Estimation of Balanced GDP *via* Reconciliation in SUT- Indian Experience

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Abstract

All product-wise statistical discrepancies are to be reconciled in the balancing of Supply and Use Table (SUT). Reconciled SUT provides estimate of a balanced gross domestic product (GDP) that is unique whether judged from production or final expenditure approach. This balanced GDP is used as a proxy for income in the sequence of accounts of 2008 System of National Accounts (SNA) where there is no place for statistical discrepancies in any of the income accounts.

The present paper discusses the points for SUT reconciliation exercise in the Indian context where though the estimates of private final consumption expenditure, fixed capital formation, and basic materials in construction are obtained by commodity flow approach but still reconciliation is cumbersome. Also challenges in obtaining a balanced GDP estimate at regional level are discussed.

Key Words: *Product-wise reconciliation, SUT, 2008 SNA, GDP, Commodity flow approach, PFCE, GFCF, Regional SUT*

1. Introduction

1.1 In contrast to 1968 System of National Accounts (*SNA*) 'consolidated set of Accounts' which had provision for statistical discrepancies/ errors and omissions as an item in each of the (see *Annex 1*), the *1993 SNA* as well as *2008 SNA* 'sequence of Accounts' have no place for any statistical discrepancies/errors and omissions. All statistical discrepancies/ errors and omissions between the estimates of supply and use of a product need to be reconciled in the framework of Supply and Use Table (SUT) for all products in the economy. Thus the basic requirement for attempting production and income accounts as recommended in the *2008 SNA* is to first reconcile the supply and use of each of the products in the framework of SUT that eventually provides a unique and acceptable estimate of Gross Domestic Product (GDP) of the economy. This unique or balanced estimate of the GDP is basically obtained in the reconciled SUT from the production data as an unduplicated but having complete coverage (market output, non-market output or output for self-consumption or capital formation) as also the final uses/expenditures of the products and is taken as a measure of production of the economy during the period. This balance GDP, a measure of production of products in the economy is then used as a proxy of income of the economy during the period to compile the various current income and accumulation accounts giving the important macro-economic aggregates like GDP, gross national income, gross national disposable income, saving, net lending/ borrowing, capital formation, as the balancing items in the individual accounts of the economy finally providing the changes in assets and changes in liabilities and net worth that accrues during the accounting period to be placed in the balance sheet of the economy along with other changes in volumes and prices. Thus importantly compilation of a balanced SUT is must and a pre-requisite as per 2008 SNA for attempting the

various income and accumulation accounts as a sequence of accounts without any statistical discrepancies/errors and omissions. SUT is recommended as an integral part of the process of compilation of national accounts statistics annually.

1.2 The estimate of GDP from a balanced SUT is unique since it satisfies the economic conceptual identity of the reconciled estimate of the GDP estimated from the production approach as well as the expenditure approach. It may be noted that as per the 1968 SNA consolidated accounts of the nation (*c.f. Annex. I*) which India and many developing countries, in Asia and Africa incidentally still follow, the national accounts statisticians quietly place the discrepancies observed between GDP and final expenditures estimates in Account-1, statistical discrepancies observed between national disposable income and its appropriation in Account-3, errors and omissions observed between capital formation and its financing in Account-5, and errors as adjustments of merchandise exports/imports to the change of ownership basis in Account-6 on External Transactions. As a contrast in the 2008 SNA that recommends compilation of the sequence of account (income accounts and accumulation accounts) separately for all institutional sectors, there is no place for statistical discrepancies/errors and omissions in any of the accounts. All statistical discrepancies/errors and omissions are supposed to have been reconciled in the SUT exercise that alone provides the balanced GDP. Thus annual construction of a balanced SUT is the most important task and a challenge to national accounts statisticians since it is the pre-requisite for implementing recommendations of the 2008 SNA to prepare the sequence of accounts.

1.3 In this paper we propose to very briefly summarize Supply and Use Tables as per 2008 SNA as a background for discussing the issues pertaining to the reconciliation of supply and use estimates of various products at economy level in the context of Indian national accounts where the private final consumption expenditure, fixed capital formation of machinery and equipment's and basic materials that go in for *pucca* (a term used for accounted construction both new and repairs and maintenance of residential and non-residential buildings, roads, bridges, etc.) construction are estimated following commodity flow approach. It is important to note that the reconciliation discussions made in this paper will be valid and applicable for all those developing countries as well that follows commodity flow approach for the estimation of their private final consumption expenditure, construction and fixed capital formation. Lastly a section is devoted to discuss the challenges faced in the construction of SUT at regional (State/Province) level and propose a feasible methodology of reconciliation in SUT at regional level to provide an almost balanced GDP at State level in the Indian regional income accounts system.

2. Supply and Use Table (SUT)

2.1 The SUT provides the framework for estimating GDP consistently from both the production and expenditure side. The balanced SUT provides consistency and coherency among the first three accounts of the 2008 SNA framework, namely Goods and Services Account, Production Account by industry and Generation of Income Account by industry. The SUTs are

based on the principle that the amount of the product available for use within the economy must have been supplied either by domestic production or by imports. The amount of product supplied must be used in the same accounting period for either or both of intermediate consumption and final uses which comprise final consumption expenditure by Households, Non-Profit Institutions serving Households (NPISH) and General Government, Gross Capital Formation and exports. SUT is an integrated, first and important part of SNA which depicts interrelationship of industries in an economy with respect to the production and uses of their products as well as imports and exports. With a complete set of product balances SUT can be created. It exists in pairs with common valuation (usually purchaser's price) and level of detail for products identified. Looking into the structure of SUT, each industry (or industry group) is listed across the top in two tables depicting outputs produced in the Supply table and depicting inputs that are consumed in the Use table. SUT is often advocated as a compilation tool for data checking and reconciliation; and data gap filling.

Supply Table

2.2 Supply Table is in the form of products by industries matrix showing which industry supplies or makes which product (s). Thus a row shows supply of a product (or product group) coming from main industry or other industries where it might be a by- product or from the rest of the world as imports. To make the supply of a product at purchaser's price adjustment is made by adding the taxes less subsidies on the products and trade and transport margins. Whereas industries are classified as per International Standard on Industrial Classification (ISIC) in columns, the products in rows are classified as per Common Product Classification (CPC). Imports are also to be classified as per CPC, harmonized to products considered though in the source data they would be as per the trade classification (Harmonized System or Standard International Trade Classification). For the Indian national accounts purposes the industries are classified as per National Industrial Classification (NIC); and products are classified as per the National Product Classification (NPC), both the classifications are consistent with the international classifications. Besides, industries are further classified for producing market products, products for own final use and non-market products because the valuation of products coming out of industries is different for market, non-market and own final use.

A Simplified Supply Table

Supplies	**Industries** **1 2 3……n**	**Imports** **(ROW)**	**Adjustments for Taxes on products, Trade, Transport margins**	**Total**
Product 1	Output by product and industry	Imports by products	Taxes less subsidies on products, Trade, Transport margins	Total Supply by product at purchasers price
Product 2				
Product m				
Total	**Total output by industry**	**Total imports**		**Total Supply**

A simplified Supply Table presented above shows industries in one column, actually comprising of several columns representing homogeneous industry groups by NIC and further classified by market/non-market products. Similarly products are shown in rows of several homogeneous products classified by NPC which are recorded in actual basic prices.

Use Table

2.3 Use Table is in form of a rectangular matrix with four quadrants. The upper left quadrant depicts use of different products by different groups of producing industries (units), thus showing intermediate consumption of industries (in columns) by products (in rows). The upper right quadrant shows final uses of different products (in rows) under final consumption expenditure (Households, NPISHs, General Government in separate columns), Gross Capital formation (Gross fixed Capital Formation (GFCF), Change in Stocks (CIS), and Valuables in separate columns) and Exports. The lower left quadrant contains information of gross value added (GVA) to show components of income generated in different industry groups. The lower right quadrant shows total final uses. A simplified use table, for illustration, is presented below where industries are shown in one column actually comprising of several columns representing homogeneous industry groups by NIC. Products are shown in rows classified by NPC presenting intermediate consumption of products by industries which are recorded in the use table.

A Simplified Use Table

Uses	**Industries** **1 2 3……n**	**Final Consumption Expenditure**	**Gross Capital Formation**	**Exports (ROW)**	**Total**
Product 1 **Product 2** . .	Intermediate Consumption by product and industry	Final Cons. Exp. (HHs, NPISH, Gen Govt.) by product	Gross Capital Formation (GFCF, CIS, Valuables) by product	Exports by product	Total Use by product at purchasers price
Product m					
GVA by Components	Gross Value Added by industry				
Total	**Total inputs by industry**				

2.4 The products and industries in the use table are classified the same way as in the supply table. Both supply and use tables are product by industry matrices adopting same classifications for products as well as industries, the basic difference between the two tables is that whereas Supply Table contains information on outputs, the use table contains information on intermediate inputs. In the Use Table allocation of exports requires the same conversion of trade classifications (HS/SITC) codes to product classification (NPC) used for products desegregation. The final consumption is categorized into those of Households, NPISHs and General Government; and Gross Capital Formation into acquisition less disposal of gross fixed capital formation, changes in stocks and acquisition less disposal of valuables. All final use categories in

columns record information product-wise as per NPC to have harmonized row entries. The value added part of the Use Table in the lower left quadrant shows GVA by industry also showing components of total gross value added/GDP as compensation of employees, taxes less subsidies on production and imports, net mixed income, net operating surplus and consumption of fixed capital separately for each industry irrespective of the industry providing market production, production for own final use, and non-market production.

2.5 The Government Final Consumption Expenditure (GFCE) consists of expenditures incurred by general government on both individual and collective consumption of products/ goods and services. Household Final Consumption Expenditure (HFCE) consists of expenditure incurred by resident households on consumption goods or services and is the largest item among the final uses (except few countries like Macau China). Non-Profit Institutions serving Households (NPISH) final consumption expenditure include final consumption expenditure of trade unions, political parties, religious and charitable organizations, and sporting and recreational associations. In many developing economies including India, the final expenditure by NPISH is placed along with final consumption expenditure by Households as Private Final Consumption Expenditure (PFCE) though the SNA recommends showing their final consumption expenditure in a separate columns. Gross fixed capital formation (GFCF) is usually broken down into its usual components- residential and nonresidential buildings; other construction; machinery and equipment; and other GFCF, which consists mainly of the increase in stocks of certain types of farm animals, purchases and development of computer software, cost of Research and Development and costs of mineral exploration. Change in stocks may either be a positive or a negative entry. As a positive entry, change in stocks includes products produced or imported during the current period but have not yet been used during the period or will be used at a later period. As a negative entry, it includes products that were available from the earlier period and used up in the current period besides the current period domestic production and imports.

2.6 The upper part of the use matrix showing the flow of products classified as per NPC into the intermediate and final use quadrants is at purchasers' prices and can be valued at basic prices. As a matter of fact from the source data it will be at purchasers' prices and for converting it to basic prices we need to identify trade and transport margins and taxes (less subsidies) on products for each of the cell entries, remove and place these in the columns against the rows of trade, transport services and an additional row made for net taxes on products. Two identities hold, one the identity by industry [*Output by industry = Input by industry*] and the other the identity by product [*Total supply by product =Total use by product*].

3. Reconciliation of Supply and Use of products

3.1 Reconciliation of supply and use of products can be undertaken either manually, or mechanically, or a combination of both. If estimate of supply of a product coming out from Supply Table is considered firm, the estimate of the use of the product in the Use Table is to be reconciled by making adjustments in one or more categories of final uses of the product, depending upon the understanding on account of the quality of the various final expenditure aggregates estimates. If for a product final expenditure aggregates estimates appear firm compared to the estimate of supply of the product, appropriate adjustments need to be made in the estimate of output of the product. Unfortunately mostly there is no exact knowledge of the errors (sampling and non-sampling) in the categories of final use estimates as well as estimates

of output of products in the present scenario of national income estimation practices followed in the system of Indian national accounts as well as in most developing countries national accounts. It is thus a challenge to national accounts statisticians to identify the weak, weaker, weakest and robust estimates according to the data collection procedure followed and estimation methodology adopted in various producing industry sectors of the economy as well as the categories of final uses for touching the estimates of supply and uses of various products, while undertaking the reconciliation exercise. For example, aggregates like general government final consumption expenditure, exports and imports are considered more firm than the estimates of household/ private final consumption expenditure, gross fixed capital formation and mostly the weakest one appears to be estimate of change in stocks of the product in the economies having a significant unorganized/ informal sector. The mechanical methods popularly known as the RAS or Modified RAS involve the pro-rata adjustment in the rows and columns of the product flow transactions matrix (keeping firm figures as fixed in the Modified RAS), where sum of the row totals and column totals is the same. For practical reasons in order to have only logical adjustments, it is considered advisable to apply mechanical methods (RAS or Modified RAS) only when discrepancy between supply and use has been brought down by manual method as small, say, less than five per cent. Thus reconciliation exercise should always begin with manual method to take account of larger discrepancies followed by mechanical method.

3.2 Since the detailed data on supply and use, both intermediate and final use categories come from various data sources of very different quality, most of the macroeconomic aggregates based on such data cannot be considered as firm. Thus reconciliation process requires expertise of the national accounts statistician to weigh the quality of various data sources and estimates before touching them up in the reconciliation exercise for each of the products.

3.3 The Asian Development Bank as a research study (2012) under RETA 6483 published SUT for 18 economies of Asia and the Pacific region but has given no clear guidelines for reconciliation of supply and use of various products.

Reconciliation in SUT in the context of Indian National Accounts

3.4 In the Indian national accounts statistics the final use category PFCE that is supposed to include final consumption expenditure of both the Households and the NPISH, is compiled following commodity flow approach. The commodity flow approach for compiling PFCE estimate of a product considers the estimate of supply of that product from domestic sources as well as imports. Since this estimate, taken from the production data, is at basic prices it is converted to purchaser's prices by adding to it the trade transport margins and taxes on product less subsidies on the product. From the supply estimate the intermediate consumption part (mostly based on the latest input-output table) is knocked out. Beside the intermediate consumption, the final consumption by general government, fixed capital formation and valuables (where applicable), adjustment for change in stocks, and exports are also knocked out. The commodity flow approach thus signifies that any or all errors and omissions in any of the aggregates for a household consumable product are already inside the PFCE estimate of that product. Thus supply and use of all household consumable products in the economy should conceptually match in the reconciliation exercise of the SUT. Similarly in the present Indian national accounts statistics, the compilation of gross fixed capital formation by type of assets and in particular the machinery and equipment and accounted (*pukka*) construction broadly follow

concept of commodity flow approached that is supposed to ensure supply and use of all capital goods as well as the basic materials that go in the construction activity as inputs to match in the reconciliation exercise of the SUT. The only products that need special attention in the reconciliation exercise are thus the solely intermediate consumption items of the industries.

3.5 However, despite following commodity flow approach in the estimation of PFCE, GFCF and construction output in the Indian national accounts (as also in many developing countries that follow methodology of estimation of various aggregates similar to India), acute discrepancies are faced in the reconciliation of supply and use of several products while undertaking reconciliation exercises on SUT. Why the supply and use estimates of various products do not match despite following commodity flow approach in the estimation of PFCE, GFCF and construction output calls for deeper scrutiny. The fact of the matter is that in the compilation of various aggregates a large number of rates and ratios are used at various stages and those need not hold true at the time of SUT reconciliation exercise. The rates and ratios may relate to intermediate consumption ratio of a product taken from the latest available Input Output Table, input structures for various products which could not be captured in the survey, product-wise break-up of raw materials, chemicals, packing materials, category of others, other of others, consumables, 'rent, rates, taxes', office expenditure, partly capital goods, parts of capital and partly capital goods, trade transport margins, index of prices and volume, and so on.

3.6 It has been seen in the recent exercise on compilation of SUT of the Indian economy for 2011-12, for which the author happen to be the Advisor, that while undertaking reconciliation exercise for the household consumable products when the work-sheets of SUT and PFCE are reviewed together the discrepancies in supply and use are resolved by identifying any coding mistakes, under-coverage, variation in rates and ratios used in the PFCE, margins, etc. Similarly for the products that are capital goods or are the basic materials used for the estimation of construction output, reconciliation of supply and use of the relevant products becomes feasible when the worksheets of SUT and GFCF or construction are reviewed together. For the products that are solely intermediate consumption items of the industries and do not appear in the PFCE, GFCF or Construction basic materials, reconciliation exercise requires special attention and care. It may be noted that for unique products like crude, mineral ores, etc. the reconciliation exercise does not pose any serious problem since the use of the product would mostly be firm and we need to check on the credibility of the supply of product. For the remaining solely intermediate consumption products reconciliation exercise is made keeping consistency of the supply and use of such products. It may be interesting to share some typical experience of reconciliation of certain products in the Indian SUT 2011-12 that has just been finalized and uploaded the Central Statistics Office (CSO) on the website of Ministry of Statistics and PI. One typical thing noted in reconciliation was that of water supply where use was very high compared to supply (production), more than Rs.4000 million. Deep examination revealed that one big Hydro-electricity plant purchased water of that amount from Government and that was not recorded in the water-supply output, the government receipt was taken as a transfer payment (fee). It was thus reconciled by adding the amount to the output of water supply. Another product showing a big gap was that of IT related services of which the output was grossly under-estimated due to the un-incorporated units not supplying reliable information.

3.7 Lesson learn is that while compiling a balanced SUT, it would be a good practice to keep a note of the gaps confronted in the unbalanced SUT separately for intermediate and final consumable products, capital products and the basic material products that go in the construction activity, and solely intermediate consumption products. These gaps when found significant would function as watch dogs to the national accounts statisticians to take necessary corrective action in reviewing/revising the rates and ratios as well as taking necessary steps to improve the quality of various economic data that is obtained via sample and census surveys, administrative statistics and type studies, as well as in choice of alternative data sets if available, in the subsequent periods.

3.8 Once the detailed data of supply and use of goods and services coming from various sources of official statistical system are reconciled in SUT, the measure of production (GDP) of an economy within a period of time, complete for all resident units without duplication is arrived at. The production account and income accounts comprising generation of income account, allocation of primary income account, secondary distribution of income account, and use of income account can then be attempted as summarized in *Annex. II*

4. Supply and Use Tables at Regional Level- Challenges

4.1 Somehow, at regional level preparation of SUT has not been taken-up seriously. The 2008 SNA does give clear guidelines for constructing SUT at the national level but unfortunately no specific guidelines are provided for regional SUT or regional accounts. Some Countries (Australia, U.K.) prepare regional accounts purely by allocation. In India the official guidelines on Regional Accounts are pretty old as dates back to 1976 and no official committee has been setup to update the guidelines for regional accounts despite updating of international Standard SNA from 1968 to 1993 to 2008. The National Statistical System needs to pay needed attention to review the guidelines for Regional Accounts. It is important to note that for implementing 2008 SNA recommendations on preparing sequence of accounts it is necessary to reconcile the supply and use of products to obtain a reconciled GDP at market prices. As a corollary, thus at regional level feasible exercises on reconciling of supply and use of products should be considered important. Once a reconciliation procedure is made feasible, exercises on regional SUT that are technically on sound footing would become available.

4.2 A regional SUT in principle should appear exactly similar to the one for the economy elaborated above with of course, a redefined interpretation of exports/ imports from other regions (States) and other countries. Beside there would be detailed data availability problems.

Interpretation of Exports, Imports in the Regional SUT

4.3 In regional SUT exports could be to the other regions within the country or to the other countries. Similarly imports could be from the other regions within the country or from the other countries. Important point to be noted is that in an open economy for a region exports/ imports information is not readily available with the official statistical system. Thus special surveys are required to obtain such information of export/ import for a region to/from other regions in the economy as well as from other countries (Rest of the World). Since it is a difficult task it would be necessary to find other options to deal with the situation. One possible way out to deal with could be to treat net export as a residual category of final use assuming domestic output as firm.

Data availability for Regional SUT

4.4 Data availability on intermediate consumption expenditures of various industries in the regional SUT is not a problem since all States compile their GVA estimate using information on output and intermediate consumption. What all needed is the break-up of intermediate consumption by products. This should not pose serious problem as information from public sector parts can be culled out from the analysis of respective budget documents/annual reports. For private sector part, information from Enterprise Surveys can be used. For agriculture sectors use should be made of Cost of Cultivation Studies of the State. Organized mining and manufacturing sector detailed data is available from Indian Bureau of Mines and Annual Survey of Industries.

4.5 As regards data availability on final consumption expenditures, Estimates of Household final consumption expenditure (FCE) at State level can be obtained using the results of Household Consumption Expenditure Surveys conducted by the NSSO. Estimate of NPISH FCE at regional level can be worked out either applying a proportion of PFCE to HFCE at national level or assuming ratio of PFCE to GDP invariant at regional and economy level. Estimates of GFCE can be obtained through the analysis of the State government and the local bodies' budget documents of the State and taking central government expenditure allocation for the State.

4.6 Gross Capital Formation has three components namely GFCF, CII and Valuables. The GFCF appear in the Use Table as column showing the acquisition *less* disposals of capital assets by the producers in the economy by type of product, CII appear as a column showing the various products that are goods and held by the producers or traders, and valuables also appear in a column by type of product. Information on net acquisition of valuables is as on date quite scanty and most States do not publish information on valuables acquired in the regional economy. Not all States are compiling estimates of GFCF. Even the States that prepare GFCF estimates are mostly doing for only public sector only.

4.7 Let us examine the issue of compiling estimates of GFCF by type of asset at the State level. The GFCF by type of asset basically includes construction and 'machinery and equipment'. Of course other items as per 2008 SNA would include expenditures on Intellectual Property Products (which include research and development, software, databases, mineral exploration/evaluation, etc.), and increase in cultivated biological resources (increment in livestock, plantation). It may be mentioned that the construction output is already estimated by the States in the course of compiling their domestic product estimation exercises. It may be mentioned that the CSO has recently attempted estimates of GFCF of all States taking public sector part from the actual analysis of budgets/ reports and private sector part by allocation of national level information. This needs to be firm-up with the interaction/ collaboration with State Directorates of Economics and Statistics (DESs) and further examination and exploitation of MCA21 database of Ministry of Company Affairs. In short though perfectly feasible, greater effort is still needed to compile reasonable estimates of GFCF by type of assets for regions.

4.8 The estimates of CII are not readily available for States. Such estimates need to be prepared by the State DESs following the institutional approach as at national level (*c.f. NAS*-

Sources and Methods, 2007) even if it is not perfect. The CSO can assist the DESs also by making available such estimates prepared by type of institutions and allocated to the States appropriately. The information on Valuables category is now available at national level. This can appropriately be allocated to States and thus again requires cooperation of CSO in this regard.

Gross State Domestic Product (GSDP) at factor cost and market prices

4.9 The States at present compile Gross State Domestic Product (GSDP) at factor cost prices only. As per 2008 SNA the GDP is always at market prices. Thus the GSDP estimates at factor cost compiled by the State DESs are in fact not the GDP estimates for the States but merely the Gross Value Added (GVA) estimates that get generated in the process of production activity in the States. States compile their estimates of domestic product following income originating approach since the income accruing approach that theoretically should be preferred, has lot of data problems. For obtaining the estimates of GDP of the State which should be at market prices we need to add the net indirect taxes to the GVA (which at present is termed as GSDP at factor cost prices) of the State. Compilation of estimates of net indirect taxes is difficult for the States since major component of indirect taxes are received by the center. To resolve this problem the CSO has since developed a methodology of allocating the indirect taxes less subsidies components for each of the States. Thus the States can now have their GSDP estimates at market prices.

4.10 It may be clarified that as per 2008 SNA the estimates of GVA at basic prices are to be obtained from output that is at basic prices by subtracting the intermediate consumption at purchasers' prices. Having obtained GVA at basic prices for all industries in the State economy, the GSDP would be obtained by adding the taxes on products less subsidies on products. CSO thus now require making available the taxes on products less subsidies on products components for each of the States to enable them to have the estimates of their GSDP at market prices.

Feasibility of SUT at Regional level

4.11 We have noted above that preparation of regional level SUT confronts serious data problems for obtaining the estimates of exports, imports, GFCF and CII. It is important that the States must compile at the earliest their estimates of GFCF. Since most States are already compiling their estimates of GFCF for public sector, what all needed is the estimates of GFCF for private sector which is feasible to start with by allocation method of the GFCF of private sector at the national level using appropriate indicators. Despite all the data problems relating to export, import, and CII it is interesting to note that balancing of supply and uses of services products in the State economy is feasible since services products do not attract generally any export, import and CII. Some services are exported/ imported but that component, if any would only be minor. Thus we can reconcile SUT perfectly for most services products.

4.12 For services products reconciliation exercises of supply of product outputs (from Supply Table converted to purchasers prices meaning including net taxes on products) and use of product (generated in the respective row of Use Table) therefore should be undertaken to remove inconsistencies that might occur in the estimates. Since services sectors contribute major share (about seventy per cent) in the economy, the reconciliation exercise is thus possible for major part of products in the economy. Beside information on certain specific products like crude to a refinery or a mineral ore import / export are readily available in the statistical system and thus

reconciliation of supply and use of such products would be cool. Thus it is feasible to prepare reasonably well SUT at regional level almost reconciled and thereby leading to an almost balanced GSDP estimate at the region/ State level.

5. Concluding Remarks

- In 2008 SNA there is no place for statistical discrepancies/errors and omissions in any of the accounts. All statistical discrepancies are reconciled in a balanced SUT which is must and a pre-requisite for compiling Sequence of Accounts
- In the Indian national accounts since commodity flow approach is followed in the estimation of PFCE and GFCF, reconciliation of supply and use of products has been found feasible.
- At State level the SUT poses challenges on account of differently defined exports/ imports and data problems for various aggregates. Almost balanced estimate of GSDP is feasible provided State level GFCF estimates for private sector are completed to start with by allocation method.

References

1. *A System of National Accounts* (1968): Series F No.2, Rev 3, UNSD, UN Publication
2. *National Accounts Statistics - Sources and Methods (*2007): Central Statistics Organisation, Ministry of Statistics and Programme Implementation, Government of India.
3. *Supply and Use Tables for Selected Economies in Asia and the Pacific: A research Study (*2012). Asian Development Bank publication.
4. *System of National Accounts* (1993): Prepared under the auspices of the Inter -Secretariat Working Group on National Accounts. Eurostat/ IMF/ OECD/ UN/ World Bank.
5. *System of National Accounts* (2008): Prepared under the auspices of the Inter -Secretariat Working Group on National Accounts. Eurostat/ IMF/ OECD/ UN/ World Bank.

JEL Codes: E01, R19

Annex. I

Consolidated set of Accounts in the 1968 SNA

Account 1: GROSS DOMESTIC PRODUCT AND EXPENDITURE

1.1	Net domestic product at factor cost (3.6)	1.6	Government Final Consumption Expenditure (3.1)
1.2	Consumption of fixed capital (5.6)	1.7	Private Final Consumption Expenditure (3.2)
1.3	Indirect taxes (3.9)	1.8	Gross Fixed Capital Formation (5.1.1)
1.4	*Less* Subsidies (3.10)	1.9	Change in Stocks (5.1.2)
		1.10	Exports of goods and services (6.1)
		1.11	*Less* Imports of goods and services (6.7)
		1.12	*Discrepancies*
1.5	**Gross domestic product (1.13)**	**1.13**	**Expenditure on GDP (1.5)**

Account 3: NATIONAL DISPOSABLE INCOME AND ITS APPROPRIATION

3.1	Govt. Final Consumption Expenditure (1.6)	3.6	Net domestic product at factor cost (1.1)
3.2	Private Final Consumption Expenditure (1.7)	3.7	Compensation of employees from ROW, net (6.2-6.8)
3.3	Saving (5.5)	3.8	Property and entrepreneurial income from ROW, net (6.3-6.9)
3.4	*Statistical discrepancies*	3.9	Indirect taxes (1.3)
		3.10	*Less* Subsidies(1.4)
		3.11	Other current transfers from ROW,net (6.4-6.10)
3.5	**Appropriation of national disposable income (3.12)**	**3.12**	**Disposable income (3.5)**

Account 5: CAPITAL FINANCE

5.1	Gross Capital Formation	5.5	Domestic saving (3.3)
5.1.1	Gross Fixed Capital Formation (1.8)	5.6	Consumption of fixed capital (1.2)
5.1.2	Change in Stocks (1.9)	5.7	Capital transfers from the ROW, net (6.15)
5.1.4	Errors and Omissions		
5.2	Purchase of intangible assets from ROW, net (6.18)		
/5.3	Net lending from the ROW, net (6.20-6.16)		
5.4	**Gross accumulation (5.8)**	**5.8**	**Finance of Gross accumulation (5.4)**

Account 6: EXTERNAL TRANSACTIONS

	Current transactions		
6.1	Exports of goods and services (1.10)	6.7	Imports of goods and services (1.11)
6.2	Compensation of employees from ROW (3.7)	6.8	Compensation of employees to ROW (3.7)
6.3	Property and entrepreneurial income from ROW (3.8)	6.9	Property and entrepreneurial income to ROW (3.8)
6.4	Other current transfers from ROW (3.11)	6.10	Other current transfers to ROW(3.11)
6.5	*Adjustment of merchandise exports to the change of ownership basis*	6.11	*Adjustment of merchandise imports to the change of ownership basis*
		6.12	Surplus of the nation on current accounts
6.6	Current receipts (6.1-6.5)	6.13	Disposal of current receipts
	Capital transactions		
6.14	Surplus of the nation on current accounts	6.18	Purchase of intangible assets from ROW, net (5.2)
6.15	Capital transfers from the ROW (5.7)	6.19	Capital transfers to the ROW (5.7)
6.16	Net incurrence of foreign liabilities (5.3)	6.20	Net acquisition of foreign financial assets (5.3)
6.17	**Receipts**	**6.21**	**Disbursements**

Annex. II

Sequence of Accounts in 2008 SNA

Production Account

	Uses	**Resources**
Production Account	Intermediate Consumption ***GVA / GDP (B1)***	Output, *of which*: Market output; Output for own final use and Non-market output (Taxes-subsidies) on products and imports

Generation of Income Account

	Uses	**Resources**
Generation of income Account	Compensation of employees (Taxes – subsidies) on production and imports ***Mixed income(B3) +Operating surplus (B2)***	***GVA / GDP (B1)***

Primary Distribution of Income Account

	Uses	**Resources**
Primary Distribution of Income	 Property Income payable ***Gross National Income (B5)***	***Mixed income (B3) +Operating surplus (B2)*** Compensation of employees (Taxes – subsidies) on production & imports Property Income receivable

Secondary Distribution of Income Account

	Uses	**Resources**
Secondary Distribution of Income	 Taxes on income and wealth payable Social contributions and other social benefits payable Other current transfers payable ***Gross National Disposable Income (B6)***	***Gross National Income (B5)*** Taxes on income and wealth receivable Social contributions & other social benefits receivable Other current transfers receivable

Use of Income Account

	Uses	**Resources**
Use of disposable Income Account	 Final Consumption Expenditure, *of which*: Household FCE; NPISHs and Government FCE Adjustments for households pension funds payable ***Gross Saving (B8)***	***Gross National Disposable Income (B6)*** Adjustments for households pension funds receivable

The balance gross saving, then flows to the financial market. Enterprises borrow from the financial market for their acquisition of non-financial capital assets, i.e., gross domestic capital formation. This leads to the accumulation accounts in the form of capital account and financial account.

Capital Account and Financial Account

	Changes in Assets	**Changes in Liability and Net Worth**
Capital Account	Gross Fixed Capital Formation Change in Inventories Acquisition less disposal of valuables Acquisition less disposal of non-produced non-financial assets *Minus* CFC ***Net Lending /Borrowing (B9)***	***Gross Saving (B8)*** Capital transfers receivable ***minus*** capital transfers payable
Financial Account	Net acquisition of financial assets ***Net Lending /Borrowing (B9)***	***Net Lending /Borrowing (B9)*** Net incurrence of liabilities

Summarizing above in short the main identities in SNA, each providing an account are:
Commodity balance: Gross value of output of goods and services at market prices (mp)

$GVO_{mp} \equiv IC + PFCE + GFCE + GFCF + CII$
$+ \text{Acquisition less disposal of valuables} + X - M \quad \ldots \ldots \ldots \quad [1]$

Where, PFCE: private final consumption expenditure (household final consumption expenditure (HFCE) and FCE of Non-Profit Institutions serving Households (NPISHs); GFCE: Government final consumption expenditure, GFCF: gross fixed capital formation, CII: change in inventories, X: exports, M: imports.
Production-side identity:

$GDP_{mp} \equiv GVO_{bp} - IC + \text{product (t-s)} + \text{(t-s) on imports} \quad \ldots \ldots \ldots \ldots \quad [2]$

Where product (t-s) denotes taxes on products less subsidies on products; and (t-s) on imports denotes taxes on imports less subsidies on imports.
Income-side identities:

$GDP_{mp} \equiv (CE + OS + MI)$ generated in domestic enterprises
$+ \text{Product (t-s)} + \text{(t-s) on imports} \quad \ldots \ldots \quad \ldots \quad [3]$

Where CE denotes compensation of employees, OS denotes operating surplus, and MI denotes mixed income, the mix of CE and OS due to self-employed/ own account enterprises.

$GNI \equiv (CE + OS \,\&\, MI)$ generated in domestic enterprises
$+ \text{Product (t-s)} + \text{(t-s) on imports}$
$+ \text{CE from RoW (net)} + \text{PI from RoW (net)} \quad \ldots \ldots \ldots \ldots \quad \mathbf{[4]}$

$GNDI \equiv GNI + \text{(net) current transfers}$
$+ \text{(Net) taxes on income and wealth from RoW} \quad \ldots \ldots \ldots \ldots \quad \mathbf{[5]}$

Expenditure-side identities:

$GDP_{mp} \equiv PFCE + GFCE + GFCF + CII$
$+ \text{Acquisition less disposal of valuables} + X - M \quad \ldots \quad \ldots \ldots \ldots \quad [6]$

$\text{Gross Savings} \equiv GNDI - (PFCE + GFCE) \quad \ldots \quad \ldots \ldots \ldots \quad [7]$

Implies, Net lending from RoW ≡
Gross Savings + (net) Capital transfer receivable
- (GDCF + acquisition less disposal of valuables)
- Acquisition less disposal of non-produced non-financial assets … … … [8]