# A User's Perspective on the Database of Services Sector in Indian Economy

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RBI, RBI, RBI, RBI, RBI, RBI

March 2006

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*Measuring the contribution of services to the Indian economy is a challenging task because it presents problems not encountered in the primary and secondary sectors. The authors discuss problems found particularly in quantifying the contribution of the banking and software sectors and suggest ways of overcoming these problems.*

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## I Introduction

Starting in the 1990s, developed and developing economies have been sharing a common feature in the composition of their gross domestic product (GDP) in the form of the rising contribution of the services sector. Adequate provision of services, in fact, is regarded as a precondition for development, as many of these services complement the growth of the primary and secondary sectors through backward and forward linkages. The efficiency of services has also improved the productivity of other sectors as well as of the economy as a whole. Efficient services not only provide direct benefit to consumers, but also help shape overall economic performance. Thus, the growing share of the services sector and its impact on the economy require undivided attention of the authorities to formulate their policy for the sustainable growth of services, thereby increasing exports, which will translate into an impact on the external strength of the economy, exchange rate and price level.

However, the statistical coverage of this predominant sector has not developed correspondingly. This could be due to various problems that arise in identifying and measuring the output of services. For a country like India, in which services account for a major chunk of GDP, nearly 60 per cent in recent years, an appropriate database for the services sector has become a sine qua non for understanding better the actual and potential contribution of the sector to growth and development of the economy. Further, some services have grown phenomenally in recent years and, given their macroeconomic implications, the revenue potential for the government, foreign exchange earning capacity, etc, it becomes important for the government to keep a close vigil on this sector.

Through various deliberations, problems associated with the compilation of various components of GDP have been highlighted. These problems, by and large, relate to identifying and measuring the output of various sectors. To address some of these problems, the CSO released recently the national accounts with a new base year (1999-2000), which has shown wider fluctuations in the growth rates of some sub-sectors as compared to the old series (Table 1). Besides, there are other problems relating to inadequate data coverage, which leads to underestimation of the GDP in some sectors.

When we have a closer look at the national accounts statistics (NAS) released recently by the CSO, subsequent to the base year revision, the services sector data is showing a diverse trend in the growth rate as compared to the corresponding figures with the old base. During 2000-01 and 2004-05, for which comparability between growth rates at disaggregated levels is possible between the old and new base, it can be seen from Table 1 that services sector GDP witnessed lower growth rates as per the new series for 2002-03 and 2003-04, while for 2004-05 it has shown increased growth rates over the old series.

From the users' point of view, such trends give a confusing picture. This may be an indication of a data discrepancy and gap. In view of the perceived data gap, we have attempted to identify the data gap in the services sub-sectors with a special focus on the issues relating to banking and software and computer services to highlight the kind of improvement that can be envisaged in the services sector statistics.

Against this backdrop, the present paper makes an attempt to highlight the data gap issues in the services sector purely from a user's perspective. The thrust of the paper is to highlight issues on scrutiny of specific segments of the services sector. In pursuit of this objective, the remainder of the paper is structured as follows. Section II discusses the data gap issues in the published ASI data. Section III offers an alternative to the present practice of deflation of banking sector GDP for improving the estimation of its value added at constant prices. Section IV covers issues in respect of software and computers. Section V sums up.

## II Data Gap Issues Pertaining to the ASI Data

Data gaps relating to the services sector have been extensively debated in various fora. Even the National Statistical Commission, headed by the former governor of RBI, C Rangarajan, has also raised various issues on data gaps in the services sector. The commission has even emphasised the need for collection of annual data for the sector in the following words:

> Although the Services Sector has a very pivotal role in the country's economic development, the database in this Sector is highly disorganised… Like the Annual Survey of Industries (ASI) that is devoted to collection of data from manufacturing and few other categories of units included in the lists maintained by the Chief Inspectors of Factories, there is no such scheme in the Services Sector for annual collection of data from the units either having a large number of workers or contributing significantly in terms of annual turnover.

From among the gaps in ASI data, we take up the issue of how to account for the services input in the production of a manufactured product. Given the synergy between industrial and

service activities, there has been a growing interaction between the manufacturing and services sectors, resulting in the use of one in the production of the other. It is common wisdom that certain services do enter as an input, just like raw materials, energy and other inputs, and they form a part of "input cost". However, there are no official statistics available that could capture the quantum of services sector output used as input for production of manufacturing output and vice versa. Though the ASI tables on capital employed, input, output and gross value added in industry give the total cost of inputs, a detailed break-up of this cost is not provided. For example, the ASI does give the cost of fuels consumed and materials consumed, but it does not provide any data on services used by industrial enterprises. So, how does one account for the volume of services input used in the production of industrial goods in an emerging scenario of higher order of interaction between services and industry?

Let us try to figure out whether we can have an estimate of services input used in the production of an industrial output which is very service intensive from the available data in the ASI. For this, we choose "Services activities relating to printing" (code: 2222 as per NIC 98-4 digit classification) for 2002-03 and try to estimate the services input from the ASI table (Table 2).

From our analysis of the published ASI data compiled in Table 2, we found that fuels and materials consumed do not add up to give the total input used. So we calculated the residual input (as the difference between total input cost and the cost of fuel and materials consumed), which was found to comprise 34.8 per cent of the total input cost.

Now, let us repeat the same exercise for another manufacturing segment, "Manufacture of Machine Tools", which is less service intensive. Here, the residual input is found to comprise only 17.4 per cent of the total input cost (Table 3).

Now, the issue is, can we attribute this residual input to "services input" in entirety or only a part of it? How to quantify the services input?

With the growing service orientation of the economy, it becomes important that official data on services inputs used by various industrial units be published separately in the ASI. Furthermore, a need is felt to develop a detailed input-output table, which would capture the interaction between the services and manufacturing sectors. In addition, the small units in services segments do not figure in the ASI data. Collection of production and employment data from these units is a challenging task unless some registration and reporting mechanism are devised to collect such data.

We can also contemplate conducting an annual survey for the services sector as is done in other countries**.** In the US, the census bureau conducts an annual survey for the services sector to provide estimates of receipts, revenue, and other measures for most traditional service industries.

## III
## Improving Estimation of GDP of Banking Sector

The financial services sector has not only expanded but also undergone significant changes in the past decade. In view of these changes, it becomes important that the methodology for estimating the value added originating in the banking and insurance sector is revised to get accurate and relevant estimates. This section examines the methodology of estimation of value added in the banking sector,

**Table 1: Sectoral Growth of Real Gross Domestic Product with the Old and New Base**

*(Per cent)*

| | (1) | 2000-01 (2) | 2001-02 (3) | 2002-03 (4) | 2003-04 (5) | 2004-05 (6) |
|---|---|---|---|---|---|---|
| I | Agriculture and allied activities | {0.0} | {6.2} | -{6.9} | {10.0} | {0.7} |
| | | -(0.1) | (6.3) | -(7.0) | (9.6) | (1.1) |
| II | Industry | {6.4} | {2.4} | {6.8} | {6.6} | {7.4} |
| | | (6.5) | (3.5) | (6.4) | (6.5) | (8.3) |
| III | Services | {5.7} | {6.8} | {7.3} | {8.5} | {10.2} |
| | | (5.6) | (6.5) | (7.9) | (8.9) | (8.6) |
| 1 | Construction | {6.1} | {4.0} | {7.7} | {10.9} | {12.5} |
| | | (6.7) | (4.0) | (7.3) | (7.0) | (5.2) |
| 2 | Trade, hotels and restaurants | {4.9} | {9.6} | {6.7} | {10.2} | {8.1} |
| | | (4.0) | (8.9) | (8.2) | (8.8) | (11.4)$ |
| 2.1 | Trade | {4.8} | {9.8} | {6.8} | {10.4} | {7.5} |
| | | (3.8) | (8.6) | (8.5) | (8.6) | |
| 2.2 | Hotels and restaurants | {6.7} | {7.8} | {5.4} | {7.9} | {15.1} |
| | | (6.8) | (12.1) | (4.0) | (10.9) | |
| 3 | Transport, storage and communication | {11.3} | {8.3} | {13.7} | {15.2} | {14.8} |
| | | (12.2) | (9.2) | (12.6) | (17.0) | |
| 3.1 | Railways | {4.1} | {7.4} | {6.1} | {5.0} | {7.2} |
| | | (4.3) | (7.0) | (5.7) | (6.4) | |
| 3.2 | Transport by other means | {7.7} | {4.0} | {10.3} | {11.9} | {12.6} |
| | | (6.7) | (3.9) | (6.1) | (11.2) | |
| 3.3 | Storage | {6.1} | {0.6} | -{4.4} | {5.4} | {2.0} |
| | | (3.1) | -(0.6) | -(10.7) | (7.9) | |
| 3.4 | Communication | {26.9} | {19.5} | {25.7} | {26.0} | {21.3} |
| | | (26.8) | (18.8) | (24.6) | (27.2) | |
| 4 | Financing, insurance, real estate and business services | {4.1} | {7.3} | {8.0} | {4.5} | {9.2} |
| | | (3.5) | (4.5) | (8.7) | (7.1) | (7.1) |
| 4.1 | Banking and insurance | -{2.0} | {9.1} | {11.3} | {0.7} | {10.2} |
| | | -(1.2) | (3.5) | (11.4) | (7.5) | |
| 4.2 | Real estate, ownership of dwellings and business services | {9.1} | {5.9} | {5.5} | {7.7} | {8.4} |
| | | (9.2) | (5.7) | (5.8) | (6.8) | |
| 5 | Community, social and personal services | {4.7} | {3.9} | {3.8} | {5.4} | {9.2} |
| | | (5.2) | (5.1) | (3.9) | (5.8) | (5.9) |
| 5.1 | Public administration and defence | {1.8} | {2.4} | {1.1} | {4.6} | {8.2} |
| | | (2.3) | (2.6) | (1.7) | (5.7) | |
| 5.2 | Other services | {7.2} | {5.1} | {5.8} | {5.9} | {10.0} |
| | | (7.7) | (7.0) | (5.6) | (6.0) | |
| IV | Gross domestic product at factor cost | {4.4} | {5.8} | {3.8} | {8.5} | {7.5} |
| | | (4.4) | (5.8) | (4.0) | (8.5) | (6.9) |

*Notes:* $ Covers "trade, hotels and restaurants" and "transport, storage and communication". Figures in { } are based on base year 1999-2000 and figures in ( ) are based on base year 1993-94.

*Source:* Central Statistical Organisation.

**Table 2: Calculation of Residual Input for 'Services Activities Relating to Printing'**

| Item | Cost (Rs Lakh) |
|---|---|
| Fuels consumed | 237 |
| Materials consumed | 3594 |
| Total input | 5879 |
| Residual input (calculated) | 2048 |
| Residual input as a per cent of total input | 34.8 |

*Source:* ASI 2002-03, Volume 1.

**Table 3: Calculation of Residual Input for 'Manufacture of Machine Tools'**

(Code: 2922 as per NIC 98-4 digit classification)

| Item | Cost (Rs Lakh) |
|---|---|
| Fuels consumed | 5427 |
| Materials consumed | 79401 |
| Total input | 102689 |
| Residual input (calculated) | 17861 |
| Residual input as a per cent of total input | 17.4 |

*Source:* ASI 2002-03, Volume 1.

and certain data issues which are important to reflect a realistic estimate of the banking sector have also been highlighted.

## Current Methodology for Estimating GVA in Banking Sector

The estimates of gross value added (GVA) are prepared separately for commercial banks, the banking department of the Reserve Bank of India, non-banking financial corporations, unorganised non-banking financial undertakings such as professional moneylenders and pawnbrokers, post office savings banks, cooperative credit societies, life and non-life insurance activities, etc.

The estimates of GVA at constant prices are prepared separately for each of the sub-sectors. In general, the base year estimates are carried forward using indicators measuring the volume of activity in the corresponding sub-sector. A suitable indicator is prepared in each case to measure the volume of activity. In cases where the volume of activity is measured in value terms, i e, at current prices, these are deflated by the wholesale price index (WPI) of all commodities to obtain the corresponding quantum index.

The CSO has recently revised the methodology for estimation of GVA originating in the banking and insurance sector. As a result, there has been a reduction in the financial intermediation services indirectly measured (FISIM), which in turn has led to downward revision of the banking and insurance sector's GDP by as much as 11.3 per cent of earlier estimates of this segment. However, it is felt that improved data coverage could possibly give a realistic estimate of GDP originating in this sector.

## Select Issues

*Problematic use of WPI for calculating value added at constant prices:* In India, for calculating the banking activity at constant prices, the aggregate deposits are deflated by the WPI, which is not proper as the WPI is not reflective of true price level for the economy as a whole because of its narrower coverage. As the price level of the banking and insurance industry changes in tandem with the price level of the economy as a whole, one needs a good measure of the price level prevailing in the economy. In this respect, it is worth reflecting on the practices prevalent in other countries.

China uses a weighted averaged price index of CPI and fixed capital investment for the estimation of banking and insurance at constant prices. This is because of the fact that the sum of the household consumption and the fixed capital formation accounts for an overwhelming proportion of GDP. Accordingly, the weighted averaged price index of the CPI and the price index of fixed capital formation, which corresponds to these two components respectively, seems to that extent to reflect the general price movement of the entire economy and also the banking sector. The weights are the proportion of household consumption and the fixed capital formation over the sum of these two items, respectively.

This appears to be a reasonable method and merits consideration in India too. This is because both the estimates of the CPI and the price index for fixed capital formation are readily available in the NAS. Further, this methodology becomes more justified owing to the fact that the sum of private final consumption expenditure and gross fixed capital formation (GFCF) in 2003-04 comprised a high proportion of about 86.6 per cent of GDP in India (Table 4). Probably, using such methodology might give us a better and a more realistic estimate of banking sector value added in the economy.

As per the broad classification of the WPI, services subsectors are not being adequately captured in the scheme. On the contrary, the price index of the private final consumption expenditure (PFCE) includes a number of service activities, apart from primary articles, fuel and power, and several manufacturing activities. Various services covered in the PFCE include, among others, transport and communication; hotels and restaurants, furniture, furnishing, appliances and services, medical care and health services; recreation, education and cultural services, etc. It is found that PFCE on these services accounted for more than one-third of total PFCE in the domestic market. The share of these services in the total PFCE in the domestic market increased significantly from 24.4 per cent in 1993-94 to 36.3 per cent in 2003-04 (Table 5).

It is felt that a weighted average index of the PFCE and GDCF could possibly yield a better measure for deflating the banking sector GDP. We attempt to construct a weighted average index of the PFCE and GDCF, which we call 'suggested price deflator' and compare it with the WPI (Table 6). It is found that there is a significant difference between the suggested price deflator and the

**Table 4: PFCE, GFCF and GDP for 2003-04 at Current Prices**
*(Rs Crore)*

| Item | 2003-04 |
|---|---|
| 1 Private final consumption expenditure (PFCE) | 1761788 |
| 2 Gross fixed capital formation (GFCF) | 627307 |
| 3 Sum of PFCE and GFCF (1+2) | 2389095 |
| 4 Gross domestic product | 2760025 |
| 5 PFCE and GFCF as a per cent of GDP (No 3 as a per cent of No 4) | 86.6 |

*Note:* The estimates of PFCE and GFCF have not changed much even in the new estimates (base 1999-2000) as released by the CSO and it is presumed that PFCE and GFCF together would comprise in excess of 80 per cent of the GDP as PFCE alone comprised about 62 per cent for the same year as per new base.
*Source:* National accounts statistics, 2005.

**Table 5: Share of Various Services in PFCE in Domestic Market**
(at current prices)
*(Per Cent)*

| Item | 1993-94 | 1999-2000 | 2000-01 | 2001-02 | 2002-03 | 2003-04 |
|---|---|---|---|---|---|---|
| Hotels and restaurants | 1.1 | 1.4 | 1.5 | 1.6 | 1.6 | 1.7 |
| Furniture, furnishing, appliances and services | 3.1 | 3.3 | 3.7 | 3.6 | 3.7 | 3.6 |
| Medical care and health services | 3.4 | 4.6 | 5.0 | 5.3 | 5.7 | 5.9 |
| Transport and communication | 11.3 | 13.3 | 15.0 | 15.4 | 16.5 | 17.1 |
| Recreation, education and cultural services | 3.1 | 3.7 | 3.8 | 3.7 | 3.7 | 3.9 |
| Other miscellaneous services | 2.4 | 3.7 | 3.8 | 3.8 | 4.1 | 4.1 |
| Total | 24.4 | 30.0 | 32.8 | 33.4 | 35.3 | 36.3 |

*Source:* National accounts statistics, 2005.

WPI. For the year 1995-96, the suggested price deflator falls short of the WPI, while it exceeds the WPI in the rest of the years. As a deviation from the WPI, the suggested price deflator exceeds the WPI by as much as 5.46 per cent in 1999-2000, with the difference narrowing down to 0.16 per cent in 2003-04. As we had seen earlier, because of revision in CSO's methodology, the banking and insurance sector GDP were revised downwards. Taking into account the suggested price deflator would lead to a further downward revision of the banking and insurance sector GDP, while it would lead to upward revision of banking and insurance sector GDP for the year 1995-96.

Nevertheless, there are certain criticisms of estimating value added of the banking and insurance sector at constant prices, which is not only difficult, but also a controversial issue at the international level [Xianchun 2004].

*Volume of activity of banking sector and technological changes:* As stated earlier, for calculating the GVA of the banking sector at constant prices, the aggregate deposits are deflated by the WPI. However, it appears that for aggregating the transactions, weights are based only on labour inputs, while taking no appropriate account of capital or other intermediate inputs. In recent years, there has been a phenomenal growth in automation of the banking sector, whereby ATMs have evolved as an important part of the banking set-up. ATM transactions happen to be capital intensive and if the traditional weights based mainly on labour inputs are used for aggregating banking activity, it might not capture the real value added in the banking sector. This implies that we need to change the weighting parameter to reflect the recent technological developments in the economy. Fixler and Zieschang (1999) have also supported the idea that the transaction based measure should be adjusted for quality to take account of the technological improvements.

*Need for broadening coverage of financial entities:* With growing liberalisation and greater integration with the global economy, the financial sector of the country has undergone a substantial change, with the emergence of newer entities, which inter alia include: investment banks, investment funds, financial holding companies, financial auxiliaries, venture capitalists, treasury companies, and security derivative dealers. Despite the emergence of newer financial entities, it seems that current data coverage estimating the value added in the banking and insurance sector does not seem to be adequate. For example, it appears that investment advisory companies, fund management companies, security derivative dealers, etc, are not properly covered in the present scheme. Further, data in respect of stockbrokers and stock exchanges should also be included as Katyal and Rai (1999) have rightly emphasised the need for estimating their contribution. So, efforts should be made to broaden the data coverage of financial entities as also bridge various other data gaps.

## IV
## Issues Relating to Software and Computers

While commenting on the "productivity paradox" debate, Robert Solow made the famous quip "You can see the computer age everywhere but in the productivity statistics". Initially there was ambiguity regarding the contribution of computers and only recently there has been convergence of opinion that computers have an important impact.

The ambiguity about the contribution of computers stems from the fact that computers are highly concentrated in industries where output is particularly hard to measure, like finance, business services and wholesale trade. Many economists have expressed the apprehension that the measurement problems might lead to underestimation of productivity growth [Dean 1999].

Sichel (1997) has attempted an insightful decomposition of the measurement gap – true output growth rate less a measurement error term – into two terms. He concentrates on a "between effect" that captures the aggregate impact of the growing share of hard-to-measure industries, while we focus on a "within effect", which measures the aggregate impact of increased measurement error within those sectors. For this the analysis is undertaken in the following three steps. First, quantification is done for computer intensity across industries, both manufacturing and non-manufacturing. Then an estimate is attempted for the impact of computers in the manufacturing sector, for which better measures of output and productivity are available. Since manufacturing output measurements are more likely to be accurate than those in services, we have a natural metric for quantifying the within effects. Finally, a range of possible increases in measurement error is taken in the non-manufacturing industries and an estimate is made of the aggregate impact. Algebraically, Sichel's decomposition can be expressed as:

$$d(\Delta u) = [d(s_1).\Delta u_1 + d(1-s_1).\Delta u_2] + [s_1.d(\Delta u_1) + (1-s_1).d(\Delta u_2)]$$

where u is measurement error in the subscripted sector, d is a difference in a variable, $\Delta$ is a growth rate and s is the share of the subscripted sector in total output. The first bracket of the above equation measures the "between effect" from a shift in share between sectors. If sector 1 is a hard-to-measure sector, then $d(s_1).\Delta u_1$ represents the increase in aggregate measurement error as the hard-to-measure sector grows in relative size. The second bracket measures the "within effect" due to increased measurement error within the hard-to-measure sectors.

McGuckin and Stiroh (2000) have estimated the measurement error and observed that "increasing measurement problems contribute to the growing divergence in industry productivity and are an important, although not dominant, part of the productivity story".

**Table 6: Estimating a New Price Deflator for Banking Sector Output**
(at current market prices)

| | Item | 1995-96 | 1999-2000 | 2000-01 | 2001-02 | 2002-03 | 2003-04 |
|---|---|---|---|---|---|---|---|
| 1 | PFCE | 765797 | 794057 | 813723 | 863108 | 887786 | 959617 |
| 2 | GDCF | 318975 | 351624 | 346682 | 336486 | 395163 | 449539 |
| 3 | GDP | 1188012 | 1266283 | 1316201 | 1383705 | 1440632 | 1564620 |
| | Weights in GDP | | | | | | |
| 4 | PFCE | 64.46 | 62.71 | 61.82 | 62.38 | 61.62 | 61.33 |
| 5 | GDCF | 26.85 | 27.77 | 26.34 | 24.32 | 27.43 | 28.73 |
| | Price indices | | | | | | |
| 6 | PFCE | 119.9 | 159.4 | 165.9 | 171.7 | 177.8 | 183 |
| 7 | GFCF | 117.8 | 139.3 | 145.7 | 152.5 | 154.8 | 161.6 |
| 8 | WPI | 121.6 | 145.3 | 155.7 | 161.3 | 166.8 | 175.9 |
| 9 | Suggested price deflator* | 119.28 | 153.23 | 159.87 | 166.31 | 170.72 | 176.17 |
| 10 | Difference (No 9 – No 8) | -2.32 | 7.93 | 4.17 | 5.01 | 3.92 | 0.27 |
| 11 | Difference (as per cent of WPI) | -1.91 | 5.46 | 2.68 | 3.11 | 2.35 | 0.16 |

*Notes:* Even under the revised base (1999-2000), PFCE on various services has shown a rising trend.
* It is the weighted average index of the PFCE and GDCF.

## Do Computers Increase Measurement Problems?

While it is well known that services sector output has always been more difficult to measure than manufacturing output, it is less clear whether these measurement problems have changed over time or if any change is specifically a result of computer investment. Information technology might be changing the nature of output in ways that are fundamentally more difficult to measure. A complete resolution would require an industry-by-industry analysis of the outputs, data and statistical methods used to create the output and productivity indices. McGuckin and Stiroh (1998) have reported that labour productivity growth accelerated for manufacturing industries that used computers most intensively, but not for computer intensive service sectors.

Baily and Gordon (1988) provided a list of examples which showed that many valuable computer related services are not captured in the official data. The list includes, inter alia, computer based airline ticketing, better inventory control, and online banking.

## Indian Experience

The official statistical system, however, has not kept pace with the rapid growth of the software industry, owing mainly to the limitations inherent in the system of data collection. Till recently, the CSO had been using the income approach for estimating GVA in the software industry. In fact, GVA in the software industry was being estimated as a product of the estimates of value added per worker (VAPW) and the corresponding workforce. For the estimate of VAPW, the CSO was initially using the results of the ES conducted in 1991-92, suitably adjusted for price rise. While revising the estimates for the 1993-94 series of national accounts, however, these were not found appropriate on the ground that the productivity (of the workforce) in the industry had by far outgrown the rate implicit in the ES results. Instead, a rate worked out from analysis of annual reports of some software companies was adopted as a measure of productivity. For the estimate of workforce, the choice was far more restricted. The CSO had to depend on the results of the decennial population census (1991) and employment and unemployment survey (EUS) (1993-94) of the NSSO, although the size of the workforce in the software industry was known to have grown faster than ever before during the following years.

NASSCOM, for the purpose of its database on software, has been collecting information on gross output, exports, sales in domestic software market, etc, since 1991 through a nationwide survey called 'NASSCOM's software industry (SNAP) survey'. This survey is conducted every year by mailing questionnaires to all the software companies in the list maintained and regularly updated by the association. Based on the filled-in questionnaires received from the companies, NASSCOM publishes the estimates of software production and exports,

which are used by official agencies like DGE, ESC, RBI and CSO without major modification. This leads to a number of complications concerning estimation of macroeconomic aggregates relating to the software industry as well as the economy as a whole.

### Accounting for Software Exports in BoP Statistics

Besides the problem of measuring the contribution of the software industry to GDP, the inclusion of "net earnings of overseas subsidiaries" poses other associated problems relating particularly to compilation of the "external transaction account" and estimation of gross national product (GNP). The "external transaction account" in national accounting is prepared from the BoP data compiled by the RBI. In India's BoP, all kinds of trade in services form part of what is called "invisible transactions". The data on invisible transactions are used for the non-merchandise segment of the current account and are classified under different heads. Software service exports form part of the classification "current miscellaneous receipts".

In the national accounts framework, the earnings of overseas subsidiaries form part of "property and entrepreneurial income from the rest of the world (RoW)" of the economy. This is one of the components of "factor income from RoW", which when added to GDP, net of "factor payments to RoW", gives the GNP of the economy.

### Other Limitations of NASSCOM Data

*Coverage of SNAP survey:* The SNAP survey encompasses member as well as non-member companies, but by its own admission, NASSCOM does not have a complete list of software companies in the country. However, NASSCOM asserts that the information it publishes pertains to all software companies and not just member companies. For the part NASSCOM is not able to cover owing to absence of a complete frame, a notional fraction (at present 3 per cent) of the total output is taken as the contribution of that part.

*Non-response:* The percentage of non-responding member companies of NASSCOM has reduced from as high as 30 per cent in 1992 to about 5-7 per cent during 1999. For making adjustments for non-response, NASSCOM takes counsel from a panel of experts consisting of CEOs and senior executives from industry, suitably supported by research staff at NASSCOM. The estimates for the non-responding companies are figured out from their earlier year's revenues and/or telephonic discussions followed by submission of written responses.

*Double counting:* The SNAP survey is designed to collect information on revenue accruing from the subcontracting route and the costs of purchases of software products meant for resale. Using this information, NASSCOM claims to eliminate double billings and is able to get the unduplicated value of gross output of the industry.

But the data on "sub-contracting a job of a project meant for exports" are not collected in the SNAP survey. Apparently, this item is yet to be included in the questionnaire, as the practice is of recent origin. However, NASSCOM states that it cross-checks the data for each company with data received from different sources. The adjustment for subcontracting is done by cross-checking with the returns submitted to the income tax authorities. The final estimates that NASSCOM produces, by its own claim, are adjusted appropriately for subcontracting.

### Product Method

It is desirable that a product method be adopted to estimate the contribution of computers and software in the GDP accounting for India. The outputs of computers may be priced in a straightforward way but the output of software might remain difficult to price. The problem is that each version of a software package is generally a unique product and typically later versions have more features added. To deal with this quality change problem, it is possible to use either a matched model approach or a hedonic regression approach.

## V
## Summing Up

As in the case of industrialised countries, the services sector in India is growing and achieving dominance in India's growth process in terms of its contribution to overall GDP as well as consumption and exports. The cross-country literature on services is largely unequivocal that measuring the value added by services is, in view of their diversified nature, a complex and challenging task. In this paper, an attempt has been made to examine and highlight some such challenges for the compiler on the basis of scrutiny of specific segments of the sector. In respect of the banking sector, we have argued that a weighted average index of the PFCE and GDCF could possibly yield a better measure for deflating the banking sector GDP as compared to the present practice of WPI deflation. In respect of computers and software, we have argued that the official statistical system has not kept pace with the rapid growth of the software industry, suggesting that a product method may be appropriate for estimation of value added from computers and software. EPW

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[The views expressed here are the personal views of the authors and do not in any way reflect those of the organisation with which they are associated.]

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