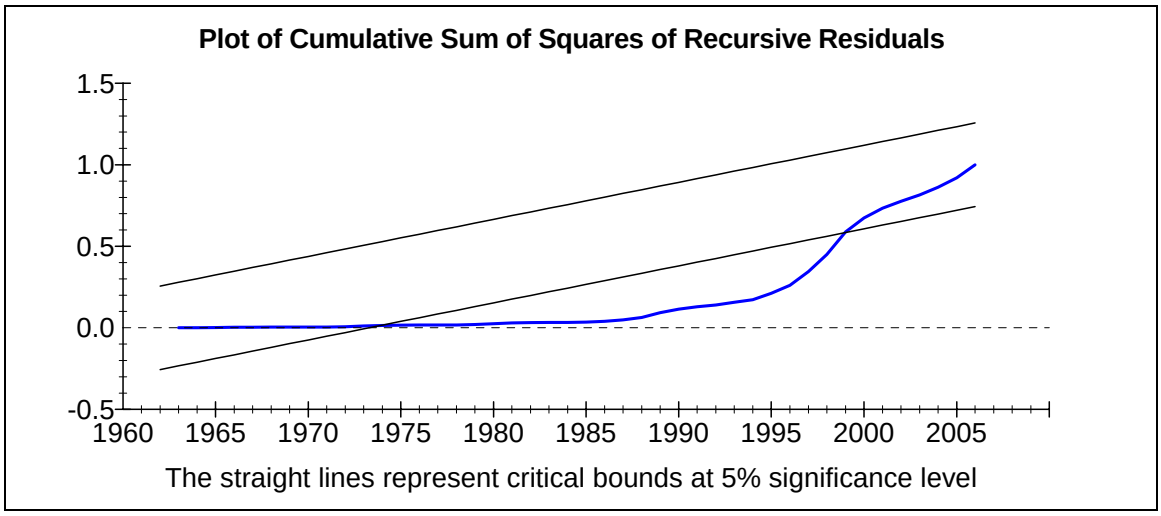
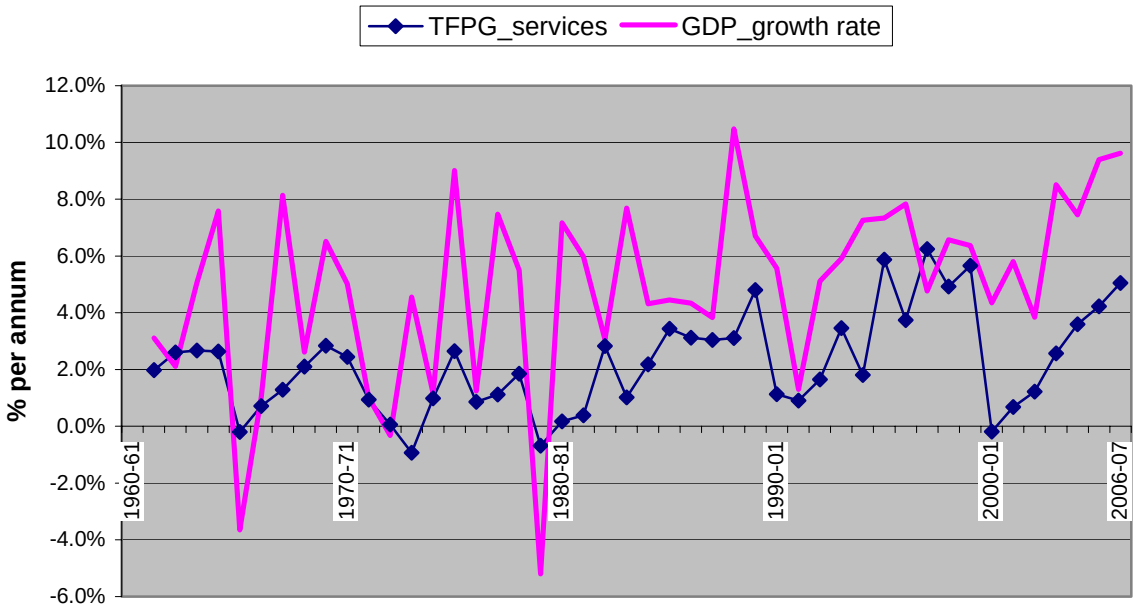


Figure 7 shows the growth rates in TFP in the services sector in different years during 1960-61 to 2006-07, along with the growth rates in aggregate GDP. A close correspondence between the two is visible in the figure. The correlation coefficient between the growth rate in TFP in services and the growth rate in aggregate GDP is 0.51. This is consistent with our earlier finding that accelerated TFP growth in services is one of the most important factors explaining the acceleration in economic growth in India in the post-1980 period. It seems to us further that productivity increases in services may have contributed to productivity increases in other sectors of the economy. Also, a lowering of the costs of services may have promoted growth in other sectors of the economy.

Figure 7: Growth rates - services sector TFP and aggregate GDP



2.5 Explaining the Productivity Surge

It has been shown above that about 40% of the increase in the growth rate of aggregate GDP in the post-1980 period is attributable to a hike in the growth rate of TFP in the services sector. It was shown further that the hike in TFP growth in the services sector in the post-1980 period is traceable primarily to a faster growth in TFP in the trade, hotels and restaurants group (from –3.4% p.a. to 2.9% p.a.) and in the public administration and other community, social and personal services group (from 1.1% p.a. to 3.5% p.a.). In the case of the trade, hotels and restaurants group, there was a major reversal of trend in capital productivity (Fig. 2). In the case of the public administration and other community, social and personal services group, there was a significant increase in the growth rate of labour productivity (Table 1 and Fig. 1). Are these real gains in productivity, or are these caused by the methods of measurement of services sector output being used for the *National Accounts Statistics*? In particular, is the growth of the services sector output for the post-1980 period being over-stated? These are important questions. But, answers must await a thorough investigation of the methods being used to measure the services sector output. This we leave as a task for the future.

3. CHANGING COMPOSITION OF GROWTH AND INTER-SECTORAL GROWTH LINKAGES

This section of the paper aims at analyzing the changing composition of growth and the sectors which are playing a lead role in pulling the overall growth of the economy.

3.1 Data problems

The difficulty, which is encountered in a typical time series analysis, relates to the changes in methodology adopted in measuring value added. For example, in the Indian context at the state level the gross state domestic product (GSDP) figures taken from the Central Statistical Organization (CSO) are available for two time periods[7]: at 1980-81 prices the series is available for the period 1980-81 through 1997-98, and at 1993-94 prices from 1993-94 through 2003-04. The problem with the two series is that they differ not only in terms of prices but also coverage or the sectoral composition. Apart from

[7] Central Statistical Organisation, "Scope of the Present Data Base", Domestic Product of States of India, 1960-61 to 2000-01, Economic and Political Weekly Research Foundation.

changes in the database and improvements in methodology including those based on the 1993 UN SNA, several new activities across sectors have been included in the series based on 1993-94 prices. Hence, an extended series, starting from 1980-81 (at 1993-94 prices) till the recent years, involves serious limitations. The usual method to construct a continuous series is the simple splicing method, though the reliability is questionable because of the differences in sectoral coverage and change in the methodology as mentioned above. From the series made available by the CSO it is difficult to gauge if revisions could be carried out while converting the series based on the 1980-81 prices into 1993-94 prices. At the state level we, therefore, prefer to report only the results based on the original series, 1980-81 to 1997-98 in 1980-81 prices. And for the later years (1999-2000 and 2003-04) we consider the series in 1993-94 prices without trying to convert them into a common base.

At the national level, it is, however, claimed that the series starting from 1950-51 to 1999-00 is based on the revised national income and production statistics linked back with 1999-00 as the base year, thus reworking the previous estimates applying the splicing technique to each activity independently.[8] But from the above statement we are still not clear if the new methodology could be actually applied for the years prior to 1980-81.

For the recent years (from 1999-2000 to 2006-07), the base of GDP was changed to 1999-2000. However, the sectoral distributions of GDP from two different series (at 1993-94 prices and 1999-2000 prices) for the year 2000-01 are quite similar. Hence, percentage figures and growth rates based on these two series may be broadly comparable.

In the context of the tertiary sector there does not exist any uniform definition. For example, transport storage and communication constituting the basic infrastructure are as good as the manufacturing activities. Also, the measurement of value added and its interpretation cannot be the same in certain components of the tertiary sector like trade, hotels and restaurants and community, social and personal services as that in agriculture and manufacturing. The rise in real income of employees engaged in some of these

[8] *Economic Survey, 2007-08*, Government of India and Central Statistical Organization, "Preface to the Fourth Edition", *National Accounts Statistics of India: 1950-51 to 2000-01*, Economic and Political Weekly Research Foundation.

activities cannot necessarily be treated as the rise in value addition made by them because the rise could be completely independent of any change in the contribution made by the employees. The rise in value added originating from the trade sector can be merely a rise in the mark-up, without any reference to the actual value addition or the productive capacity of the economy. This problem can be there in manufacturing as well. But there is a difference between the manufacturing and services sector in this respect. Large manufacturing firms may be exploiting monopoly power and raising the markups, but this problem can be overcome if we estimate value addition in terms of factor cost instead of market prices.

The other issue relates to the situation in which certain service related activities within manufacturing enterprises are moving out. These activities were counted earlier as part of the manufacturing activities, and because of super-specialization these activities now fall into the domain of the tertiary sector. This may mean a sudden rise in the share of the tertiary sector in the total value added for the recent years while in the past they remained embedded in the category of manufacturing.[9] All this entails problems of comparability of sectoral shares over time.

For the IT sector also there is no uniform definition because the concepts, methods and applications involved are constantly evolving almost every day. In India, it covers one particular sub-sector — software and IT enabled services — which employ a substantial proportion of the total employment in the ICT sector in the country while in some other countries it encompasses communication and hardware sectors (Sarkar and Mehta, 2006).

Besides, value added originating from some of the activities within the tertiary sector is not captured appropriately. Transport of goods, television serials and film production and advertisements are only a few examples of such activities.

[9] Banga and Goldar (2007) in fact bring out distinctly that services as an input to manufacturing production increased in the recent years.

3.2 Composition of Growth

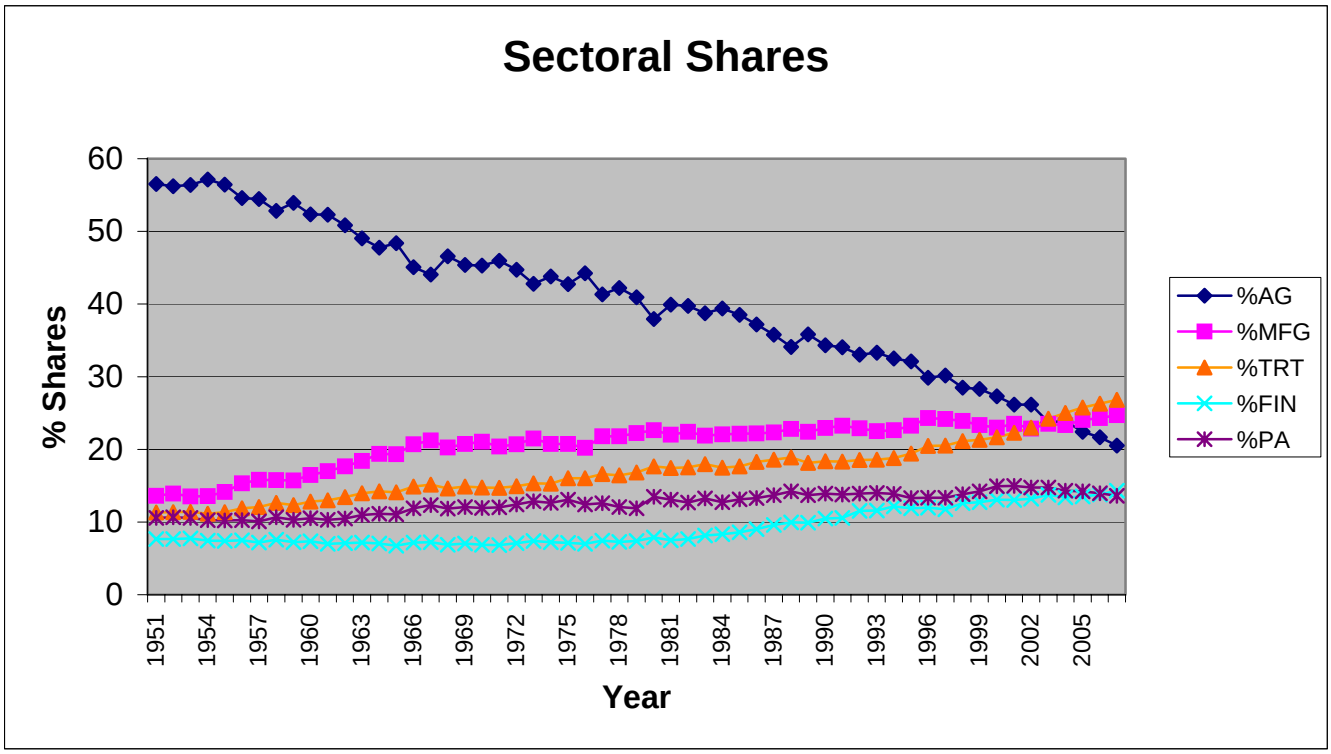
The share of the primary sector (agriculture, forestry and fishing, mining and quarrying), particularly after 1960-61, has started declining steadily, and after 1990-91 the extent of decline has been perceptibly high (Table 5 and Fig. 8). The relative size of the secondary sector (manufacturing, construction and utilities) on the other hand increased, sluggishly though, over the years. In fact, after 1980-81, the extent of the rise is almost one percentage point per decade. However, some of the components of the tertiary sector have expanded considerably over the years. For example, the relative size of trade, hotels, transport and communication and financing, insurance, real estate and business services shot up since the eighties. Public Administration and other community, social and personal services remained more or less stable in relative terms between 1980-81 and 2006-07 mainly because of the downsizing of the public sector.

Table 5: Relative Size of Different Sectors (%)

Year	Primary	Secondary	Trade, Hotels, Transport and Communication	Financing, Insurance, Real Estate and Business Services	Public Administration and Defence, and Other Services
1950-51	56.53	13.62	11.30	7.67	10.57
1960-61	52.28	17.02	13.00	7.00	10.31
1970-71	45.95	20.38	14.72	6.82	12.01
1980-81	39.94	22.03	17.44	7.49	13.10
1990-91	34.05	23.24	18.34	10.58	13.78
2000-01	26.18	23.51	22.29	13.04	14.98
2006-07	20.55	24.71	26.81	14.31	13.62

Source: Central Statistical Organization, cited in *Economic Survey*, 2007-08, Government of India.

Figure 8: Relative Size of Different Sectors: 1950-51 to 2006-07



Note: AG stands for Primary sector, MFG for secondary sector, TRT for trade and transport sector, FIN for finance, and PA for Public Administration and other services.
Source: See Table 5.

From Table 6 it is evident that India's economic growth has been as high as 7 per cent in last seven years. Though the primary sector growth improved during the eighties and nineties compared to the seventies, the 2000s again show a deceleration. The secondary sector on the other hand showed improvement during the nineties and in the present decade. However, trade and transport and financing and business services grew at a much faster rate than the secondary sector.

After three decades of sluggish growth rates, India since the mid-eighties has been experiencing reasonably high growth rates. Various studies suggested that the main contribution to this change came from the tertiary sector in the absence of a sustained and persistent industrial growth (Kapila, 2003; Reserve Bank of India, 2000-01; Bhattacharya and Sakthivel, 2004). While this spurt originating from the tertiary sector was most

welcome by policymakers and some of the academicians, the missing development of the secondary sector also raised an intense debate.

Datta (2001) points out that the tertiary sector's contribution to GDP has increased steadily over time and it has established itself as the largest sector of the Indian economy. While he notes the importance of some of the sub-sectors like transport in the context of growth and thus includes it in the secondary sector, he also shares the view that the growth of other sub-sectors like public administration and defence is neither necessarily related to the demand of the development process, nor is it related to the need for improvement in the overall efficiency in a developing economy. However, after making price adjustments, his recalculations of the series did not really show that it expanded much faster than the GDP growth at constant prices. The rise in the share of this sub-sector is a reflection of the rise in the cost of the services. On the other hand, sub-sectors like transport, communication and banking are believed to contribute significantly to the overall economic growth. Especially the role of information technology (IT) and business process outsourcing services (BPOS) in enhancing the economic growth has been noticed widely in the reform period in India (World Bank, 2004).

Table 6: Growth Rates (per cent per annum)

Period	Primary	Secondary	Trade, Hotels, Transport and Communication	Financing, Insurance, Real Estate and Business Services	Public Administration and Defence and Other Services	GDP
1950-51 to 1959-60	2.71	5.97	5.16	3.01	3.45	3.62
1960-61 to 1969-70	1.62	5.57	4.66	3.06	5.11	3.23
1970-71 to 1979-80	1.84	4.40	5.26	4.35	3.61	3.39
1980-81 to 1989-90	3.19	5.42	5.76	8.86	6.05	5.04
1990-91 to 1999-2000	3.37	6.23	7.96	7.65	6.30	5.87
2000-01 to 2006-07	2.68	7.58	10.11	7.60	5.32	6.70

Source: See Table 5.

3.3 Lead-Sector Pulling the Overall Growth

In the process of economic growth Kaldor (1967) suggested that it is the manufacturing sector, which plays the role of engine of growth, as the potential for productivity growth is highest in this sector. He, in fact, provided the theoretical rationale for the patterns of structural change that Kuznets (1955) had observed in the case of the advanced countries during the process of their economic development (Dasgupta and Singh, 2006).

Issues relating to the growth of the tertiary sector are enormous. Kuznets (1966) suggested on the basis of the historical experience of the developed countries that the tertiary sector expands in relative terms only when development matures with a considerable rise in per capita income in the process of rapid industrialization. In other words, after the secondary sector has already acquired dominance both in terms of value added and work force, i.e. the relative size of industry predominates that of the other sectors, the tertiary sector then acquires significance in value added and work force composition. This is because of the fact that after a considerable rise in per capita income originating from the commodity-producing sector the demand for services increases as the consumption demand for commodities gets saturated. Though because of rise in productivity in the manufacturing sector prices decline thus stimulating the demand for manufacturing products, the greater income elasticity of demand for services results in a larger share of the tertiary sector than the others.

It is relatively easy to rationalize the shift in favour of the tertiary sector in the context of the developed countries because following the rapid progress in industrialization the demand for several services grows faster, which in turn reduces the share of the secondary sector in the total product of the economy. But in the case of the developing countries, the dominance of the tertiary sector before the secondary sector's relative size could outweigh that of other sectors did invite concerns at least in the past (Rao, 1954, 1986). Bhattacharya and Mitra (1990) argued that a wide disparity arising between the growth of income from services and commodity producing sector tends to result in inflation and/or higher imports leading to adverse balance of trade. This is particularly so if the tertiary sector value added expands because of rising income of those who are already employed and not due to income accruing to the new additions to the tertiary sector work force. In other words, if expansion in value added and

employment generation both take place simultaneously within the tertiary sector, there will be a commensurate increase in demand for food and other essential goods produced in the manufacturing sector. However, if the expansion of the tertiary sector results only from the rise in income of those who are already employed in this sector, the additional income, as per Angel's law, would largely generate demand for luxury goods and other imported goods since the demand for food and other essential items has already been met (Bhattacharya and Mitra, 1990).

On the other hand, factors like increasing role of the government in implementing the objectives of growth, employment generation and poverty reduction, expansion of defence and public administration, the historical role of the urban middle class in wholesale trade and distribution and demonstration effects in developing countries creating demand patterns similar to those of high income countries have been highlighted to offer a rationale for the expansion of the tertiary sector (Panchamukhi et al., 1986). As the elasticity of service consumption with respect to total consumption expenditure is higher than unity even in countries with very low per capita consumption (Sabolo, 1975), the rapid growth of the tertiary sector has been further rationalized in terms of a strong demand base existing in the economy. Sub-sectors like transport, communication and banking do contribute significantly to the overall economic growth as they constitute the basic physical and financial infrastructure. Especially the role of information technology (IT) and business process outsourcing services (BPOS) in enhancing the economic growth is said to be significant (World Bank, 2004). In addition, the new growth theorists indicate that skill-intensive activities exert positive externalities on the rest of the economy, and thus a concentration of new activities in the tertiary sector with the initiation of IT industry, holds possibilities of raising productivity and growth (Romer, 1990). All this tends to suggest that services too hold the possibility of playing the role of an engine of growth.

Keeping in view this perspective we have tried to identify the lead sector which primarily takes on the role of engine of growth. The growth rate in each of the five sectors has been taken separately as the determinant of the growth in the rest of the economy (see Table 7). In terms of the adjusted R^2 the trade and transport sector turns out to be the most significant one though secondary sector (inclusive of manufacturing)

growth is also an important determinant of the growth in the rest of the economy. Even in terms of the responsiveness of growth in the rest of the economy to sectoral growth, the trade-transport sector dominates the secondary sector. A one percent increase in the trade-transport sector growth rate raises the overall growth rate by 0.76% while the secondary sector raises it by only 0.46%. These estimates seem to have remained stable over the years as the CUSUM and CUSUM-squared tests do not favour any structural change. Even the dummy variable test carried out after assigning the slope dummies for the eighties, nineties and 2000s does not turn out to be significant (Table 8).[10]

Table 7: Impact of Different Sectors on the Rest of the Economy

Dep. Var: Growth Rate in the Rest of the Economy, i.e., Growth Rate in (GDP- the lead sector VA)

Lead Sector	**Equ. 1**	**Equ. 2**	**Equ. 3**	**Equ. 4**	**Equ. 5**
Intercept	5.33 (17.14)*	1.74 (2.14)*	-0.43 (-0.46)	2.91 (3.37)*	3.69 (2.83)*
Growth in Primary Sector	0.11 (2.12)*				
Growth Rate in Secondary Sector		0.46 (3.66)*			
Growth Rate in Trade-Transport			0.76 (5.42)*		
Growth Rate in Finance				0.27 (1.98)*	
Growth Rate in Public Adm. and Other Services					0.16 (0.65)
Adj R^2	0.06	0.18	0.34	0.05	-0.01

Note: (1) * represents significance at 5 per cent level. (2) Brown, Durbin and Evan's test (1975) has been carried out to assess if there has been any structural change. Both the CUSUM and CUSUM-squared tests confirm that there has not been any structural change in any of the sample years.

[10] Three slope dummies representing eighties (1980-81 to 1989-90), nineties (1990-91 to 1999-2000) and 2000s (2000-01 to 2006-07) have been included to examine if the impact of any sector on the rest of the economy has changed relative to the fifties, sixties and seventies. The results do not support any statistically significant change.

Table 8: Regression Equations with Dummy Variables

Dep. Var: Growth Rate in the Rest of the Economy, i.e., Growth Rate in (GDP- the lead sector VA)

Equation 1		Equation 2		Equation 3	
Intercept	1.69 (2.12)*	Intercept	3.61 (3.27)*	Intercept	-1.47 (-1.36)
Growth Rate in Secondary Sector	0.31 (2.26)*	Growth Rate in Finance Sector	0.0004 (0.0004)	Growth Rate in Trade-Transport Sector	0.97 (4.68)*
Growth Rate in Secondary Sector*D1	0.33 (1.80)	Growth Rate in Finance Sector*D1	0.155 (0.67)	Growth Rate in Trade-Transport Sector*D1	0.17 (1.02)
Growth Rate in Secondary Sector*D2	0.27 (1.55)	Growth Rate in Finance Sector*D2	0.15 (0.63)	Growth Rate in Trade-Transport Sector*D2	-0.11 (-0.75)
Growth Rate in Secondary Sector*D3	0.27 (1.66)	Growth Rate in Finance Sector*D3	0.37 (1.50)	Growth Rate in Trade-Transport Sector*D3	-0.22 (-1.39)

Note: D1, D2 and D3 are the three slope dummies representing the eighties (1980-81 to 1989-90), nineties (1990-91 to 1999-2000) and 2000s (2000-01 to 2006-07) which have been included to examine if the impact of any sector on the rest of the economy has changed relative to the earlier period (fifties, sixties and seventies).

3.4 State-Level Evidence

Across states also, the relative size of the tertiary sector value added grew considerably, over the period 1980-81 through 1997-98. By 2003-04, it accounted for nearly half or more of the state domestic product in the states of Andhra Pradesh, Assam, Karnataka, Kerala, Maharashtra, Tamil Nadu and West Bengal. Between 1999-200 and 2003-04 the share of the tertiary sector increased in almost every state except Gujarat (Table 9). However, the inter-state variations in the share of the tertiary sector remained more or less same over the years, suggesting the possibility of growth of this sector across all the states without being confined to only a few regions (see Table 9).

Table 9: Share of Tertiary Sector Value Added in GDP

State	1980-81	1985-86	1990-91	1995-96	1997-98	1999-2000	2003-04*
Andhra Pradesh (AP)	37.04	39.66	42.78	43.56	45.69	46.58	48.96
Assam (ASS)	39.89	42.09	44.73	46.48	48.19	42.87	49.05
Bihar (BIH)	27.65	28.23	30.48	35.15	35.02	38.56	39.58
Gujarat (GUJ)	32.31	35.81	37.24	37.51	37.86	41.63	40.12
Haryana (HAR)	26.77	28.67	30.71	33.54	37.18	37.87	42.57
Karnataka (KAR)	33.56	37.80	41.18	42.25	44.53	43.70	49.93
Kerala (KER)	38.14	42.29	44.81	45.91	46.36	55.38	62.75
Maharashtra (MAH)	37.23	41.81	42.32	45.99	48.94	51.14	57.71
Madhya Pradesh (MP)	26.83	29.44	30.42	31.94	33.69	36.53	39.34
Orissa (OR)	30.28	31.97	37.51	39.64	41.10	41.38	44.71
Punjab (PUN)	30.86	27.96	28.77	28.44	29.28	36.28	37.26
Rajasthan (RAJ)	34.46	30.79	32.77	32.19	33.81	39.47	42.82
Tamil Nadu (TN)	40.66	42.82	43.27	47.20	48.51	48.26	54.51
Uttar Pradesh (UP)	32.77	34.45	36.82	37.97	40.18	39.74	41.99
West Bengal (WB)	38.75	40.49	41.54	42.19	43.92	48.85	53.51
Coeff. of Variation	13.92	16.08	15.28	15.43	15.25	13.19	16.10

Note: Shares for all the years except 1999-2000 and 2003-04 are from the series based on 1980-81 prices. Figures for 1999-2000 and 2003-04 are given in 1993-94 prices.
*For Karnataka, Bihar, Uttar Pradesh and West Bengal the terminal year is 2002-03 and for Assam it is 2004-05. For the rest of the states it is 2003-04.

Source: Central Statistical Organization (CSO), Government of India.

Nevertheless, the composition of the tertiary sector has been undergoing significant changes. Particularly after the deregulation and liberalization programmes initiated in the country in the mid-eighties and early nineties, respectively, such changes are quite perceptible. For the sake of convenience we divide the tertiary sector into two broad categories: one that constitutes trade, hotels and restaurants and community, social and personal services including public administration and defence; and the other, finance, real estate ownership and business services and transport storage and communication including the IT sector and the BPOs operating in these activities. While the latter is treated as the modern dynamic component, the former does not necessarily comprise productive activities though they could be important from the non-economic viewpoint.

At the state level the share of the banking sector in total tertiary sector value added increased in most of the states during this period (Table 10). In some of the states like Bihar it accounted for a considerably small share in 1980-81 (around 5% or so), which then more than doubled by the year 1997-98. In some of the industrialised states like Maharashtra and Gujarat, the relative size became as high as 34% and 28% respectively in the year 1997-98. On the other hand, the trade sector, the proliferation of which is not necessarily indicative of growth as argued by Bhattacharya and Mitra, 1990, seems to be losing its share in several states. Public administration, which has been treated largely as an indicator of increasing dependency rather than positive indicator of growth (Bhattacharya and Mitra, 1990; Datta, 2001), too is on the verge of decline in terms of relative size. On the other hand, the percentage share of transport, storage and communication grew in several states like Gujarat, Kerala, Madhya Pradesh, Orissa, Punjab, and West Bengal and remained more or less constant in several other states by 1997-98.

Table 10: Composition of Tertiary Sector across States

State	Year	Transport, Storage and Communication	Trade, Hotels etc.	Banking	Real Estate, Business Services	Public Admin. Etc.	Other Services
AP	1980-81	16.22	36.49	5.78	13.80	10.60	17.11
	1997-98	13.86	36.91	14.05	9.37	8.91	16.90
	1999-2000	16.06	28.82	10.87	14.27	10.38	19.6
	2003-04	19.79	26.52	11.06	14.36	9.25	19.01
ASS	1980-81	8.89	27.71	3.21	27.90	9.36	22.93
	1997-98	11.17	23.04	11.33	20.01	15.14	19.31
	1999-2000	8.81	30.34	12.50	8.10	17.34	22.90
	2004-05	12.74	30.56	9.71	7.40	13.20	19.39
BIH	1980-81	12.69	25.74	5.11	26.56	12.06	17.84
	1997-98	10.72	22.43	11.40	16.88	16.57	22.01
	1999-2000	13.45	33.92	9.99	9.76	15.94	16.95
	2002-03	13.05	33.92	10.7 3	8.86	14.72	18.72
GUJ	1980-81	15.60	29.49	10.74	21.01	7.99	15.17
	1997-98	18.47	26.04	27.56	10.57	6.34	11.03
	1999-2000	19.75	26.81	16.71	13.01	9.18	14.54
	2003-04	19.83	30.59	14.76	13.34	6.51	14.96
HAR	1980-81	12.58	43.47	6.44	13.87	8.41	15.24
	1997-98	12.84	48.67	12.21	8.60	7.88	9.79
	1999-2000	21.93	37.36	11.72	8.50	7.94	12.55

	2003-04	22.95	43.65	10.38	7.01	5.68	10.33
KAR	1980-81	13.17	34.79	9.28	18.79	9.36	14.61
	1997-98	14.68	33.66	19.44	10.86	9.51	11.86
	1999-2000	15.08	28.94	14.66	14.89	9.20	17.89
	2002-03	18.56	27.45	13.30	14.59	7.45	18.66
KER	1980-81	13.93	36.81	7.13	12.51	10.51	19.11
	1997-98	22.06	26.11	20.09	7.75	12.70	11.28
	1999-2000	18.62	32.93	12.54	11.19	10.14	14.58
	2003-04	20.35	32.61	14.91	9.50	8.40	14.17
MAH	1980-81	15.46	31.17	13.39	13.86	7.78	18.35
	1997-98	14.21	23.44	33.60	6.35	5.82	16.57
	1999-2000	18.05	22.82	28.34	10.18	8.26	12.35
	2003-04	20.61	24.00	25.03	9.32	6.64	14.40
MP	1980-81	15.21	37.79	5.90	15.25	10.56	15.29
	1997-98	18.94	30.49	14.30	10.06	10.83	15.38
	1999-2000	17.20	28.79	8.75	14.39	12.10	18.77
	2003-04	20.15	25.54	10.51	15.79	11.81	16.19
OR	1980-81	9.82	42.89	4.17	15.84	12.71	14.57
	1997-98	12.93	37.45	11.54	10.30	12.71	15.07
	1999-2000	19.33	22.80	9.61	13.14	14.80	20.33
	2003-04	23.16	22.43	10.05	12.43	13.61	18.31
PUN	1980-81	8.44	42.46	7.46	15.24	9.22	17.18
	1997-98	13.41	34.01	18.29	10.16	12.30	11.82
	1999-2000	15.14	34.24	14.40	11.85	12.96	11.41
	2003-04	15.51	33.59	16.48	11.26	12.51	10.64
RAJ	1980-81	11.29	36.51	7.16	18.96	10.39	15.70
	1997-98	11.16	35.36	16.15	10.82	9.67	16.84
	1999-2000	14.78	32.31	8.60	15.02	10.37	18.92
	2003-04	14.74	33.17	8.97	14.30	9.43	19.40
TN	1980-81	17.77	37.96	7.28	13.87	8.84	14.28
	1997-98	18.20	30.85	18.26	12.03	9.16	11.50
	1999-2000	17.46	31.11	16.63	11.39	10.52	12.89
	2003-04	20.29	31.07	13.19	13.14	9.11	13.19
UP	1980-81	9.95	41.25	5.02	18.72	8.68	16.38
	1997-98	10.22	31.24	13.94	13.79	13.54	17.26
	1999-2000	14.99	31.70	9.45	15.06	12.36	16.44
	2002-03	17.11	30.84	9.19	14.40	11.59	16.87
WB	1980-81	12.45	30.20	12.97	20.90	7.64	15.85
	1997-98	18.06	27.49	18.67	17.59	7.72	10.47
	1999-2000	14.74	25.53	21.27	14.00	11.49	12.97
	2002-03	13.82	24.11	25.74	14.59	10.44	11.31

Note and Source: See Table 9. Also, for the abbreviations of the states see Table 9.

The pattern seems to have continued even after that. The relative size of transport, storage and communication increased in several states like Andhra Pradesh, Assam, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and Uttar Pradesh between 1999-2000 and 2003-04. However, for banking and real estate and business services the increase is not very distinct during this period.

As mentioned above, many scholars questioned the desirability of a pattern of growth largely being accounted by the tertiary sector. The value added originating from the tertiary sector is not seen to be the same as that from the commodity producing sector and, hence from the development point of view there could be serious reservations in accepting the tertiary sector at par with the manufacturing sector. For example, the implementation of the recommendations made by the committees looking into pay revisions, enhances the tertiary sector value added from time to time, as much of the organised employment comprises public sector employment. But to treat this aspect as rise in value addition made by the employees engaged in the tertiary sector and to assign equal importance to this rise as that of value added growth from agriculture or manufacturing, could be faulty. Hence, an overall growth led primarily by the tertiary sector may have serious implications in terms of sustainability. Nevertheless, some of the components of the tertiary sector like transport, storage and communication and banking and insurance are crucial to economic development, and it would be equally erroneous to treat them as redundant or superfluous to growth. The use of services is growing rapidly in the industrial sector and the increased use of services is contributing to both output and productivity growth in the industrial sector, and from this point of view Banga and Goldar (2007) argue that the Indian services sector may not only sustain its own growth but also help improve the growth of the industrial sector in future.

It may be interesting to see if the states with relatively higher shares of the dynamic components experienced higher growth rates. For this purpose we have divided the sates into two three categories: states with sluggish growth in the nineties in net state domestic product (NSDP), states with medium growth and states experiencing rapid growth. They have been cross-classified by the relative size of the dynamic components within the tertiary sector (Tables 11 and 12). *The dynamic components comprise transport, storage and communication, and financing, real estate and business services.*

This classification has been done for two sub-periods separately keeping in view the differences in the base year prices. Table 11 gives the cross-classification of states by the magnitude of average annual growth rate for the period 1990-91 through 1997-98 (in 1980-81 prices) and the relative size of the dynamic components of the tertiary sector. Table 12 gives the cross-classification based on the average growth rate for the period 1999-2000 through 2003-04 and the relative size of the dynamic components of the tertiary sector in 1993-94 prices.

Table 11: States Cross-Classified by the Magnitude of Average Annual Growth Rate (1990-91 through 1997-98) and the Relative Size of the Dynamic Components of the Tertiary Sector (1997-98) in 1980-81 prices

Growth Rates	% Share of the dynamic component <40%	% Share of the dynamic component 40-45 %	% Share of the dynamic component 45% and above
Sluggish Growth (<3 % p.a.)	BH, UP		
Medium Growth (3-4.99% p.a.)	AP, HAR, OR, RAJ	MP, PUN	
Rapid Growth (5% p.a. and above)		KAR	GUJ, KER, MH, TN, WB

Note: Annual growth rates (point-to-point) estimates are based on NSDP figures.

Table 12: States Cross-Classified by the Magnitude of Average Annual Growth Rate (1999-2000 through 2003-04) and the Relative Size of the Dynamic Components of the Tertiary Sector (2003-04) in 1993-94 prices

Growth Rates	% Share of the dynamic component <40%	% Share of the dynamic component 40-45 %	% Share of the dynamic component 45% and above
Sluggish Growth (<3 %p.a.)		PUN, UP	MP
Medium Growth (3-4.99% p.a.)	RAJ	KER	KAR, MH, OR, TN, WB
Rapid Growth (5 % p.a. and above)	ASS, BH	HAR,	AP, GUJ

Note: Annual growth rates (point-to-point) estimates are based on GSDP figures.

Though the association between these two attributes does not seem to be very distinct, at least this much is evident from Table 11 that the sluggishly growing states like

Bihar and Uttar Pradesh during 1990-91 to 1997-98 had the lowest shares of the dynamic components within the tertiary sector value added, and on the other hand Gujarat, Kerala, Maharashtra, Tamil Nadu and West Bengal with a more than 5% rate of growth per annum, corresponded to higher shares of the dynamic components. In fact, most of the states appearing in col. 1 of Table 11 are characterized by poor socio-economic indicators while those in col. 3 are relatively better off.

Over the period, 1999-2000 through 2003-04, it is again evident that among the states, which grew rapidly or moderately, many had a very large size of the dynamic component (more than 45%) within the tertiary sector (Table 12). All the three states in col. 1 are indeed backward and several of those in col. 3 — though not all — can be treated as developed in terms of socio-economic indicators. All this cross-sectional evidence is taken to interpret that there are at least certain components within the tertiary sector, which have the capability to enhance the overall growth of the economy.

3.5 Effect of Tertiary on Industry

Several authors have shown that the tertiary sector can stimulate the development of the secondary sector. An empirically well-documented example is the positive relationship between the financial sector development and the growth of the whole economy. Mitra et al. (2002) noted that industrial productivity growth is a function of financial infrastructure along with physical and social infrastructure. This was observed across various industrial groups ranging from light goods industries to heavy and intermediate goods industries as well. In addition, the new growth theorists indicate that skill-intensive activities exert positive externalities on the rest of the economy, and thus concentration of new activities in the tertiary sector with the initiation of IT industry, holds possibilities of raising productivity and growth (Romer, 1990).[11] We therefore expect that the tertiary sector is growth-enhancing for the secondary sector, especially manufacturing. Banga and Goldar (2007) based on the production function approach show that the Indian manufacturing production depends to a considerable extent on the services sector as one of the inputs.

[11] Also see Aghion and Howitt (1999).

The regression of secondary sector growth (GRSEC) on the trade-transport sector growth (GRTRT), primary sector growth (GRPR) and growth in real estate and financial services (GRFIN), based on time series data at the all-India level, show that the trade-transport sector growth is the only significant determinant of industrialization:

GRSEC = 0.53+ 0.88GRTRT+ 0.052GRPR- 0.69GRFIN
(0.59) (5.71)* (0.82) (-0.59)

Adj. R^2=0.44.

Mitra and Schmid (2008, forthcoming) based on state-level data show that services like transport, trade and banking are indeed important for manufacturing growth. It is important to see that these services — together with electricity — are actually part of the infrastructure, facilitating production in the manufacturing sector. It is also interesting to note that the share of public administration and the growth rate of manufacturing are inversely related — though not significant at the 10 percent level — possibly indicating the adverse repercussions of a large bureaucracy on industrial growth.

3.6 Inter-Sectoral Relationship: Variance Decomposition Analysis

In order to understand the relationship among sectors, the vector auto-regression model (VAR) has been estimated on the basis of sectoral growth rates with two lags. The coefficients obtained from estimation of the VAR model cannot be interpreted directly. In order to overcome this problem, following Litterman's (1979) Innovation Accounting Techniques, a Variance Decomposition analysis has been carried out.

From Table 13 it is distinct that at the tenth time horizon (medium to long run), 41.16% of the forecast error variance in secondary sector growth is explained by trade-transport growth whereas secondary sector growth explains a higher proportion (92.08 per cent) of forecast error variance in the trade-transport growth at the same time horizon. Hence, the causality runs from secondary to trade-transport, which is contrary to the findings we have noted from the regressions of overall growth rates on the sectoral growth rates.

Table 13: Magnitude of Variance Explained at the Tenth Time Horizon by Different Components

(per cent)

Variance in Manufacturing Growth Explained by Trade-Transport Growth	41.16	Variance in Trade-Transport Growth Explained by Manufacturing Growth	92.08
Variance in Manufacturing Growth Explained by Finance Growth	40.05	Variance in Finance Growth Explained by Manufacturing Growth	63.66
Variance in Manufacturing Growth Explained by Public Administration and other Services Growth	34.23	Variance in Public Administration and Other Services Growth Explained by Manufacturing Growth	19.14
Variance in Manufacturing Growth Explained by Agriculture Growth	16.51	Variance in Agriculture Growth Explained by Manufacturing Growth	59.28
Variance in Trade-Transport Growth Explained by Finance Growth	101.36	Variance in Finance Growth Explained by Trade-Transport Growth	72.50
Variance in Trade-Transport Growth Explained by Public Administration and Services Growth	85.37	Variance in Public Administration and Services Growth Explained by Trade-Transport Growth	21.61
Variance in Trade-Transport Growth Explained by Agriculture Growth	42.85	Variance in Agriculture Growth Explained by Trade-Transport Growth	66.36
Variance in Finance Growth Explained by Public Administration and Services Growth	59.00	Variance in Public Administration and Services Growth Explained by Finance Growth	21.11
Variance in Finance Growth Explained by Agriculture Growth	30.68	Variance in Agriculture Growth Explained by Finance Growth	65.50
Variance in Public Administration and Services Growth Explained by Agriculture Growth	8.90	Variance in Agriculture Growth Explained by Public Administration and Services Growth	54.74

Secondary sector growth also influences the finance sector growth and agriculture growth to a larger extent than the effect they have on the secondary sector growth at the tenth time horizon. It is only relating to public administration and other services that the causality runs from these to the secondary sector, possibly indicating the impact of the policy concerning the downsizing of the public sector and the closure of the public sector units in manufacturing.

Even in the case of finance and public administration the causality does not seem to be running from the trade-transport sector, rather it is the reverse. Only agricultural growth is influenced more by the trade-transport sector than the effect of the former on the latter. In addition agriculture is also influenced by finance and public administration and other services. Between finance on the one hand and public administration and other services on the other, the causality is from the latter to the former.

On the whole, between the secondary and trade-transport sectors, the secondary still appears to be the lead sector in the medium to long-run though the share of the trade-transport sector in GDP has increased considerably over the years contributing (in terms of weight) substantially to the aggregate growth rate. The causality also runs from the secondary sector to the other components of the tertiary sector like finance. Hence, much more attention needs to be paid to the revival of the industrial sector and for boosting its growth so that the aggregate growth of the economy derives its impetus from industrialization.

On the whole, views on the growth of the tertiary sector were pessimistic particularly prior to the nineties. However, in recent years several dynamic components within the tertiary sector have been growing rapidly and contributing to the overall growth of the economy. This pattern of services-led-growth can contribute to productivity growth in other activities as well. However, this must not be taken to interpret that sectors other than the services do not matter in driving the overall growth rate. As seen in terms of the variance decomposition analysis, the manufacturing-cum-construction is the key-sector impacting on many other sectors within the economy. In the light of the study by Dasgupta and Singh (2006), we need to employ IT in other activities like manufacturing and agriculture aggressively so that their contribution to overall growth also improves. Judged from this point of view we need not have to speculate then whether services-led-

growth would be sustainable or not as all the sectors would be able to play their respective roles in the process of economic growth.

4. CONCLUDING REMARKS

Economic growth in the Indian context started accelerating since the eighties. Part of this rise has originated from productivity growth, which has been more spectacular in some of the components of the tertiary or services sector. Of the 2.4 percentage point increase in the rate of economic growth that took place in India in the post-1980 period, about 40% is attributable to a faster growth in TFP in services. Within the tertiary or services sector all the four sub-sectors experienced an increase in the growth rate of labour productivity in the post-1980 period. This was most marked in the case of public administration and other community, social and personal services. It is interesting to note that in this group of services, there was only a modest increase in the growth rate of output, but a marked acceleration in the growth rate of output per worker which possibly resulted from the downsizing of the public sector followed as a part of the deregulation and reform process on the one hand and on the other pay hikes in the salaries of the central and state government employees from time to time. So part of this productivity growth is trivial and has come through due to accounting reasons, particularly in public administration. Nevertheless part of the productivity growth, especially in trade, hotels etc. is possibly real and has derived stimuli from rapid increases in demand for such services with a subsequent expansion in these activities.

As regards the composition of GDP, there has been a major shift in favour of the tertiary sector and hence, this shift has also contributed to the overall growth. However, between the secondary and trade-transport sectors, the former still appears to be the lead sector in the medium to long run though the share of the trade-transport sector in GDP has increased considerably over the years contributing substantially to the aggregate growth rate. Hence, the policy focus has to be on the industrial sector for boosting its growth so that the aggregate growth of the economy derives its impetus from industrialization.

Views on the growth of the tertiary sector were pessimistic particularly prior to the nineties. However, in the recent years several dynamic components within the tertiary

sector have been growing rapidly and contributing to the overall growth of the economy. But this must not be taken to interpret that sectors other than the services do not matter in driving the overall growth rate. As seen from the analysis, manufacturing-cum-construction is the key-sector impacting on many other sectors within the economy.

Part of the productivity growth within the tertiary sector has possibly originated from the application of IT services. If that is the case we then need to explore possibilities of applying IT services in the agriculture and manufacturing sector aggressively so that their contribution to overall growth also improves. We need not have to speculate then whether services-led-growth would be sustainable or not as all the sectors would be able to play their respective roles in the process of economic growth.

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