

Research Brief

STATUS AND COMPILATION ISSUES
IN NATIONAL ACCOUNTS STATISTICS

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Research Brief

STATUS AND COMPILATION ISSUES IN NATIONAL ACCOUNTS STATISTICS

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1 Introduction

This brief is aimed at providing an understanding of the concepts and procedure used for compiling GDP estimates, particularly in the Indian context. The approach is to first provide the overall systemic and data environment in which national account statistics are compiled and subsequently discuss the processes in the Indian context. The compilation process highlights the data sources and method of estimation followed in India, as is understood from the official publications of the National Statistical Office (NSO).

GDP numbers are a commonplace in macroeconomic policy, research and in public discourse as they capture the general state of the economy, direction and magnitude of economic growth. However, it is also a commonplace that debates and conclusions on economic growth and their trends often overlook the finer details of compiling such macro aggregates, which leaves parts of our understanding either incomplete or for want of sufficient information. It is reasonable to expect that important macro aggregates are not marred with measurement and computational inconsistencies, but at the same time it is equally important to recognize the limitations that are inherent in the process of compilation.

National Account aggregates such as Domestic Product, Capital Formation, Consumption Expenditure, among others, are compiled on the basic principles of the System of National Accounts (SNA). While the SNA provides a guide-post for compiling such aggregates, several country specific indigenous methods are also adopted, which in-turn are guided by the structure and composition of the economy and data availability. Indigenous or ad-hoc methods have a large bearing on the quality of the estimates and their underlying data quality and methodology are often ignored in the overall assessment of growth and structural change.

GDP (or estimates of [Gross] Domestic Production) are a part of the broader set of ‘accounts’ prepared under the System of National Accounts. These accounts are namely Production, Generation of Income, Redistribution or Transfers, Financial or Flow of Funds, External Sector, Expenditure and Assets and Liabilities of institutional sectors such as Public Sector, Private Corporations and the Households. While the focus of macroeconomic policy is largely on growth patterns of Domestic Production (GDP) and Capital formation, the entire set of accounts provide a comprehensive and internally consistent picture of the economy. It should be noted that the internally consistency is primarily because GDP estimates can be compiled *independently* using *alternative* but *equivalent methods* that yield similar estimates and upon reconciliation, they would turn lead to equivalence.

However, given a country context, in practice, it may not be possible to estimate using alternate methods on account of several data limitations and inadequacies of the statistical system. In such a situation, policy makers and data users have to rely on available estimates, without

having recourse to cross-validate and reconcile national account aggregates.

Major countries adopting SNA have attempted to produce estimates from alternate methods. In the Indian context, historically, erstwhile series of national accounts (base year 1999-2000) presented estimates of factor incomes, among other aggregates, several of which were discontinued over the years. While the expenditure side estimates continue to be compiled, they have their own share of measurement and data issues, both at the national and regional level.

Understanding GDP numbers requires a round-about view of the data sources, methods and the assumptions made in compiling such numbers. GDP numbers are *estimates*, in the sense that they are a measure of the value added produced by different institutional sectors engaged in economic activity. Statistically, estimates have a margin of error and given the quality of input data and the method(s) used, the magnitude of the errors can be small, large or even unknown. However, in the general discourse, such errors are usually ignored and data users often do not have the information on the magnitude of such errors. Data users have a limited assessment of the definitions, data sources and the extent of revisions in estimates as it is generally not possible to reconstruct parts of national account aggregates for users.

Thus, to develop a working knowledge it is relevant to understand the generally accepted set of principles that are followed, in so far as they are consistent with international standards and also bring objectivity in building such aggregates. To deal with these issues, the brief is arranged as follows;

- **Section 2** presents the environment in which overall National Accounts and GDP estimation is undertaken, the requirements of the metric and some of the core standards required in the process of compilation. These standards are essential to take note of as they present the overall quality of the statistical products, in line with international standards. **Section 3** describes in brief the new developments in the sources and methods since the introduction of the 2011-12 base year series.

- **Section 4** outlines the structure and composition of sectoral value added in the economy as captured by the national accounts and a brief summary of the methods adopted. The components of the expenditure side and the data sources used are also discussed.

- **Section 6** presents an analysis of the revision cycle of GDP numbers, the nature, direction and the magnitude of change that is observed in the sequence of revisions.

Section 7 summarizes the issues with the 2011-12 series and **Section 8** summarizes the issues with the Regional Accounts, i.e. estimates of Gross State Domestic Product (GSDP), particularly after the introduction of the 2011-12 series. **Section 9** outlines the issues with the larger domain of official statistics that are relevant to consider towards improvement of the quality of statistical products.

2 The environment

2.1 Principles and Prerequisites for estimation

One of the important facets of the SNA is the conceptual background it provides for compiling value addition or related macro aggregates. In brief, the four basic elements required are;

Conceptual	- Requires definitions of ‘what to capture’
Data	- Requires data based on definitions
Statistical	- Requires a methodology & technique to estimate and aggregate
Comparability	- Requires comparability with other aggregates, or even cross country

Respective country’s compilation manuals do not describe conceptual elements in detail as they are primarily embedded in the SNA. Statistical agencies generally describe the data sources they use in estimation. However, data sources such as sample surveys (eg: consumption expenditure, industrial production or prices) or administrative data (such as taxes, financial statements) have their own definitions and constructs, which may or may not be designed for use in national income accounting. This difference is more pronounced in data from administrative sources as they are an outcome of the administrative system and not necessarily statistics (based on any statistical procedure) collected for national income accounting purposes. Comparability is an essential requirement across various statistical products. Since concepts, data sources and methods of estimation change over time, the estimates so prepared ought to have a reasonable degree of comparability with previous aggregates.

In this context, the IMF Special Data Dissemination Standard (SDDS) also provides guideposts on what qualities or characteristics a metric ought to possess. Some of these are mentioned as under;

Legal environment	Relevance	Quality Management	Transparency
Ethical standards	Concepts	Scope of measurement	Classification
Valuation	Source data	Statistical techniques	Validation
Revisions	Consistency	Accessibility	

In brief, a country’s national account aggregates are produced by their statistical agencies that operate within the legislative and regulatory boundaries of the country. Thus, all statistical data such as population or enterprise census, industrial production, price collection, tax records, public finances, external sector transactions, etc., obtained either through the administrative system or surveys requires enabling legislative powers and an adequate administrative setup. Within the statistical system; data management, dissemination, documentation of techniques, manuals, accessibility are some of the essential requirements for maintaining quality and relevance of statistical products. Achieving these standards require statistical agencies to

regularly publish manuals, data sources, methods of estimation and dissemination policies. Across countries, these features are included in a Code of Practice of the statistical agency that is made available to users.

While improvements in data collection and coverage are largely an administrative matter, the improvements at a conceptual level can be understood from the historic versions of the SNA and the timeline in which countries have adopted the revisions of the SNA. Implementation of SNA has been staggered as most countries take time to realign their existing sources and methods to new conventions. Also new administrative challenges emerge as new data sources get included, which may or may not have a past. Thus, while incorporating new sources and methods aids in quality of estimation for future years, it poses several limitations for recreating estimates of previous years. It is generally accepted that recommendations of the SNA are taken as guideposts and each country is expected to align its sources and methods with its recommendations. However, for any statistical agency, it may not be possible to revise its existing methods within a short span of time. Thus, major overhaul and upgrades are made in a *base year revision* that takes into account limitations of previous base year series and new international conventions.

3 GDP estimation and the 2011-12 Base Year series

3.1 The change of Base Year

New developments in national accounts involve improvements in data capture, methodological changes and institutional practices. Most of these changes are considered as a major overhaul and also create a numerical and qualitative impact on the system. Thus, such changes are usually done *periodically* so as to reconstruct a new set of accounts with a reference point called as base year. However, new developments or changes made in a base year come with several complications. As new methods and data sources are used to capture a wider set of activities, the same when applied on the past can present a different picture as most new activities may not have existed in the past.

The primary reason for changing the base year of the national accounts periodically is to take into account the structural changes taking place in the economy. In India, the practice was to revise the base ever 5 years, so as to coincide with quinquennial rounds of the NSSO. However, since 2004-05, base year revision has been staggered due to several reasons. With the financial crisis of 2009-10, 2011-12 was chosen as the base year instead of 2010-11 and the updated series was released only in 2015. Since the last base year revision (2011-12), the Indian economy went through several structural, policy induced and economic crisis events. These changes however

could not be captured completely as either a normal year was not available to be considered as base year and NSSO rounds were not conducted routinely during the decade.

In the 2011-12 series several new conceptual and statistical features were introduced in line with the recommendations of the SNA 2008. These changes led to major revisions in the levels and growth rates of sub-sectors and thus aggregate GDP. Some of the important changes are summarized herein, which serves as a backdrop to understand the methodology in detail.

- By convention, in India, GDP referred to GDP at Factor cost, at constant prices. With the change in convention, the new terminology following SNA is to present “**GVA at Basic Prices**” and the new reference for GDP is “**GDP at Market prices**”. Primarily, the differences between the aggregates are based on the separation of Production and Product taxes, where, Production taxes are invariant with level of output, such as stamp duty, registration fees, etc and Product taxes are ad-valorem or indirect taxes, such as VAT or GST. The reference point for estimation can be arrived as under;

S. No	Item	Value
1	GVA at Factor Cost	
2	[Add:] Production Tax	
3	[Less:] Production Subsidy	
4	GVA at Basic Prices	$(1 + 2) - 3$
5	[Add:] Indirect Product Taxes	
6	[Less:] Product Subsidies	
7	GDP at Market Prices	$(4 + 5) - 6$

- In the dis-aggregated statements of the national accounts, the net of production taxes and subsidies is presented separately. Thus, it is possible to reconstruct the earlier aggregate of GDP at FC for comparative purposes. The difference between GDP FC and GVA BP is significant only for sub-sectors that have large subsidies, whereas at the aggregate the difference in levels (Rs.) is less than 5%.

Other conceptual changes

- In the 2011-12 series, a new class of assets; Intellectual Property and Cultivated Biological resources was added under Gross Capital Formation.
- Research and Development expenditure of government, public and private corporations has now been capitalized, hence is now a part of capital formation, whereas in the earlier series, it was treated as intermediate consumption. This change was based on the SNA recommendation that; the output of research and development should be capitalized as ‘intellectual property products’ except in cases where it is clear that the activity does not entail any economic benefit to its producer (and hence owner) in which case it is

treated as intermediate consumption (SNA 2008, para. A3.46)

- In case of Private Final Consumption Expenditures (PFCE) of Households, expenditure on Gold and Silver was earlier treated as *consumption expenditure*. In the 2011-12 series, these expenditures have been treated as savings and included in 'valuables' under capital formation.
- Non-financial and financial corporations, general government, public corporations and households are now shown separately in view of their intrinsic differences in economic activity and functions.
- Unincorporated enterprises which belonged to households but were maintaining books of accounts have been classified as '**Quasi corporations**' and are included in the Private Corporate Sector, instead of the Household sector. This shift led to an increase in the estimates of the private corporate sector and a drop in the household sector as compared to the 2004-05 series.
- Coverage extended to major municipal bodies and autonomous institutions extended as compared to the 2004-05 series.
- Major revision of methodology and estimates in few sub sectors: Registered Manufacturing - i.e. Change of method from **Establishment** to **Enterprise** in the manufacturing sector and use of MCA21 database in place of RBI sample of studies for the Private Corporate (Manufacturing) sector and the Annual Survey of Industries.
- A new **Effective Labor Input** method was introduced for estimating value added in the un-incorporated (i.e Household) manufacturing sector. This method is based on estimating GVA per worker using different marginal productivity of three types of workers, namely Owner, Hired and Helper. In the 2004-05 series, all workers were treated as homogeneous and the estimate was based on the average GVA per worker.
- Services sector now includes NBFCs, regulatory bodies and services of stock brokers, mutual funds, pension funds, etc. data on which in the 2004-05 series was limited or unavailable.
- **Output of RBI:** Previously, output of RBI was calculated as a mix of market and non-market output. The banking operations were considered as market activities and output of the issue department was taken as a non-market activity. In the new series, the entire output of RBI is considered as a non-market activity and is measured using the cost approach.
- SNA 2008 mentions two kinds of illegal activity:
 - activities that are not illegal per se, but which become illegal if carried out by unautho-

rized persons, e.g. unlicensed practitioners or unauthorized lotteries; and

- activities that are against national law regardless of who carries them out, e.g. illegal transportation in the form of smuggling of goods or people, the production of and trade in narcotics, human trafficking.

- Across countries, there are no direct estimates of such illegal activities and hence are not a part of estimation.

In terms of level changes, the 2004-05 and 2011-12 series showed considerable changes at the sub-sector level. Also, due to reclassification of economic activities, an exact mapping of the old and new sub-sector classification was not achieved. SNA recommendations are detailed and operate at a granular level. As a base year revision also makes several internal changes (i.e. other than those recommended by SNA), for a user it may not be possible to separate the effect of SNA recommendations and internal changes. It is also accepted that changes in sources and methods can lead to a revision in the levels (in currency terms) and growth rates in comparison to any previous series. However, statistical agencies usually provide the reasoning behind revisions on the premise that new sources and methods have either improved coverage, data, or the method.

Table 1 presents the differences at current prices for the year 2011-12 in both the old and new series. Comparing the level differences, few contentious areas were raised; (i) upward revision in manufacturing, Electricity, Gas & Water supply sector and (ii) major drop in trade sector. The single largest change happened in the retail, wholesale, hotels and restaurants sub-sector as the levels dropped by nearly 40%. These changes are primarily on account of (i) overestimation of growth of employment in these sectors in the 2004-05 series and changes in method of estimation from labor input to the Effective Labor Input method. (See CSO 2015c for a discussion on the method of estimation)

In case of the manufacturing sector the major change was due to the introduction of the MCA21 data set for the organized part of manufacturing and services, collective called as the private corporate sector. The MCA21 data set while enhancing the coverage of registered companies for estimation of value addition, capital formation and savings, introduced a new set of challenges in the process. Some of the key limitations of the data set were; (i) no clear identification of economic activity of the company for it to be classified as either manufacturing or services, no geographical indicators for it to be classified by state and (iii) no factor level details such as employment, production, output or input costs, etc. While some of these problems were addressed through new set of forms along with the financial statements, no effective resolution could be achieved. Some of these issues were subsequently highlighted in the report of the committee on Real Sector Statistics, CSO (2018). A more detailed discussion on the issues with the MCA21 database is presented in Section 7.

Table 1: Comparison of levels of sectors of the base year, 2004-05 & 2011-12 series, Rs. Crore (Current Prices)

				04-05 Sr	11-12 Sr	(Rs.)	
	Industry		Industry	2011-12	2011-12	Diff	*
1	Agri, FRST, FHG	1	Agri, FRST, FHG	14,99,098	15,01,947	0.19	
1.1	Agriculture	1.1	Crops	13,00,569	9,82,151	-	
		1.2	Livestock	-	3,27,334	-	
1.2	Forestry & LGG	1.3	Forestry, logging	1,31,667	1,24,436	-5.49	
1.3	Fishing	1.4	Fishing, Aquac.	66,862	68,027	1.74	
2	Mining, Quarr.	2	Mining, Quarr.	2,22,716	2,61,035	17.21	*
3	Manufacturing	3	Manufacturing	12,36,182	14,09,986	14.06	*
3.1	Registered			8,85,547	-	-	
3.2	Unregistered			3,50,635	-	-	
4	EGW	4	EGW, Other	1,35,670	1,86,668	37.59	**
5	Construction	5	Construction	6,89,798	7,77,335	12.69	
6	TR, HTL & Restr	6	TR, Rep, HTL, Restr.	14,57,565	8,83,582	-39.38	**
6.1	Trade & repair	6.1	Trade & repair	13,30,489	7,93,681	-40.35	***
6.2	Hotels & Restr.	6.2	Hotels & Restr.	1,27,076	89,901	-29.25	**
7	Transp., STR, Brdc	7	Transp, STR, Brdc.	6,14,707	5,29,534	-13.86	
7.1	Railways	7.1	Railways	62,710	61,150	-2.49	
7.2	Transp, other			4,56,754	-	-	
		7.2	Road transport	-	2,62,442	-	A
		7.3	Water transport	-	6,910	-	B
		7.4	Air transport	-	4,393	-	C
		7.5	Serv. inc transp.	-	63,602	-	D
7.3	Storage	7.6	Storage	5,496	5,108	-7.07	
7.4	Communication	7.7	Comm., BDcasting	89,747	1,25,930	40.32	***
8	Fin, Ins., RE, B. Serv	8	Financial Serv.	13,81,524	4,80,226	-	E
8.1	Banking & Insurance			4,81,495	-	-	
8.2	RE, Odwell, B.Serv	9	RE, Odwell,P.Serv.	9,00,029	10,50,651	16.74	F *
9	Community, P.serv.			11,54,431	-	-	
9.1	PBAdm. & Defence	10	PB Adm, Defence	4,98,346	4,91,155	-1.44	
9.2	Other services	11	Other services	6,56,085	5,34,827	-18.48	*
10	GDP FC (1 to 9)	12	GVA BP (1 to 11)	83,91,691	81,06,946	-3.39	

- Abbreviations: Agri, FRST, FHG are Agriculture, Forestry and Fishing, LGG is Logging, Aquac. is Aquaculture, EGW is Electricity, Gas and Water Supply, Other includes, remediation services, TR, REP, HTL, Restr are trade (wholesale and retail), Repair services, Hotels and Restaurants. Transp. STR, Brdc/ BDcasting are Transport, Storage and services related to Broadcasting, Comm. is Communication, RE, Odwell, P.Serv are Real Estate, Ownership of Dwelling and Professional Services, PB Adm. is Public Administration
- A,B,C,D are components of transport by other means (items 7.2 - 7.5) as shown in the 2011-12 series. E and F are reclassified sub sectors
- *, **, *** magnitude of revisions

4 Indian NAS and the process of compilation

In India, national account aggregates are compiled on the basis of the SNA guidelines. However, as the structure and data availability are operational constraints, estimation has its own unique features. In short, a **17 sector** classification i.e. broad economic activity classification is used and more than one method is followed, i.e. Income, Expenditure and Value Addition (Production). In cases where there are *non-market* activities or in cases where goods and services may not have a price (eg: services provided by general government), cost based methods are used. Estimates are presented at current and constant prices for different *institutional sectors*, i.e. **General Govt**, **Firms** (Public Corporations & Private Corporates) and **Households** and suitable price deflators, i.e. wholesale and retail (consumer price) indexes are used for deflating current price estimates to base year prices.

4.1 Structure and Composition

In order to visualize the process, it is useful to situate the economy into economic activity and institutional sectors. Economic activity classification is based on the National Industrial Classification (NIC) 2008 that groups several economic activities, ranging from agriculture to services. The NIC follows a hierarchical structure, where each broad activity is further divided into sub-categories, represented by sector and sub-sector codes. The highest level of aggregation is at 2 digit, whereas sub-sectors can be identified at 3,4 or 5 digits. The advantage of NIC is that the same structure is followed for other aggregates such as; employment, enterprise surveys, or price series.

The other side of the classification is/are the institutional sectors, where, General Government comprises of the legislative and administrative setup such as ministries, departments of all levels of the government; central, state and local bodies. It also includes autonomous bodies that receive grants or financial support from the government. The information about General Govt. is available from their annual budgets that are presented in legislative assemblies or parliament and the task is to identify the *type of expenditure that goes as final consumption expenditure, capital expenditure, transfers and other financial and external transactions*.

To aid the process, a system called the Classification of Functions of Government (CoFoG) is used to classify and identify various types of expenditures. Details of expenditure are usually available in the expenditure budget of the government and the final figures are available in the Finance Accounts after the audit is conducted by the Comptroller and Auditor General of India (CAG).

Departmental Enterprises (Railway, Post, Ordnance Factories, etc.) are part of the government in the sense that they are owned, managed and controlled by respective ministries. The information about such enterprises is also available from the budget and the task again is to identify production, intermediate costs, taxes, capital expenditure, etc. Non-Departmental (commercial) Enterprises (eg: BSNL, erstwhile Air India) are incorporated entities such as companies (under the Companies Act) and may be listed on the stock exchange. Information about their revenue, profit, assets etc. is available from their financial statements and annual reports.

Private Corporate sector comprises of entities that are incorporated as companies (financial or non-financial) (or limited liability partnerships, etc.) that may or may not be listed on the stock market. Companies are required to file their annual financial statements (Profit & Loss Statement, Balance Sheet and other mandatory disclosures) as per the Companies Act, with the Ministry of Corporate Affairs (MCA).

The information on the corporate sector is available from the master database of such financial statements (MCA21). With financial statements, the task in contrast to general government is to estimate *value of output, intermediate cost and taxes* for compiling value addition. Other major aggregates include savings and capital formation in the private corporate sector. The actual process has more complications as the statistical system has to deal with non-filing by companies, winding up, diversified enterprises that do a multitude of activities and operate in a number of geographic locations.

Households are the reminder and perhaps that largest in proportion to other institutional sectors. SNA 2008 defines households as [SNA: 2.17] ‘institutional units consisting of one individual or a group of individuals. All physical persons in the economy must belong to one and only one household. The principal functions of households are to supply labor, to undertake final consumption and as entrepreneurs, to produce market goods and non-financial (and possibly financial) services. The entrepreneurial activities of a household consist of *unincorporated* enterprises that remain within the household except under certain specific conditions.’

Another distinguished type is called NPISH, i.e. Non-profit institutions serving households (NPISHs) which are legal entities engaged in the production of non-market services for households or the community at large and whose main resources are voluntary contributions. (example: charity organizations, section 25 companies in the Indian case).

Tables 2 and 3 present the size and composition of the total economy as observed in the national accounts. The figures are of GVA at Basic Prices for each institutional sector operating across different economic activities. The change in these shares is mapped to 2021-22 to capture the changes in the economy as reflected in the national account aggregates.

Table 2: Estimates of GVA by sectors & Institutions, 2011-12 (**Base year**), Rs. Lakh Cr.

S.No	Sectors	Institutions					Total	% Share
		GG	DE	NDE	Pvt. C	HH		
1	Agri+Fi+Fs	-	0.40	0.02	0.37	14.26	15.06	18.37
2	M & Qry.	-	-	1.62	0.44	0.57	2.63	3.21
3	MANF	-	0.27	1.06	11.69	1.80	14.82	18.08
4	El., Gas, WS	0.19	0.10	1.11	0.48	0.06	1.94	2.37
5	CONST	0.43	0.12	0.03	1.32	5.85	7.74	9.45
6	TR, RE, HT, RS	-	0.00	0.20	3.67	4.95	8.83	10.77
7	TRNS, STR, COMM	-	0.77	0.53	1.93	2.08	5.30	6.47
8	FinServ.	-	0.06	2.44	2.30	-	4.80	5.86
9	RE, OWD,PS	-	0.02	0.03	4.59	5.95	10.59	12.93
10	PB. Adm.	4.92	-	-	-	-	4.92	6.01
11	OTH Serv	2.39	-	0.01	1.65	1.27	5.31	6.48
	GVA BP (Lk. Cr.)	7.95	1.72	7.05	28.44	36.79	81.96	100.00

Table 3: Estimates of GVA by sectors & Institutions, Current Prices, 2021-22, Rs. Lakh Cr.

S.No	Sectors	Institutions					Total	% Share
		GG	DE	NDE	Pvt.C	HH		
1	Agri+Fi+Fs	-	0.01	0.01	0.86	34.04	34.93	19.47
2	M & Q	-	-	1.70	0.66	0.92	3.28	1.83
3	MANF	-	0.39	1.83	22.08	2.86	27.16	15.13
4	El. Gas, WS	0.47	0.07	2.76	1.41	0.36	5.06	2.82
5	CONST	0.64	0.18	0.08	2.32	10.00	13.22	7.37
6	TR, RE, HT, RS	-	-	0.47	7.99	9.78	18.29	10.20
7	TRNS, STR, COMM	-	0.68	0.63	4.49	3.70	9.50	5.29
8	FinServ	-	0.12	4.82	5.95	-	10.88	6.07
9	RE, OW, PS	-	-	0.06	16.21	14.01	30.28	16.87
10	Pub AD	12.38	-	-	-	-	12.38	6.90
11	OTH Serv	6.44	-	0.01	4.82	3.17	14.45	8.05
	GVA BP (Lk. Cr.)	19.94	1.50	12.36	66.79	78.84	179.43	100.00

- Abbreviations: Agri, FRST, FHG are Agriculture, Forestry and Fishing, LGG is Logging, Aquac. is Aquaculture, EGW is Electricity, Gas and Water Supply, Other includes, remediation services, TR, REP, HTL, Restr are trade (wholesale and retail), Repair services, Hotels and Restaurants. Transp. STR, Brdc/ BDcasting are Transport, Storage and services related to Broadcasting, Comm. is Communication, RE, Odwell, P.Serv are Real Estate, Ownership of Dwelling and Professional Services, PB Adm. is Public Administration
- GG is General Govt., DE and NDE are Departmental and Non-Departmental Enterprises, Pvt. C is Private Corporate and HH is Household sector

Percentage share by institutional sectors in overall GVA (2011-12 Series)

Institution	% Share in Total GVA	
	2011-12	2021-22
General Govt.	9.70	11.11
Departmental Enterprises (DE)	2.10	0.84
Non-Departmental Enterprises (NDE)	8.61	6.89
<i>Public Sector</i>	20.41	18.84
Pvt. Corporate Sector	34.70	37.22
Households	44.89	43.94
Total	100.00	100.00

The change in size and composition over the decade highlights few points for consideration.

- Within the institutional sectors, the highest share in GG is of Public Administration & Defense
- Highest share of HH is in Agriculture, Fishing, while the highest share of Pvt. Corp. is in Manufacturing
- Highest share of DE is in Transport & Communication, while the highest share of NDE is in Financial Services sector
- Over the decade, the size of GG has increased to 11.12%, while the size of DE and NDE has shrunk to 0.84% & 6.89% respectively.
- During the period, Pvt. corporate increased to 37.22% and the household sector remained roughly same at 43.95% of the aggregate economy

While these changes are expected to reflect the structural shifts in the economy the compilation has several limitations. For instance, apart from the base year, the information on the household sector is unavailable in any given year, or on a routine basis. Thus, base year estimates have to be extrapolated using relevant indicators. Such a process has two concerns; (i) the size of household sectors is nearly 45% of aggregate GDP, for which there is no direct estimation in any given year and (ii) the indicators used for extrapolation are primarily from the organized sector, thus superimposing the growth rates of the organized on the un-incorporated or household sector. Thus, level estimates and compositional changes do not entirely reflect the size and growth of the household sector on a yearly basis. As current year estimation moves far from the base year estimates, the errors get compounded and the estimates lose accuracy.

These limitations are brought out more subtly in the sector-wise details of estimation as practiced in the national accounts. The next sections summarize the procedure with the necessary details for the production and expenditure side estimates.

4.2 Sources and Methods

Sources and Methods are grouped into five institutional sectors and two parts - namely method followed and data used or available for estimation. To being with, the broad coverage of the institutional sectors is mention which acts as the universe for the scope of estimation for that particular sub-sector.

Table 4: Types of Enterprises under Organized & Unorganized Sectors, 2011-12 Series

I.	Organized Sector
(a)	<i>General Government</i>
(b)	<i>Public Financial/ Non-Financial Corporations</i>
1.	Dept. Enterprises (DE) or Dept. Commercial Undertakings (DCU)
2.	Non-Dept. Commercial Undertakings (NDCUs or NDE)
(c)	<i>Private Financial/ Non-Financial Corporations</i>
1.	Private Incorporated Enterprises
2.	Quasi-Corporations, including;
(i)	Crop plantations, other than those covered in Pvt. Corp. Sector
(ii)	Unincorporated Enterprises covered in Annual Survey of Industries
(iii)	Unincorporated Enterprises of manuf., not covered in ASI but maintain accounts
(iv)	Co-operatives providing non-financial services
(v)	Unincorporated Enterprises providing non-financial Serv. maintaining accounts
(vi)	Unorganized Financial Enterprises
II.	Households or Unorganized Sector
a.	Enterprises not covered in 'I', i.e, all non-Government Unincorporated Enterprises not classified as Quasi Corporations and includes <i>Non-Profit Institutions serving Households</i> (NPISH)

Source: NSO (2015)

Estimates for all major aggregates are first compiled at current prices and suitable price deflators are applied across sectors. Deflators are applied at the lowest level of aggregation possible (i.e. economic activity level) as available from the Wholesale and Consumer Price Index (WPI, CPI) groups. In case of agriculture, prices of outputs (crops) and input (seed, feed, irrigation, etc.) items are available for the base year hence the same are used to compile the constant price estimate. In principle, the method is of a *double deflator*, where output and input prices are available separately. In case of other sectors the final value added (which is a residual of Output - Input - Taxes) is deflated by an output price deflator (i.e. WPI or CPI). Thus, this method is a *Single deflation* method, where value added is deflated by a representative output price index.

For all practical purposes, the broad method followed for each institutional sector is as under.

Ins. Sec.	GG	DE	NDE	Pvt. Corp	HH
Method	Income	Income	Production	Production	Extrapolation from base yr.
Data	Budget	Budget	Ann. Reports	MCA21	Unincorp. Survey

- **Production Approach:** In this approach, first the value of total production is estimated, which constitutes the Gross Value of Output (GVO) and value of Intermediate Consumption (IC) is deducted to arrive at Gross Value Added (GVA). This approach is typically followed for commodity producing sectors like, Agriculture (including Livestock), Forestry, Fishery, Mining & Quarrying and Manufacturing
- **Income Approach:** In this method, the income accrued to the factors of production like, land, labour and capital in the form of factor payments, i.e. rent, wages and salary (including any social security benefits), interest and profit (or loss, as a residual) of the entrepreneur are used for arriving at total value added. This method is typically followed for sectors such as; Electricity, Gas and Water Supply, parts of Trade, Hotels & Restaurants, Transport, Storage & Communications, Financing and Insurance, Real Estate, Ownership of Dwellings, Professional Services, Public Administration and other personal services. The income approach is a distribution of total value added into its components, i.e. factor incomes, however, separate estimates of factor shares are not presented.
- **Expenditure Approach:** This method measures income at the stage of disposal, i.e. similar to accounting for final expenditures. This method based on the commodity flow approach is adopted for estimation of value added in the Construction Sector.

4.3 Details of estimation

Given the institutional sectors, economic activity wise method of estimation is elaborate in the sense that it has to account for all institutional sectors and the sum of value added thereof is the estimate of that sector. The process is further split into (i) coverage of activities and (ii) method and (iii) available data. In cases where no data is available on either output or cost, base year or fixed proportions are applied and value added is computed.

As earlier, estimates of the public and private sector are prepared from expenditure available in the annual budgets of central and state governments and the financial statements of registered companies in the MCA. For the household sector, primarily, base year estimates are extrapolated using indicators as annual information from surveys, local area statistics, etc. are not available with the NSO.

4.3.1 Agriculture and Allied Activities

Agriculture and allied activities are part of the Primary sector that includes; crops (both subsistence and commercial), government irrigation system, mining, forestry, farming, grazing, fishing and quarrying. The packaging and processing of the raw materials associated with this sector is also a part of this sector.

4.3.2 (a) Crops

The economic activities included in are:

- (i) Growing of field crops, nuts, seeds, fruits, vegetables and medicinal plants
- (ii) Management of tea, coffee and rubber plantations
- (iii) Floriculture
- (iv) Agricultural and horticultural services on a fee or on contract basis such as harvesting, baling and thrashing, preparation of tobacco for marketing, pest control, spraying, pruning, picking and packing
- (v) Foreyard and backyard cultivations
- (vi) Ancillary activities of cultivators such as gur making, transportation of own produce to primary markets, activities yielding rental income from farm buildings and farm machinery and interest on agricultural loans
- Government irrigation system comprises supply of water through various Government channels to the agriculturists

Estimates are prepared at crop level for major and minor crops. Output and prices of crops is made available from the Dept. of agriculture and input prices of feed, seeds, irrigation, power, etc. are also collected from various centers.

Estimates of GVA from crops sector including operation of Government irrigation system are prepared by using the production approach. In case of crops, the estimation of GVA at current prices involves evaluation of gross value of the products, by-products and ancillary activities at the prices received by the producers and deducting the value of inputs of raw material and services consumed. In case of irrigation by Government sources, the total factor income generated as a result of providing the irrigation services is estimated. For constant prices, the same process is adopted with prices of the base year, i.e. 2011-12.

4.3.3 (b) Forestry and Logging

Forestry and Logging is a sub-sector that deals with a host of economic activities related to forests, namely;

- (i) Forestry (e.g. planting & conservation of forests, gathering of forest products)
- (ii) Logging (e.g. felling and rough cutting of trees and transportation of forest products for commercial sale)
- (iii) Farmyard/ industrial wood & fuel wood collected by the primary producers from trees outside regular forests
- By convention, forest products are classified into two broad groups, viz. (a) *Major Products* comprising industrial wood (timber, round wood, match and pulp wood) and fuel wood (fire wood and charcoal wood) and (b) (Non Timber) *Minor Products*, comprising a large number of heterogeneous items such as bamboo, sandal wood, charcoal, lac, fodder, honey, resin, gum, tendu leaves, etc.

Industrial Wood: The quantity and value of Timber (logging/ sale) are provided by the Forest Development. For

produce outside these forests, a norm of 10% of recorded production provided by Forest Survey of India is used to account for their production. For non-timber products such as; bamboo, tendu leaves, grass & grazing, gum, etc. the valuation is provided by the Forest Dept.

Fuel wood: The quantity/output of fuel wood is estimated through consumption approach, as reliable estimates on production of fuel wood are not available. Firewood quantity is worked out by applying the consumption rate of firewood chips (from the results of NSS 68th round). For subsequent years, the value is worked out by applying the growth observed in quantity of firewood consumption of NSS 61st round (2004-2005) and 68th round (2011-12). The value of agriculture by-products viz. cotton stick, arhar stick, jute stick & bagasse which has already been taken into account in crop sector is netted out and the estimates are then inflated by 7.64% (as per the Sources & Methodology given by NSO) to account for consumption of fuel wood by industries & religious purposes.

4.3.4 (c) Fishing and aquaculture

Activities covered in the Fishing sector are:

- (i) Commercial fishing in (a) ocean, coastal and offshore waters & (b) inland waters, that include catching, tackling and gathering of fish from rivers, irrigation and other canals, lakes, tanks, fields, etc.
- (ii) Subsistence fishing in land waters and artificial ponds
- (iii) Gathering of sea weeds, sea shells, pearls, sponges and other ocean and coastal water products.
- (iv) Fish curing viz., salting and sun drying of fish

(v) Production of prawn

- The estimates of catch (i.e. fish production) are made available from the Fisheries dept. Costs ****

4.3.5 Mining and quarrying

The methodology for compilation of GVA from major minerals was revised in the 2011-12 series. In the 2004-05 series, estimates of production and input costs were taken from the Indian Bureau of Mines (IBM), whereas in the 2011-12 series, GVA at basic prices is computed first at the all-India level using the annual financial statements of public sector companies, MCA21 database for the annual reports of private sector companies and input rates of major minerals supplied by IBM Nagpur and subsequently allocated to States on the basis of suitable indicators. An indirect estimate of the value of output of extraction of sand at basic prices is derived through the value of commodities used for construction.

4.3.6 Manufacturing

Manufacturing sector covers activities in organized and unorganized sector, which have compiled using different databases, such as; (i) Budget document of Govt., (ii) Annual accounts of Public sector companies, (iii) MCA21 database for annual reports of private sector companies and (iv) the Annual Survey of Industries (ASI).

First, *Organized Manufacturing* - Estimates are derived using the annual accounts of Non Departmental Enterprises (NDE), Private corporate sector from MCA database and quasi corporations as covered by ASI, apart from the Departmental Enterprises (DEs), like Railway Workshops, GOI Printing Press and Ordnance Factories. ASI captures the data by type of organization such as private and public limited companies, NDEs, proprietary and

partnership factories, Hindu Undivided Family, KVIC etc. Annual accounts of DEs, NDEs and Private Corporate Sector being already available, the estimates relating to the Non-Government unincorporated enterprises, which include partnership and proprietorship enterprises in ASI have been estimated and are classified as quasi-corporations. These enterprises being small in size, their coverage from ASI has been treated as of enterprise even if the data is collected through establishment approach.

In addition, in accordance with the recommendation of SNA 2008, unincorporated manufacturing enterprises maintaining accounts are quasi-corporations and therefore, their estimates have been included in organized manufacturing. For obtaining estimates of GVO/GVA by compilation category in the case of private corporate sector, the estimates as obtained as the sum of all enterprises have been apportioned using the corresponding share in ASI.

Second, *Unorganized Manufacturing* - The unorganized manufacturing consists of household enterprises. In the 2011-12 series, the effective labor input method has been used for compilation category-wise estimation of base year GVA of unincorporated manufacturing enterprises at all India level from the NSS 67th round Survey on Unincorporated Enterprises, 2010-11 and NSS 68th round Employment Unemployment Survey, 2011-12. For the year when ASI is not available, the proceeding year estimates are moved using IIP and WPI.

4.3.7 Electricity, gas, water supply & oth. utility serv.

Economic activities in this broad sector include; (i) Generation, transmission and distribution of electricity, (ii) Manufacture of bio-gas and supply of gas through pipelines, (iii) Collection, purification and distribution of

water for domestic and industrial consumers. Irrigation systems are excluded from this sector as they have been covered within Agriculture in the crop sector. Also, the output of Liquefied Petroleum Gas (LPG) is not covered as it has been included under the manufacturing sector, as the production of LPG is a manufacturing activity and (iv) Remediation and other utility services has been introduced as a new group in the 2011-12 series.

Electricity:

- The estimates are compiled using the production approach. Specifically, estimates are compiled through the *enterprise* approach by aggregating the estimates for DEs, NDEs and companies in the private corporate sector. The all-India value added from public corporations (DEs and NDEs) are compiled using their respective budget documents and annual reports. The base year (2011-12) estimates of GVA from electricity sub-sector are being moved to the subsequent years by the quantum index electricity consumption.

Gas

- In comparison to the 2004-05 series, the methodology and estimates are compiled by following same production approach through by aggregating the estimates for NDEs, companies in the private corporate sector and manufacturing of gas in households through bio-gas plants (gobar gas), whereas the estimates for go-bar-gas have been classified under the Households sector.

Water Supply

- The value added estimates for Water Supply are obtained by aggregating for State Administrative Department, companies in the private corporate sector and private unincorporated enterprises (unincorporated enterprises). As part of state activities, the data regarding

wages, salaries and other benefits for those urban areas in which the water supply services are maintained by the municipal committees/ corporations is obtained from their annual budgets. The total expenditure on water supply services obtained from the State Budget and municipal committee budgets is treated as net product from water supply services in the public sector.

Remediation and other utility services

- The estimates for this sector are compiled by aggregating the estimates for recycling, sewerage, sanitation and other waste management services. The National estimates for recycling in the organized sector (public and private) are obtained from ASI, while those for the remaining services (sewerage and sanitation) of organized sector are compiled by aggregating the estimates of DEs obtained from analysis of budget document and estimates of the private corporations compiled using MCA21 data base. The all India estimates for the unincorporated enterprises are estimated using the NSS 67th round Survey on Unincorporated Enterprises, 2010-11 and NSS 68th round Employment and Unemployment Survey, 2011-12. The unincorporated enterprises are classified as quasi-corporations, if they are maintaining the accounts and otherwise, as household enterprises. For the year where ASI is not available, previous year's estimates are extrapolated using IIP and WPI.

4.3.8 Construction

The economic activities covered in this sector are construction of buildings, alteration, addition, repair and maintenance of buildings, construction and maintenance of roads, bridges, tunnels, rail bridges, airfield runways

and construction of other utility projects.

- Estimates of construction sector are prepared using commodity flow approach. The estimates of GSVA for General Government, DCUs, NDCUs, households and residual are prepared separately. Details are as under;
- *General Government*: Estimates of Net State Value Added (after deducting CFC) for public part of the sector are prepared using the information from the central and state budgets. Estimates for the Local Bodies are prepared using the financial statements of the local bodies. GSVA/NSVA for Central Govt. is allocated to States by NSO.
- *Dept. Undertakings*: All India GVA of DCU (Railways Construction) is on the basis of outlays on construction assets of Railways.
- *Non Dept. Commercial Undertakings*: GVA estimate of NDCUs are provided by analyzing the Central and States annual reports of NDCUs (construction companies) and after appropriate allocation of central NDCUs to States.
- *Household sector*: Results of All India Debt and Investment Survey (AIDIS) 2013 is used for compilation of base year estimates of output of Rural Residential Building (RRB), Urban Residential Building (URB) and Non Residential Buildings & Other Construction (NRB & OCW). For later years of new series (base 2011-12), the estimates of RRB and URB are first compiled at constant price (2011-12 price), using yearly inter-census year growth rate of dwellings. Weighted index of RRB and URB is used to arrive at the current price estimates. These weighted indexes of RRB and URB are compiled using price indices of different items, such as;

RRB - Price of Cement, Iron & Steel,

Bricks, Timber and CPI (Rural) URB - Price of Cement, Iron & Steel, Bricks, Timber, Wages of Urban Labor, Index of Fixture & Fittings, Index of Other Materials

- GVA estimates of RRB, URB and NRB& OCW for base year (2011-12) is compiled by applying GVA to Output Ratio (applied on output).

Residual: Residual estimate consists of Private Corporations and other residual part of public sector. General Pucca Construction index compiled using price indexes of Cement, Iron & Steel, Bricks, Timber, Wages of Rural and Urban Labor, Index of Fixture & Fittings, Index of Other Materials is used as deflator to arrive at constant price estimates General Government, DCU, NDCU, Plantation and Residual part.

4.3.9 Trade & repair services

Trade and Repair Services includes wholesale and retail trade and repair of motor vehicles and retail sale of automotive fuel, wholesale and retail sale of lottery tickets.

- Trade and Repair Services - The major sources of data utilized are; (i) Budget document for estimates of public sector, (ii) Annual accounts of public trading enterprises, (iii) MCA 21 database for annual reports of private sector companies, (iv) NABARD publication, Statistical Statements Relating to Cooperative Movement in India, 2004-05 and (v) NSS 67th (Enterprises Survey (ES) 2010-11) and 68th round (Employment Unemployment Survey (EUS), 2011-12)
- Trade and Repair Services - GVA estimates for public sector are prepared by analyzing the budget documents and the annual accounts of public trading enterprises. Estimates for private cor-

porate are prepared using MCA21. Estimates for the quasi-corporations and unorganized sector derived using Labor Input method.

4.3.10 Hotels & Restaurants

Economic activities covered include; services rendered by hotels and other lodging places, restaurants, cafe, etc. Activities also include camping grounds, recreational vehicle parks/trailer parks and other accommodation provided by student residence, workers hotels/boarding houses, wherever available.

- Hotels and Restaurants - The major sources of data utilized are; (i) Budget document for estimates of public sector, (ii) Annual accounts of public sector companies, (iii) MCA 21 database for annual reports of private sector companies, (iv) NSS 63rd round (Enterprises Survey (ES) 2006-07), (iv) NSS 67th (Enterprises Survey (ES) 2010-11) and 68th round (Employment Unemployment Survey (EUS), 2011-12). Value added estimates for public sector are prepared using estimates from annual budgets and accounts of public trading enterprises/corporations. Estimates for private corporate are prepared using MCA21. The GVA estimates for unorganized sector are prepared using the Effective Labor Input method using the NSS 68th round and GVAPW from NSS 67th round.

4.3.11 Real estate, ownership of dwelling & professional services

Coverage of economic activities in this sector are;

- Real estate activities
- Computer & information related services - Repair of computers and Software publishing are not included in

this sector in new series and moved to Trade & Repair Services and Communication & services related to broadcasting respectively

(iii) Professional, scientific and technical activities including R&D

(iv) Administrative and support service activities and other professional activities - New category formed out of re-classification from the 2004-05 series. This category includes all administrative and support service activities, including legal and accounting activities.

(v) Ownership of dwelling (occupied residential houses), which includes the housing services generated from rented residential houses, also includes the imputed value of owner occupied dwellings. Services rendered by non-residential buildings are considered to be a subsidiary activity of the industries, which occupy the buildings and therefore are not included in this sector.

- Data used for estimates in the sector includes; (i) Budget document of Central and State government, (ii) Annual reports of public sector companies, (iii) MCA 21 database for annual reports of private sector companies, (iv) Population census 2011(Data on dwellings and rent per dwelling for urban areas), (v) AIDIS 2013, (vi) NSS 67th (Enterprises Survey (ES) 2010-11) and 68th round (Employment Unemployment Survey (EUS), 2011-12)
- The estimates of public sector are compiled from the budget analysis and annual reports of public sector companies. Estimates for private corporate are prepared using MCA21 database (except for ownership of dwelling). The GVA estimates for unorganized sector prepared using the effective Labor Input method using the NSS 68th round and

GVAPW from NSS 67th round.

- Value added estimates for ownership of dwelling of urban areas are estimated as gross rental (actual rent paid and imputed rent for ownership of dwelling) of the residential census houses less cost of repair and maintenance. Gross rental for urban part is obtained as rent per household (NSS 67th round) multiplied by projected number of dwellings for current year as per census 2011.
- Gross rental for rural areas is estimated through user cost approach, using the capital stock of rural residential buildings. At constant prices gross rental is obtained as rent per household for base year multiplied by number of dwellings for current year. Repair and maintenance is deflated using CPI (Misc.) and is subtracted from gross rental to arrive at GVA estimate at constant prices.

4.3.12 Transport

For estimation, the major sources of data utilized are; (i) Railway Budget, (ii) Annual reports of NDEs and (iii) MCA21 database for annual reports of private sector companies. Value added estimates for public sector are prepared using the budget documents and the annual financial statements of NDEs. As earlier, estimates for private corporate are prepared using MCA21 database. Base year estimate moved with combined indicator of passenger Kms and net tonne Kms, combined with their earnings in the base year as weights. Economic activities include; (i) Railways, (ii) Road Transport, (iii) Water Transport, (iv) Air Transport and (v) Services incidental to transport. For the respective sub-sector;

Road Transport - Activities related to passenger and freight road transport, motorised and non motorised transport. *Water Transport* - Activities related sea and coastal passenger and freight water transport, inland passenger

and freight water transport. *Air Transport* - Passenger and Freight transport. *Services incidental to transport* - Incidental services such as car parking, support services at bus station, lighthouse activities and operation of terminal facilities

4.3.13 (a) Railways

The method of estimation continues to be same as followed in the erstwhile 2004-05 series. The estimates of GVA are prepared by the income approach in case of DEs and production approach in case of NDEs and private corporate companies. The all India GVA is compiled using the Annual Railway Budget in case of DEs and Annual reports in case of NDEs. Estimates of Railway operated by the private companies, (freight, etc.) are prepared using their financial accounts from the MCA21 database. The constant prices estimates at the all India level are estimated using the Implicit Price Deflator (IPD).

4.3.14 (b) Road transport

The data sources utilized are (i) Annual accounts of State road transport corporations, (ii) MCA 21 database for annual reports of private sector companies, (iii) NSS 67th (Enterprises Survey (ES) 2010-11) and 68th round (Employment Unemployment Survey (EUS), 2011-12). The analysis of profit and loss account provides the estimates for state road transport corporations. Estimates for private corporate are prepared using MCA21 database. The GVA estimates for unorganized sector prepared using the effective Labor Input method using the NSS 68th round and GVAPW from NSS 67th round. The GVA for the year 2011-12 is moved to subsequent years on the basis of the index prepared using number of registered vehicles in the State/UT.

4.3.15 (c) Water transport

The data sources utilized are; (i) Annual accounts of Public sector/ shipping companies, (ii) MCA 21 database for annual reports of private sector companies and (iii) NSS 67th (Unincorporated Enterprises Survey (ES) 2010-11) and 68th round (Employment Unemployment Survey (EUS), 2011-12) for the household sector. Value added estimate of public part uses the water transport part of budget documents and annual accounts of Public Shipping companies. Estimates for private corporate are prepared using MCA21 database. The GVA estimates for unorganized sector prepared using the effective Labor Input method using the NSS 68th round and GVAPW from NSS 67th round. CPI (Transport and Communication) for the State is used as a deflator to arrive at constant price estimates.

4.3.16 (d) Air transport

The estimation is primarily based on MCA21 database for annual financial statements of the private sector companies. CPI (Transport and Communication) for the State is used as a deflator to arrive at constant price estimates.

4.3.17 (e) Services inc. to transport

Estimates of Services incidental to transport are based on data from; (i) Annual accounts of companies engaged in services incidental to air and water transport, (ii) MCA 21 database for annual reports of private sector companies and (iii) NSS 67th (Enterprises Survey (ES) 2010-11) and 68th round (Employment Unemployment Survey (EUS), 2011-12). The GVA estimate for unorganized part are prepared using the effective Labor Input method using the NSS 68th round and GVAPW from NSS 67th round. The GVA for the year 2011-12 is moved to subsequent years on the basis

of the combined growth observed in road, water and air transport for the corresponding years.

4.3.18 Storage

The economic activities covered in this sector are; (i) Warehousing Corporations, (ii) Cold Storage and (iii) Storage not elsewhere classified, which are based on data availability from; (i) Budget document of Central and State government, (ii) MCA 21 database for annual reports of private sector companies, (iii) NSS 67th (Unincorporated Enterprises Survey (ES) 2010-11) and 68th round (Employment Unemployment Survey (EUS), 2011-12). The estimates of public sector are compiled from the Budget analysis of the State & Central Government. Estimates for private corporate are prepared using MCA21 database. The GVA estimates for unorganized sector are compiled using the effective Labor Input method using the NSS 68th round and GVAPW from NSS 67th round.

4.3.19 Communication & services related to broadcasting

A new category Recording, publishing and broadcasting services was included in this category. The economic activities covered in this sector are postal and courier services, activities of cable operators, telecommunication and recording, publishing and broadcasting services. Data used for the purpose are; (i) Budget document of Department of Posts, (ii) Annual accounts of Non-Departmental Commercial Enterprises (NDE) i.e. BSNL, MTNL, (iii) MCA 21 database for annual reports of private sector companies, (iv) NSS 67th (Unincorporated Enterprises Survey (ES) 2010-11) and 68th round (Employment Unemployment Survey (EUS), 2011-12)

The estimates of public sector are compiled from the Budget of the Central Government

and analysis of annual accounts of NDEs. Estimates for private corporate are prepared using MCA21 database (for telecommunication, activities of cable operators and recording, publishing & broadcasting services). The GVA estimates for unorganized sector prepared using the effective Labor Input method based (Except for telecommunication - Labor input method) using the NSS 68th round and GVAPW from NSS 67th round.

4.3.20 Financial services

The data set used for the purpose is limited to (i) Budget document of Central and State government, (ii) Annual reports of public sector companies and (iii) MCA 21 database for the private corporate sector. Typically, all India GVA estimates are prepared for following categories; viz.

- Scheduled Commercial Banks (SCB)
- Non-Banking Financial Corporations
- Non-Banking Financial Companies (NBFC)
- Post Office saving banks (accounts)
- Co-operative credit societies
- Insurance Corporations
- Banking Department of the Reserve Bank of India (RBI)
- Employees Provident Fund Organization (EPFO)

4.3.21 Public administration

The economic activities of the Public Administration & Defence services cover services rendered by the administrative department of the general Government i.e. Central & State Government, Union Territories, Municipal Corporations, Municipalities, Housing Boards, Cantonment Trusts, Improvement Trusts, Zila Parishads /District & local boards and Panchayati Raj Institutions.

Data used for preparing estimates include; (i) Budget document of Central and State Gov-

ernment, (ii) Annual accounts of local bodies, i.e. Urban (Municipalities) and Rural (Panchayats) and (ii) Annual Financial Accounts of Autonomous Institutions (Center/ State). The estimates of public sector are compiled from the Budget analysis of the Central and State Government and analysis of annual accounts of local bodies and autonomous institutions.

4.3.22 Other services

In this sector, the coverage of economic activities relate to; (i) Education services, (ii) Human health & care services, (iii) Recreation, cultural and sporting activities, (iv) Activities of membership organizations, (v) Personal services including washing, hair dressing, custom tailoring, etc., (vii) Private households with employed person.

The 2011-12 series reclassified some categories such as; Sewerage & refuse disposal, Veterinary services and were included as a part of utility services in the Electricity, Gas, Water Supply and professional services categories. The major sources of data utilized are; (i) Budget document of Central and State Government, (ii) Annual reports of public sector companies, (iii) MCA 21 database for annual reports of private sector companies and (iv) NSS 67th (Enterprises Survey (ES) 2010-11) and 68th round (Employment Unemployment Survey (EUS), 2011-12).

Primarily, the estimates of public sector are compiled from the budget of the Central and State Government and the annual accounts of public sector companies, whereas the estimates for private corporate are prepared using MCA21 database. As earlier, the GVA estimates for unorganized sector are prepared using the Effective Labor Input method based on the NSS 68th round and GVAPW from NSS 67th round. Estimates for Educational services, Human health & care services, private households with employed persons and remaining service (including all other activities)

are prepared separately. As it is not possible to identify the households with employed persons as an enterprise, the value added generated by this activity includes wages paid to employed persons by the households. The value added per worker is estimated on the basis of wage/compensation as available in the NSS 68th round Employment Survey.

Available Statements

- NAS provides disaggregated statements of estimates of value added by sectors and economic activities. In the 2004-05 series, NAS also provided statements on detailed transactions of the Public Sector, which has been discontinued in the 2011-12 series.
- Estimates of factor incomes are not compiled, hence not available.
- Estimates by the production side sum to *GVA at Basic Prices*, whereas estimates from the expenditure sum to *GDP at Market Prices*. NAS does not provide the component of *taxes on products* by sectors (economic activity) and is only available from the Input-Output tables.

5 Expenditure side estimate of GDP

NAS provides expenditure side GDP estimates which are based on the conventional macroeconomic identity of $GDP = PFCE + GFCE + GFC + X - M$, measured at market prices. Expenditure side components are;

- **Consumption:** of private households on goods and services (**PFCE**) and NPISH
- **Government Exp.** Expenditures on goods and services that the govt. consumes in providing public services. Example, direct purchases of material, labor, etc. (**GFCE**)
- **Gross Capital Formation**
 - Final purchases of machinery, equipment and tools by business
 - Construction: New and repairs
 - Changes in inventories (Physical stocks)
 - Valuables
- **Exports and Imports (X-M)**

The balancing item between the production side estimate of value added (and taxes) and the expenditure side estimate is shown as *Discrepancies*. While the expenditure side estimates are presented separately, there are several qualitative limitations to its aggregates.

- Expenditure side estimates are not derived independently of the production side. Within the components, Govt. Final Consumption Expenditure (GFCE) is derived from the budget and primarily consists of compensation of employees and purchase of goods and services by the general government. The component of net exports is derived from data on international flow of goods and services as reported by RBI and DGCIS.

Gross Capital formation includes fixed capital formation by all institutional sectors, with the households treated as a residual, i.e. after accounting for public and private corporate sector from the estimated overall estimate. The overall estimate is first prepared by type of asset (Dwellings, Buildings and Structures) and institutional sector using the information on basic material groups (viz. Cement & Cement Products, Iron & Steel, Bricks & Tiles, Timber & Bitumen, Glass Products, Fixtures & Fittings) and Service Charges.

- While the extent of expenditure on fixed assets is available for the public and private sector, capital formation for the household is based on the estimates of the NSS All India Debt and Investment Survey (2013) for investment in rural residential buildings and NSS 65th Round on Conditions of Housing (2009).

- For the private corporate sector, the estimate based on the available set of companies is scaled up (as in case of GVA) to account for the unavailable companies.
- One of the major limitations of the process of compiling capital formation are that the ratio and proportions used for the household sector are dated and may not correspond to the level of activity in economy. Since the proportions are fixed, they also do not take into account the variations and economic fluctuations that happen over the years.

Thus, the measurement errors could be significant, particularly for the household sector as survey results are not available on a routine basis. This case is more prominent for the physical assets such as residential buildings, dwellings and other structures as they are primarily based on overall use of inputs (expenditure on construction items) and not direct estimation of residential construction undertaken by households.

- In case of private final consumption expenditure, the aggregate is treated as a residual on the expenditure side after accounting for the other components. Using this residual, the NAS allocates item wise expenditure based on a commodity flow method. The method, which begins by using the estimate of production accounts for imports, removes exports and makes adjustments (in case of food items) for wastage, seed & feed consumption, trade/ transport margins, marketable surplus and supply through Public Distribution Systems.

The remainder of production is valued at average annual prices and is treated as domestic consumption expenditure. However, while estimating the residual production, the NAS uses fixed proportions on item (such as seed, feed, wastage, etc.) which are based on previous surveys. In case of services (housing, water supply, health, recreation, communication, education, etc), either a fixed proportion of GVO (gross value of output) is considered as consumption expenditure or the proportions are based on the 68th Round of NSS Consumption Expenditure survey (2011-12).

5.1 Data Sources and their Status

The indicative list of data sources captures the nature of database which is either from administrative sources or surveys. In case of the organized sector, data sources are primarily from administrative sources (such as MCA), whereas for the household sector estimates are from the surveys. Since the introduction of the 2011-12 series, the status of the data sources is as under;

	Sector	Indicative Data Sources
1	Agriculture	State DES, Min. of Agriculture
2	Forestry and Logging	State DES, Forest Dept.
3	Fishing	State DES and Min. of Agri.
4	Mining and Quarrying	Indian Bureau of Mines, etc.
5	Manufacturing - Registered	ASI and now MCA21
6	Manufacturing - Unregistered	NSSO Enterprise Surveys
7	Construction	Nat. Building Org., CPWD, etc.
8	Electricity, Gas and Water Supply	CERC, SEBs
9	Transport, Storage and Comm.	NSS EUS, Empl. Survey
10	Railways	Dept. Enterprise
11	Storage	NSS UES, Empl. Survey
12	Communication	NSS UES, Empl. Survey
13	Trade, Hotel and Restaurants	NSS UES, Empl. Survey
14	Banking and Insurance	SCBs, NABARD, etc.
15	Real Estate, Dwellings etc.	NSS UES, Empl. Survey
16	Public Adm. and Defence	Budgets, Dept. Undertakings
17	Other community services	Budgets, Dept. Undertakings

- Allied activities in agriculture include dairy, horticulture, etc., ASI is Annual Survey of Industries CERC is Central Electricity Regulatory Commission and SEBs are State Electricity Boards, DES is Directorate of Economics of Statistics of respective state governments, ELI method is Effective Labor Input method: capturing number of person-jobs, UES is Unincorporated Non-Agricultural Enterprise (excluding construction), EUS is Employment and Unemployment Survey, MCA is Ministry of Corporate Affairs

Table 5: Status of Data sources and proportions used in NAS

	Data	Status
1	Population Census	Dated by 12 years
2	Economic Census	Dated by 9 years
3	Consumption Exp. Survey	Dated by 12 years
4	Unincorporated Ent. Survey	Dated by 13 years
5	Employment Survey	2015-16 Survey has not been incorporated in NAS Dated by 12 years PLFS has not been incorporated in NAS
6	Consumer Price Index (CPI)	Dated by 12 years
7	Wholesale Price Index (WPI)	Dated by 12 years
8	Index of Indust. Prod. (IIP)	Dated by 12 years
9	Input Output Table	Dated by 15 years
10	NIC codes	Dated by 14 years

The delay in quinquennial surveys has led to several quality issues with the estimates. As earlier, base year benchmark estimates have been dated by nearly 12 years, which may not reflect changes that have happened over the years. Similarly, in case of price series, the composition of the item basket does not reflect the changes that have happened at the household level (in case of CPI) and the weight structure of the index does not adequately represent the expenditure shares in recent years. These changes are more significant for services as expenditure on transport, communication, health is likely to have changed considerably in the recent years. Specifically, the weight structure of items such as fuel, power, lighting, health, housing may lead to an understatement of their contribution to overall inflation as these weights have not been revised since 2011. On the index front, the item selection depends on the standard product description and market shares of items. Given the change in product variety, composition, quality and expenditure patterns, the prices of existing item basket may not adequately represent the product variety and the variation in prices.

In the literature, the divergence between the aggregate and share estimates of NSSO's household consumption expenditure survey and the expenditure side of the NAS has been highlighted on several counts. Apart from the measurement issues, the composition of item wise expenditure (as shown in the NAS) and the composition of weights for the price index (as used in CPI) presents a contrasting picture. Thus, if the weight structure of the CPI were to be aligned with the NAS, the contribution of services would be significantly higher in overall inflation.

6 Understanding Revisions in GDP

Revisions in GDP estimates are a part of constructing the national accounts. This section uses Sapre & Sengupta (2017) to provide a short summary of the revision cycle of GDP estimates. GDP numbers for any given year are released in a sequence, primarily because it is not possible to compile the estimates in a span of a calendar or financial year. Since collection of data is time consuming, GDP numbers for any given year are released in a sequence of revised estimates *based on different levels of data availability*. The SNA however does not specifically provide a revision cycle or its methodology, thus leaving for respective countries to adopt their own procedures.

Since GDP numbers are required by different stakeholders on an annual basis, several intermediate GDP estimates are computed. These are the Advance Estimates (AE), Quick Estimates (QE) and Provisional Estimates (PE). Over time, as actual source data is made available for various sectors, intermediate estimates are *revised*. These are termed as First (1st RE), Second (2nd RE) and Third (3rd RE) Revised Estimates. As we move further on the revision cycle, the revised estimates are assumed to get closer to the actual state of the economy. Revisions can

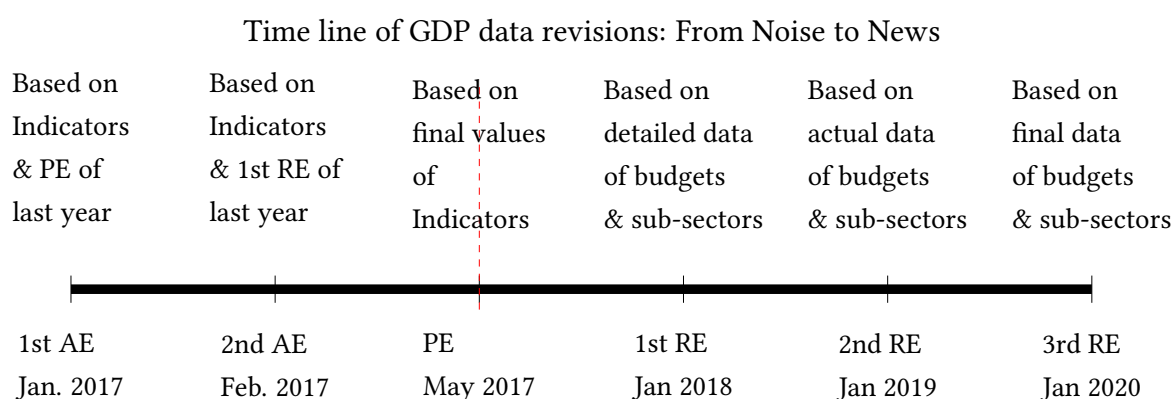
be studied in all formats - annual, quarterly, levels, growth rates, current or constant prices and for each base year series. The following example illustrates the general revision process and illustrates the change in the estimate as we move along the revision cycle.

The CSO releases 6 estimates of annual GDP numbers:

Estimate	Time period (from 1st AE)
1st Advance Estimate (1st AE)	-
2nd Advance Estimate (2nd AE)	1 month
Provisional Estimate (PE)	2 months
1st Revised Estimate (1st RE)	10 months
2nd Revised Estimate (2nd RE)	1 year 10 months
3rd Revised Estimate (3rd RE)	2 years 10 months

Source: CSO (2016)

The 2nd Advance Estimate was introduced in 2016



Extent of revisions in Rs. Lk. Crore (Current prices)										
	Item	Adv. Est			3rd RE	2nd RE	1st RE	Diff.		
		18-19	19-20	20-21				18-19	19-20	20-21
1	Agri +	26.92	30.47	34.95	30.30	33.58	36.09	3.37	3.11	1.15
2	M & Q	4.57	4.03	2.94	3.78	3.59	3.25	-0.80	-0.45	0.31
3	Manuf	28.54	28.83	25.54	28.13	27.05	27.09	-0.41	-1.78	1.56
4	EGW	4.53	5.03	4.77	4.49	5.02	5.07	-0.03	-0.01	0.30
5	Constr	12.79	14.40	12.14	13.52	13.73	13.16	0.74	-0.67	1.02
6	TR/HT	31.58	33.91	27.11	32.03	34.78	28.66	0.45	0.87	1.55
7	Fin Serv	35.56	39.45	38.96	35.29	38.79	40.46	-0.26	-0.66	1.49
8	Pub. Adm	25.13	28.90	29.36	24.21	27.01	26.79	-0.92	-1.88	-2.57
	GVA BP	169.61	185.02	175.77	171.75	183.55	180.58	2.14	-1.47	4.81

- Difference is 3rd RE - AE (first Advance Estimate), + ve sign shows under-estimate at the AE stage, -ve sign shows over-estimate at the AE stage

6.1 What to make out of revisions?

- High frequency indicators are by construct noisy indicators of the growth performance of the sub-sector they represent. Also, most high frequency indicators suffer from seasonality and are influenced by business cycle conditions. For instance, components of the Index of Industrial Production (IIP) are used as indicators for the registered manufacturing sector. Typically, item level manufacturing output has a seasonal variation and fluctuates with other business indicators. Similarly, sales of vehicles, tax collections, passenger & freight revenue, among others suffer from seasonality on account of various events over the calendar year.
- The element of seasonality may also change over time. Given that most of the indexes are based on a fixed sample frame of production units, each indicator has a limited ability in capturing the level of economic activity in its sector. Other than seasonality, the coverage of the indicator also poses certain limitation. Presently, a single indicator is considered as representative of the entire sector and the choice of high frequency indicators is guided more by the notion of data availability and coverage, than accuracy.
- *Revisions and economic fluctuations*: It is important to de-link periodic revisions from actual fluctuations in the economy that are inevitable due to the changes in the underlying macroeconomic conditions. Subsequent revisions of initial estimates of GDP should not and cannot be concluded as pure economic fluctuations in levels of value addition or other aggregates.
- *Revisions and expectations*: The basic premise of the AE and its subsequent revision is that initially, the state of the economy can be projected for the current year based on its previous position. Subsequently, the projection can be revised, once source data becomes available. However, in this process, revisions can and often miscommunicate the information about the economy and are taken by surprise, especially when revisions take place contrary to expectations.
- *Revision and directional uncertainty*: it useful to have some directional predictability about the final estimate. The level of revisions at the sub-sector level may be very different as compared to overall GDP growth rate. While growth rates of some sectors are overestimated in the initial estimates, most sectors do not show any consistent trend over the years. Manufacturing has been the only sector where the AEs were consistently overestimating of the actual growth rate. The analysis at the sub-sector level shows that extent of revision in both direction and magnitude in any sector remains unpredictable.
- *Revision and credibility*: revisions must be assessed on the basis of their relevance (are the estimates still relevant when they become available or is the time lag too long), reliability

(can the estimates be used to predict the conditions prevailing in the economy), and accuracy (how close are the estimates to measuring the outcomes they are designed to measure).

7 Issues with the 2011-12 series

Some of the key areas of concerns that came up with the introduction of the methods and datasets in the 2011-12 series are as follows;

Manufacturing sector

- *Enterprise vs. Establishment approach:* The use of MCA data also led to few conceptual changes. First, the dataset includes both manufacturing and service sector companies, as opposed to ASI that only had factories. Second, it was asserted that the financial statements from MCA21 capture information of the entire ‘enterprise’ (i.e. a firm) as opposed to an ‘establishment’ (i.e. a factory) covered under the ASI (See CSO (2015) for details). Thus, the enterprise level has a wider coverage as it accounts for all source of value addition that an establishment level approach may miss. However, Dholakia et. al. (2018) showed that such a situation was possible only in a case where the head office was outside the state in which the factory was situated. See CSO (2015), Anant (2017), Dholakia et.al (2018) for a detailed discussion on the issue. The methodological changes for the manufacturing sector and consequently the data revisions have been substantial. Various authors (Nagaraj, 2015a, 2015b, 2015c, Rajakumar (2015), Nagaraj and Srinivasan (2016), Sapre and Sinha (2016)) have analyzed the estimation process in detail. The important findings relate to;
- The MCA21 database (*as yet*) does not offer clear identifiers of economic activity such as manufacturing, trading or other services to classify enterprises. This process has the potential of mis-classification of companies which can lead to incorrect sectoral estimates of growth rates. The enterprise is classified into the sector/ economic activity as shown by the NIC digits in the Corporate Identification Number (CIN), which could be different than the actual economic activity carried out by the enterprise. The efforts to use MGT 7/9 form that has product level revenue contribution is a feasible way forward but also has major limitations. The revenue generation criteria does not clearly distinguish between manufacturing or trading as an activity as it only reports the items that have the maximum revenue generation.
- The filing patten of companies in the MCA21 ought to be studied in detail. Presently, the universe of companies is dynamic in the sense that the MCA adds companies on a monthly basis (based on new registrations) and de-registers companies as per the norms

of de-registration. Within the dynamic additions and deletions, the estimates are built on an ‘active’ of companies that have submitted their financial statements atleast once in the past three years. Within the active set of companies, the number of available companies that file financial statements are on average 58%, thus leaving a large number of active companies as ‘unavailable’. The filing pattern as available for the initial years from the press note (MoF, 2019) is as under.

Table 6: Information of aggregates from MCA21 dataset

Year	12-13	13-14	14-15	15-16	16-17
Filing for the year (lakhs)	5.6	6.1	6.0	6.3	7.1
Active Companies(lakhs)	8.8	9.5	10.1	10.8	11.6
Multiplier (Based on PUC)	1.15	1.14	1.17	1.13	1.17
Share of PUC of Reporting Co.	87%	88%	85%	88%	85%
Filing as a % of active	63.64	64.21	59.41	58.33	61.21

Ministry of Finance (2019)

- One of the key differences in the erstwhile ASI based estimates and the MCA21 is that in the ASI the multipliers were based on the number of factories as per the sampling strategy. Whereas, in the MCA21, the multiplier to scale up value added and other aggregates is based on the inverse of the ratio of Paid-Up Capital (PUC) of active to available companies. This construct of the multiplier assumes a close association of PUC and GVA and the scaling up is done at the aggregate level with the single multiplier, as opposed to strata based multipliers in the ASI. It is well known that at an enterprise level, while value added can be negative for any given year, PUC does not vary on a yearly basis and will always remain positive and thus may not be the most suitable metric for scaling up value addition. A detailed study of PUC, GVA and the filing pattern would be required to establish whether such a scaling up technique is leading to mis-measurement and the potential of overestimation of value addition and other aggregates such as savings and capital formation.
- In case of un-organized manufacturing, growth rates of the organized sector (based on MCA) are used to extrapolate the levels of GVA. While there could be several areas of sector wise mis-classification of companies in the MCA, using the growth rates of the organized sector poses serious measurement errors and has the potential to overestimate growth rates for the unorganized sector.
- In comparison to the ASI, the MCA data also does not offer product classification as sources of value addition include revenue from all source of the enterprise, as opposed to industrial sales. Thus, at the enterprise level, using Profit and Loss statements, it is not possible to separate sources of value addition, particularly for multi-product companies or diversified enterprises. The lack of separation poses challenges for applying appropriate

price deflators (such as WPI) as value addition may include the contribution of both manufacturing and service activities.

- MCA21 presently does not have geographical and physical indicators (such as plant location, employees, etc.) which makes it unusable for building state level estimates. Thus, estimates allocated to states within the manufacturing sector present a disconnect with the ASI based estimates and pose an inconsistent picture in terms of levels and growth rates.

Services Sector

- One of the major challenges of the 2011-12 series is the estimation of unorganized part of the services sector. Since the estimates are based on value added per worker in the base year (2011-12), it does not take into account the changes in employment in the services sector or the improvements/ fall in value added by workers. The extrapolation is based on growth in indicators of the organized sector (such as; Motor Vehicles Sales, Growth in profits of organized hotels/ restaurants, GST collections, which replaced all service tax collections for services such as communication, storage, warehousing, cargo handled for transport sector, etc.) and growth in GVA of corporate sector for other professional services. These indicators pose several measurement errors as in recent years there has been no updation of the landscape of the unorganized sector enterprises. The count of unorganized sector enterprises is based on the last available survey of 2010-11 (67th Round of Un-incorporated enterprises) and the urban and rural directory of establishments. These estimates have nearly lost their relevance as the landscape of enterprises may have undergone considerable changes, especially after introduction of GST and the Covid-19 pandemic.
- As of 2023, the current base year is dated by nearly 12 years and given the non availability of updated data source, it is expected that the present series would be revised only during the next base year change. However, as new and updated sources are brought out, the revisions in the next base year are more likely to alter the levels, composition and growth rates of the unorganized sector.

8 Issues with Regional Accounts

- GDP estimation underwent considerable changes after the introduction of the 2011-12 base year series of the National Accounts. The changes made at the all-India level also led to considerable changes at the state level, primarily on account of changes in source data and method of estimation. A detailed mapping of changes between the 2004-05 and the 2011-12 series could not be done as no process manuals were available alongside the

changes in methodology in the 2011-12 series. NSO released the manual (NSO: 2019) for compilation of Gross State Value Addition (GSVA), which provides a general approach for all states. Respective states in their own manuals have adopted and documented the same principles, with minor variations, wherever applicable.

- NSC Committee on Regional Accounts (2020) made detailed sector wise recommendations for improving the overall quality of state income estimates. One of the specific recommendations was [.] “A bottom up approach for compilation of National Aggregates from the corresponding State aggregates is deemed to be the ideal approach and should be followed to the extent possible in all sectors except the supra-regional activities. Actually, such is the status in respect of Agriculture, Forestry and Fishing. However, for structural, administrative and data availability reasons, allocation of National Aggregates amongst the States becomes imperative. It is nonetheless emphasized that States ought to evolve systems and processes so that such allocations are minimized.” (NSC (2020))

Although the methods followed are consistent across states, the quality of data, particularly for the agricultural sector and indicators used for allocation may differ. The broad structure is summarized as follows;

I. Organized Sector

(a) *General Government (GG)* - Estimates for GG are prepared from State Budget or are distributed in the proportion of the Central Government Employees.

(b) *Public Financial/ Non-Financial Corporations*

1. Departmental Enterprises (DE) or Departmental Commercial Undertakings (DCU) - Estimates are prepared from State Budget or distributed in the proportion of the Central Government Employees.

2. Non-Departmental Enterprises (NDE) or Non-Departmental Commercial Undertakings (NDCUs) - Analysis of Profit and Loss statement of NDCU for States or All-India estimates are allocated on the basis of State wise number of employees and value of assets.

c. *Private Financial/ Non-Financial Corporations*

1. Private Incorporated Enterprises and 2. Quasi-corporations: All India estimates are allocated using indicators (based on ASI and NSSO's unincorporated enterprise survey)

II. Households or Unorganized sector

Estimates of services (including quasi corporate sector) and manufacturing sector are prepared for the base year by multiplying the value added per worker by labor input and extrapolating these benchmark estimates with suitable indicators for other years.

Information on Taxes and subsidies on products are provided by the NSO to respective states.

- Manufacturing sub-sector (including organized and unorganized) underwent substantial changes in terms of both data source and method of estimation. With the data source changed from ASI to MCA21, the method for state income in manufacturing changed from a bottom-up to a top-down approach. Estimates for organized manufacturing are first compiled at the all-India level and are then allocated to regions based on the proportion of state x industry in the ASI. For the unorganized part, the new Effective Labor Input method is based on differential marginal productivity of three types of workers and is based on estimates of value added per worker in the base year (2010-11 67th round NSSO survey for the establishments and 2011-12 68th round NSSO survey for employment). For all subsequent years, the base year estimates are extrapolated based on representative indicators.
- *Estimates at Market Prices:* Presently, sector specific aggregates are not available at market prices. These are available at either at factor cost (as in the erstwhile 2004-05 series) or at basic prices, which is inclusive of production taxes. The estimate of product taxes (total indirect taxes) is available only at the aggregate which is added to aggregate GSVA at the state level to arrive at GSDP at market prices.

Procedural

- *Benchmark Year:* Substantial part of GSDP depends on the benchmark estimates of the base year. For instance, for the household sector, estimates of labor productivity/input (or value added per-worker), workforce composition depends entirely on the base year.
- *Alternate aggregates:* Presently, no other equivalent measures of aggregate income such as expenditure estimates and factor incomes are not available. Thus, currently available estimates cannot be reconciled or cross-checked with other alternate equivalent estimates.
- *Other macro aggregates:* Presently, other macro aggregates such as Gross Capital Formation and its components such as Fixed Capital, Change in Stocks, Valuables, etc. are not available or are not being compiled as part of the overall set of accounts. In some cases, few States have prepared the estimates for the Public Sector, whereas no estimates have been compiled for the private corporate and household sectors. Similarly, in absence of income and expenditure side aggregates, estimates of savings of various institutional sectors are not being compiled.
- Within the scheme of preparing the national accounts, regional accounts (state income) also follow the same principles, but differ in terms of their process of compilation.

Conceptually, region specific estimates can be prepared by two approaches, namely; *income originating* within the region and *income accruing* to the region. In the first approach, the estimates correspond to the income *originating* to factors of production that are physically located *within* the geographic boundary of the region. Thus, GSDP (or final value added estimates) reflects the net value of goods and services *produced within* the region.

- In the second approach, the estimates correspond to the income *accruing* to the residents of a region, irrespective of the *ownership* of factors of production by persons residing within the region. In this case, the GSDP estimates reflect the net value of goods and services available to the residents or that is attributable to the region. Conceptually, income accruing is wider in coverage than income originating in the region. Income accruing also provides a true and fair measure of the economic standard of living or Per-Capita aggregates of the region.
- However, procedurally, this method is data intensive and requires detailed inter-regional flows of goods & services, factors of production and factor payments. Regional entities such as States and Districts have ‘open boundaries’ with free physical and financial flows. Due to non-availability of data that can capture all such flows, it is practically difficult to prepare estimates based on the income accruing concept. Thus, in its present structure, GSDP estimates are prepared by the first approach, i.e. domestic product *originating within the geographical boundaries* of the region. Both methods, however, can lead to potentially different estimates, primarily because free flow of factors of production, goods and services and factor payments can lead to a significant difference between the income *originating* within the geographical boundaries and the income *accruing* to residents.
- There are two accepted practices of compiling the state level estimates; either a top-to-bottom approach in which national totals are estimated first and its parts are allocated to regions based on indicators, or a bottom-up approach, in which estimates are prepared for the region and are aggregated to arrive at national totals. In the present system of compilation, the approach is top-to-bottom and other than the direct estimation of value addition in the agriculture and allied sectors (crops, livestock, fishing) the estimates for all of manufacturing and services sector are prepared and allocated by the NSO. Such an allocation process is conventionally followed in case of supra-regional activities such as railways, communication etc. for activities that are not confined to a region. However, under the present system of compilation, it is followed for nearly all sub-sectors.
- Since state boundaries are ‘open’ to flow of goods and services, factors of production and individuals, compiling *final expenditure* estimates is also a major challenge. Recent

papers T. Rajeswari & Singh (2018) and Sapre & Sinha (2018) attempt to estimate the PFCE component in the expenditure side at the state level. The results remain inconclusive as there are no set of indicators that can be used to allocate item wise expenditure in a meaningful way. Another issue with allocation is that for some states the PFCE component upon allocation from the NAS can exceed its GSDP as measured from the production side. While this excess is a possibility, the same will have to be resolved in several iterations to balance the expenditure side identity at the state level.

Statistical Products, others:

- *Concordance with other statistical products:* National Account aggregates require input data from several other statistical databases such as agricultural/ industrial production, Census, municipal records, trade statistics, among others. Most of the input statistics are independently available in publications such as the statistical abstract, business register, departmental reports and publications, etc. However, it is possible in several cases that the input data published in other publications does not reconcile with the input data being used for GDP estimation. These discrepancies are largely due to level of updation of statistical databases and the information used by NSO for computation and allocation.
- *Back Series:* Presently, the available series of GSDP is of the 2011-12 base year and begins from 2011-12. A back series as is available for aggregate GDP is not available at the state level. The non availability of a back series considerably limits any scope of analysis as longer trends of growth and structural changes cannot be analyzed.
- *Statistical Audits:* As of prevailing practices of the statistical agency (either at the national or state level) statistical audit of products such as GSDP, IIP, agricultural statistics, statistical abstracts or any other publicly disseminated statistical product are not routinely conducted. Statistical audits are an important means of identifying gaps, limitations and quality of products, the findings of which can be used for making changes during periodic base year revisions.

New concerns for GDP/GSDP estimation:

GDP (including GSDP) estimates follow the guiding principles of the SNA and methodological or changes in data sources are introduced typically during base year revisions. However, changes in the economy are a continuum and capturing such qualitative and quantitative changes is a challenge for the statistical system. The economy wide changes in the past decade, particularly in areas of telecommunication, digital services, e-commerce, electronic payment systems and e-commerce based service delivery have significantly altered the services sector. While these changes happen across states, some of the key services sectors such as retail trade, transport, tourism, room rentals, hotels

and restaurants have a much higher impact in tourism driven states. Broadly, there are four areas that requires a systemic effort to capture the nature of economic activity, employment, pricing and thus sources of value addition. These are;

Digital content and assets - Content on internet based technologies, digital assets such as; internet networks, servers, cloud storage, media and related infrastructure.

Free content: Free content available via internet in the form of media, tutorials, etc. that does not require any subscription fee or charges.

Platform aggregators and service providers - which has linkages with retail trade, hotels and restaurants, personal services (such as medical, beauticians, educational/ coaching services), city transport (such as taxi providers) and payment systems. Other areas are equally challenging such as hotels, home-stay, paying guests and for similar hospitality services.

Service delivery: Internet enabled technologies (ITES) that are used for service delivery such as food, consumer products that may or may not be chargeable, but employ a significant amount of workforce.

The national accounts statistics has also made initial progress in compiling environmental accounts. Thus, newer set of accounts such as Natural Environmental Asset Account are also being compiled. Such accounts however are not being compiled at the state level.

9 Issues with Official Statistics

9.1 Statistical system and Code of Practice

- *Data standards*: Statistical agencies in all developed countries have adopted a Code of Practice (CoP). The CoP subjects the official statistics to standards of data quality, periodic reviews of methodology, conducting statistical audits and mandates a consistent policy on updating data sources and methods. In India, limited efforts in this domain (other than base year revisions) have been made at the national and state level. Adopting international best practices, a CoP suitable to the Indian landscape ought to be formulated for overall and timely improvement of national and regional income estimation.
- *Engagement with stakeholders*: A consistent communication policy to regularly engage with data users is vital. While the sources and methods available from the CSO provide an account of how national aggregates are compiled, the process of adjustments made at the state level is largely unknown to data users. Renewed efforts at the state level are required to build the expenditure side estimates of GSDP, capital formation of all

institutional sectors, input-output tables, updating price series and routine collection of local area statistics in selected areas (such as housing, unorganized enterprises and updating of business registers).

- *Exploring new data alternatives:* GDP estimation relies primarily on data generated through administrative processes and sample surveys. With rapid changes in the nature and volume of economic activities, traditional sources of collecting data will eventually fall short of the requirement. New systems like the Goods & Services Identification Network (GSTIN) and digital transaction records that generate detailed product or service level information on three key items, value, volume and prices, need to be explored. Data from these systems can be used to produce reliable price indices and consumer expenditure estimates. The latter can feed into the expenditure approach of measuring GDP and also for state level estimation of major aggregates.
- *Revision metrics:* Actual data on economic activities is not readily available for the computation of GDP estimates for any given year. A detailed study of historic revisions in India's annual GDP data, both at the aggregate and sectoral levels reveals that there have been large and unpredictable revisions in growth rates (Sapre and Sengupta 2017). Currently, detailed of revisions are not studied at state level as various DES do not publish historic data on revisions. Initiatives in this area would lead to clarity and improvement in overall quality of estimates.

There are several areas for research in the national accounts which require initiation. One of the first is the compilation of expenditure side estimates of GSDP. Second is the allocation of organized manufacturing/services sector estimates at the state level, which is presently based on the state x activity share as per the ASI. A bottom-up approach would be required to reconcile the estimates of MCA and ASI by mapping the state wise list of registered corporates in the respective ROCs of the states and the ASI frame of each state. Similarly, for the unorganized sector, regular updates of state wise Business Registers, directory of establishments and the finalization of the Economic Census would aid in assessing the landscape of the enterprises.

Some of the papers that have highlighted issues in national accounts have been mentioned in the reading list for a general and topical assessment.

Notes

Definitions used in the NAS

- **Production boundary** : Production is an activity carried out under the control and responsibility of an institutional unit that uses inputs of labour, capital and goods and services to produce goods and services.
 - Includes: Own Account Production (i.e. for self consumption)
 - Excludes: Domestic and personal services that are produced and consumed within the same household
- **Asset Boundary** : Based on (i) creation of ownership and (ii) economic benefit
 - Includes: Assets held domestically by various entities
 - Excludes: Mineral deposits that have not been explored
- **Consumption Boundary** : For estimating final consumption expenditures of various entities, such as general government, households and NPISH.
- **Income**: based on “Sum of incomes distributed by resident producer units”, i.e compensation of employees + gross operating surplus + gross mixed income + taxes less subsidies on production and imports
- **Expenditure**: based on “Sum of the final uses of goods and services (excluding intermediate consumption) + Govt. Purchases of goods and Services, + Capital formation + Exports – Imports”
- **Value addition**: $GVA = \text{Gross Value of Output} - \text{Value of Intermediate Consumption} - \text{Product taxes}$

The specific aggregates are as follows;

GVA:	Value of output less value of inputs (less taxes) used in production
GDP:	Aggregate measure of production activities (within the country) by summing up their GVA
Factor Cost:	Output measured at prices of basic factors of production
Basic price:	Amount receivable by producer as value of output minus tax plus subsidy Basic price measures the amount retained by the producer
Market Prices:	Price offered in the market, i.e. inclusive of all taxes
Current price (Nominal):	Prices prevailing in the current year
Constant price (Real):	Prices prevailing in a chosen base year (Eg: 2011-12)
Final Consumption:	Expenditure on goods & services for final use (not for production)
GNP or GNI:	Value of all goods and services produced in a country plus <i>income</i> earned by the country's citizens abroad, minus <i>income</i> earned by foreigners in the country

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