

IMPROVING GDP EXHAUSTIVENESS – AN EXAMPLE FROM INDIA

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I INTRODUCTION

1. In India, the Central Statistical Organisation (CSO) of the Ministry of Statistics and Programme Implementation (MSPI) is responsible for the compilation and release of national accounts statistics. The CSO releases annual national accounts, quarterly national accounts, input-output tables, and regional accounts, following established international guidelines and standards. India is a subscriber to the IMF's Special Data Dissemination Standards (SDDS).

2. The releases on national accounts statistics include production and expenditure based GDP estimates, both quarterly and annual, and also both at current and constant (1999-2000) prices. The annual national accounts also include income based GDP estimates at current prices.

3. An important feature of India's GDP estimates is that the GDP compiled through production approach is treated as firmer estimate of GDP. Using the same data sources, some income and expenditure GDP aggregates are derived as residuals, or through the commodity flow approach. While, the level of GDP from production and income side is same, discrepancy with GDP expenditures is shown separately.

4. In view of the predominant preference to GDP from Production method, India adopts various procedures and approaches aimed at exhaustively measuring the GDP from production side (covering economic activities that fall within the production boundary of 1993 SNA, namely production of all goods, production of services that are supplied to other units, and production of housing services by owner-occupiers and domestic services produced by employing paid employees). There are, however, many challenges in this. Firstly, India has large informal or unorganized or household sector and data on this is available only periodically through benchmark surveys. Secondly, there are no quarterly/annual economy-wide enterprise surveys and labour force surveys. Thirdly, the production data on primary activities comes from administrative sources, some of which have under coverage of activities.

5. Due to these limitations, the CSO has to adopt different procedures even for compiling GDP by production method. These procedures, besides aiming to produce consistent set of national accounts aggregates at industry/institutional sectoral level, also aim at exhaustively measuring the GDP. For example, for many services sectors and the informal segments of various industries, benchmark estimates are initially compiled through labour input method, and for subsequent years, the benchmark estimates are extrapolated with proxy physical indicators. For the non-financial corporations, macro-aggregates are compiled on the basis of sample companies' accounts, suitably adjusted for the exhaustive coverage. On the expenditure side, the firmer estimates of Gross Capital Formation are compiled from the financing side (as

¹ Views expressed in some sections are the personal views of author

sum of saving, which includes own account capital formation in the household sector, and net capital inflow), as also from the commodity flow methods (to estimate the output of construction, machinery & equipment and software, available for capital formation) and capital expenditures made by industries. The three independent estimates are confronted and discrepancy is recorded with the firmer estimate coming from the financing side. The economic activities having under coverage in the administrative data are updated with the help of indirect methods.

6. Since the CSO compiles some GDP aggregates through commodity flow methods or as residuals using the same set of basic data, there is a significant reliance on fixed ratios, particularly in the estimation of output of construction sector, private final consumption expenditure and gross fixed capital formation. Updation of these fixed ratios is, therefore, undertaken at the time of revision of base year through specially focused type studies and input-output tables.

II PROCEDURES ADOPTED FOR EXHAUSTIVE GDP MEASURE

OECD Handbook definition of NOE

7. The OECD handbook defines non-observed economy (NOE) as, activities which should be included in GDP but are not covered in statistical surveys or administrative records used in national accounts compilation. The 5 components of the NOE are:

- Economic Underground
 - (1) Underground Production
 - (2) Illegal Production
 - (3) Informal Production
- (4) Household Production for own final use
- (5) Statistical Underground

8. The underground production refers to the deliberate concealment of legal activities from public authorities to avoid payment of taxes, social security contributions, meeting certain legal standards, like minimum wages, health and safety regulations, compliance costs (filling up of returns, etc) or to claim unemployment benefits.

9. The illegal production is defined as “all illegal actions that fit the characteristics of transactions – notably that there is mutual consent – are treated in the same way as legal actions”. The illegal production covers activities forbidden by law, such as production of goods and services whose production or sale is forbidden by law, and activities which are usually legal but illegal for unauthorised producers.

10. The informal sector, as per 15th International Conference of Labour Statisticians, covers “units engaged in production of goods/services with primary objective of generating employment and incomes to the persons concerned”. These units typically operate at low level of organization, with little/no division between labour and capital and on a small scale. Labour relations, where they exist, are based mostly on casual employment, kinship or personal and social relations rather than contractual arrangements. A vast majority of informal sector activities provide goods and services whose production and distribution are perfectly legal.

11. The household production for own final use includes production of crops, livestock, other goods, construction of own houses, imputed rents, and services produced with the help of domestic servants.

12. The statistical underground refers to production missed due to deficiencies in data collection programme, undercoverage of enterprises, non-response, under reporting and conceptual (tips, wages and salaries in kind).

Procedures adopted in India for exhaustive measurement of GDP

13. It is difficult to separately identify and estimate the NOE activities, as they mostly overlap, particularly with reference to informal sector. Also, India has large informal sector (what is usually referred to as **unorganised** sector in the Indian national accounts, which is the household sector including private unincorporated enterprises. The unorganised sector also includes some formal activities on which there is no regular system of data availability). There are also no annual labour force, enterprise and retail trade surveys in India, which can provide information on the current status of economic activities and can be used for making annual estimates of unorganised sector. Therefore, different procedures are adopted for different industries to measure exhaustively the GVA in respect of each of the industries covered under the International Standard Industrial Classification (ISIC). These include a significant amount of rates and ratios and indirect methods (such as benchmark-indicator methods, where benchmark estimates prepared based on long-term surveys are extrapolated with proxy indicators for the annual estimates). It is estimated that rates and ratios and indirect methods account for about 10% and 30% of GDP, respectively. Therefore, the relevance of proxy indicators used in the indirect methods assume utmost importance. These are usually validated at the time of revision of base year.

14. As regards illegal activities, a part of these are included in the national accounts through indirect methods, such as covering the entire cropped area (through land-use statistics and village level records), accounting for total workforce (through labour force surveys), etc. However, smuggling and other explicit illegal activities are not directly covered in the national accounts.

15. With reference to production of goods for own final use, this is limited to the goods in agriculture, forestry, and fisheries only. Due to lack of availability of data, manufactured goods produced within households exclusively for own final use (such as weaving of clothes, fetching of water, etc.), are not covered in national accounts. It is also generally true that household manufacturing activities for own consumption are most difficult to estimate. Efforts to collect this information through consumer expenditure surveys also did not give desired results. However, production of housing services by owner-occupiers and domestic services produced by employing paid domestic staff are included in the national accounts. Also covered in the national accounts is the output of own account capital formation.

16. Thus the production boundary of Indian national accounts broadly corresponds to the 1993 SNA production boundary with the exception of manufactured goods produced within households exclusively for own consumption.

Contribution of unorganised sector

17. The household sector including private unincorporated enterprises is the unorganised segment of the economy. The unorganized sector in the Indian national accounts, contributed 58.0 per cent of the Net Domestic Product (NDP) in the year 2004-05, of which 18.7 per cent was from the agriculture and allied activities, 4.5 per cent from the manufacturing, 4.4 per cent from construction, 14.5 per cent from trade, hotels and restaurants, 5.1 per cent from transport, storage and communication, 6.5 per cent was from financing, insurance, real estate and business services and 4.0 per cent from community, social and personal services.

18. The share of unorganized sector in the total NDP of the country is, however, declining. During 1999-2000, the unorganized sector contributed 61.1 per cent. The decline in the unorganized sector's share is mainly on account of declining share of agriculture in the overall NDP from 26.5 per cent to 19.8 per cent. The agriculture and allied activities are predominantly in the unorganized sector. Thus, if the agriculture and allied activities are excluded, the unorganized sector's contribution increased from 35.5 per cent in 1999-2000 to 39.3 per cent in 2004-05.

19. For a more appreciation of the procedures adopted to exhaustively measure GDP, we need to see the salient features of estimating GDP in each of the broad industries. These are given in brief below:

Value added by industry

Agriculture, forestry, fishing and mining

20. The estimates of value added for the primary activities (agriculture, livestock, forestry, fishing and mining) are compiled by multiplying the data on production in quantities with the producers' prices, and deducting from therein, the material input costs. The commodity-wise data on production, prices and inputs are available from the administrative source agencies. The production data in agriculture, forestry and fishing includes **production for own final consumption**.

21. Regarding agricultural activities, estimates of area under different crops are made from the village records generally on complete enumeration basis, and the estimates of yield for principal crops are based on about 500,000 crop cutting experiments conducted every year. For some of the other crops, especially those covered under plantation crops, the respective Boards provide the relevant production data. However, there is under coverage in this in respect of crops, although the gross cropped area is accounted for from the land use statistics. These relate to certain miscellaneous and 'other' crops, for which data on area under these crops is available from land-use statistics, but yield rates are not available. For the sake of exhaustiveness, an estimated value per hectare is applied on the area under these miscellaneous and other crops to arrive at the value of output estimate. Similarly, in respect of output of grass used as feed of livestock, estimates are built up using the gross area available from all sources (including forest) for grazing purpose. The value of output of agriculture also includes agricultural production in the backyard/foreyard, which is estimated on the basis of data available on land under homestead and value per hectare of horticultural crops. Through this procedure, all the NOE activities are covered together.

22. In the case of livestock, the 5-yearly livestock census provides the data on various categories of livestock population, by age and breed. The growth rates observed between the previous two censuses are used to estimate the livestock population for the subsequent years. The annual yield rates of livestock products are estimated through the Integrated Sample Survey, which is conducted through administrative agencies. By applying the yield rates on the projected livestock population, estimates of various livestock products are obtained. This procedure ensures exhaustive measurement of output of livestock products.

23. In the case of forestry, the production data furnished by the forest agencies on industrial wood, minor forest products and firewood has some amount of under-coverage. In order to account for this undercoverage, the total production of industrial wood is taken as 110% of the reported production. For the firewood, the production is estimated from the data on household consumption of firewood (available from consumer expenditure surveys) suitably adjusted for inter-industry consumption and other agricultural by products used for firewood purpose. The data on household firewood consumption is available from the consumer expenditure surveys of National Sample Survey Organisation (NSSO), which includes consumption from own resources.

24. Data on fishing activity is available from the surveys conducted at landing centres to capture the production of marine and inland fish. The under-coverage in this case relates to subsistence fishing (mainly for own final consumption). Based on type studies conducted in some places, the subsistence fishing is estimated to be 12.5% of inland fish production. The data on production of salted and sundried fish is also available from the administrative sources. The value addition on account of these activities is included in the national accounts.

25. For the mining and quarrying activities, data on major minerals, including salt production through pan drying process of reliable quality is available regularly from administrative sources. Contribution of minor minerals to the value added is estimated from the data available with State Governments. The under coverage in this relates to subsidiary activities undertaken by the mining enterprises. The contribution of these subsidiary activities is assessed by analysing the annual reports of these enterprises. Mining activity is mostly in the public sector.

Construction

26. In the absence of data on construction starts and building permits, the commodity flow and expenditure approach is adopted for exhaustively measuring construction activity. For measuring the output of Construction activity, it is divided into two components namely (i) Accounted Construction (Pucca Construction) and (ii) Un-accounted construction (Kutchha Construction). The output of construction of the total economy is compiled by a composite methodology comprising both commodity flow approach and expenditure approach and taken as the total production costs of accounted and unaccounted constructions. The value of accounted construction undertaken with the use of construction materials such as cement, steel, bricks, timber, fixtures etc., is determined by commodity flow method. The estimates of labour intensive unaccounted construction (undertaken mostly with the help of

freely available or traditional, locally procured materials like leaves, reeds, mud, etc.) are prepared by expenditure approach using data from sample surveys (mainly from the decennial All India Debt and Investment Survey (AIDIS), the latest is for the year 2002-03). A fixed percentage of value of output (separately for accounted and unaccounted constructions), which is updated at the time of revision of base year, is taken to be the GVA. The estimates of value of output and value added, so derived include the own account construction undertaken by the households.

Ownership of dwellings

27. Estimates of services of ownership of dwellings are compiled from the data available on dwellings (separately in rural and urban areas) from the decennial population census. The annual estimates of number of dwellings are compiled using the growth rates observed in the previous two censuses. To this size of dwellings, an average rent per dwelling (separately for rural and urban areas), which is estimated from consumer expenditure surveys, is imputed to obtain the housing services produced by owner occupied dwellings.

Unorganised Manufacturing, Utilities and Services

28. The organized sector for these activities broadly comprises, (i) registered manufacturing activity (establishments employing 10 or more workers using power or 20 or more workers not using power), and (ii) public and private corporate sector in respect of all other activities. Estimates of GVA for registered manufacturing are based on annual survey of industries (ASI). The under coverage in these surveys relate to some workshops in the public sector and general government. The survey data is, therefore, suitably augmented with the data on these workshops obtained from the administrative sources. In order to account for non-responding units, employment data as available in the business frame in respect of these units, is used to update the survey estimates. For Utilities and Services activities, estimates of GVA for public sector components are based on budget documents and annual reports of public enterprises. For the segment of the economy covered under joint stock companies, benchmark GVA estimates are based on the number of employees engaged in this segment and value added per worker estimated from the enterprise surveys. For subsequent years, the benchmark estimates are extrapolated with the growth rates observed in respective economic activities, as available from administrative sources and analysis of sample companies' accounts, every year.

29. All units complementary to the above coverage of organized sector, comprise the unorganized sector in respect of manufacturing, utilities and services. In the absence of annual enterprise surveys, the gross value added (GVA) estimates for these activities are compiled through indirect methods, using the benchmark-indicator procedure. In this procedure, the benchmark GVA estimates are initially prepared at detailed economic activity level for the base year of national accounts series using the estimated workforce engaged in the particular activity and the value added per worker (VAPW) in the same activity. While preparing benchmark estimates, alternative data sources such as those available on consumption are also examined (for example in the case of health and education services). For subsequent years, the base year GVA estimates are extrapolated with appropriate indicators relevant to the economic activity.

Estimates of total workforce by economic activity

30. For estimating the total workforce in the country by detailed industry, the large-scale household sample surveys on Employment and Unemployment conducted by the National Sample Survey Organisation (NSSO), which provide work force participation rates (WPR) in different industries, are the source that is adopted in the national accounts compilation. These WPRs used in conjunction with the estimated population (available from the Decennial Population Census of the country), provide workforce estimates, by industry groups, as per International Standard Industrial Classification (ISIC). However, the requirement of workforce estimates for use in national accounts compilation is the number of jobs performed, rather than the headcount, as the value added per worker estimate comes from the enterprise surveys, which includes multiple jobs performed by individuals. The data on total number of jobs performed in each economic activity is not directly available. The available data on employment from the NSSO is through household enquiry method, which gives data on number of workers. The difference between the number of workers and the number of jobs is the multiple jobs performed by employed persons, data on which is, however, available from the NSSO reports. The estimates of workforce using WPRs from Employment and Unemployment Survey (EUS) and population estimates from the Population Census are compiled separately for rural and urban areas and also by gender, male and female. The total workforce in the country estimated through this procedure refers to the number of jobs performed and is taken as the controlling total. The workforce in each industry group estimated from the EUS is then cross-validated with the workforce data available from the decennial population census, to check for inconsistencies. Suitable adjustments in workforce estimates are made from the population census for some of the industry groups, for which the sample survey estimates are not considered reliable, without changing the total estimated workforce from the EUS.

31. Once the total workforce is estimated by industry-group using WPRs from EUS, the workforce is divided between organized (comprising public sector and private organized sector) and unorganized sector. The data on total estimated workforce in public sector and private organized sector is available annually from the Administrative sources. These workforce estimates are compiled following the enterprise approach, therefore, they refer to 'number of jobs'. The estimated workforce in the unorganized segments of various economic activities are derived as residual by deducting the organized sector workforce estimates from the total workforce of each industry group.

Estimates of Value Added Per Worker (VAPW) by economic activity

32. The estimates of VAPW for the unorganized manufacturing and services sectors are from the detailed data available from the enterprise surveys conducted by the NSSO, from time to time on different unorganised industries of the economy. These enterprise surveys typically cover all units other than those covered in the public sector, except the manufacturing industry. For the manufacturing industry, the enterprise survey covers all units not covered under Annual Survey of Industries (ASI). Other than the surveys on unorganised manufacturing, the enterprise surveys cover all units in the private sector – both organised as well as unorganised. These enterprise surveys provide information on value added, employment, etc. separately for the units covered under private corporate sector and the unorganised sector. The value added per worker of the units in a particular industry group is estimated as the ratio of gross value added to the

total employment in all the units of the particular industry group. The VAPW is estimated separately for the private corporate sector part and the unorganised part of each industry group. While compiling detailed VAPW estimates, unit level data is thoroughly scrutinised for inconsistencies in the data among various items, such as output, inputs, salaries and wages, investment, etc. Also, suitable adjustments in the survey data are made according to the national accounts concepts.

33. The gross value added of the unorganised segment of a particular industry group in the benchmark year is the product of gross VAPW and the workforce in that industry group in the same year.

Estimates for subsequent years in respect of unorganised segments

34. In the case of unregistered manufacturing, the procedure followed for estimating the GVA for subsequent years is to first estimate the GVA at constant prices by extrapolating the base year estimates with the growth observed in the index of industrial production (IIP), at each detailed industry level. Subsequently, the current price estimates of GVA for unregistered manufacturing sector are obtained by superimposing the relevant wholesale price indices (WPIs) on the constant price GVA estimates, at detailed industry level.

35. For electricity, gas and water supply, the GVA of unorganized part of water supply activity at current prices is estimated using the extrapolated workforce estimates and wages of municipality workers (smallest ones), while the constant price GVA estimates are compiled by deflating the current price GVA estimates by relevant price indices.

36. For the unorganized part of trade, hotels and restaurants, GVA estimates of base year are extrapolated with gross trading index (GTI), which is specially compiled using the trading incomes from the commodity producing sectors (trading income, in turn, is compiled from marketing surplus ratios and the corresponding trade margins of each commodity) and imports. The GTIs are compiled separately at current prices and constant prices and are used to extrapolate the base year estimates, to obtain the current and constant price GVA estimates of unorganized trade, hotels and restaurants activities.

37. In respect of all other services, the estimates for the unorganized segments are prepared by extrapolating the base year estimates with suitable indicators or by extrapolating the two components, namely, workforce and value added per worker. Some of these indicators are the index of agriculture production, index of cargo handled for water transport, volume index in the case of communication, etc.

III CONCLUDING REMARKS

38. The production boundary of India's GDP estimates is close to 1993 SNA, with the exception of manufactured products produced by households exclusively for own final consumption. The CSO accords prime importance for exhaustively measuring the GDP from the production approach. Due to the presence of large unorganised sector, data gaps in the source data, and undercoverage in the administrative data sources, the CSO adopts alternate procedures and methods to ensure realistic measurement of both, the level and growth rates of GDP.

39. It is not possible to separately identify the various NOE activities in the Indian national accounts, as there is considerable overlapping. The efforts to appropriately include the contribution of unorganised sector in the GDP, due to its overwhelming size, also include indirectly the other NOE activities. The CSO, however, does not explicitly include the illegal activities in GDP estimation.

40. For the exhaustive measurement of GDP, the CSO essentially makes adjustments in the administrative data for the under-coverage, non-reporting, underestimation; and uses labour input method for the unorganised sector. It is important, while using rates and ratios and indirect methods for a sizeable part of GDP estimation, that they are frequently updated and their reliability is tested. Generally, most rates and ratios are updated at the time of revision of base year through type studies and input-output tables. Regarding indirect methods, it has been observed that the revisions in the level of GDP estimates has been marginal whenever results of new surveys are included in GDP compilation.

41. While exhaustive measurement of GDP is an extremely difficult task, continuous efforts are made to improve the quality and coverage of source data. Indicators used in indirect estimation of GDP are continuously evaluated for their appropriateness and changes are made when needed. The CSO provides an extensive documentation of the sources and methods used in the compilation of national accounts. All methodological documents on national accounts as well as the complete set of publications on national accounts are available on the internet, at www.mospi.gov.in.

References

- (1) Commission of European Communities, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations and World Bank (1993): System of National Accounts 1993
- (2) Organisation for Economic Co-operation and Development (2002): Measuring the Non-Observed Economy - A Handbook
- (3) Central Statistical Organisation, India (1998): National Industrial Classification
- (4) Central Statistical Organisation, India (2004): Report of the Working Group on Workforce Estimation for Compilation of National Accounts Statistics with base Year 1999-2000
- (5) Central Statistical Organisation, India (2006): Brochure on New Series of National Accounts Statistics, base year 1999-2000.
- (6) Central Statistical Organisation, India (2007): National Accounts Statistics: Sources and Methods

Annex**SHARE OF UNORGANISED SEGMENT IN NET DOMESTIC PRODUCT BY
ECONOMIC ACTIVITY (at current prices) (percent)**

industry		1999-00	2004-05
1	agriculture, forestry & fishing	96.5	94.4
2	mining & quarrying	8.4	7.9
3	manufacturing	37.6	32.8
4	elect. gas & water supply	2.7	4.7
5	construction	58.8	62.1
6	trade, hotels & restaurant	84.4	80.6
7	transport,storage & comm.	56.3	63.7
8	financing,insurance,real estate & business services	48.4	44.5
9	community,social & personal services	23.1	27.1
10	net domestic product at factor cost	61.1	58.0