

## **METHODOLOGY OF COMPILING QUARTERLY GDP ESTIMATES**

The Central Statistical Organisation (CSO) introduced the quarterly estimates of Gross Domestic Product (GDP) on 30.6.1999. Quarterly Releases include GDP estimates compiled through production approach (QGDP) and quarterly expenditures of GDP (QGDE) compiled through expenditure approach. The QGDP estimates from the production side is estimated as QGVA at basic prices + net taxes on products. The differences between the QGDP estimated by economic activity as QGVA at basic prices plus net taxes on products and the QGDE estimated from the expenditure side is shown as discrepancy. QGVA estimates at constant prices are compiled first. The production approach used for compiling the QGVA estimates is broadly based on the benchmark-indicator method. In this method, for each of the industry-groups, estimates of GVA are compiled by extrapolating value of output or value added at constant prices of the previous year with relevant volume/physical indicators. In case of indicators like Government expenditure, financial results of listed companies etc., which are in nominal terms, these are deflated by appropriate price indices. The price indices/ indicators used are as same as that used in compilation of the annual estimates. Annual forecasts of GVA estimates and corresponding estimates for all quarters of the current year are prepared all the time (even while preparing Q1 estimates, projections for Q2, Q3, and Q4 are made, based on available data on forecasts, targets, and other auxiliary information) for the current year to make them consistent with the annual forecasts of GVA. In general terms, quarterly estimates of Gross Value Added (GVA) are extrapolations of annual series of GVA.

. The QGVA estimates at current prices are compiled by superimposing appropriate Wholesale Price Index/Consumer Price Index on the QGVA estimates at constant prices, at major industry group level. This is done by estimating the industry wise Implicit Price Deflators (IPDs) for each quarter, using the relevant price indexes, for the reference quarter. The IPDs are worked out as ratio of GVA at current prices and GVA at constant prices. The QGVA estimate at current prices for each industry equals the product of QGVA for the quarter at constant prices and the IPD for the quarter of that industry. Details of the methodology of compiling QGVA estimates at current and constant prices are described below:

## QUARTERLY ESTIMATES OF GVA BY PRODUCTION APPROACH

| S.No | Item         | Indicator/ Source of data  | Method of estimation  |  |
|------|--------------|--|---|--|
|      |              |  | At current prices   | At constant (2011-12) prices   |
| 1    | <b>Crops</b> | <p>Quarterly production from Ministry of Agriculture for principal crops. Using the season-wise production data and the Indian Crop Calendar, the Ministry of Agriculture prepares the estimates of quarterly agriculture production of different crops. This method assumes that the entire production of a particular state/season/crop occurs in the harvesting period. By adopting this method, the total estimated agriculture production during the four quarters of a financial year (April to March) will be different from the one relating to the agriculture year (July to June). However, for annual national accounting purposes, CSO has been adopting the total crop production in an agriculture year as that in the financial year. The two estimates of annual crop production differ to the extent of the difference in production during April-June period of the two successive years. Therefore, in order to ensure consistency between the quarterly GVA estimates and the annual GVA estimates, the agriculture production estimates in the four quarters of a financial year are adjusted on a prorata basis to that of the total production in the agriculture year.</p> | <p>Superimposing appropriate WPI on estimates at constant prices.</p> | <p>QGVA is estimated separately for (a) Principal Crops for which quarterly production data is available. The commodity-level value of output for the reference quarter is estimated by extrapolating the estimated commodity-level value of output at constant prices of the same quarter of the previous year with the growth in production of particular commodity during reference quarter</p> <p>(b) Other crops for which quarterly production data is not available, the annual estimate is prepared using log-linear estimation or targets announced by the Ministry of Agriculture. The annual estimated production of such crops is equally apportioned between quarters.</p> <p>Input: Previous years' input output ratio</p> <p>GVA = Output-Input</p> |

| S.No | Item             | Indicator/ Source of data  | Method of estimation   |  |
|------|------------------|--|--|--|
|      |                  |  | At current prices  | At constant (2011-12) prices   |
| 2    | <b>Livestock</b> | Targets/ projections of Milk, egg, meat and wool production from Ministry of Agriculture, Department of Animal Husbandry | Superimposing appropriate WPI on estimates at constant prices. | <p>In the case of livestock products, quarterly estimates of production are available for four major items, namely, milk, egg, meat and wool, from the Department of Animal Husbandry and Dairying, Ministry of Agriculture. These estimates are compiled through special tabulations of the questionnaires on annual Integrated Sample Survey. This survey is conducted in three seasons, namely, summer, rainy and winter, primarily to estimate the yield rates of production per different categories/ages/breeds of animals. This season-wise data which is available with a time lag is used for compiling quarterly estimates. Hence, using growth in production as reflected in the annual Targets/ projections of major livestock products annual GVA estimates are first compiled. These estimates are apportioned among quarters on the basis of latest available quarterly distribution. In the case of other livestock products for which targets or production data is not available, previous year's value of output is extrapolated to the current year on the basis of log-linear estimation technique. The annual estimate is apportioned equally between quarters.</p> <p>Input: Previous years' input output ratio</p> <p>GVA = Output-Input</p> |

| S.No | Item                             | Indicator/ Source of data   | Method of estimation   |  |
|------|----------------------------------|---|--|--|
|      |                                  |   | At current prices  | At constant (2011-12) prices   |
| 3    | <b>Forestry &amp; Logging</b>    |   | Superimposing appropriate WPI on estimates at constant prices. | <p>Previous year's value of output of industrial wood, fuelwood and minor forest products is extrapolated to the current year on the basis of past growth trends.</p> <p>This annual estimated figure is apportioned equally to the four quarters of the year. The estimates of input are derived on the basis of previous year's input-output ratio.</p> <p>GVA=Output- Input</p> |
| 4    | <b>Fishing &amp; Aquaculture</b> | Production of Marine fish and Inland fish from Department of Animal Husbandry, Dairying & Fisheries | Superimposing relevant WPI on estimates at constant prices.    | <p>The quarterly value of output for the reference quarter is estimated by extrapolating the estimated output at constant prices of the same quarter of the previous year with the quarterly production growth.</p> <p>Input: Previous years' input output ratio<br/>GVA=Output- Input</p>   |

| S.No | Item                          | Indicator/ Source of data   | Method of estimation   |   |
|------|-------------------------------|---|--|---|
|      |                               |   | At current prices  | At constant (2011-12) prices  |
| 5    | <b>Mining &amp; quarrying</b> | <p>Monthly data on Coal, Crude oil and Natural gas, from DIPP, Ministry of Commerce and Industry and Ministry of Petroleum &amp; Natural Gas, Monthly IIP data from Quick Estimates of IIP released by CSO, MOS&amp;PI</p> <p>Financial performance of companies listed with stock exchanges(BSE/NSE)</p> | <p>Superimposing relevant WPI on estimates at constant prices.</p> | <p>The quarterly production data in respect of coal, crude petroleum, natural gas and the IIP for mining sector are used to extrapolate the value of output of coal, crude petroleum and other major and minor minerals of the same quarter of the previous year (<i>excluding output in the private corporate sector which is estimated separately</i>)</p> <p>Quarterly GVA of Private corporate sector of this industry in the previous year is extrapolated by quarterly growth observed in the indicator based on Staff costs, Profit before tax and depreciation worked out from quarterly financial results of listed companies obtained from BSE/NSE. As growth estimated for private corporate sector is in nominal terms, they are deflated by using appropriate WPI.</p> <p>Inputs: Input-output ratios of the previous year are used separately for fuel minerals and other minerals.</p> <p>GVA=Output-Input</p> |

| S.No | Item                 | Indicator/ Source of data   | Method of estimation   |  |
|------|----------------------|---|--|--|
|      |                      |   | At current prices  | At constant (2011-12) prices   |
| 6    | <b>Manufacturing</b> | Monthly Index of Industrial Production (IIP) from Quick Estimates of IIP released by CSO, MOS&PI<br>Financial performance of companies listed with stock exchanges(BSE/NSE) | Superimposing appropriate WPI on estimates at constant prices. | <p>For the organised sector, value added in the reference quarter is estimated by extrapolating the estimated GVA in same quarter of previous year with quarterly growth observed in the indicator based on Staff costs, Profit before tax and depreciation worked out from quarterly financial results of listed companies from BSE/NSE. The private corporate sector estimates which are in nominal terms are distributed across different compilation categories as per the latest available ASI results. These estimates are then deflated by using appropriate WPI for different compilation categories.</p> <p><u>Quasi corporate and unorganized sector</u><br/>The value added at 2- digit level (NIC)for the reference quarter is estimated by extrapolating the estimated value added at 2-digit level at constant prices of the same quarter of the previous year with the growth observed in IIP for manufacturing sector at 2-digit level during reference quarter. The quarterly value added is the sum of value added estimated at 2-digit level.</p> |

| S.No | Item   | Indicator/ Source of data   | Method of estimation   |  |
|------|--|---|--|--|
|      |  |   | At current prices  | At constant (2011-12) prices   |
| 7    | <b>Electricity, Gas, water supply and other utility services</b> | Monthly Index of IIP of Electricity from Quick Estimates of IIP released by CSO, MOS&PI | Superimposing appropriate WPI on estimates at constant prices. | <p><b>Electricity:</b><br/>The indicator for the electricity sub-sector is the monthly Index of Industrial Production for Electricity segment. The value added for the reference quarter is estimated by extrapolating the estimated value added at constant prices of the same quarter of the previous year with the growth observed in IIP Electricity during reference quarter.</p> <p><b>Gas, Water supply and other utility services</b><br/>In respect of this sub-sector, no data is available on quarterly basis. As quarterly data is not available, the annual forecast is first made using the past trends and the same is apportioned equally among the four quarters of the year.</p> |

| S.No | Item                | Indicator/ Source of data  | Method of estimation                              |  |
|------|---------------------|--|---|--|
|      |                     |  | At current prices                                 | At constant (2011-12) prices   |
| 8    | <b>Construction</b> | Joint Plant Committee data for steel consumption, Cement production from DIPP, Ministry of Commerce and Industry and Monthly IIP data from Quick Estimates of IIP released by CSO, MOS&PI<br>. | Superimposing WPI on estimates at constant prices | <p>QGVA is compiled separately for accounted and Unaccounted construction.</p> <p>Major items taken into account for compiling QGVA from accounted construction are Cement, Steel, Bricks and tiles, Fixtures and fittings, Bitumen and Bitumen mixtures and Glass and Glass products .</p> <p>Value added in the reference quarter is estimated by extrapolating the estimated QGVA in same quarter of previous year with quarterly growth observed in the production of cement and cement products (using the indicator cement production), iron and steel (using the indicator steel consumption), bricks and tiles and glass and glass products (using IIP for non- metallic mineral products), Bitumen and Bitumen mixtures (using IIP for coke and refined petroleum products) and timber and round wood (using the indicator IIP-wooden fixtures) during the reference quarter.</p> <p>For unaccounted construction including plantations and mineral exploration, the value added is first estimated for the entire year using past trends. Thereafter, the annual estimate is apportioned equally to four quarters.</p> |



| S.No | Item                               | Indicator/ Source of data  | Method of estimation  |  |
|------|------------------------------------|--|---|--|
|      |                                    |  | At current prices   | At constant (2011-12) prices   |
| 9    | <b>Trade &amp; Repair services</b> | Sales tax from web site of CAG, Office of Accountant Generals of State Governments, CAG website<br>Financial performance of companies listed with stock exchanges(BSE/NSE) | Superimposing WPI of Traded commodities on estimates at constant prices       | Indicators for compiling QGVA estimates are quarterly sales tax growth and quarterly private corporate growth. WPI of Traded commodities are used for deflation.   |
| 10   | <b>Hotels and Restaurants</b>      | Financial performance of companies listed with stock exchanges(BSE/NSE)  | Superimposing WPI of Traded commodities on estimates at constant prices       | Indicator for compiling QGVA is the quarterly private corporate growth. WPI of Traded commodities are used for deflation   |
| 11   | <b>Railways</b>                    | Net Tonnes Kilometers & Passenger Kilometers, Ministry of railways   | Superimposing CPI transport and communication on estimates at constant prices | The data on the two key indicators of this sector, namely, passenger kilometers and net tonne kilometers are available on quarterly basis. The two indicators are combined into one indicator with the weights as earnings from passengers and freight. The value added for the reference quarter is then estimated by extrapolating the estimated value added at constant prices of the same quarter of the previous year with the growth observed in this combined indicator in the reference quarter. |

| S.No | Item   | Indicator/ Source of data   | Method of estimation   |   |
|------|--|---|--|---|
|      |  |   | At current prices  | At constant (2011-12) prices  |
| 12   | <b>Other Transport</b><br><b>(i) Road transport (ii) Water Transport (iii) Air transport (iv) Services incidental to transport</b> | Road: Number of commercial vehicles on road, estimated using the data on sales of commercial vehicles<br>Water: Cargo handled at major ports<br>Air: passenger kilometers flown and freight tonne kilometers flown (both domestic and international)<br>Services: Combined growth of water and land transport<br><br>Source: SIAM(Society for Indian Automobiles Manufacturers), M/o Shipping, Infrastructure Report of PI wing of MOS&PI | Superimposing CPI transport and communication on estimates at constant prices. | <p><i>Road Transport:</i> For the QGVA estimates, indicators used are stock of commercial vehicles on road (estimated by adding sales of commercial vehicles in the quarter to earlier stock).</p> <p><i>Air Transport:</i> For air transport the indicators used are passenger kilometers and freight tonne kilometers flown. The value added for the reference quarter is then estimated by extrapolating the estimated value added at constant prices of the same quarter of the previous year with the combined growth observed in physical indicator (passenger and freight traffic) during reference quarter.</p> <p><i>Water Transport:</i> For water transport, growth observed in cargo handled at major ports is used an indicator.</p> <p>For services incidental to transport, combined growth of water and land transport is used to extrapolate the previous years' quarterly estimates.</p> <p>Storage - As quarterly data is not available, value added is first estimated for the entire year using the growth rate observed in the last few years. Thereafter, the annual estimate is apportioned equally into four quarters.</p> |

| S.No | Item   | Indicator/ Source of data  | Method of estimation   |   |
|------|--|--|--|---|
|      |  |  | At current prices  | At constant (2011-12) prices  |
| 13   | <b>Communication &amp; services related to broadcasting</b>          | <p>Number of Telephone and cellular subscribers,&amp; Minutes of usage(MOU),Service tax</p> <p>Sources:<br/>TRAI and Department of Telecommunication,<br/>Service tax from CBEC,<br/>Company Finance Data from BSE/NSE</p> | Superimposing CPI transport and communication on estimates at constant prices. | Annual estimates are first compiled using, private corporate growth from listed companies, Minutes of usage (for telecommunication) and service tax ( courier and cable services). The annual estimates are quarterized using growth in number of subscribers.  |
| 14   | <b>Real estate, ownership of dwellings and professional services</b> | Financial results of listed companies relating to real estate & computer and related services from BSE/NSE   | Superimposing WPI/appropriate CPI on estimates at constant prices.             | <p>In the case of Real estate and Professional services, the key indicator used is the quarterly growth observed in the indicator based on Staff costs, Profit before tax and depreciation worked out from quarterly company finance data of listed companies. Deflator used is WPI.</p> <p>In the case of Ownership of Dwellings, annual estimates are compiled using the information on growth in rural and urban dwellings and are distributed equally in the four quarters.</p> |

| S.No | Item                      | Indicator/ Source of data   | Method of estimation   |   |
|------|---------------------------|---|--|---|
|      |                           |   | At current prices  | At constant (2011-12) prices  |
| 15   | <b>Financial services</b> | Monetary and other Financial Institutions: Aggregate deposits and bank credits as obtained from RBI monthly Bulletin<br>Insurance: Net premium received on life and non-life insurance business<br>Data on linked and non-linked Life insurance received from LIC of India and IRDA for non-life insurers | Superimposing GVA deflator of non financial sector on constant prices. | The indicators used for compiling quarterly estimates are quarterly data on aggregate deposits and credits (deflated) and net premium received on life and non-life insurance business. Deflator used is GVA deflator of non financial sector   |
| 16   | <b>Other services</b>     | CAG and CGA website/Department of Expenditure, Ministry of Finance, government revenue expenditure net of interest payments, Service tax; growth in consumer expenditure on health and education and non- food items group from NSS consumption expenditure surveys.                                      | Superimposing appropriate CPI on estimates at constant prices.         | For public sector quarterly growth observed in government revenue expenditure net of interest payments and subsidies (deflated by CPI (Combined) is used as indicator.<br><br>For private sector, annual forecast is first made using indicators like growth in consumer expenditure on education, health, non-food items and service tax to extrapolate GVA of education, health, and other services of the previous year. Relevant CPI is used for deflating current price estimates. This annual estimate is apportioned equally into four quarters. |

| S.No | Item                                     | Indicator/ Source of data   | Method of estimation  |   |
|------|--|---|---|---|
|      |  |   | At current prices   | At constant (2011-12) prices  |
| 17   | <b>Public administration and defence</b> | Revenue expenditure net of interest payments of Central and State Governments and subsidies deflated by the consumer price index.<br>Controller General of Accounts, Ministry of Finance, Office of Accountant Generals of State Governments, CAG website | Superimposing CPI (combined) on estimates at constant prices. | The value added for the reference quarter is estimated by extrapolating the estimated value added of the same quarter of the previous year with the growth observed in government revenue expenditure net of interest payments and subsidies (deflated) during reference quarter. The current price estimate so obtained is deflated by using CPI (Combined). |

## QUARTERLY ESTIMATES OF GDP BY PRODUCTION APPROACH

QGDP estimates are compiled by summing QGVA at basic prices and net taxes on products. Methodology of compiling taxes on products and subsidies on products are given below:

| S.No | Item                  | Indicator/ Source of data  | Method of estimation  |  |
|------|-----------------------|--|---|--|
|      |                       |  | At current prices   | At constant (2011-12) prices   |
| 1    | Taxes on products     | Monthly data on customs, excise, sales tax and other taxes from Controller General of Accounts, Ministry of Finance, Office of Accountant Generals of State Governments and CAG website. | Quarterly current price estimates of taxes on products are compiled using monthly data on tax revenue.  | Constant price estimates of taxes on products are compiled by volume extrapolation. Volume extrapolation is done separately for different product taxes using volume growth of taxed goods and services and aggregated to get the total volume of taxes. |
| 2    | Subsidies on products | Expenditure on major subsidies is used as an indicator.  | Annual estimate is first compiled by extrapolating the previous year's estimate worked out on the basis of actual analysis of central and state budgets with growth observed in major subsidies. Annual data on subsidies so estimated are distributed between quarters on the basis of Government revenue expenditure. | Current price estimates are deflated using GVA deflators.  |

## QUARTERLY ESTIMATES OF GDP BY EXPENDITURE APPROACH (QGDE)

| S. No | Item   | Indicator/ Source of data                                     | Method of estimation   |  |
|-------|--|---|--|--|
|       |  |   | At current prices  | At constant (2011-12) prices   |
| 1     | <b>PRIVATE FINAL CONSUMPTION EXPENDITURE</b> | Growth in consumption of food items, IIP, Output of services. | <p>First, the annual estimates of the reference year at current prices are compiled. For compiling commodity-wise estimates of PFCE, physical indicators are used for each commodity of expenditure. These indicators in respect of agricultural commodities are based on trends in consumption (worked out from commodity flow estimates of previous years). For manufactured goods, key indicator used is the IIP. For services, indicator used is the output of services, as estimated for compiling Gross value added (GVA) of services. The indicator growth is applied on the previous year PFCE estimates to get the annual estimates. Appropriate price indices (CPI) are superimposed to obtain the current price estimates.</p> <p>For the commodity-wise quarterly estimates of PFCE, the annual current price estimates are apportioned to quarters on the basis of proportions derived from bench mark estimates in the case of food items. (Quarterised PFCE data for the year in which the consumer expenditure survey was conducted, forms the benchmark estimates.) For other items, the distribution is on the basis of quarterly proportion of output/GVA of relevant groups.</p> | Current price estimates are deflated using weighted average of CPI and WPI |

| S. No | Item  | Indicator/ Source of data  | Method of estimation   |   |
|-------|---|--|--|---|
|       |   |  | At current prices  | At constant (2011-12) prices  |
| 2     | <b>GOVERNMENT FINAL CONSUMPTION EXPENDITURE</b> | Monthly data on central government expenditure net of interest payments available from the website of Controller General of Accounts (CGA), Department of Expenditure, Ministry of Finance.  | Quarterly estimates of GFCE for the reference quarter are obtained by extrapolating the estimated GFCE of the same quarter of the previous year with growth observed in the combined quarterly revenue expenditure of Central and State governments net of interest payments and subsidies.  | Current price estimates are deflated using weighted average of CPI and WPI.   |
| 3     | <b>GROSS FIXED CAPITAL FORMATION</b>            | IIP for capital goods available from the use-based classification superimposed by WPI of appropriate group and (b) data on imports/exports of machinery and equipment, growth in GVA in Software services as estimated using quarterly company finance data from BSE/NSE | GFCF is compiled separately in respect of construction and machinery component. For the quarterly GFCF in respect of construction, the indicator used is the quarterly growth in GVA of construction sector at current prices. For the quarterly GFCF estimates in respect of machinery and equipment, the indicator used for compiling current price estimates is the quarterly production of capital goods available from the use-based classification of Index of Industrial Production (IIP) superimposed by WPI of appropriate group and data on imports/exports of machinery and equipment. For estimating the GFCF in respect of intellectual property products like software, growth in GVA as obtained from quarterly company finance data of listed companies is used as an indicator. | Quarterly estimates of GFCF construction at constant prices is obtained by using quarterly growth in GVA construction at constant price available from production side. For quarterly estimates of GFCF in respect of machinery and equipment, key indicator used is the quarterly production of capital goods available from the use-based classification of Index of Industrial Production (IIP). |



| S. No | Item                    | Indicator/ Source of data  | Method of estimation   |  |
|-------|-------------------------|--|--|--|
|       |                         |  | At current prices  | At constant (2011-12) prices   |
| 4     | <b>CHANGE IN STOCKS</b> |  | Average growth of agriculture, manufacturing and mining industry at current prices is used to extrapolate the annual figure at current price of the previous year. This annual estimate is apportioned into quarters on the basis of estimated GVA of manufacturing sector at current prices | Average growth of agriculture, manufacturing and mining industry at constant prices is used to extrapolate the annual figure of the previous year. This annual estimate is apportioned into quarters on the basis of estimated GVA of manufacturing sector at constant prices. |
| 5     | <b>VALUABLES</b>        | Net imports of valuables mainly covering gold and silver, and gems and jewellery available from DGCIS and Growth in relevant IIP           | Estimate of Valuables (mainly covering gold and silver, and gems and jewellery) is compiled by using growth in net imports of gold and silver as indicator   | The constant price estimates is compiled by using appropriate price deflators.   |
| 6     | <b>NET EXPORTS</b>      | Data on Invisibles from Balance of Payments data released by RBI and quarterly data on merchandise trade from Ministry of Commerce (DGCIS) | Quarterly data on Invisibles from Balance of Payments data released by RBI and quarterly data on merchandise trade from Ministry of Commerce   | For estimating exports and imports at constant prices weighted GDP deflators are used  |