

# Is Services Sector Output Overestimated? An Inquiry

R NAGARAJ

India's services sector-led growth since the 1990s remains a puzzle – it has taken place at a low level of per capita income, without a proportionate transformation in the workforce, and amidst a deceleration in agriculture and a stagnation in industry. This paper argues that the output of services is perhaps overestimated since computing value added in services and finding suitable price deflators for them is difficult even in the best of circumstances. The answer to the puzzle, therefore, lies (at least partially) in the deterioration in economic statistics, and the use of a widely acknowledged faulty methodology. More specifically, services output seems overestimated due to (i) the inflated estimate of the growth of the private corporate sector, (ii) a slower rise in the services deflator, and in particular (iii) of an overstatement of the decline in the prices of communications services.

I am grateful to Pranab Bardhan for his probing questions on my previous paper on the recent economic growth that prompted the inquiry. I am indebted to Ramesh Kolli for his detailed written response; and to K L Krishna, D S Prasada Rao and Partha Ray for their comments and suggestions on an earlier draft of the paper. I also thank the audience at a seminar at the Centre for Development Studies, Thiruvananthapuram for their sharp questions and criticisms. The usual caveats apply.

R Nagaraj ([nagaraj@igidr.ac.in](mailto:nagaraj@igidr.ac.in)) is at the Indira Gandhi Institute of Development Research, Mumbai.

In 2006-07, services (tertiary) sector contributed 55% of India's real gross domestic product (GDP) at factor cost, having grown annually at 8% since 1990-91, to become the economy's leading sector.<sup>1</sup> Cross-country comparison suggests that in 1990, India's share of services, at 40% of the domestic output, was consistent with its per capita income for low income countries. By 2001, its share at one-half of the GDP was higher by 5 percentage points, compared to the average for low income countries, and closer to the average for low middle income countries (Gordon and Gupta 2004). The faster growth of services since the 1990s is accompanied by agricultural deceleration and industrial stagnation.

Speeding up of services growth is a puzzle (i) at such a low level of per capita income (around \$630 at current exchange rates in 2006), and (ii) without a corresponding shift in the workforce distribution. These trends defy the stylised facts in economics that are still valid for the economies of the Organisation for Economic Cooperation and Development (OECD) (Schettkat and Yocarini 2006).

The services sector's exceptional performance is widely attributed to technological change and economic reforms since the early 1990s. To quote Kochhar et al:

The big change has been in services, which have grown substantially for a variety of reasons – for example, telecommunications perhaps because of the private sector is allowed in, software and business process outsourcing because of the opening of the economy, and construction perhaps of the growth of retail finance (Kochhar et al 2006: 982).

Such an explanation overlooks the fact that over 60% of services sector output still originates in the unorganised sector that has been hardly touched by the reforms or technical progress. Much of the public sector continues to be dominated by labour-intensive services, with limited modernisation.

Attributing the economic outcomes to the policy shifts and technological change is intuitively appealing. However, such an explanation fails to notice the potential problems in measuring output in this sector. This is surprising given its seriousness even in the developed economies for quite a while now.

Synoptically, the earliest trends in services sector growth were noticed in the changing employment composition. As rising industrial wage set the floor for the entire economy, Baumol argued that services sector growth merely reflected the rise in wages. As services were not amenable to technical change, provisions of services were bound to lead to higher and higher costs and a rising share of services in the economy – known as Baumol's cost disease hypothesis (Baumol 1967).

Griliches (1992) demonstrated the difficulties in measuring productivity and quality improvements in services, but argued

that there have indeed been improvements in output per worker in services. It is perhaps worth quoting him at length to appreciate the conceptual and measurement problems involved:

Although services are different, they are not really so different from goods as far as the problem of measuring output is concerned. Most of the problems afflicting the measurement of commodity output affect also the measurement of services, only more so. To measure the output of any activity we need to know its total receipts and have adequate information to construct an appropriate price index for it. To measure productivity, we need in addition parallel information on the inputs used in production (total costs and prices or units used). In either case, we need to know the relevant transaction unit and deal with the problem of quality change, which arises from the underlying heterogeneity of outputs and inputs and continuing appearance of new products, varieties and services, and the disappearance of the old ones.

Why is the problem more serious in some of the services sectors? Partly it is data problem, but also, more importantly, it is a conceptual one. ... Many of the service industries produce intermediate products in areas with very little direct price coverage, such as computer programming, advertising and information. The producer price index (PPI), formerly the wholesale price index, the major source of deflators for the GNP by industry series, does not collect services prices (except air- and water-transport and telephone services). Because of this lack of data, a number of service industries series are deflated by makeshift deflators, and real output is assumed to grow proportionately to some measure of inputs and to lead to no observed productivity growth by assumption. The latter is true of the whole government sector, the contribution of various non-profit organisations, such as universities, and such much difficult-to-measure sectors as banking and business services (Griliches 1992: 6-7).

Declaring that Baumol's cost disease has been finally cured with the recent technical progress, Triplett and Bosworth (2001) illustrate the difficulties in estimating services sector output and productivity growth:

In all of these services industries, conceptual and empirical problems in measuring output and prices are notorious: For example, an economic consulting firm is part of the business services industry. How do we measure the output of an economic consulting firm? How would we construct a price index for economic consulting? And how would we compute the productivity of economists? The science of economics is no closer to developing methods for measuring the output of economists' own activities than it is for measuring the output of banks, law firms, and insurance agents. All of these services poses difficult problems for constructing price indexes and real output measures and therefore for measuring productivity (Triplett and Bosworth 2001: 25).

Considering the caution and caveats displayed in the foregoing discussion, the celebratory tone of discourse on India's services-led growth appears premature. Perhaps it would be more realistic and fruitful to take a closer look at the conceptual and methodological issues involved in measuring output, to question if the official estimates truly represent the reality.

As a first step in this direction, Nagaraj (2008) examined the output trends at a disaggregated level to the extent the National Accounts Statistics (NAS) permitted. It discovered that two services, namely, communications and businesses services, accounted for the largest share of the incremental output in services, growing close to 20% per year taking their combined share in services GDP to 14.6% in 2006-07, up from 3.4% in 1991-92. As there are reasons to believe there is an overestimation of the number of

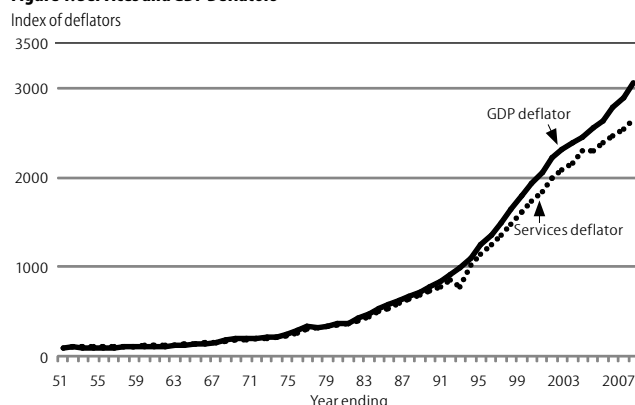
direct telephone lines, and a possible double counting of the value added in business services (also as factor payment), we expressed scepticism about the true extent of the expansion of these services. These measurement deficiencies are attributable to the absence of independent public agencies to collect the primary data, or the official capacity to verify the credibility of the information provided by the employers' associations. Thus, we expressed doubts on the veracity of the official estimates, without denying the recent progress in these services.

Continuing the inquiry, we now investigate two aspects, namely, the price deflators used to obtain the real output series, and the private corporate sector's contribution to services sector output.

## 1 Price Deflators

Between 1950-51 and 1990-91, implicit GDP and services sector GDP deflators moved in perfect unison (Figure 1). Thereafter, however, the services sector deflator rose at a slower rate than the GDP deflator, with a further slowdown after 2002-03.<sup>2</sup> So, over the 17 years since 1990-91, the annual trend growth rate of services sector deflator is 5.6%, while that for the GDP deflator is 5.8% – both of them being distinctly lower than the rise in the consumer price index for urban non-manual workers (CPI-UNMW), at 6.6% per year.

**Figure 1: Services and GDP Deflators**



As most services are labour-intensive with little technical change, it seems reasonable to assume that the labour cost in the organised sector services would have risen at least as much as the wages. Further, if we accept the widely held view that public sector wages set the floor for the private sector wage negotiations, and that the Fifth Pay Commission wages settlement in the mid-1990s boosted public sector wages significantly, then it is hard to believe that the services sector deflator could have risen at a slower pace than the GDP deflator.

Arguably, the introduction of computers could have compensated by a faster productivity growth. But considering the low level of penetration of information technology in government and in the unorganised sector, such an argument appears weak. Moreover, measuring the effects of the new technology on productivity is found to be hard, even in the developed economies.<sup>3</sup> Thus, prima facie, there is a case to suggest an underestimation of the price rise in services since the 1990s.

If the services deflator had grown as fast as the GDP deflator (as was the case in the previous four decades), then the services sector

output annual growth rate between 2002-03 and 2006-07 (the recent boom years), shrinks from 9.3% to 7.6%. Further, if deflated by the CPI-UNMW, it gets further reduced to 7.5% per year (Figure 2).

To find out which of the services accounted for the decline in prices, we disaggregated the price deflators to the extent the NAS permitted. Communications price deflator declined the most – nearly halved in seven years (from 100 to 54.4), between 1999-2000 and 2006-07 (Table 1). Undeniably, the real price of communication has declined lately, as any one would testify – due to technological change, growing competition, and expansion of the scale and scope of the service. But the moot point is, could the price deflator halved in just seven years?

**Table 1: Growth Rates of Implicit Deflators of GDP in Services (1999-2000 to 2006-07, % per year)**

Services	Implicit Deflators
Trade, hotel, restaurants	5.3
Transport, storage, communication	-0.3
Railways	2.3
Other transport	4.1
Communication	-8.1
Finance, insurance	3.7
Banking and insurance	1.7
Real estate, business services	5.3
Community, social, personal services	4.0
Public administration and defence	4.4
Other services	3.5
All services	3.4
GDP (factor cost)	4.1

These are average of annual growth rate.

**Table 2: Price Index of Communications**

	2000	2007
India	100	54.4
US	100	88.1
Japan	100	94.2
Korea	100	96.7

For India it is the implicit GDP deflator; for the rest it is the consumer price index. Sources: NAS; Global Insight for US (data from BLS); Data Stream for Japan and Korea.

from 25.7% to 17.6%, between 1999-2000 and 2006-07 (average of annual growth rates).<sup>6</sup>

Previously, we had argued that the telecommunication firms have an incentive to inflate the number of subscribers to corner scarce telecommunication bandwidth, leading to an overestimation of the value added (Nagaraj 2008).<sup>7</sup> We have now demonstrated an overestimation of the value added on account of an overstatement of the decline in prices (compared to the US, Japan and Korea). In other words, both the price and the quantity of supply of the telecommunication services are seriously flawed, overstating the extent of the output growth.

**2 Private Corporate Sector's Contribution**

To obtain the domestic output by type of institution, the NAS disaggregates the services sector into the organised and unorganised, the latter accounting for about 60% of the total. The organised

sector consists of the public and private corporate sectors, with a negligible contribution from cooperatives. Lately, the shares of the unorganised sector and the public sector have declined marginally (Shetty 2007). Therefore, by definition, the private corporate sector's (PCS) contribution has gone up, accounting for the rest. Has it really increased as much as the official estimates show? In other words, how credible are the value added estimates for the private corporate sector?

In 2006, about 6,00,000 companies were registered under the Companies Act, but only a small fraction of them, in fact, produced goods and services; most companies do not even submit audited accounts regularly as required by the law. Hence, no direct estimation of the sector's economic contribution is possible. This is obtained by "blowing up" (multiplying) the sample estimates of a small number of companies (though accounting for a large share of the paid-up capital) for the universe of the registered companies. This procedure is widely – even officially – acknowledged to overestimate the private corporate sector's share in the domestic saving and investment (Nagaraj 2008). We now try to find out if the same faulty procedure has contaminated the domestic output estimates as well.

**2.1 Methodology**

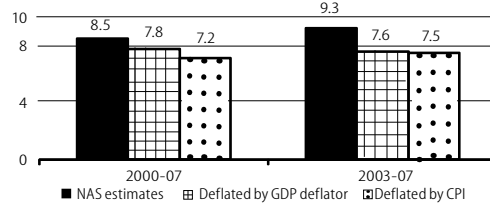
NAS provides information on (i) GDP, (ii) GDP in public sector, and (iii) the unorganised sector's share in the net domestic product (NDP) at current prices. These data are available from 1993-94 to 2002-03 (with 1993-94 base year), and from 1999-2000 to 2005-06 (with 1999-2000 base year).

Using items (i) and (iii) above, the organised sectors GDP is obtained. Subtracting item (ii) from this estimate yields GDP in the private corporate sector – for domestic output as well as for its ninefold disaggregation. The forgoing procedure assumes the ratio of the organised to unorganised sector GDP at current and constant prices to be the same.

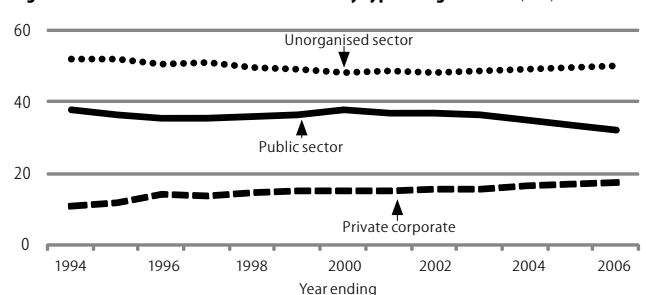
**2.2 Results**

As noted above, between 1993-94 and 2005-06, the unorganised sector's share in services output has declined marginally, and that of the public sector by about 6 percentage points; and, a corresponding rise in the private corporate sector's share – from 10% to 17% of services GDP (Figure 3). The annual trend growth rates of the real output during this period for public,

**Figure 2: Official and Revised GDP Growth Rate in Services Estimates (in %)**



**Figure 3: Distribution of Services Sector GDP by Type of Organisation (in %)**



private corporate and the unorganised sectors are 7.5%, 11.2% and 7.8%, respectively.

The rising share of the private corporate sector in services output is also true for the economy as a whole. During the same period, its share in GDP has doubled to 20% (Figure 4). In 1993-94, nearly two-thirds of the corporate sector output was from

**Table 3: GDP Originating in Private Corporate Sector**

1	Percentage Distribution			
	1993-94 2	1999-2000 3	1999-2000 4	2005-06 5
Agriculture and allied	1.9	0.9	9.6	5.9
Mining	0.2	1.5	1.5	0.8
Manufacturing	63.7	53.9	47.9	44.4
Elec gas, water	-3.9	-1.8	-2.0	1.1
Construction	16.0	8.9	9.5	10.9
Trade, hotel, restaurants	7.6	17.0	12.3	13.1
Trade	6.0	14.3	10.3	10.8
Hotel, restaurant	1.8	2.7	2.2	2.3
Transport, storage, communication	3.8	-4.7	1.3	-1.5
Other transport	2.8	0.1	1.8	1.8
Communication	-10.3	-14.8	-0.1	2.6
Finance, insurance	15.2	22.5	22.2	21.6
Banking and insurance	9.0	13.7	13.0	10.0
Real estate, business services	2.9	7.2	7.3	11.8
Community, social, personal services	14.7	15.1	9.6	9.1
Other services	15.5	15.5	0.5	5.5
GDPfc	100	100.0	100	100

Estimates in Columns 2 and 3 are based on 1993-94 base-year, and Columns 4 and 5 on 1999-2000 base-year.

Source: NAS, various issues.

manufacturing, declining to 44% by 2005-06; the shares of construction, hotel and restaurants and so on have risen (Table 3).

By many accounts, the private corporate sector has indeed grown rapidly, diversifying into many newer activities. But, could its share have really doubled in a decade, when the economy grew 6.1% annually? We contend this is an illusion. As the private corporate sector predominantly consists of non-operating companies, its size gets overestimated when the sample estimates are "blown up" for the universe of registered companies.

To demonstrate our contention, we compare the official figures with an alternative estimate computed using the Centre for Monitoring Indian Economy (CMIE) corporate sector data. Such a comparison is not perfect, however, principally, because the alternative estimate is based on the information for about 6,000 companies in 2005, out of over 6,00,000 registered companies.<sup>8</sup> But CMIE claims that it has collected data from all the working companies that furnish audited accounts.<sup>9</sup> As a first approximation, the alternative estimate may be reasonably accurate, if a slight underestimate. Figure 5 reports the official and the alternative estimates of the size of the private corporate sector, as a share of GDP.<sup>10</sup> It suggests the following:

(1) In 1993-94, the size of the private corporate sector in the alternative estimate is merely one-half of the official figure, at 6% of GDP.

(2) In the 12 years between 1993-94 and 2004-05, its size has risen by 2.1 percentage points of GDP (from 5.7 to 7.8), as against about 10 percentage points in the official figures (from 10% to 20%).<sup>11</sup>

To allow for possible underestimation in the CMIE data, a sensitivity analysis was carried out with doubling the growth rate, yet

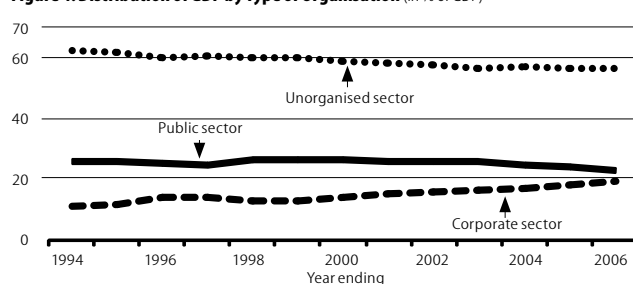
it did not make a material difference to our inference. Thus, even conceding a possible underestimation in CMIE, undoubtedly the official figures are seriously overestimated. Such an inference is buttressed by the infirmities in the estimation procedures, as amply borne out by numerous observations made in the official NAS: *Sources and Methods*, reproduced in the Appendix here (CSO 2007).

### 3 Conclusions

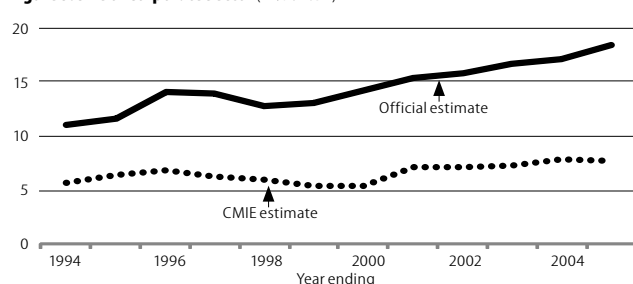
India's services sector-led growth since the early 1990s – at a low level of per capita income, unaccompanied by a corresponding rise in its employment share, and poor performance of commodity producing sectors – is a puzzle. It defies the stylised facts of economic growth. Many have attributed the growth acceleration to technical change giving rise to new business opportunities in the IT and IT enabled services, and generally to the economic reforms that have deregulated many markets and boosted private enterprise. Such an explanation seems unconvincing since these changes have hardly touched the unorganised sector that accounts for three-fifths of services sector output, and the public sector has witnessed very little penetration of the new technology.

Few have cared to look at the quality of the underlying economic statistics. This is surprising given that there are major concerns about the quality of services sector output estimates in the developed economies, as they graduated to post-industrial societies. This paper demonstrates an overestimation of services output in India on two counts: one, an underestimation of the services deflator since 1990-91; and, two, an overestimation of

**Figure 4: Distribution of GDP by Type of Organisation (in % of GDP)**



**Figure 5: Size of Corporate Sector (in % of GDP)**



the value added in the private corporate sector due to faulty methodology. A steep fall in the prices of communications in the current decade is mainly responsible for the decline in the services deflator. By comparing it with the US, Japan and Korea we demonstrate that the price decline in communications is overstated, hence the growth in real output is overestimated.

Our efforts to indicate the magnitude of the overestimation of the domestic output yielded the following results:

- (1) Assuming the services deflator grew at the same rate as the GDP deflator (as was the case in the previous four decades), the services sector's annual growth gets reduced by 0.7%, between 1999-2000 and 2006-07 – from 8.5% to 7.8% per year.
- (2) Assuming the decline in the prices of communication services were the same as in the US, the annual growth rate shrinks by 8.1% per year between 1999-2000 and 2006-07 – from 25.7% per year to 17.6%.
- (3) Assuming that the value added in the private corporate sector

estimated using CMIE is more realistic, its annual growth rate gets reduced by 0.5% to 5.5% between 1993-94 and 2005-06, and by 0.8% to 5.8% between 2002-03 and 2004-05.

It is not possible to find the combined effect of the forgoing revisions for lack of consistent data on all the required categories. But, the magnitudes of the alternative estimates shown above are large enough to make a serious dent in the official estimates. If our arguments are persuasive and the evidence credible, then the answer to the question posed in the title of the paper is “yes”. It perhaps warrants a careful review of the output estimation procedures; and also, for a fresh look at the recent growth experience.

## NOTES

- 1 The services sector includes (i) trade, hotels and restaurants, (ii) transport, storage and communications, (iii) financing, insurance, real estate, and business services, and (iv) community, social and personal services.
- 2 Analysing the growth of the 1950s, K N Raj as early as in 1961, alluded to the problem of overestimation of services sector output due to an underestimation of the rise of their prices. See Mody (2006).
- 3 It is worth recalling Robert Solo's famous quip that the effect of computers is everywhere, except in productivity estimates. The dispute in the US is now settled after improvements in the measurement methods. However, with little comparable efforts in India it is hard to expect a similar changes in the measured productivity in such a short time; therefore the output estimates are likely to be faulty.
- 4 Ideally, China is the best comparator. But the Chinese statistics are probably a bigger minefield than ours.
- 5 The US data is from the Bureau of Labour Statistics; data for Japan and Korea are from DataStream. We thank Bobray J Bordelon of Princeton University library services for providing the data.
- 6 Some may fault our comparison since these economies witnessed price declines in telecom services earlier than in India. But efforts to deflate with the earlier years do not alter our finding. Between 1992-93 and 2006-07, communications deflator declined annually at 5.7 % in India, but only 1.5 % in the US.
- 7 To minimise the problem of price indices in services, the Central Services Organisation apparently uses physical indicators to estimate the real output. But what if the physical indicators are poor, as in the case of the number of direct telephone lines, which is probably overestimated. Further, what if the revenue per telephone line falls within the spread of access, as seems to be the case recently. Therefore, there is no short cut to estimating accurately the number of lines in operations and the price of the service.
- 8 The CMIE dataset is not a panel; the number of companies included in it has gone up from about 2,000 in 1993-94 to about 6,000 in 2005.
- 9 To quote from a CMIE document: “The set of companies selected for this study is based on the availability of the audited unabridged annual accounts. ... The first step in selecting companies was the identification of a global set on which all further selections would be performed. These were companies which had at least one account available during the period April 1998 and March 2006, and which were operational. By ‘operational’ we mean companies which had at least some sales. This excludes companies which had accounts but had not begun commercial activities” (CMIE 2006: 288).

# Karnataka Jnana Aayoga

## (Karnataka Knowledge Commission)

### Government of Karnataka

Room No. 219, II Floor, Vidhana Soudha, Bangalore-560 001  
Ph: 080-2203 3297, 2225 0330

Invites applications for the post of

## **RESEARCH ASSOCIATES (3 Nos.)**

in the Commission on a contract basis for a period of two years (extendable to a period of one year) on a consolidated salary. Salary will be commensurate with the qualification and experience. The job will involve extensive desk research, organization and co-ordination of meetings, conduct research studies, travel and preparation of draft documents and interact with various stakeholders.

The applicant must be at least a post graduate in **Social Science/Pure Science/Management/Commerce/ Engineering/Technology** having an excellent academic record. Research experience or Ph.D., is preferable. Proficiency in Kannada is an added qualification. Knowledge of **MS Office, Power Point, Excel and SPSS** is essential.

Eligible candidates need to send in their application along with a detailed CV and a sample of writing (published articles/short reports) either by email ([secy-jnanaayoga@karnataka.gov.in](mailto:secy-jnanaayoga@karnataka.gov.in)/[mahiti-jnanaayoga@karnataka.gov.in](mailto:mahiti-jnanaayoga@karnataka.gov.in)) / post so as to reach the Member-Secretary on or before **16th February, 2009**. Short-listed candidates would be called for interview. Second class train fare or bus fares would be borne by the Commission for candidates attending interview from outside Bangalore.

Sd/- **Member Secretary**  
Karnataka Jnana Aayoga, Bangalore

- 10 Corporate profitability has shot up in the recent boom – as evident from tripling of the ratio of profit after tax to net worth of the RBI sample of companies to 16 % (Nagaraj 2008). The zooming profitability is taken to represent a growing share of the corporate sector in the economy. But this is not supported either by other measures of financial performance, or by a significant rise in the corporate sector's share in the domestic output.
- 11 Strictly speaking, one should also adjust the denominator by replacing the official estimate of GDP in PCS by the CMIE estimates. We did this, but it does not change materially the trends reported.

## REFERENCES

- Baumol, William J (1967): "Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crises", *American Economic Review*, Vol 57, June.
- CMIE (2006): *Corporate Sector* (Mumbai: CMIE).
- CSO (2007): *National Accounts Statistics: Sources and Methods* (New Delhi: Government of India).
- Griliches, Z, ed. (1992): "Output Measurement in the Service Sectors", *Studies in Income and Wealth* # 56 (Chicago: University of Chicago Press and National Bureau of Economic Research).
- Gordon, James and Poonam Gupta (2004): "Understanding India's Services Revolution", IMF Working Paper (WP/04/171), September.
- Kochhar et al (2006): "India's Pattern of Development: What Happened, What Follows?", *Journal of Monetary Economics*, Vol 53, No 5, July.
- Nagaraj, R (2008): "India's Recent Economic Growth: A Closer Look", *Economic & Political Weekly*, Vol 43, No 15, 12 April.
- Raj, K N (1961): "Some Features of Economic Growth of the Last Decade in India", *Economic Weekly*, 4 February, reproduced in Ashoka Mody (ed.), *Inclusive Growth: K N Raj on Economic Development: Essays from the Economic Weekly and Economic & Political Weekly* (Hyderabad: Orient Blackswan), 2006.
- Schettkat, Ronald and Lara Yocarini (2006): "The Shift to Services Employment: A Review of the Literature", *Structural Change and Economic Dynamics*, Vol 17, No 2, June.
- Shetty, S L (2007): "Status Paper on Database Issues of Services Sector", *Economic & Political Weekly*, Vol 42, No 37, 15 September.
- Triplett, Jack E and Barry P Bosworth (2001): "Productivity in the Services Sector" in Robert M Stern (ed.), *Services in the International Economy* (Ann Arbor: University of Michigan Press).

### Appendix: Excerpts from NAS Sources and Methods

(1) 16.6 Private Organised Sector: Estimates of GVA relating to private corporate sector are prepared by using the results of the RBI study of the finances of a sample of companies. GVA of the sample companies is inflated by the ratio of paid-up capital (PUC) of all the companies engaged in trading activity (data obtained from the Ministry of Corporate Affairs) and PUC of sample companies. The constant-price estimates of private corporate segment are obtained by applying the GDP implicit deflator (GDP excluding the GDP of Trade,

hotels and restaurants) on the current prices estimates.

(2) 16.7 The estimates of GVA for cooperative societies (for trade only) are prepared using information available from NABARD's publication entitled "Statistical Statements Relating to Cooperative Movement in India", Part II-Non-credit societies. The publication has a time lag of four to five years. The constant price estimates of cooperative societies in trade sector are obtained by moving the base year estimates with the index of deflated sales (the value of sales at current prices is deflated using wholesale price indices of non-food articles and manufactured products) of corporate sector.

(3) 16.8 The GVA estimates of Maintenance and repair of motor vehicles and Repair of personal household goods activities are prepared as a product of workers and GVA per worker. The estimates of number of workers for these two categories are taken from DGE&T publication "Employment Review". The estimated GVA per worker for these activities is obtained by dividing the GVA estimates as prepared in paragraph 16.6 by the number of corresponding workers in private corporate sector, in the absence of direct data.

(4) 16.9 In the case of the activity, "Maintenance and repair of motor vehicles", the growth trend observed in private corporate sector relating to wholesale and retail trade excluding motor vehicles is used to move the current price estimates, for subsequent years. The constant price estimates are prepared by deflating current price estimates with the implicit price deflator, mentioned in paragraph 16.6, for subsequent years. For the activity of repair of personal household goods, the base year estimates are moved with the growth rate in workforce, for obtaining the estimates for subsequent years. The constant price estimates are inflated by CPI-IW to obtain estimates at current prices, for other years (CSO 2007: 151).

Quality and limitations of database

(5) 16.22 While the GVA estimates of public sector which are based on current data may be considered reliable, the private corporate sector GVA estimates based on RBI sample studies are not robust, as these are based on thin samples, and sometimes in the absence of these data, the information

available on PUC [paid-up capital] in the activity is used as such. Further, for the unorganised part of the activity no current data are available and only the benchmark estimates are moved with the indicator of GRI from commodity producing sectors. As there has been no survey conducted on the Trade sector, since the 53rd round, the base year estimates also are not based on current data (CSO 2007: 153; emphasis added)

(6) Estimates of GDP for Transport, storage and communication

Quality and limitations of database

17.35 The estimates of value added from Railways and Communication in public sector are based on up-to-date and reliable information. For the private sector, the estimates are not that robust as these are compiled mostly through indirect methods using proxy indicators, such as number of telephone connections or extrapolating with inter-survey growth rates in workforce (CSO 2007: 161; emphasis added).

(7) Real estate, ownership of dwellings and business services

Quality and limitations of database

19.29 While the estimates for the organised sector in the computer related services are estimated from direct data sources, those of organised and unorganised segments in respect of all other sub-sectors are prepared through benchmark-indicator method. On these segments no current data on annual basis is available, although rental information for urban areas from CPI (UNME) can be assumed to be a reliable source of current data. Regular, timely and complete data in respect of these services, if available on the corporate sector, could improve considerably the quality of their GVA estimates (CSO 2007: 171).

(8) Other services

While the estimates for the public sector component are estimated from direct data sources, those of private organised and unorganised segments in respect of all economic activities are prepared through benchmark-indicator method. On these segments no current data on annual basis is available. Regular, timely and complete data in respect of these services, if available on the corporate sector, could improve considerably the quality of their GVA estimates (CSO 2007: 179).