Services-led Growth

The Indian Experience

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Abstract

In sharp contrast to the experience of all countries in their earlier stages of economic development, GDP growth in India since the mid-1990s has been driven primarily by services. The present paper examines (a) the demand and supply side factors behind India's "Services Revolution"; and (b) the relative role of agriculture and industry vis-à-vis that of services in India's growth process in the foreseeable future, and the nature of policies required to quicken the process and promote the basic developmental objectives. Apart from the increase in services intensity due to splintering or outsourcing of various types of services by industrial and agricultural enterprises, the other demand side factors contributing to services GDP are found to be government final consumption expenditure, export of services and a significant shift towards consumption of services by households due to increasing inequality of income. The most important factor on the supply side has been the increase in total factor productivity, reflected in a sharp fall in ICOR as well as in labour intensity—something which helped growth of India's services exports far exceed that of world export of services. However, the revealed comparative advantage of services does not imply that industry and agriculture should play a minor role in the development process or that the government should adopt a hands-off policy in respect of sectoral allocation of resources. Despite high growth, labour absorption in services has been abysmally small. What is much more important to recognise, hangover from the pre-reforms production structure, disruptions in the credit delivery system and severe infrastructural bottlenecks, have seriously undermined the relative performance of agriculture and industry. More generally, the basic problem in this regard lies in efficient allocation of resources across sectors for the most cost effective way of meeting the optimal menu of domestic absorptions. From this viewpoint enhancing productivity of primary and secondary sectors through efficient disbursement of credit and adequate provisioning of infrastructural services have to be the most important role of the tertiary sector over the intermediate run.

The revealed comparative advantage of services does not imply that industry and agriculture should play a minor role in the development process or that the government should adopt a hands-off policy in respect of sectoral allocation of resources.

I. Introduction

One of the most interesting features of the Indian economy over the last fifteen years is emergence of services as the dominant sector and main driver of GDP growth. In 1950-51 services accounted for a little less than 30 per cent of GDP while the shares of agriculture and

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industry were about 57 per cent and 14 per cent, respectively. Since then both services and industry gained at the expense of agriculture and by 1990-91 services became the leading sector with a share of 41 per cent, nearly 10 percentage points more than the share of agriculture (Table 1). However, it is in the post-reforms period, especially from the mid-1990s, that the economy has been characterised by what the World Bank (2004) calls "India's Services Revolution". During this period there has indeed occurred a qualitative change in the economy's sectoral composition. As a backdrop to our analysis it is useful to take stock of the most striking features of this change.

It took forty years, from 1950-51 to 1990-91, for services' share in GDP to rise by 11 percentage points; an increase of the same magnitude came about in the post-reforms era in only 14 years, between 1990-91 and 2004-05. Second and no less noteworthy, until 1990-91 industries' share grew at a faster pace than services': during 1950-91 the former rose by nearly 100 per cent while increase in the latter amounted to about 37 per cent. In the post-reforms period however while industry's share has barely budged and exhibited a mildly declining trend from 1995-96, that of services jumped from 41 per cent in 1990-91 to 52 per cent in 2004-05 (Table 1).

TABLE 1 Sectoral Shares in GDP							
Ratio	*1950-51*	*1960-61*	*1970-71*	*1980-81*	*1990-91*	*1995-96*	*2000-01*	*2004-05*
Agriculture & allied activities	56.90	46.74	46.07	38.86	31.27	28.24	24.62	21.13
Industry	14.28	19.46	20.65	24.50	27.64	28.12	26.60	27.15
Services	29.80	34.30	33.66	36.64	41.10	43.64	48.78	51.72

Note: Unlike in the RBI publication construction is not included in services, but is treated as part of the secondary sector.
Source: Reserve Bank of India (2006); Government of India (2006); EPW Research Foundation (2004); CSO (2006).

Third and related to the second, during the pre-reforms era, except in the first half of the 1970s, industrial growth displayed an upward trend and was higher than the growth in services. But the 1990s, especially the period 1995-05, saw a deceleration of industrial growth (Table 2). Radically different has been the performance of the services sector over the last 10-15 years. Its growth has shown an upward trend and exceeded that of industries by more than 2.5 percentage points during 1995-05. This together with the sector's rising share in GDP has made contribution of services to GDP growth significantly higher than that of the other two sectors: while in the 1970s and 1980s services accounted for 48 per cent and 49 per cent of GDP growth respectively, the figure shot up to more than 66 per cent during 1995-05 (Table 3).

	TABLE 2								
	Aggregate and Sectoral Investment and GDP								

	1970-71 to 1980-81	1980-81 to 1990-91	1990-91 to 2004-05	1995-96 to 2004-05	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
1 GDP										
a Growth of GDP at factor cost	3.44	5.51	5.92	5.80	5.57	1.30	5.12	5.90	7.25	7.34
b Investment: Growth	5.02	7.20	7.47	7.25	13.72	-12.32	9.28	5.83	22.92	11.13
c Investment as % to GDP	17.88	21.70	25.08	25.47	24.07	21.93	23.79	21.25	23.38	26.53
2 Agriculture &allied activities										
a Growth	1.60	3.13	2.54	1.99	4.11	-1.55	5.79	4.12	5.01	-0.87
b Share in GDP	42.04	34.31	27.35	25.49	31.27	31.53	30.94	30.97	30.40	28.24
c Share in Investment	14.46	10.46	8.22	7.96	11.01	8.26	8.64	8.42	7.38	6.32
3 Industry										
a Growth	**4.44**	**6.90**	**6.04**	**5.39**	**7.74**	**-0.55**	**3.96**	**5.21**	**10.18**	**11.64**
b Share in GDP	22.65	26.27	26.79	26.74	27.64	26.38	26.73	26.26	27.10	28.12
c Share in Investment	46.58	52.96	52.40	52.25	55.69	53.95	52.50	50.09	51.19	60.08
4 Services										
a Growth	4.64	6.88	7.99	8.04	5.32	4.80	5.35	7.67	7.08	10.46
b Share in GDP	35.47	39.42	45.85	47.63	41.10	42.09	42.34	42.77	42.50	43.64
c Share in Investment	38.96	36.58	39.38	39.79	33.30	37.78	38.86	41.49	41.42	33.61

	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
1 GDP									
a Growth of GDP at factor cost	7.84	4.79	6.51	6.06	4.37	5.78	3.99	8.51	6.91
b Investment: Growth	-0.95	7.68	0.66	20.85	-1.41	-2.94	17.44	13.76	16.63
c Investment as % to GDP	21.77	22.57	21.38	26.45	24.48	24.30	25.13	26.29	28.49
2 Agriculture & allied activities									
a Growth	9.61	-2.43	6.20	0.31	-0.11	6.49	-7.16	9.60	1.15
b Share in GDP	29.16	27.84	27.69	26.22	24.62	24.96	22.52	22.83	21.13
c Share in Investment	7.80	7.79	7.97	8.48	8.52	8.92	8.89	8.28	6.63
3 Industry									
a Growth	**7.08**	**4.28**	**3.75**	**4.79**	**6.55**	**3.40**	**6.79**	**6.62**	**7.68**
b Share in GDP	27.43	27.23	26.50	25.86	26.60	25.68	26.77	26.44	27.15
c Share in Investment	57.21	55.95	54.73	51.44	45.95	43.05	47.79	52.26	54.06
4 Services									
a Growth	7.20	9.83	8.35	10.06	5.49	6.76	7.92	9.06	8.94
b Share in GDP	43.41	44.93	45.81	47.92	48.78	49.36	50.71	50.73	51.72
c Share in Investment	34.99	36.26	37.31	40.08	45.53	48.03	43.32	39.46	39.31

Note: (i) Agriculture & allied activities consist of agricluture, forestry and fishing. (ii) Unlike in the RBI publication construction is not included in services, but is treated as part of industry.

Source: Reserve Bank of India (2006); Government of India (2006); EPW Research Foundation (2004); CSO (2006).

TABLE 3 Sectoral Contribution to GDP Growth				
	1970-71 to 1980-81	*1980-81 to 1990-91*	*1995-96to 2005-06*	*1990-91 to 2004-05*
GDP at factor cost (growth)	3.44	5.51	5.80	5.92
Agriculture & allied activities	0.67 (1.6)	1.07 (3.13)	0.51 (1.99)	0.69 (2.54)
Industry	1.01 (4.44)	1.81 (6.90)	1.44 (5.39)	1.62 (6.04)
Services	1.65 (4.64)	2.71 (6.88)	3.83 (8.04)	3.66 (7.99)

Note: Figures within brackets denote sectoral average GDP growth.
Source: Calculated from Table 2.

Compared with the growth of agriculture and industries, not only has services' growth in the post-reforms period been higher, but it has also been much more stable.

Fourth, compared with the growth of agriculture and industries, not only has services' growth in the post-reforms period been higher, but it has also been much more stable. Between 1991-92 and 2004-05 volatility (measured in terms of the coefficient of variation) of agricultural growth was nearly 8 times and of industrial growth more than twice that of services' (Table 4). Indeed, since 1990-91 there has occurred a considerable increase in volatility in agriculture and industries, but the increase in variation in services' GDP has been quite modest. This feature of services along with its growing share has tended to make post-reforms GDP growth much more stable than in the 1970s and the 1980s.

Finally, increasing dominance of services' GDP has gone hand in hand with emergence of India as a major exporter of services, especially in IT and IT enabled products. Since the early 1990s both

TABLE 4 Growth and Volatility: Overall and Sectoral			
	1971-72 to 80-81	*1981-82 to 90-91*	*1991-92 to 04-05*
GDP			
Growth (Mean)	3.16	5.64	5.83
Coff. Of var	137.75	39.05	31.84
Agriculture & allied activities			
Growth (Mean)	1.83	3.55	2.58
Coff. Of var	475.21	150.74	188.74
Industry			
Growth (Mean)	4.05	7.11	5.81
Coff. Of var	88.91	28.22	51.85
Services			
Growth (Mean)	4.42	6.72	7.78
Coff. Of var	34.03	17.16	23.04

Source: Calculated from National Accounts Statistics (NAS) data.

merchandise and services exports of India have grown at a higher rate than GDP as well as world exports. However, growth in services' exports has been much more spectacular, especially from the mid-1990s. It is interesting to note that there was no significant difference in growth rates of world exports of goods and services[1] in this period. The annual average growth of both types of exports was in the range 6.53-6.97 per cent during 1990-2005 and 1995-2005 (Table 5). Growth of India's merchandise exports in these periods was higher at 10.63 and 10.91 per cent respectively. The result was that the country's share in global exports of goods increased from 0.52 per cent in 1992 to 0.91 per cent in 2005. Performance of services was much more impressive. With an average growth of 17.05 per cent the country's services exports as a proportion of world exports of services rose from 0.53 to 2.32 per cent between 1992 and 2005. Indeed, during 1995-05 growth of India's services exports (at 21.5 per cent) was almost two times that of world exports. This resulted in a near four-fold increase in her share in global services exports (Table 5), and underlined the country's strong competitive edge in this sphere of production.

In the context of developments summarised above economists have been busy sorting out a number of issues, analytical as well as prescriptive. The most widely discussed among them relates to factors

TABLE 5 India's Exports of Goods and Services 1991-2005								
Year	Growth of Global Merchandise Exports	Growth of India's Merchandise Exports	India's Share in World Merchandise Exports	RCA of Goods	Growth of Global Services Exports	Growth of India's Services Exports	India's Share in World Services exports	RCA of Services
1991	1.91	-1.3	0.5	0.97	5.66	6.4	0.59	1.14
1992	7.11	10.7	0.52	0.997	12.05	-0.2	0.53	1.013
1993	0.42	9.9	0.57	1.01	1.90	2.9	0.53	0.95
1994	14.39	16.0	0.58	0.998	9.74	19.8	0.58	1.007
1995	19.40	22.4	0.59	1.01	14.68	12.1	0.57	0.97
1996	4.59	8.1	0.61	1.02	7.22	6.2	0.56	0.94
1997	3.48	5.7	0.63	0.98	3.85	24.3	0.68	1.06
1998	-1.61	-4.5	0.61	0.94	2.28	24.0	0.82	1.26
1999	3.82	6.7	0.62	0.89	4.12	26.6	1.00	1.43
2000	13.01	18.8	0.66	0.89	6.16	14.5	1.07	1.46
2001	-4.12	2.3	0.70	0.89	0.07	4.8	1.13	1.44
2002	4.85	13.6	0.76	0.90	7.21	13.8	1.19	1.41
2003	16.84	15.9	0.75	0.88	14.23	20.7	1.26	1.48
2004	21.44	32.4	0.82	0.82	19.56	66.9	1.76	1.76
2005	13.34	25.9	0.91	0.77	10.45	45.5	2.32	1.97

Note: RCA denotes revealed comparative advantage. For an explanation see fn. 45.
Source: http://stat.wto.org/Home/WSDBHome.aspx

[1] Measured in US dollar.

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behind the rapid growth of services, given the lacklustre performance of the other two sectors in the post-reforms period. Questions have also been raised regarding sustainability of services' growth witnessed in recent years and measures required in this regard. More generally, since the changing sectoral composition of the Indian economy runs contrary to that of other countries in the process of economic development, doubts are often expressed regarding both the feasibility and desirability of the country's growth being driven mostly by services. The rest of the paper is devoted to a discussion of these issues and organised as follows. Section II provides a three-sector macroeconomic framework for examining the inter-sectoral demand and supply-side linkages and identifying the major factors that are likely to be important in governing the output and GDP in the services sector. In terms of this framework we analyse in section III the most important demand and supply side factors behind India's "Services Revolution". The final section examines the relative role of services vis-à-vis that of agriculture and industry in India's growth process in the foreseeable future and the nature of policies required to quicken the process and promote the basic developmental objectives.

II. Services Growth: Some Causal Links

Inter-sectoral Linkages in Services Production and Value added

As in explanations of all economic phenomena, in respect of services' growth also it is useful to distinguish between demand and supply side factors and consider the interaction between them. While identifying these factors and examining their impact it is also necessary to remember that services GDP whose growth and share in aggregate GDP we have been considering in Section I does not refer to services' output, but value added, i.e., output less intermediate inputs used up in its production. The implication is that (a) since demand and supply are proximately related to output, not value added, an analysis of effects of the two sets of factors on the sector's output is a prerequisite for examining their impact on its GDP; and (b) the outcome depends crucially on inter-sectoral linkages from the demand as also the supply side.

Demand side Factors

Consider first sources of demand for services' output. It is useful in this context to distinguish between the final and intermediate demand. While the second is nothing but firms' demand for services for purposes of production (of final *or* intermediate products), the first consists of purchases of services by their ultimate users and includes household consumption of services, government final consumption expenditure,[2] and export of services. So far as intermediate demand is concerned, it is related to output of all sectors[3] which require services

[2] Representing public services enjoyed by the community as a whole.
[3] Including the services sector itself.

as inputs. However, since the demand for sectoral outputs in their turn are ultimately derived from the *final* demand for goods and services, it is necessary to consider inter-sectoral linkages while examining the determinants of output and value added of the services sector.

The simplest way of analysing the inter-sectoral linkages in determination of aggregate as also sectoral output and GDP is to consider the short-term, demand-driven[4] behaviour of a three-sector[5] economy in terms of an input-output framework. Given the input-output coefficient matrix, a unit of final demand for the ith sector's product requires a combination (vector) of output of all the three sectors to meet both the final demand and the direct-cum-indirect inputs of different sectors needed therefor (see Appendix for details). This set of outputs along with the input-output coefficients yields the sectoral and hence aggregate GDP generated for sustaining a unit of final demand for i's product.[6] Thus sectoral output and income levels depend upon the final demand vector. For equilibrium in the system it is necessary that the final demand for the three sectors' outputs resulting from sectoral incomes generated by some final demand vector exactly equals that vector. The nature of this equilibrium is not difficult to specify in terms of the conventional (short run) macroeconomic framework. The main difference will be that now we need to specify (a) the autonomous components of the final demand[7] for the three sector's products; and (b) sectoral propensities relating to consumption (or induced invest-ment[8]). Given these specifications, the equilibrium sectoral output and GDP vectors[9] are obtained from the *autonomous* components of the final demand vector (See Appendix).

Before considering the supply-side factors[10] it is useful to take stock of some of the implications of the inter-sectoral linkages charac-terising the equilibrium considered above—implications which are of immediate relevance for identifying the major (demand-side) drivers of GDP growth in services and other sectors of the Indian economy. First, growth in services GDP is positively related to increases in final demand in all the three sectors; but the impact of a rise in final demand

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[4] This is in line with the mainstream consensus that aggregate output of an economy is demand determined in the short run, but governed by supply-side factors in the long run.

[5] Consisting of agriculture, industry and services.

[6] Corresponding to a unit of final demand the aggregate incomes gener-ated equals one unit.

[7] The autonomous component of final demand is that part of demand which is not dependent on the endogenous variables, e.g., sectoral output or income levels.

[8] Or imports.

[9] And hence aggregate GDP.

[10] In the demand-determined income determination model we have been considering, supply-side factors enter through the input-output coefficient matrix. But as we shall presently see, even if the coefficients remain unchanged, their inter-sectoral differences can significantly affect the macroeconomic and sectoral outcomes.

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for services will be greater than that of an equivalent increase for agricultural or industrial goods. This follows from the general result that the output of a sector per unit increase in its own final demand is larger than unity, but a proper fraction for a similar increase in other sectors.[11] Second, the greater the increase in the autonomous demand for services relatively to that in agriculture or industry, the larger will be the rise in the final demand for, and hence in incomes originating in, services. Third, the higher the direct-cum-indirect services intensity of industrial and agricultural products, the larger will be the effect of an increase in their (final) demand on services GDP. Finally, the more income elastic the demand for services, the higher will tend to be the sector's share in GDP in a growing economy, other things remaining the same.

To sum up, given the input-output coefficients, the most important demand side factors driving services growth are sources of change in aggregate demand and income elasticity of demand for services. Thus if an economy's growth is propelled by investment,[12] by rising purchases of durable consumer goods,[13] or by sharp increases in merchandise exports, growth of industrial GDP will tend to be higher than that of services. On the other hand, services tend to become the leading sector when growth originates in a step-up in government expenditure, booming export of services or a rise in the propensity to consume along with a pronounced shift in preferences for services. The important point to note in this connection is that, high income elasticity of demand for services provides a push to GDP in services, but cannot generally make it the leading sector if the basic sources of growth are capital accumulation or merchandise exports.

Supply-side Factors

Despite the mainstream consensus, explanation of the short-term behaviour of aggregate and sectoral GDP in terms of demand-side factors alone is generally inappropriate for an economy like India's. Agricultural production, it is widely acknowledged, is governed primarily by monsoon, irrigation and other infrastructural facilities, farmers' capital stock and availability of credit. Again, output of many a firm is often constrained by transport bottlenecks, shortage of power or severe congestion in ports. Finally, not only do such infrastructural hurdles dampen private investment and retard (both short- and long-run) growth, but supply constrained production in some sectors also limits demand and hence production in others which are not so constrained.

Two important implications of the aforesaid constraints on sectoral growth are worth noting at this stage. First, in the short run

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[11] Since otherwise production will not be viable.

[12] The lion's share of which represents final demand for the secondary sector's products.

[13] Fuelled perhaps by liberalisation of the financial system.

growth will tend to be higher in those sectors which, apart from not being capacity constrained, use less of infrastructural facilities and cater more to foreign than domestic market. Second, in the medium and long run relative growth of different sectors depends significantly on how far rapid removal of infrastructural bottlenecks requires large scale government intervention and how efficient framing and implementation of public policies in this regard are. To be more specific, a government supported boost to investment in irrigation, rural reconstruction, power, roads, rails and ports will raise overall growth, but the supply-side impact of these investments is likely to be more on industrial and agricultural GDP than on incomes originating in services.

Apart from easing of capacity constraints, there are a variety of routes through which supply side factors affect both the overall growth and its sectoral composition in the medium and the long run. First, with the expansion of industrial production it becomes economical for producers to outsource advertisement, consultancy, marketing, transport, security, etc. from firms specialising in provision of these services. The implication is that over time growing final demand for industrial products will tend to raise the share of services' GDP at the expense of industries'. This "splintering" of production activities will be reflected in an increase in the coefficient of services input at the expense of that of its own input in the industrial sector. Such splintering also occurs in agriculture with the growth of capitalist farming. Thus even when economic growth is not associated with rising share of services in *final* demand, there will be a tendency for their share to rise at the expense of the shares of the primary and secondary sectors.

Second, technological progress, widely regarded as the main driver of long-run growth, can have substantial impact on sectoral shares. While the overall growth due to technical improvements takes place through an increase in total factor productivity,[14] their effects on the different sector's growth will not generally be uniform. Splintering of the production process and increases in services' share associated therewith are an old phenomenon;[15] but over the last two decades it has been greatly accentuated by the IT revolution and major financial innovations including those relating to risk management, financing of mergers and acquisitions, etc. This does not mean that organisational/technical innovations are always biased toward services. Scale economies often favoured giant industrial enterprises characterised by not only horizontal but also vertical integration of different stages of production. Bulk of the technological progress since the mid-eighteenth century has in fact been in the secondary sector and this close connection between manufacturing and improvements in technical know-how

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[14] Or what in the growth accounting literature has come to be known as the Solow residual, following Solow (1957).

[15] Note that splintering tends to become economical with increases in the scale of production and need not be due to technical changes.

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constituted perhaps the most important reason behind low-income countries opting for industrialisation to realise their developmental aspirations. In fact, though services' share in GDP went up in practically all countries in their earlier stages of economic growth, the increase was less than that of the secondary sector. Only when a country's per capita income had reached a moderately high level did growth of services outpace industrial growth.

Third, an important constituent of supply-side factors is the country's tax-cum-regulatory system, affecting as it does not only overall incentives to save and invest, but also the extent of competitive pressure in different sectors, allocation of resources, ease of entry and exit, or doing business in particular lines of activity. Hence changes in the regulatory framework or the nature of economic reforms implemented by the authorities can have far reaching impact on growth of aggregate GDP as well as its sectoral composition.

Fourth, with increasing importance of international trade and widening coverage of tradables at the expense of non-tradables, evolution of a country's comparative advantage as well as trade policies is expected to be decisive in determining the relative performance of different sectors. The important point to appreciate in this connection is that, changes in a country's comparative advantage over time depends not only on growth of its labour and capital stocks vis-à-vis that of other countries, but also on development of physical-cum-financial infrastructure and investment in education, training and research. Remembering the significance of externalities and public goods character of output in these sectors, the role of government policies in shaping a country's comparative advantage,[16] especially at its earlier stage of economic development, can hardly be overemphasised.

III. Understanding the "Services Revolution" in India

While examining the nature of and factors behind India's "Services Revolution" (SR) the first step is to identify the point at which there was a break from the earlier trend in growth of the sector and in its relative share compared with that of industry. A look at Table 2 suggests that while SR is no doubt a post–reforms phenomenon, it is from the mid-1990s that there occurred a major divergence between the performance of the tertiary and the secondary sectors. Until 1995-96, the average growth of industries and services were of the same order so that increases in their shares (at the expense of agriculture) were also broadly similar: between 1991-92 and 1995-96 the shares of industries and services rose from 26.4 and 42.1 per cent to 28.1 and 43.6 per cent respectively. In contrast, the ten-year period 1995-2005 saw the average industrial growth declining from 6.1 per cent in 1991-96 to 5.4 per cent

[16] Or what should more appropriately be called the revealed comparative advantage (RCA)—something we shall presently discuss in Section IV in connection with the comparative advantage India is perceived to enjoy in services.

even while services' growth went up by 1.1 percentage points (to 8.04 per cent). The result has been that contrary to the experience of all countries which have passed or been passing through a similar stage of economic development as India's as of now, while the share of industrial GDP fell from 28.1 per cent in 1995-96 to 27 per cent in 2004-05, the share of services went up from 43.6 to 51.7 per cent during the same period. To put the matter in a different manner, the 8.2 percentage point increase in services' share exceeded the decline in agriculture's by 1.1 percentage point and was at the expense of the secondary sector.

In view of the aforesaid features of sectoral behaviour, our focus in the present section will be on the demand and supply side factors driving services' growth during 1995-05. Following our analysis in Section II let us first discuss how far the relatively autonomous components of growth in final demand for services[17] can explain the significantly better performance of the sector compared with that in the earlier period.

Demand-side Factors

One of the most important components of final demand for services is public consumption[18] and in popular discussions its increase as a result of pay hikes of government and semi-government employees[19] is often cited as a major factor behind the high growth of services during the reference period. There was indeed a sharp rise in public consumption and compensation of government employees in the second half of the 1990s compared with that in the first half: while their average annual growth rates were only 2.7 and 2.9 per cent respectively during 1990-95, the corresponding figures for 1995-2000 were 9.9 and 10.8 per cent (Table 6). There can thus be little doubt that the jump in public consumption was an important factor behind the 9.2 per cent growth clocked by the services sector in the first half of our reference period (1995-05), remembering that despite the fall in the quantitative significance of public consumption in services,[20] it was still about 25 per cent of services GDP in the mid-1990s. However, as the effects of the Pay Commission award petered out, growth of public consumption and the government's wage bill declined to 3 and 2.8[21] per cent respectively over the period 2000-05 even while services GDP grew at a rate of more than 7.6 per cent per annum. For the entire period

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[17] The autonomous components are those which are not significantly affected by GDP itself. See Appendix.

[18] Representing the quantum of public services enjoyed by the community.

[19] Following implementation of the Fifth Pay Commission awards.

[20] One measure of this is the ratio of public consumption to services GDP. There was a 3.5 percentage point decline in the ratio during 1990-95, from 28.2 per cent in 1990-91 to 24.8 per cent in 1994-95.

[21] Due to non-availability of data for government's wage bill the average was taken over the period 2000-03.

Contrary to the experience of all countries which have passed or been passing through a similar stage of economic development as India's as of now, while the share of industrial GDP fell from 28.1% in 1995-96 to 27% in 2004-05, the share of services went up from 43.6 to 51.7% during the same period.

1995-05 public consumption grew at the rate of 5.87 per cent, and hence cannot be regarded as a factor behind the Services Revolution.

Among the demand side factors it is the export of services which recorded the most spectacular growth during the reference period, especially over 1997-05: the average growth in the former was a whopping 19.1 per cent, but that in the latter was as much as 25 per cent (Table 6). Since services exports were relatively small to begin with, their quantitative impact on the sectoral GDP growth was somewhat modest in the initial stage, but became increasingly important

		1970-71 to 1980-81	1980-81 to 1990-91	1990-91 to 2004-05	1995-96 to 2004-05	1990-91	1991-92	1992-93	1993-94	1994-95
1	Government final consumption expenditure (GFCE)	4.06	7.34	5.90	5.87	3.40	-0.66	3.13	6.46	1.24
a	*Compensation of employees*	*5.46*	*7.69*	*6.97**	*6.82**	*3.42*	*1.11*	*4.93*	*3.31*	*1.73*
2	Private final consumption expenditure	na	na	5.46	5.39	3.68	1.56	3.49	4.76	5.59
a	*Services consumption*	*na*	*na*	*6.85*	*8.64*	*na*	*1.08*	*3.63*	*-1.09*	*4.03*
3	Export of Goods & Services	10.53	6.93	11.45	11.60	5.89	21.77	9.86	16.91	7.74
a	*Export of Services*	*17.70*	*4.56*	*16.27*	*19.06*	*4.51*	*32.80*	*2.10*	*9.91*	*6.35*
4	Import of Services	11.91	8.69	14.84	14.49	-1.18	26.33	9.91	22.91	6.81
5	Final demand for services (FDS)	na	na	7.54	8.91	na	1.72	3.61	2.32	3.15
6	Services GDP	4.64	6.88	7.99	8.04	5.32	4.80	5.35	7.67	7.08
Memo item										
7	GDP growth	3.44	5.51	5.92	5.80	5.57	1.30	5.12	5.90	7.25

TABLE 6a
Components of Final Demand for Services (Growth)

Note: * Figures are the average of the period upto 2003.

		1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
1	Government final consumption expenditure (GFCE)	8.03	4.45	11.05	12.89	13.20	0.49	3.10	-2.42	4.46	9.23
a	*Compensation of employees*	*7.71*	*5.84*	*13.85*	*10.59*	*16.04*	*2.72*	*1.10*	*4.67*	*na*	*na*
2	Private final consumption of expenditure	5.81	9.98	2.23	7.69	7.63	2.89	5.64	2.83	7.82	3.75
b	*Services*	*7.23*	*6.83*	*6.64*	*6.61*	*11.85*	*10.29*	*7.28*	*9.05*	*9.10*	*7.73*
3	Export of Goods & Services	18.03	3.42	6.63	10.45	11.19	21.81	-2.67	17.81	10.57	37.10
a	*Export of Services*	*17.92*	*0.10*	*24.06*	*46.62*	*18.16*	*22.47*	*-9.14*	*18.47*	*18.90*	*59.23*
a	Import of services	34.40	-12.27	18.26	42.64	4.71	27.24	-4.88	21.22	-10.07	76.68
5	Final demand for services (FDS)	8.54	5.84	9.46	13.02	12.93	8.11	3.82	6.48	8.44	14.35
6	Services GDP	10.46	7.20	9.83	8.35	10.06	5.49	6.76	7.92	9.06	8.94
Memo item											
7	GDP growth	7.34	7.84	4.79	6.51	6.06	4.37	5.78	3.99	8.51	6.91

Note: Final demand for services (FDS) consists of (i) Government final consumption expenditure; (ii) Private final consumption expenditure on services and (iii) Export of services.
Source: Reserve Bank of India (2006); Government of India (2006); EPW Research Foundation (2004); CSO (2006).

TABLE 6b
Components of Final Demand for Services (Shares)
(All are as % of GDP unless otherwise specified)

		1970-71 to 1980-81	1980-81 to 1990-91	1990-91 to 2004-05	1995-96 to 2004-05	1990-91	1991-92	1992-93	1993-94	1994-95
1	Government final consumption expenditure (GFCE)	9.75	11.25	11.61	11.76	11.61	11.37	11.22	11.37	10.73
a	*Compensation of employess as % of services GDP*	*16.81*	*17.54*	*16.85*	*16.63*	*18.22*	*17.71*	*17.72*	*16.66*	*15.99*
2	Private final consumption expenditure (PFCE)	na	na	63.21	64.28	67.03	67.46	66.32	66.25	65.09
a	*Services*	*na*	*na*	*17.18*	*17.33*	*17.52*	*17.55*	*17.28*	*16.30*	*15.78*
b	*Services as % of PFCE*	*na*	*na*	*27.24*	*26.94*	*26.15*	*26.02*	*26.06*	*24.60*	*24.24*
c	*Services as % of services GDP*	*na*	*na*	*41.34*	*39.81*	*47.46*	*46.24*	*45.37*	*41.90*	*41.00*
3	Exports of goods & services	5.29	6.29	11.85	13.20	7.27	8.77	9.15	10.20	10.23
a	*Export of Services*	*0.85*	*1.46*	*3.44*	*3.59*	*1.44*	*1.89*	*1.83*	*1.92*	*1.90*
b	*Export of services as % of Exports of goods & services*	*15.58*	*23.27*	*24.21*	*26.44*	*19.77*	*21.56*	*20.04*	*18.83*	*18.59*
c	*Export of services as % of services GDP*	*2.61*	*4.12*	*6.99*	*8.12*	*3.89*	*4.98*	*4.81*	*4.94*	*4.94*
4	Import of Services	0.56	1.02	2.70	2.79	1.13	1.41	1.47	1.73	1.72
5	Final demand for services (FDS)	na	na	31.77	32.68	30.57	30.82	30.33	29.59	28.41
	Memo item									
6	Services GDP % of total GDP	35.47	39.42	45.85	47.63	41.10	42.09	42.34	42.77	42.50

		1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05
1	Government final consumption expenditure (GFCE)	10.84	10.65	11.31	12.29	12.96	12.65	12.42	11.84	11.31	11.33
a	*Compensation of employess as % of services GDP*	*15.80*	*15.85*	*16.69*	*17.82*	*18.53*	*17.96*	*17.03*	*16.75*	*13.20*	*na*
2	Private final consumption expenditure	63.98	65.52	64.11	65.14	65.45	64.79	65.10	64.30	63.83	61.53
a	*Services*	*15.72*	*15.64*	*15.96*	*16.05*	*16.76*	*17.78*	*18.15*	*19.01*	*19.09*	*19.11*
b	*Services as % of PFCE*	*24.56*	*23.86*	*24.89*	*24.64*	*25.61*	*27.45*	*27.88*	*29.56*	*29.91*	*31.06*
c	*Services as % of services GDP*	*39.87*	*39.63*	*38.90*	*38.18*	*38.45*	*40.03*	*40.13*	*40.95*	*41.23*	*40.75*
3	Exports of goods & services	11.21	10.80	11.02	11.49	11.92	14.09	12.93	14.63	15.47	18.50
a	*Export of Services*	*2.08*	*1.94*	*2.31*	*3.19*	*3.52*	*4.15*	*3.58*	*4.08*	*4.46*	*6.60*
b	*Export of services as % of Exports of goods & services*	*18.58*	*17.98*	*20.92*	*27.77*	*29.51*	*29.41*	*27.70*	*27.86*	*28.84*	*35.87*
c	*Export of services as % of services GDP*	*5.28*	*4.92*	*5.62*	*7.58*	*8.07*	*9.33*	*7.92*	*8.78*	*9.64*	*14.08*
4	Import of Services	2.14	1.75	1.98	2.67	2.61	3.19	2.89	3.36	2.78	4.57
5	Final demand for services (FDS)	28.64	28.23	29.57	31.54	33.24	34.57	34.15	34.92	34.86	37.04
	Memo item										
6	Services GDP as % of total GDP	43.64	43.41	44.93	45.81	47.92	48.78	49.36	50.71	50.73	51.72

Source: Reserve Bank of India (2006); Government of India (2006); EPW Research Foundation (2004); CSO (2006).

By far the largest component of final demand for both goods and services is private consumption. Hence in any analysis of macroeconomic aggregates including services GDP it is necessary to pay special attention to behaviour of households.

over time. Thus the ratio of exports of services to the sector's GDP increased from 4.98 per cent in 1991-92 to 5.62 in 1997-98; however, soaring exports raised the ratio by 250 per cent over 1997-05, from 5.62 in 1997-98 to 14.08 per cent in 2004-05. Indeed, emergence of foreign demand as a major source of services growth[22] constitutes perhaps the most striking feature of India's macroeconomy over the last decade.

By far the largest component of final demand for both goods and services is private consumption. Hence in any analysis of macroeconomic aggregates including services GDP it is necessary to pay special attention to behaviour of households. However, since disposable income is the most important determinant of household consumption, it is not generally treated as an *autonomous* component of demand driving GDP and its variation over time. So far as household demand for services is concerned, its temporal changes are therefore traced to GDP growth[23] and income elasticity of demand for services. In a growing economy income elastic demand for services would tend to raise the ratio of household purchase of services to private consumption expenditure. During our reference period private consumption of services grew at an average rate of 8.64 per cent compared with growth rates of aggregate and services GDP at 5.87 and 8.04 per cent respectively. With household purchase of services amounting to 40 per cent of services GDP, behind its high growth during the reference period household demand may thus seem to have played a major role. The interesting point to note in this connection is that the observed household income elasticity of demand for services (averaging 1.5 for the ten-year period) is far too high for a poor country like India, remembering that at low levels of per capita income it is the demand for food which tends to rise at a faster rate than income.[24] The explanation of the unusually high income elasticity of demand in the Indian instance seems to lie primarily in increasing inequality of income and introduction of a whole host of services households can spend on. For a demand side explanation of services growth one thus has to consider not only the autonomous components like government consumption and exports, but also factors affecting income distribution and household preferences.[25]

[22] This is also partly true of the overall GDP growth : during 1995-05 growth of all exports (at 11.6 per cent) was substantially higher than the overall GDP growth (at 5.8 per cent); as a result the share of exports in GDP went up from 10.2 per cent in 1994-95 to 18.5 per cent in 2004-05. See Rakshit (2007).

[23] As the principal determinant of growth in private disposable income. See Appendix and Gordon and Gupta (2004).

[24] Until household income is large enough to meet all the basic nutritional, biological and conventional needs. It is the somewhat lumpy nature of the latter (consisting of shelter, clothing, transport and fuel) which accounts for income elastic demand for food at low levels of income.

[25] Given the input-output and sectoral distribution of value added coefficients, one may trace the increasing inequality to changes in the autonomous

The larger part of services output is used as intermediate inputs which, given the input-output coefficients, are determined by the final demand for goods and services. The implication is that sectoral output (used as final and intermediate product) and GDP depend on both the *level* of final demand and its distribution across sectors. Tables 8[26] and 9, derived from input-output matrices (Table 7), quantify this relation for the Indian economy. A column, say *i*, of Table 8 gives the gross output of the three sectors required for meeting a unit of final demand for the ith sector's product. The ith column of Table 9 shows the corresponding GDP in the three sectors.[27] Thus on the basis of the 1998-99 input-output matrix, incomes originating in services from a unit final

TABLE 7			
Sectoral Share Matrices (Production Linkages)			
	Agriculture	*Industry*	*Services*
1979-80			
Agriculture	0.16	0.13	0.039
Industry	0.068	0.345	0.105
Services	0.02	0.149	0.096
1993-94			
Agriculture	0.145	0.035	0.034
Industry	0.140	0.365	0.150
Services	0.048	0.213	0.195
1998-99			
Agriculture	0.117	0.081	0.019
Industry	0.075	0.397	0.145
Services	0.05	0.173	0.144
Source: Sastry et al. (2003); Singh (2006).			

components of the final demand vector and the fact that the overwhelming part of additional expenditure of high income consumers are on goods and services in which the share of value added accruing to low income workers is often minuscule. The tendency is accentuated by large fiscal sops to the affluent by way of tax-free dividend incomes and negligible tax on capital gains.

[26] Obtained from the inverse of [I-A] matrix where A is the input-output coefficient matrix. See Appendix.

[27] Table 9 is obtained from Tables 7 and 8 in the following manner. A column sum of the input-output coefficient matrix gives the cost of intermediate inputs and hence the value added of a unit of output produced in that particular sector. Thus in 1979-80 corresponding to a unit of agricultural output the cost of intermediate inputs was (0.160+0.068+0.020) or 0.248 so that the value added was (1-0.248) or 0.752. Similarly for value added per unit of industrial and services output. The estimated output of the *j*th sector corresponding to a unit of final demand of the *i*th sector (as shown in Table 8) times value added per unit of *j*th sector's output then yields the value added in *j* due to a unit of final demand for *i*. Thus since in 1979-80 a unit increase in final demand for industrial goods would raise agricultural output by 0.260 units (Table 8), the agricultural GDP generated therefrom would have been (0.260 x 0.752) or 0.196 (Table 9). See Appendix. In view of lack of data for sector specific imported input coefficients, we could not take them into account while estimating the sectoral GDP coefficient matrices.

demand for agricultural, industrial and services products are 0.07, 0.25 and 0.85 respectively. The implication is that, even if aggregate demand (and hence GDP) remains the same, there will be an increase in services GDP if there is a shift in (final) demand from agriculture and industry to services, or from agriculture to industry. Thus not only the relatively higher growth of autonomous components of final demand for services and high income elasticity of services consumption, but the significant shift in final demand in favour of industrial at the expense of agricultural goods must also have played a role in boosting services growth during the reference period, remembering that services GDP generated per unit of final demand for industrial products is 3.6 times that for agricultural goods.

The implication is that, even if aggregate demand (and hence GDP) remains the same, there will be an increase in services GDP if there is a shift in (final) demand from agriculture and industry to services, or from agriculture to industry.

TABLE 8 Sectoral Demand Matrices (Demand Linkages)			
	Agriculture	*Industry*	*Services*
1979-80			
Agriculture	1.214	0.26	0.083
Industry	0.135	1.601	0.191
Services	0.049	0.269	1.139
1993-94			
Agriculture	1.187	0.087	0.066
Industry	0.297	1.704	0.330
Services	0.149	0.457	1.334
1998-99			
Agriculture	1.150	0.170	0.054
Industry	0.167	1.768	0.303
Services	0.101	0.367	1.233

Note: Sectoral demand matrix for 1998-99 is estimated from the input-output coefficient matrix for the year given in Table 7.
Source: Sastry et al. (2003).

It is important to appreciate in this connection how sectoral incomes from a final demand vector are affected by temporal changes in the economy's input-output coefficient matrix. The matrix tends to change over time due to technological improvements and reorganisation of industries of which splintering, as already noted, forms an important feature. These changes affect the impact of final demand and are generally biased in favour of services. This was indeed so for the Indian economy between 1979-80 and 1993-94. Over this 14-year period there was a significant increase in direct as well as direct-cum-indirect services intensity in agricultural and industrial production (Tables 7 and 8). The result was that the impact of a unit increase in final demand for farm and industrial products on services GDP rose from 0.037 and 0.204 in 1979-80 to 0.093 and 0.284 respectively in 1993-94. The period was also marked by a considerable increase in

direct and direct-cum-indirect input coefficient[28] in services production itself so that income originating in the sector due to a unit demand for its own product registered a moderate fall. These trends were reversed between 1993-94 and 1998-99.[29] Direct and indirect services intensity of agriculture and industry declined drastically; and so did, in varying degrees, intensity of all three categories of inputs in production of services. Thus according to the latest input-output matrix (for 1998-99) the impact of an increase in final demand for industrial and agricultural goods on services GDP is now less and that for services somewhat more than at the beginning of the post-reforms period.

So far as the services sector's input coefficients are concerned, the reversal of the trend is largely due to major changes in the composition of the sector and may be regarded as a transitory phenomenon. The same can perhaps be said of the behaviour of input coefficients in agriculture and industry, as the two sectors were in the process of adjustment under the liberalised environment. But at the same time the reversal in these two sectors could be a reflection of an inefficient credit delivery system, inadequate infrastructural facilities the major part of which belongs to the services sector, and failure of farms and industrial enterprises to enhance their efficiency through appropriate splintering or use of services like information technology.

Finally, for examining the contemporaneous as also the temporal behaviour of aggregate and sectoral incomes, it is important to appreciate the major determinants of aggregate demand and its

TABLE 9 Sectoral GDP Coefficient Matrices			
	Agriculture	*Industry*	*Services*
1979-80			
Agriculture	0.91	0.20	0.06
Industry	0.05	0.60	0.07
services	0.04	0.20	0.87
1993-94			
Agriculture	0.79	0.06	0.04
Industry	0.11	0.66	0.13
services	0.09	0.28	0.83
1998-99			
Agriculture	0.87	0.13	0.04
Industry	0.06	0.62	0.11
services	0.07	0.25	0.85
Note: Calculated from Tables 7 & 8.			

[28] Agricultural input coefficients registered some increase, but this was outweighed by increases in inputs from the secondary and tertiary sectors (Tables 7 and 8).

[29] The latest year for which the input-output matrix is available.

According to the latest input-output matrix (for 1998-99) the impact of an increase in final demand for industrial and agricultural goods on services GDP is now less and that for services somewhat more than at the beginning of the post-reforms period.

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composition. The most important of these determinants, apart from the input-output coefficient matrix, are (a) autonomous demand vector; (b) expenditure propensities of agents engaged in different sectors; (c) import coefficients; and (d) the ratios of (sectoral) private disposable incomes to sectoral incomes.[30] We have shown in the Appendix [equation (10)] the derivation of multi-sector multipliers (where m_{ij} refers to income originating in sector i due to a unit of autonomous expenditure on j's output produced domestically), and hence how sectoral incomes are governed (among other factors) by the autonomous expenditure vector [equation (11)]. Table 9a reproduces our estimates of sectoral multipliers for the two years 1993-94 and 1998-99. The estimates are no more than illustrative and (given the data limitations) are based on some heroic assumptions and abstractions.[31] Even so they reveal some interesting features of sectoral multipliers and the way they are affected by changes in input-output coefficients and expenditure propensities. As expected, the multiplier is the largest (and greater than unity) for the sector where the increase in autonomous expenditure takes place. Second, among the three m_{ii}'s the multiplier is the highest for agriculture, followed by that for services and industry. So far as cross multipliers are concerned, the estimates are similar to that for GDP coefficients (Table 9): the services sector multiplier is higher for autonomous demand for industrial than for farm products. Third, between 1993-94 and 1998-99, while all the three multipliers for the agricultural sector rose, those for the other two sectors fell, with the steepest fall taking place in industries. This, as we have discussed earlier, was due primarily to the reversal of the trend in input-output coefficients.

Indeed, the actual decline in sectoral multipliers must have been greater[32] than what is shown in Table 9a since data limitations prevented us from estimating multi-sector multipliers taking into account sectoral import intensities and their increase between the two years.[33] In the absence of relevant data we have also not been able to consider how differences in income distribution, tax burden and spending propensities out of income originating in different sectors affect aggregate[34] and inter-sectoral multipliers. However, given

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[30] The ratios in their turn depend on intra-sectoral distribution of income and the system of taxes and transfers in force.

[31] The most important of these are (a) use of a uniform ratio of disposable income to total (sector) income for all sectors; (b) identical consumption propensities of income earners; (c) equality of marginal and average tax and consumption ratios; and (d) neglect of import coefficients (while estimating sectoral, though not, total autonomous expenditure multipliers).

[32] Though there is an overestimate of the sectoral multipliers for any given year.

[33] As shown in Table 9a, when imports are abstracted from the overall multipliers in 1993-94 and 1998-99 were 2.96 and 2.87 respectively; but when aggregate import-intensity is taken note of, the figures come down to 2.21 and 2.04 respectively.

[34] It is for this reason that the *overall* multiplier in our estimates does not depend upon where the autonomous expenditure takes place.

the overall structure of the Indian economy it is not very difficult on the basis of our analysis to suggest some results of a qualitative nature.

First, since the import intensity of agriculture is judged to be the least and that for industry the highest, a unit increase in autonomous expenditure on agriculture will tend to have the largest and that on industry the smallest effect on both the aggregate multiplier and on incomes originating in the sector itself. For similar reasons the negative impact of an oil price shock will tend to be more on the secondary than the other two sectors.[35] Second, with the high and growing income inequality in services m_{i3}'s are likely to be significantly less than the estimates provided in Table 9a. Finally, there are reasons to believe that services intensity in a number of growing industries and modern modes of marketing of agricultural goods have been assuming increasing importance. Hence, services sector multipliers for autonomous expenditure on agricultural and industrial goods are perhaps more now than what one might infer from the 1998-99 input-output matrix.

TABLE 9a			
Sectoral Autonomous Expenditure Multiplier Matrices			
	Agriculture	*Industry*	*Services*
1993-94			
Agriculture	1.53	0.80	0.79
Industry	0.68	1.23	0.69
Services	0.75	0.94	1.48
Autonomous Expenditure multiplier for the economy with no leakage by way of imports : 2.96. Autonomous Expenditure multiplier taking into accout the *overall* import intensity of the economy: 2.21.			
1998-99			
Agriculture	1.67	0.93	0.84
Industry	0.52	1.08	0.57
Services	0.67	0.86	1.45
Autonomous Expenditure multiplier for the economy with no leakage by way of imports : 2.87. Autonomous Expenditure multiplier taking into accout the *overall* import intensity of the economy: 2.04.			
Note: (i) Multipliers are derived from Table 7, using the relation $y = [v] [I-A-C]^{-1}$, equations (5) and (10) of Appendix. The multiplier m_{ij} indicates income generated in sector i due to a unit increase in autonomous expenditure on sector j. (ii) Estimates for sectoral consumption coefficients and ratio of private final consumption expenditure to GDP for the two years are obtained from EPW Research Foundation (2004).			

Since the import intensity of agriculture is judged to be the least and that for industry the highest, a unit increase in autonomous expenditure on agriculture will tend to have the largest and that on industry the smallest effect on both the aggregate multiplier and on incomes originating in the sector itself.

[35] The least affected would perhaps be the services.

An immediate problem with the supply side explanation is that the post-reforms period saw a decline in growth of capital formation in the services sector even while there was a pronounced increase in its GDP growth.

Supply-side Factors

So far our analysis of services growth has run in terms of operation of demand side factors. Even when we took into account changes in input-output coefficients—obviously a supply side factor—their effect was presumed to operate only through changes in the magnitude of the impact of final demand on sectoral output and value added, with production remaining demand determined everywhere. One problem with this approach is that if the capacity output of (say) subsector i (given by its installed capital stock and capital coefficient) falls short of demand for its output, production in not only i but a whole host of other industries which use i's products directly or indirectly as their input will no longer be demand determined. Thus corresponding to the installed capacity in various sectors and the input-output matrix,[36] there is a production possibility frontier (PPF) giving the maximum sustainable combinations of final demand. When the economy operates on PPF, growth is governed by supply rather than demand side factors.[37] For the economy as a whole the most important of these factors are capital accumulation and technical progress[38] both of which shift PPF outward. Since our focus is on services, let us see if we can identify some supply side factors driving its growth in the post-reforms era.

An immediate problem with the supply side explanation is that the post-reforms period saw a decline in growth of capital formation in the services sector even while there was a pronounced increase in its GDP growth. During 1995-05, the sectoral investment growth (at 4.82 per cent) fell short of services GDP growth (at 8.04 per cent) by 3.2 percentage points and was also significantly lower than the 7.25 per cent growth recorded by aggregate investment (Table 2). The result was that compared with the incremental capital–output ratio (ICOR) of 5.02 during 1995-05 for the economy as a whole, services ICOR was only 2.4 and this in its turn was substantially less than the sectoral ICOR of 3.8 for the period 1990-95 (Table 10).

TABLE 10
Overall and Services ICOR

	1980-81 to 1990-91	1990-91 to 1995-96	19901-91 to 2004-05	1995-96 to 2004-05
ICOR for the economy	4.77	8.58	5.96	5.02
ICOR for services sector	3.72	3.84	2.84	2.43

Note: Estimated from NAS data.

[36] To be more accurate, given the A and B (capital coefficient) matrices and stocks of capital goods.

[37] Thus demand side factors assume predominance when the economy operates with some slack, i.e., the combination of final demand lies below PPF.

[38] Resulting in an increase in productivity of factors used.

The above evidence seems to go against the supply side explanation of services growth. The reason is that in the presence of excess capacity demand driven growth goes hand in hand with a declining ICOR, as happened during the reference period. Again, the demand rather than supply side explanation may appear more plausible since practically everywhere technological progress in services (which could have accounted for the sharp fall in the sectoral ICOR) has generally been found to be significantly slower in services than in industries.

To dismiss the supply side explanation out of hand does not however seem appropriate when we take into account some other features of services' growth. The most important of these is perhaps the behaviour of labour absorption in this sector. During the two periods, 1993-00 and 1999-05, growth of employment in services was 2.56 and 1.58 per cent respectively; the corresponding figures were 8.83 and 7.63 for (sectoral) GDP growth, and 2.52 and 2.50 for (sectoral) ICOR (Table 11). Thus compared with the period 1987-94, the period 1994-05 was characterised by higher GDP growth in services, but substantially lower ICOR as also slower growth in investment and employment. These features of the post–reforms services growth make a purely demand side explanation highly suspect: when production is demand determined, growth of employment tends to be close to (if not more than) that of GDP. The decline in both the labour coefficient[39] and ICOR between 1993-94 and 2004-05 (Table 11) implies that productivity improvements—the most important supply side factor *a la* Solow (1957) and others—were a major feature of the tertiary sector during this period.

It may also be noted that were the services growth entirely demand determined, their exports between 1994 and 2005 would not have grown at a rate more than three times the growth of global export of services. Such a growth differential and the corresponding quantum leap in the country's share in the world services exports, from 0.57 per cent in 1995 to 2.32 per cent in 2005 (Table 5), suggest major efficiency gains in and increasing competitive strength of the services sector vis-à-vis that of agriculture and industries.

Part of the reason behind the phenomenon noted above is historical. The fact that services are in general much less capital intensive and many of them were relatively new implied that unlike industries, burdened with large, outmoded and inefficient capital equipment and catering to a sheltered domestic market in the pre-reforms period, it was much easier for the services sector entrepreneurs to switch over to or adopt the most efficient technology and organisational structure, and focus on economising cost as well as on the quality and timely delivery of their products in a fiercely competitive

To dismiss the supply side explanation out of hand does not however seem appropriate when we take into account some other features of services' growth. The most important of these is perhaps the behaviour of labour absorption in this sector.

[39] i.e., labour used per unit of services GDP.

It may also be noted that were the services growth entirely demand determined, their exports between 1994 and 2005 would not have grown at a rate more than three times the growth of global export of services.

TABLE 11a
Sectoral GDP, Capital Formation and Employment (Shares)

	1983-84	1987-88	1993-94	1999-00	2004-05
Components of GDP (as % of GDP)					
1　Agriculture & allied activities	36.62	31.89	30.97	26.22	21.13
2　Industry	25.75	26.68	26.26	25.86	27.15
3　Services	37.63	41.43	42.77	47.92	51.72
Investment (as % of total investment)					
1　Agriculture & allied activities	12.29	11.24	8.42	8.48	6.63
2　Industry	50.82	50.31	50.09	51.44	54.06
3　Services	36.89	38.45	41.49	40.08	39.31
Employment Ratios (as % of total employment)					
1　Agriculture & allied activities	63.18	60.14	60.39	56.70	58.60
2　Industry	15.62	17.57	15.83	17.57	18.50
3　Services	21.20	22.29	23.78	25.73	22.90

Source: Reserve Bank of India (2006); Government of India (2006); EPW Research Foundation (2004); CSO (2006); NSSO (2006).

TABLE 11b
Sectoral GDP, Capital Formation and Employment (Growth except for ICOR)

	1983-84 to 1987-88	1987-88 to 1993-94	1993-94 to 1999-2000	1999-00 to 2004-05
GDP at factor cost	4.23	5.84	6.63	5.91
Investment	8.31	6.10	10.38	8.70
ICOR	5.45	6.98	4.31	5.35
Employment	2.74	2.28	0.95	3.54
Agricultural sector				
Agricultural GDP	0.06	4.90	2.97	1.99
Investment in agriculture	-0.67	1.67	4.83	1.66
ICOR	-0.25	0.81	2.06	-11.09
Employment	2.06	2.74	0.02	5.06
Industrial sector				
Industrial GDP	6.02	5.99	6.95	6.21
Investment in Industry	6.70	7.30	10.02	8.76
ICOR	11.32	-0.04	12.67	8.59
Employment	6.96	0.75	3.05	5.54
Services sector				
Services GDP	7.03	6.54	8.83	7.63
Investment in Services	4.54	8.98	6.14	6.47
ICOR	3.40	3.72	2.52	2.50
Employment	4.89	3.95	2.56	1.58

Source: Reserve Bank of India (2006); Government of India (2006); EPW Research Foundation (2004); CSO (2006).
Note: ICOR over a period is the average of the yearly ICORs. In view of wide fluctuations in agricultural GDP ICOR in agriculture turned out to be negative in some periods.

environment. Again, in view of the relatively low financial requirement of the sector capital market imperfections did not cause insurmountable hurdles for entrepreneurs, new or old, to move quickly to their optimal scale of operation and adjust their production in line with changing market conditions.

Second, except for trade, banking and insurance, most of the other services were lightly regulated even in the pre-reforms period. Since 1991 trade and financial sector liberalisation has proceeded at a much faster pace than in industries. No less if not more important has been the lifting of barriers to entry of private enterprises in services like air transport and telecommunications which had previously been the exclusive preserves of enterprises belonging to the public sector. Indeed, large expansion of telecommunication facilities in the post-reforms period played an important role in preventing supply bottlenecks in the process of rapid growth of the services sector, especially of its most dynamic sub-sectors like information technology (IT) and IT enabled services (ITES).

Third, fiscal sops and government policies relating to foreign direct investment (FDI) helped considerably in expansion of productive capacity and growth of services. Rules relating to entry of FDI have always been much less restrictive for this sector than elsewhere. Various tax concessions especially on export earnings were substantial. So were facilities provided by State governments for setting up and running production units. Importance of these measures lies in the fact that both FDI and setting up of export oriented production facilities tend to raise a sector's total factor productivity.

Finally, the overall efficiency improvement, reflected in the fall in labour coefficient as well as in ICOR, was due in no small measure to a shift in composition of services. Apart from IT and ITES, the other high growth services were communications, banking and insurance whose value added per unit of capital[40] and labour employed is higher than in other sub-sectors. It may also be noted in this connection that these high growth services employ highly educated rather than un-skilled labour. No wonder, a shift in the composition of the labour force in the services sector is reflected in a much higher growth of value added than of aggregate employment.

Interaction of Demand and Supply Side Factors
There is a basic difference in the operation of demand and supply side factors in driving economy-wide and sectoral growth. According to mainstream consensus in macroeconomics, demand factors are predominant in governing the short-term growth of an economy; but in the long run growth is governed entirely by supply

> Indeed, large expansion of telecommunication facilities in the post-reforms period played an important role in preventing supply bottlenecks in the process of rapid growth of the services sector, especially of its most dynamic sub-sectors like IT and IT enabled services.

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[40] Note that here capital implies installed machinery and equipment along with inventory, *not* financial capital employed in the subsector.

At the sectoral level, among the long-run supply side factors no less important than capital formation are competitive environment, technical progress, innovation and introduction of new products which shift demand towards the sector and create new demand for its produce.

side factors like capital accumulation (including investment in human capital), growth of labour, and technical progress, endogenous or exogenous. However, expansion of a particular sector in both the short and the long run will be the outcome of interaction of factors operating on both the demand and the supply side. Installed capacity or supply of critical inputs like power may no doubt affect the short-run supply response of a sector to an increase in demand for its products; but more intensive use of capital stock, and substitution of scarce intermediate inputs and their diversion from other sector, or larger imports still permit demand to have an important impact on sectoral growth. In other words, in the short run through changes in relative prices supply and demand conditions play a much greater role in affecting sectoral than aggregate GDP. In the long run the demand side impact is even more substantial. In a sector enjoying higher growth of demand, capital accumulation will be larger,[41] and so will investment in physical and human capital for meeting demand for inputs and skilled labour more intensively used in the sector.[42] At the sectoral level, among the long-run supply side factors no less important than capital formation are competitive environment, technical progress, innovation and introduction of new products which shift demand towards the sector and create new demand for its produce. All these are apart from the way in which inter-sectoral input-output linkages make the demand and supply side factors operating in different sectors closely intertwined in determining the temporal behaviour of their output and value added.

IV. Services-led Growth: Sustainability and Optimality

In the context of the tertiary sector's strong dynamism over the last decade many a commentator expects services to remain the major driver of India's growth in the foreseeable future. Some go further and suggest that the sector is yet to realise its vast growth potential, but for that it is necessary to adopt proactive policies relating to both the demand and the supply side of the market. Typical in this regard is perception of the World Bank[43] (2004): "India's developmental aspirations depend to a considerable extent on its ability to sustain the rapid growth of its services sector. Such growth in turn depends on its ability to secure improved access to foreign markets, create a more competitive domestic economy and develop appropriate regulatory institutions".

The above perception regarding the predominance of services and the overwhelming importance of their exports cannot but appear odd to most economists, especially those not acquainted with India's

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[41] For any given level of aggregate investment.

[42] In other words, given the overall capital accumulation and growth of labour supply, a sector facing larger and larger demand for its product will enjoy faster growth compared with other sectors of the economy.

[43] See also Gordon and Gupta (2004).

growth since the mid-1990s. How can an extremely poor and large country like India, defying all contemporary and historical evidence, bypass agricultural and industrial development before graduating into an advanced economy where the overwhelming part of GDP originates in services? How is the country to meet its investment needs[44] or the requirement of food, clothing and other industrial products which form by far the largest part of consumption before a sufficiently high standard of living is attained? While exports are no doubt of great help, is not the domestic market far more important for a large economy like India's?

There can be several possible responses to the question how the Indian economy might be a contrarian. Let us note some of those that an economist with a World Bank-like perception may be expected to advance. First, the idea that all countries have to traverse the same development path is somewhat simplistic. There has to be a first for everything and with services propelling India's growth since 1992-93 (Table 2) on a sustained basis, it is not unreasonable to expect the sector to continue to remain the most dynamic one.

Second and more important, there is strong empirical evidence that India has acquired strong comparative advantage in services relatively to industry and agriculture. As already noted, over the period 1991-2005, especially between 1996 and 2005, the growth differential between India's and world exports was significantly higher for services than for merchandise exports. Until 1996 India's revealed comparative advantage[45] (RCA) in services was lower than in goods, albeit marginally. Since then there has been a sharp rise in services' RCA, from 0.94 in 1996 to 1.97 in 2005, along with a corresponding decline in that of industrial and agricultural goods (Table 5). Thus compared with other sectors not only have services emerged as much more competitive in the world market, but the rising *trend* in their RCA may also be taken to suggest the sector's dynamic comparative advantage and enormous growth potential.

Third and related to the second, with increasing openness of the world economy, reflected in world exports growing more than 4 times than that of global income in recent years, it is now much easier even for large countries like India and China to step up their growth through specialising in their areas of comparative advantages. Given the high income (and price) elasticity of demand for services, increasing affluence of the world's upper income groups, and continued trend in outsourcing-cum-splintering, global trade in services is expected to rise

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[44] Which represents final demand only for goods.

[45] RCA of a product (say) *y* is nothing but share of *y* in the country's exports as a proportion of the share of global export of *y* in aggregate world exports. A value of RCA for *y* greater than 1 suggests that the country's trade pattern reveals a comparative advantage of *y*. However, since RCA in any particular year may be affected by random shocks, it is advisable to take a moving or some other average of RCA as a measure of the sector's competitive edge in the world market.

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at a faster rate than their merchandise counterpart. Indeed, even apart from softwares, a whole host of services, e.g., health, education, financial services, consultancy, engineering services, etc., which were previously non-tradables, are increasingly being exported and imported. Hence economic logic seems to suggest that not only can services provide a major thrust to India's future growth, but shifting resources to the sector away from other lines of activity may in fact be development promoting.

Finally, with higher income and faster growth attained through specialisation in services, the country would, it is reasonable to argue, be in a much better position to meet its need for agricultural and industrial goods through imports, remembering that all of these are tradable. This does not mean the demise (or even decline) of the primary or the secondary sector (in absolute terms); but if the trend over the last 12-13 years is any guide, in the process of economic growth the sectoral balance of the Indian economy may well resemble that of rich economies much before the country joins the middle level income group.

Some Caveats

There is nothing intrinsically wrong, the above evidence and arguments suggest, if India short-circuits the development process though reliance on services rather than agriculture or industry. However, there are several issues, especially from the viewpoint of policy options, that need to be addressed while considering the sustainability and optimality of services-led growth.

Growth and Employment

The first and perhaps the most important of these issues relates to the extremely dismal record of employment growth in services even while the sector has been generating an increasingly larger share of the country's GDP (Tables 2 and 11). In the context of the vast pool of unemployed and underemployed labour in the economy, a (sectoral) GDP elasticity of employment amounting to no more than 0.2[46] is a matter of serious concern and has prompted a number of economists to suggest a more balanced development of different sectors. Thus after emphasising the strong future growth prospects of services exports and other segments of the sector, Gordon and Gupta (2004) conclude their paper with the observation: "Nevertheless, it is imperative that industrial and agricultural sectors grow rapidly. The relatively jobless nature of growth in India's services sector further underscores this need."

However, the conclusion appears to run contrary to some fundamental economic principles. Given the much higher productivity of both labour and capital in services compared with that in other

[46] Which may go down further, if the past trend continues.

sectors, and the large comparative advantage the former enjoys, the diversion of resources away from the primary and secondary sectors to services may be considered the best way of maximising both GDP *and* employment growth in the medium and the long run. The low growth of employment in services relatively to their GDP, as already noted, is due partly to rising share of high quality, skill intensive services— something which may be considered a transitory phenomenon. Given the higher productivity and profitability of these sub-sectors, they may be expected to grow at a faster rate with larger reinvestment of profits and higher capital accumulation financed from other domestic as well as external sources. In the process the share of labour employed in services will show a rising trend, with growth of employment over-shooting that of labour. Only if the sector loses its competitive edge over agriculture and industry would it be optimal to try to secure their rapid growth; otherwise, the overall growth of the economy will be reduced, and so will be that of productive employment and real wages. Given such a perspective, what is called for, it may be argued in the context of relatively low absorption of labour in services, is not promotion of agriculture and industries,[47] but a social security system and training programme to take care of the unemployed and make them employable in the sun-rise sectors.

There are two basic problems with the business-as-usual policy and the argument that proactive measures for stepping up agricultural and industrial growth will be inefficient or distortionary. A growth process characterised by huge unemployment, rising absorption of labour in slow rather than fast growing sectors (Table 11) and widening wage/income differential can hardly be regarded as optimum even if these disquieting trends are ultimately reversed. The suggestion for social security and training programmes to tide over the transitional travails is well taken. But with high costs of taxes and transfers com-pounded by mind boggling administrative difficulties, it is unlikely that an effective social security system encompassing the entire population can be put in place in the near future without a sharp cutback in investment or creating a fiscal crisis. Again, training programmes, unless of a fairly general nature,[48] are best left to enterprises or indus-try bodies. Under these conditions and in view of the negligible social opportunity cost of unemployed or underemployed labour, promotion of industries and agriculture may be viewed a second best solution to the problem arising from jobless growth of services, even if the policies involve some sacrifice in overall economic growth.

Second and more fundamental, RCA of services in the Indian economy, our analysis in Section III suggests, is neither inherent nor immutable, but the outcome of factors behind which the government's

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[47] This applies to the sectors as a whole, not to some of their subsectors which may be highly productive and can hold their own against foreign competition.
[48] Which anyway would be part of courses in any technological school.

Remembering that industries require much larger capital than services for operating efficiently, it is no wonder entrepreneurs in the former found it more difficult to adjust their production structure for gaining cost-competitiveness.

policy omissions and commissions played an important role. Since an appreciation of factors governing RCA of different sectors is crucial in putting India's services revolution in a proper perspective and drawing policy conclusions, even at the risk of some repetition it is important to take stock of the sources of the sector's (observed) competitive edge over industry and agriculture and examine whether they truly reflect its dynamic comparative advantage or absence of a level playing field, characterised by gross distortions in the economic system.

Sectoral RCAs and their Interpretation

In Section III we have already explained how the pre-1991 policy regime created significantly stiffer obstacles for industries than for services in effectively competing under a liberalised economic environment. The major hangover of industrial enterprises from the pre-reforms era consisted of sub-optimal or inefficient scale, capital structure and modes of production due to quantitative control on capacity (through licensing); reservation for small scale units; and distortionary tariffs, quotas, domestic availability criteria and other import restrictive measures that fostered inefficiency and eroded competition. Because of problems relating to reorganisation or downsizing of the labour force, and of the high capital intensity, the process of restructuring of the old industrial enterprises and making them competitive in the world market was both difficult and time consuming; and so was entry of new firms in areas characterised by large scale economies.

Matters were not helped by continuance of reservation for small scale units in selected industries in the post-reforms period and funds constraints entrepreneurs were faced with. Financial liberalisation including adoption of Basel norms was followed by drying up of bank lending to the commercial sector and demise of development financial institutions (DFIs); at the same time the private bond market remained grossly underdeveloped and the stock market, manipulated by scamsters and fly-by-night operators, proved an extremely poor source of mobilising capital for the major part of the post-reforms period (Rakshit, 2004). Remembering that industries require much larger capital than services for operating efficiently, it is no wonder entrepreneurs in the former found it more difficult to adjust their production structure for gaining cost-competitiveness. Add to that the fact that (a) anti-dumping measures as well as non-tariff barriers are much more widespread for industrial products, and (b) government policies relating to foreign direct investment (FDI) and fiscal concessions have generally been biased in favour of services, and it is not very difficult to appreciate why RCA of industries[49] registered a fall during our reference period (Table 5).

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[49] Strictly speaking the RCA is for agricultural and industrial goods taken together.

Perhaps the most crucial factor behind the relatively poor performance of industries as well as agriculture was the woefully inadequate infrastructural facilities. This, as we have argued elsewhere (Rakshit, 2004, 2007), severely eroded the competitive strength of the primary and secondary sectors, caused significant deceleration of private investment, and constituted a major factor behind the slowdown in industrial and agricultural growth along with increased volatility of the latter. Indeed, the fact that despite all the handicaps noted above growth of India's merchandise export (at 13.9 per cent) during 1995-05 was 4.7 percentage point higher than that of world exports suggests that given a level playing field agriculture and industry can play a leading role in India's growth, as they had played in all advanced countries in their earlier stages of economic development.

Resource Endowment, Inter-sectoral Allocative Efficiency and Growth: Some Policy Perspectives

The most important issue that needs to be addressed in the context of the foregoing analysis concerns policies relating to inter-sectoral allocation of resources best suited for promoting the country's developmental objectives. In view of the large pool of educated and skilled labour force, considerable number of annual entrants to this pool from universities and institutes, relatively low fixed capital requirement of the sector, and rapid development of entrepreneurial skill (aided by FDI) in exploiting emerging opportunities in the domestic and international markets, there are strong grounds for believing that fairly fast growth of services over the next decade or so is both feasible and desirable: the incremental return on human and non-human resources deployed in this sector would generally be higher than in their alternative uses and contribute towards raising the overall saving and investment in the economy. In fact, government support for upgradation of select universities and institutes to facilitate the sector's growth may also be justified on the basis of social cost-benefit calculus remembering that (a) such investment would be of a marginal nature and are attended with positive externalities; and (b) the *average* return on higher education[50] is significantly larger than the risk adjusted return of an individual agent, especially in a highly imperfect capital market.

But the higher growth potential of services does not warrant special dispensation for most categories of services. The exceptions are education,[51] R&D, broadcasting and telecommunications which generate considerable external benefits. In general tax concessions and favoured treatment of services have been distortionary and reduced government's ability to finance much needed investment in many a

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[50] For all the trainees taken together.
[51] Note that government policies relating to upgradation of selected centres of education and institutes are largely sector neutral.

There is thus no alternative to adoption of policies that will provide a big boost to gainful employment of low-skilled labour in the process of the country's transition to a middle-income economy.

crucial area. Government support for services in securing "improved access to foreign markets" (World Bank, 2004) would no doubt be a step in the right direction; but no less important are vigorous international negotiations for lifting tariff and non-tariff barriers agricultural and industrial products face in advanced economies. The least the government can do is to remove the distortions and provide a level playing field where entrepreneurs decide for themselves on the scale of investment and operation in different lines of economic activity.

However, a neutral policy, our earlier analysis suggests, is not enough in realising the basic economic goals. Given the vast army of unskilled labour, and extremely poor quality of primary, secondary and university education (with a few islands of excellence serving a minuscule minority), even a doubling of export growth of services over the next decade and continuation of the trend in consumption propensities relating to services observed in recent years would hardly make any difference to the dismal employment scenario in the country. It is also important to recognise that intensive retraining of labourers on the wrong side of the mid-thirties has mostly been found ineffective. Again, even making about a quarter of the country's labour force suitable for deployment in the fast growing, skill-intensive services in the foreseeable future appears next to impossible, considering the magnitude of investment required for redressing the poor state of the country's primary and secondary education. There is thus no alternative to adoption of policies that will provide a big boost to gainful employment of low-skilled labour in the process of the country's transition to a middle-income economy.

There are two basic (supply-side) policy initiatives[52] that seem crucial for raising allocative efficiency, expansion of employment opportunities of low-skill labour and providing a boost to GDP growth in the medium run. The first is institution and expansion of an effective credit delivery system, absence of which has constituted a major hurdle to productive investment in the economy, especially by small and medium enterprises (Banerjee *et al*, 2003; Rakshit, 2004, 2005a). The second is large scale investment in irrigation, roads, railways, communication, ports, power, rural as well as urban reconstruction, and other infrastructural facilities. Elsewhere (Rakshit, 2006) we have indicated in some detail the economic rationale of such investments. Their significance is three-fold: (a) they are highly labour intensive[53] and

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[52] An important reason behind poor industrial growth from the mid-1990s was sharp slowdown in public investment causing a deceleration of private capital accumulation and prolonged demand deficiency (Rakshit, 2004, 2007). This is a crucial factor which needs to be taken into account while assessing the relative performance of different sectors during our reference period and underscores the need for policies for avoiding demand deficiency since otherwise supply side policies are likely to prove ineffective.

[53] Except for investment in power.

would in the process of their implementation directly absorb large number of workers whose opportunity cost is close to zero; (b) provision of these infrastructural services would help productive use (on a sustained basis) of unemployed or grossly underutilised resources, both human and non-human, especially in remoter regions; and (c) they would remove some major handicaps faced by a large number of producers in agriculture and industry, and hence pave the way for raising allocative efficiency of investment and resource use across different sectors of the economy.

Sectoral Policies from a Broader Perspective

It cannot be overemphasised that questions like whether to foster agriculture, industry or services for stepping up growth or promoting other objectives are somewhat beside the point and cloud pertinent issues. The basic problem is rather how best to utilise resources for raising the country's standard of living, avoiding gross inequality of income and above all rapidly moving towards a system where everybody has equal opportunities for advancement in life and realising his ambition. Judged from this perspective it is important to distinguish between the significance of services in effectively meeting their two categories of demand, final and intermediate. There can be little doubt that adequate provision of services like shelter, public transport, education, health care, and law and order constitutes a basic responsibility of the state. Beyond these most of the other *consumption* services cannot be regarded as essential and their fast growth over the last decade has been the result of increasing inequality and reflects a major failure of the tax system (Rakshit, 2005). Earnings from exports of services raise no doubt the economy's potential for better promotion of economic and social goals. But so far the increase in income originating therefrom has not been properly tapped for meeting the economy's basic consumption and investment requirement. Again, apart from the fact that there is no special case for supporting services' exports, it is necessary to take into account the highly volatile nature of export-led growth of services: thus even though world income growth was largely stable during the reference period, growth of services *sans* Public Administration and Defence was characterised by a large coefficient of variation.[54]

The other and much more important point to appreciate in this connection is that the best way of meeting the final demand for any product involves the use of the most cost-effective combination of (direct and indirect) inputs from a wide variety of sectors which in its

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[54] The coefficient of variation of India's growth of services' exports during 1995-00, 2001-05 and 1995-05 was 45.7, 83.7 and 77.5 per cent respectively. The corresponding figures for growth of services GDP sans Public Administration & Defence (at 45.6, 57.6 and 48.6 per cent respectively) were somewhat less, but by no means moderate.

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turn requires optimum organisation of the economy's production structure.[55] From this viewpoint what matters is not the sectoral distribution of aggregate income corresponding to some final demand,[56] but whether (a) the structure of production and choice of techniques[57] minimise use of the economy's limitational resources (like different categories of labour, fixed capital, land, etc.); and (b) the vector of domestic absorption (consisting of different categories of domestic consumption and investment) is in consonance with social preferences.[58] Since both capital formation and the overwhelming part the community's consumption consist (or rather should consist) of commodities until the country has joined the middle-income group, the proper role of the services sector lies primarily in enhancing the productivity and efficiency of agricultural and industrial enterprises.

What about use of services exports for meeting the domestic absorption of goods through imports? We have already noted why this may not be the most efficient way of meeting the economy's consumption and investment needs in the foreseeable future. No less important is it to appreciate the magnitude of the problem involved in such a reorganisation of the country's production structure. In 1995-96 the share of goods in domestic absorption was 75.3 per cent which, thanks to increasing inequality, came down to 72.3 per cent in 2004-05. Despite the sharp rise in services' exports in the intervening period, their net contribution[59] towards financing imports was no more than 2.0 per cent of GDP in 2004-05. Thus financing even 10 per cent of domestic absorption of goods through services exports over the next decade appears next to impossible. Add to that volatility of export demand,[60] highly imperfect international market for foodgrains and other agricultural products,[61] and the consequent problem of ensuing food security (Storm, 1997), and it is not very difficult to see why

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[55] The input-output matrix, it may be noted, gives the actual *average* inter-industry input coefficients in any period and indicates neither the optimal structure of production, nor the most cost-effective coefficients taking account of alternative ways of organising production, substitution possibilities in use of inputs, and the opportunity cost of limitational inputs.

[56] Note that aggregate incomes originating in different sectors exactly equals the final demand, but the intersectoral distribution of income is crucially dependent on the structure of the economy and the corresponding input-output coefficients.

[57] Which yield the input-output coefficients.

[58] The perceptive reader much have recognized that while (a) enables the economy to choose a point on the outermost (net) production possibility frontier (given the limitational resources), (b) ensures that the point chosen is social welfare maximizing.

[59] Given by the difference between exports and imports of services.

[60] Especially with emergence of fierce competition from Eastern Europe and developing Asia.

[61] Which tends to produce a yawning gap between the marginal and average cost of importing grains, edible oil or other agricultural goods for a large country like India.

enhancing productivity of primary and secondary sectors has to be the most important role of services in a poor country like India. Note that the two major policy initiatives suggested by us, viz., development of an effective credit delivery system and large scale investment in infrastructure, are primarily designed to augment the productive capacity of the services sector;[62] but their principal benefit will take the form of efficient production of agricultural and industrial goods. If in the process a large part of additional GDP originates in services rather than in primary or secondary sectors, there is nothing reprehensible or laudatory about it.

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Note that the two major policy initiatives suggested by us are primarily designed to augment the productive capacity of the services sector; but their principal benefit will take the form of efficient production of agricultural and industrial goods.

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[62] Except for irrigation and power.

Appendix: Sectoral Production and Income

Input-output Approach

Consider an economy with 3 sectors, agriculture *(1)*, industry *(2)* and services *(3)*. Let the input-output coefficient matrix of the economy be given by

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \tag{1}$$

where a_{ij} = the amount of ith input required for producing 1 unit of jth sector's output.

Value added in j is given by the relation

$$v_j = 1 - \sum_{i=1}^{3} a_{ij} - a_{pj} \tag{2}$$

where a_{pj} is the amount of imported input required per unit of j.

Given a final demand vector for the 3 sectors' output, F, production and value added in the 3 sectors are immediately obtained[63] from (1) and (2):

$$[I\text{-}A]X = F \tag{3}$$

where $X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$ gives the column vector of the three sectors' gross

output, x_1, x_2 and x_3; and $F = \begin{bmatrix} f_1 \\ f_2 \\ f_3 \end{bmatrix}$ represents the three sectors' <u>final</u>

demand, f_1, f_2 and f_3.

Pre-multiplying l.h.s and r.h.s of (3) by $[I\text{-}A]^{-1}$ we obtain output of the three sectors, X, as a function of F:

$$X = [I\text{-}A]^{-1}F. \tag{4}$$

The corresponding vector of incomes originating in the three sectors is then given by[64]

$$y = \begin{bmatrix} y_1 \\ y_2 \\ y_3 \end{bmatrix} = \begin{bmatrix} v_1 & 0 & 0 \\ 0 & v_2 & 0 \\ 0 & 0 & v_3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} v_1 & 0 & 0 \\ 0 & v_2 & 0 \\ 0 & 0 & v_3 \end{bmatrix} [I\text{-}A]^{-1}F. \tag{5}$$

[63] *F* refers to final demand vector for *domestically* produced goods and services. We shall presently consider imports for meeting final demand.

[64] It may be noted that column *j* of *[I-A]⁻¹*, a 3 x 3 matrix, gives the gross output levels of the three sectors corresponding to a unit of final demand for *j*. Estimates of *[I-A]⁻¹* are given in Table 8.

The aggregate income of the economy Y is nothing but the sum of sectoral incomes:

$$Y = \sum_{i=1}^{3} y_i \qquad (6)$$

Relations (5) and (6) indicate how aggregate and sectoral incomes of the economy are given by the composition of final demand and the economy's input-output coefficient matrix.

Equilibrium in the System

But what determines the composition of final demand? In order to answer the question we need to distinguish between the exogenous and endogenous components of final demand. The simplest way of closing the model is to follow the text-book analysis of income genera-tion suitably modified to take account of intersectoral linkages and composition of demand. We have already specified the nature of import demand for intermediate inputs. So far as import content of final demand is concerned, let us assume that

c_{ip} = fraction of consumption demand for i met through imports;
α_p = fraction of investment demand met through imports;
g_p = fraction of G met through imports.

Let investment consist of industrial products alone.[65] In view of sectoral differences in effective tax rates and consumption propensities, we need to differentiate among domestic consumption of the three types of goods out of incomes originating in different sectors. To be more specific, we take the consumption coefficient matrix to be of the following form:

$$C = [C_{ij}] = [(1-c_{ip})c_{ij}d_j v_j] \qquad (7)$$

where c_{ij} = fraction of disposable income in j spent on consumption of i; d_j = disposable income per unit of value added in j; and hence C_{ij} = *domestic* consumption of i due to production of one unit of j.

The autonomous part of the final demand vector D for domes-tically produced goods and services used for closing the model is fairly standard:

$$D = \begin{bmatrix} E_1 \\ (1-\alpha_p)N + E_2 \\ (1-g_p)G + E_3 \end{bmatrix} \qquad (8)$$

where E_i = export demand for i; N = investment demand; and G = government final consumption expenditure.

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[65] i.e., we are ignoring accumulation of stocks of agricultural goods.

For equilibrium in the system it is necessary that the output in any sector i must equal the direct and indirect input demand, consumption demand and autonomous demand for domestically produced i:

$$[I\text{-}A\text{-}C]X = D$$
Or $\quad X = [I\text{-}A\text{-}C]^{-1}D \quad\quad\quad (9)$

The multi-sector multiplier M is given by:

$$M = [m_{ij}] = \begin{bmatrix} v_1 & 0 & 0 \\ 0 & v_2 & 0 \\ 0 & 0 & v_3 \end{bmatrix} [I - A - C]^{-1} \quad\quad\quad (10)$$

where m_{ij} = income generated in the ith sector by a unit of autonomous expenditure on domestic output of j.

However, since per unit of N and G domestic expenditure amounts to $(1\text{-}\alpha_p)$ and $(1\text{-}g_p)$ respectively, the sectoral multipliers for N and G will be less than that for E_2 and E_3 respectively.

Using (8) and (10), the matrix of sectoral incomes generated by the autonomous demand vector D is given by

$$[y_{ij}] = [m_{ij}] \begin{bmatrix} E_1 & 0 & 0 \\ 0 & (1-\alpha_p)N + E_2 & 0 \\ 0 & 0 & (1-g_p)G + E_3 \end{bmatrix} \quad\quad\quad (11)$$

where y_{ij} is income originating in sector i due to autonomous expenditure in sector j.

Aggregate income in sector i, Y_i, and total income in the economy are then immediate:

$$Y_i = \sum_{j=1}^{3} y_{ij} \quad\quad\quad (12)$$

$$Y = \sum_{i=1}^{3} Y_i = \sum_{i=1}^{3} \sum_{j=1}^{3} y_{ij} \qu\quad\quad (13)$$