

Government of India
Ministry of Commerce & Industry
OFFICE OF THE ECONOMIC ADVISER

MANUAL ON COMPILATION OF
INDEX NUMBER OF WHOLESALe PRICES IN INDIA

About the Price Index

The price index is an indicator of the average price movement over time of a fixed basket of goods and services. The constitution of the basket of goods and services is done keeping in to consideration whether the changes are to be measured in retail, wholesale, or producer prices etc. The basket will also vary for economy-wide, regional, or sector specific series. At present, separate series of index numbers are compiled to capture the price movements at retail and wholesale level in India. There are four main series of price indices compiled at the national level. Out of these four, Consumer Price Index for Industrial Workers (CPI-IW), Consumer Price Index for Agricultural Labourers / Rural Labourers (CPI -AL/RL), Consumer Price Index for Urban Non-Manual Employees (CPI-UNME) are consumer price indices. The Wholesale Price Index (WPI) number is a weekly measure of wholesale price movement for the economy. Some states also compile variants of CPI and WPI indices at the state level.

WPI is also compiled by many states covering state level wholesale transactions. Presently WPI series compiled are -- Assam (base 1993-94), Bihar (1991-92), Haryana (1980-81), Karnataka (1981-82), Punjab (1979-82), U.P.(1970-71) and West Bengal (1980-81). Most of the state series are cover agricultural commodities only.

Step-wise introduction to compilation of WPI

Like most of the price indices, WPI is based on Laspeyres formula for reason of practical convenience. Therefore, once the concept of wholesale price is defined and the base year is finalized, the exercise of index compilation involve finalization of item basket, allocation of weights (W) at item, groups/ sub-groups level. Simultaneously, the exercise to collect base prices (P₀), current prices (P₁), finalization of item specifications, price data sources, and data collection machinery is undertaken. These steps are discussed in detail in the following sections :

1) Concept of Wholesale Prices:

Wholesale price has divergent connotations adopted by the different departments using them. There is no uniform definition for agricultural and non-agricultural commodities as all the wholesale prices can not be collected from the established markets.

Agricultural commodities: In practice, there are three types of wholesale markets viz., primary, secondary and terminal in the agricultural sector. The price movements and price levels in all three vary. Price movement in the terminal market may tend to converge toward the retail prices. Option to collect the wholesale prices for these three different stages of wholesale transactions exists for agricultural commodities though the primary market is prepared.

Ministry of Agriculture has defined wholesale price as the rate at which relatively large transaction of purchase, usually for further sale, is effected. Various state agencies concerned with the collection of wholesale prices of agricultural commodities are following the concept of Ministry of Agriculture. However, there are certain variation with regard to inclusion or exclusion of incidental charges, duties and taxes. For e.g., in Andhra Pradesh, the wholesale prices include incidental charges such as weightment charges, cost of bags and sales tax. In Gujarat, the wholesale prices are inclusive of packing charges and taxes. In Punjab and Tamil Nadu, the wholesale prices are inclusive of incidentals. In Haryana, the wholesale prices for agriculture commodities exclude taxes but include arat, weightment and the lorry charges, whereas, non-agricultural products include sales tax, etc.

Non-agricultural commodities: For non-agricultural commodities, which are predominantly manufacturing items, the problem arises, as there are no established sources in markets. This is true of mining and fuel items also. The issue of ex-factory vis-à-vis wholesale prices for non-agriculture items have been discussed by the successive Working Groups set up for the revision of WPI and all have reached the conclusion that in practice, it is not feasible to collect wholesale prices for most of the manufacturing items. It has also been observed that the margin of wholesalers in case of non-agricultural commodities remains unchanged for over a long period of time. As a result, it is felt that the trends in the index compiled on the basis of ex-factory prices would not be much different from the index if compiled on the basis of wholesale prices if it were feasible to get these prices. The last Working Group has recommended collecting wholesale prices from the markets as far as possible, because the economy is moving towards globalisation and open trade with inputs increasing in the commodities set.

The wholesale price as defined for WPI: The concept of wholesale price adopted in practice represent the quoted price of bulk transaction generally at primary stage. The price pertaining to bulk transaction of agricultural commodities may be farm harvest prices, or prices at the village mandi /market of the Agricultural Marketing Production Committee/ procurement prices, support prices. For manufactured goods the wholesale prices are administered prices, ex- factory gate/ ex-mill, ex-mine level. Ex- factory prices exclude rebate if any, other taxes and levies are excluded though excise duty is currently included.

Wholesale price and producer price: The wholesale price as defined above differs from producer (output) prices as the latter excludes all kind of taxes and transport charges. In 1993 SNA, Producer(output) price is defined as the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus VAT or similar deductible tax, invoiced to the purchaser. It excludes any transport charges invoiced separately. It excludes any transport charges invoiced separately by the producer. However, the producer (input) prices include retail or wholesale margins.

2) Choice of Base Year:

The well known criteria for the selection of base year are (i) a normal year i.e. a year in which there are no abnormalities in the level of production, trade and in the price level and price variations, (ii) a year for which reliable production, price and other required data are available and (iii) a year as recent possible and comparable with other data series at national and state level. The National Statistical Commission has recommended that base year should be revised every five year and not later than ten years.

3) Selection of Items, Varieties/ Grades, Markets:

To ensure that the items in the index basket are as best representatives as possible, efforts are made to include all the important items transacted in the economy during the base year. The importance of an item in the free market will depend on its traded value during the base year. At wholesale level, bulk transactions of goods and services need to be captured. As the services are not covered so far, the WPI basket mainly consists of items from goods sector. In the absence of single source of data on traded value, the selection procedures followed for agricultural commodities and non-agricultural commodities have also been different.

Agricultural commodities: As there is a little scope of emergence of new commodities in the agriculture, the selection of new items in the basket is done on the basis of increased importance in wholesale markets. Varieties, which have declined in importance, need to be dropped in the revised series. Final inclusion or exclusion of an item in the basket is based on the process of consultation with the various departments. The exercise of adding /deleting commodities, specifications and markets is completed once the consultation process is over. In the existing WPI series, items, their specifications and markets have been finalized in consultation of with the Directorate of E&S (M/O Agriculture), National Horticulture Board, Spices Board, Tea board, Coffee Board and Rubber Board, Silk Board, Directorate Of Tobacco, Cotton Corporation of India etc.

Mining Items: For deciding on the inclusion and exclusion of mineral items, their grades, market centers etc. suggestions of Indian Bureau of Mines are taken into account. Specifications of coal, coke and lignite have been decided in consultation with the Department of Coal. Likewise for selection of petroleum products the Ministry of Petroleum is consulted and for electricity suggestions are taken from Central Electricity Authority.

Manufactured Products: Selection of items from manufacturing sector, as a whole, is the most tedious and time taking process. To ensure complete coverage, selected items have to represent not only the organized manufacturing sector but also vast informal sector.

- a) **Organized Manufacturing Sector:** Regular time series data on value of production are available through Annual Survey of Industries covering factory sector. The criterion for selection of items has been based on the cut off traded value of a product during the base year. The traded value of a product is the sum total value of output as per ASI base year+ Excise duty + Imports during base year- Exports during the base year. WPI 1993-94 adopted a cut off traded value of Rs. 120Cr. All possible efforts are made to establish a proper concordance between the NIC classification adopted in ASI and ITC (HS) classification for imports and exports quantum. The problem of concordance arises in case of textile items and for this segment, the selection of items has been done with the help of Office of the Textile commissioner. Some of the items may not feature in the final basket even though the traded value is above the cut off point. This may be due to poor specifications or non-availability of regular data source for continuous pricing.
- b) **Unregistered / unorganized manufacturing sector:** Units falling in this sector add substantial portion to the total manufacturing production in the economy. Unorganized manufacturing sector covers traditional sectors like handlooms, sericulture, coir, khadi and village industries and modern segments like SSI and power looms. Further the small-scale sector encompasses both organized and unorganized segments of the manufacturing sector. But for informal sector, all encompassing time series data on value of production are not available. In the past, Working groups have made efforts to pool value of production data from disparate sources like results of surveys on Own Account Enterprise (OAE), Directory Manufacturing Establishment (DME) and Non-Directory Manufacturing Establishment (NDME), Economic Census and its follow up surveys and Census of Registered SSI units. The last Working group could not use these data sources mainly because it found the data available either farther from the chosen base year or were incompatible. However, some items from silk, coir, power looms and handlooms based were included on the suggestions of agencies responsible for these segments.

The selection of specification/ grade/ variety in respect of manufactured products as also the selection of sources for supplying regular price data is done with help of production data. Selection of data sources is done on subjective sampling basis. For each item, a list of 10 major manufacturers/ producers is prepared and efforts are made to seek willing cooperation from the top five manufacturers for regular supply of weekly wholesale price quotations. Data collection is done on conditions of confidentiality. At least five price quotations in respect of representative grades are included in the index. In case there are less than five manufacturers of an item, then all the units are roped in to furnish the price data.

4) Derivation of Weighting Diagram :

Weights used in the WPI are value weights not quantity weights as its difficult to assign quantity weights. Distribution of the appropriate weight to each of the item is most important exercise for reliable index. Unlike consumer price indices, where weights are derived on the basis of results of Expenditure Surveys, several sources of data are used for derivation of weights for WPI.

Because of non-availability of updated Supply and Use Table (SUT), the approach, finding favour with the successive Working groups, is based on top down stratified compartmentalized system. Under this approach, weights are first assigned at Major group level from outside with due account made for exclusion of services from the total value of transactions in the economy. This method for weighting diagram represents more accurately structural changes at higher level of aggregation. Further, compartment system also ensures that wherever data for a more recent year are available they can be used, while in other compartments data from more distant year can be achieved. This has also made it possible to use different sets of data sources for agricultural and manufacturing items.

Weights of Agriculture commodities: For building of the weights of agricultural commodities, the data on sale of agricultural commodities is not available as there is large number of markets. Therefore, to arrive at the approximate traded value of agricultural commodities; an indirect method of arriving such estimates is used. These weights are based on the Marketed value (MV) arrived at by multiplying Marketed Surplus Ratio (MSR) to the estimates of Value Of Production (VOP) of agricultural commodities. The estimates of VOP are based on the estimates of quantity of production, as brought out by the Directorate of Economics and Statistics(DES), and an average price of a commodity.

The ratio of quantity marketed to quantity produced gives the MSR.

$$R = \frac{MQ}{QOP} = \frac{\text{Marketed Quantity}}{\text{Quantity of Production}}$$

The estimates of MSR's are based on the results of Comprehensive Scheme on Cost of Cultivation of DES and other sources. The Directorate of Marketing and Inspection, M/O Agricultural, is also responsible to generate MSR's.

In practice MSR's are worked out on the basis of production value of three years average production to remove the bias on account of fluctuation in individual commodity and over all production. No estimates of MSR's are available in the case of new items of fruits, vegetables and flowers, and these are finalized separately by the working group, based on the related crops. MSR's of flowers and meat items are kept 100 considering that production of these is mainly for market sale.

Manufactured items: As discussed above, the traded value of manufactured products i.e., total production + excise duty+ imports - exports value for the year are worked out from various sources. Final weights of each item is based on its traded value plus pro rata imputed traded value of items which need to be excluded from the basket due to various reasons.

In the current series traded value of items falling under 'Other manufacturing' have been imputed amongst other items in the remaining sub-groups of 'Manufactured products' as there was only one item featuring above the cut-off mark. Retaining it would have led to extreme fluctuations. Similarly weight of crude petroleum was distributed pro rata amongst fuel items, as procuring its wholesale prices was not possible.

5) Collection of Prices:

In WPI pricing methodology used is specification pricing. Under this, in consultation with the identified source agencies, precise specifications of all items in the basket are defined for repeat pricing every week. All characteristics like make, model, features along with the unit of sale, type of packaging, if applicable, etc are recorded and printed in the price collection schedule. At the time of scrutiny of price data all these are kept in mind. This pricing to constant quality technique is the cornerstone of Laspeyres formula. In case of changes in quality and specifications, due adjustments are made as per the standard procedures.

The collection of base prices is done concurrently while the work on finalisation of index basket is on. Therefore, price collection is normally done for larger number of items pending finalisation. Once the basket is ready, current prices are collected only as per the final basket from the designated sources. Weekly prices need to be collected for pre-determined day of the week. For the current series prices are quoted on the basis of the prevailing prices of every Friday. Agricultural wholesale prices are for bulk transactions and include transport cost. Non- agricultural prices are ex-mine or ex-factory inclusive of excise duty but exclusive of rebate if any.

6) Treatment of prices collected from open market & administered prices:

There are some items which constitute part of index baskets but the prices for these items are either totally administered by the Government or are under dual pricing policy. The issue of using administered prices for index compilation is resolved by taking into account appropriate ratio between the levy and non-levy portions. Where these ratios are not available, the issues can be resolved through taking the appropriate number of price quotations of the administered prices and the open market prices after periodic review.

Due to variation in quality and different price movements of the commodities belonging to unorganized sector, separate quotations from organized and unorganized units have to be taken and merged based on the turnover value of both the sectors at item level. For pricing from unorganized sector, adequate number of price quotations has to be drawn out of the list of units by criteria of share of production as far as possible.

7) Classification structure:

The Working Groups over the period have been suggesting to bring the classification of various items under different groups and sub-groups as per the latest revised National Industrial Classification (NIC) which in turn is comparable to International Standard Industrial Classification (ISIC). The classification based on NIC renders the WPI data amenable to comparison with the Index of Industrial Production (IIP) and National Income data.

The grouping and classification of WPI is also useful for in depth analysis as separate inflation rates can be worked out for groups with items whose prices are given to extreme fluctuations, affected by international prices or have administered prices. Apart from the headline inflation based on WPI, core inflation, manufactured products inflation, primary articles inflation etc. can be easily computed. The classification structures adopted in the WPI (1993-94) series is as below:-

Major Group/Groups	
I. Primary Articles	II. Fuel, Power, Light & Lubricants
i) Food Article	
ii) Non-Food Articles	
iii) Minerals	

III. Manufactured Products	
i) Food Products	vii) Rubber & Plastic products
ii) Beverages, Tobacco & Tobacco Products	viii) Chemicals & Chemical Products
iii) Textiles	ix) Non-Metallic Mineral products
iv) Wood & Wood Products	x) Basic Metals, Alloys & Metal Products
v) Paper & Paper Products	xi) Machinery & Machine tools
vi) Leather & Leather Products	xii) Transport Equipment & parts

The classification of 'manufactured products' is similar to the classification adopted in the Index of Industrial Production (IIP) except that the sub group of 'Other Manufacturing' has not been retained and its traded value has been imputed in to remaining sub-groups.

8) Methodology of Index Calculation

Actual index compilation is done in stages, though due to computerization now, the machines do all complex calculations. In the first stage, once the price data are scrutinized, price relative for each price quote is calculated. Price relative is calculated as the ratio of the current price to the base price multiplied by 100 i.e. (P₁/P₀)X100. Assigning weights at quotations level is difficult, as it needs detailed data.

In the next stage, commodity/item level index is arrived at as the simple arithmetic average of the price relatives of all the varieties (each quote) included under that commodity. An average of price ratio/ relative is used under implicit assumption that each price quotation depends on its price level in the base period and all the quotations produced are equal. Since quantities produced at unit level are not equal the average of price relative method is preferred to arrive at item level index in WPI.

Next, the indices for the sub groups/groups/ major groups are compiled and the aggregation method is based on Laspeyres formula as below:

$$I = S (I_i \times W_i) / S W_i$$

Where,
I = Index numbers of wholesale prices of a sub- group/group/ major group/ all commodities
S = represents the summation operation,
I_i = Index of the ith item / sub- group/ group/ major group.
W_i = Weight assigned to the ith item of sub- group/group/ major group.

The weights are value weights. Aggregation is first done at sub-group and group level. All commodities index is compiled by aggregating Major group indices.

9) Handling of the Seasonal Commodities :

There are number of agriculture items, especially some fruits and vegetables, which are of seasonal nature. When a particular seasonal item disappears from the market and its prices are not available because of its being out of season, the weights of such item is imputed amongst the other items on pro rata basis with in the sub-group of vegetables or fruits. The underlying assumption is that if the items remained available, the prices of these items would have moved in the same proportion as the prices of the other items in the sub-group, which did remain available. This is equivalent to giving a greater weight to the remaining items. The seasonality problem can be sorted by adopting other methods like, i) prices of unavailable items can also be extrapolated forward from the period of availability or ii) if such seasonal item has insignificant weight it can be taken permanently from the basket etc.

10) Procedure for Estimation for Non-response and Data Substitution

As the series grow older, many of the items in the basket tend to disappear from the market, or item specification may change or the source agency may no longer manufacture the item.

- a) If the source agency stops manufacturing and the item is still available in the market, then efforts are made to locate and fix another representative source producing item with matching specification.
- b) In case no suitable substitute is available, the weight of the item is imputed to similar other item or among other items of the sub-group/group. The criterion for imputation is that the price movement of the outgoing item and the item to which weight is imputed is similar. Imputation of weight is not a long-term solution and ultimately replacement has to be effected.
- c) In case item with different specifications need to be taken in the basket as a substitute then the new price and old price is linked by splicing.

Substitution and replacement: First of all it should be ensured that the prices of both the price quotations, outgoing quotation (old price) and incoming quotation (new price) are collected concurrently for some time and respective price movements observed for any extreme variation. Splicing is done by putting out a ratio (linking coefficient) of concurrent price quotations and multiplied by the base price as below:

$$\frac{\text{Price of New Quotation (Incoming Price)}}{\text{Price of old quotation (Outgoing Price)}} \times \text{Base Price of the item}$$

Price relatives are worked out by dividing the current price with the updated base price. Splicing can be done other way round, i.e., linking coefficient can be worked out by dividing old price (outgoing quote) with the new price (incoming quote) and multiplied by the current price.

In WPI the substitution is effected from the date final indices are compiled. The effective date and the splicing ratio are documented properly.

11) Provisional Vs Final:

Primary objective of WPI is to bring out an estimate of headline inflation for the economy. Because of late receipt of price data, part of the price data cannot be utilized as the WPI is released on weekly basis. The weekly indices are compiled after a short gap of two weeks only as compared to other indices, which are compiled on monthly basis. The WPI are, therefore released provisionally and final revised indices, incorporating all possible quotations, are released after a gap of two months.

12) Data collection mechanism :

At present data collection for WPI is solely based on voluntary basis. Price data pertaining to 'Primary articles' and 'Fuel & petroleum products' are mainly collected through administrative Ministries/Departments, PSUs and state government Departments. For 'Manufactured products', apart from some government sources, data collection is done through Chambers of Commerce, Trade Associations, Business Houses and leading Manufacturing Units.

13) Linking Factor:

In order to maintain continuity, the time series data on wholesale price index, it is important to provide linking factor so that new series when released may be compared with the outgoing one. It provides a basis for determination of cost escalation and wage settlement and secondly, generates a long time series data for analytical purposes.

There are three commonly used methods for linking new series with old one i.e. (i) arithmetic conversion method (ii) ratio method and (iii) regression method. In arithmetic linking method the relationship between the indices in the old series (Y) and those in the new series (X) is assumed to be linear i.e. Y = cx, where c is the conversion factor given by

$$c = \frac{Y}{X}$$

Y and X being average values of the indices in the two series for the year chosen as the base period (12 months) of the new series (in practice X = 100). Under the ratio method, month wise ratio of new indices and old indices are worked out first and then average of ratios is taken as a linking factor. In the third method, the relationship is based on Y = a+bx, where a and b would be so estimated that the sum of squares of deviations of the actual values of Y (during the base year of the new series) from the estimated values (derived from the above equation) is minimum. The linking factor derived from these three different formulae may vary and provide different estimates. Therefore, it is necessary to analyze and assess the linking factor worked out before these are released publicly. While publishing the linking factor, the option should be left to the user to use any of these methods to suit their specific objectives.

The linking factor for the WPI, which has been published officially, has been based on arithmetic conversion method. The linking factor is worked out only at aggregate level for all commodities. Because of the vast changes in the commodity baskets, it has not been found feasible to compile linking factor at group/ sub-group level. Even though for analytical purpose, it would be very useful to have linking factor at desegregated level.

14) Approval and Release of revised Series

As per the established practice, a Working Group is set up for revision of existing WPI series with the approval of the Minister in-charge of the Department of Industrial Policy & Promotion. Detailed deliberations on all aspects including methodological issues are held first at the level of sub groups and thereafter in the Working Group. The views expressed at both the levels and recommendations based thereon are incorporated in the report of the Working Group.

The Report of the Working Group is first placed before the Technical Advisory Committee on Statistics of Prices & Cost of Living (TAC on SPCL) in Central Statistical Organisation (CSO) and thereafter before the Committee of Secretaries (COS). It is only after acceptance of the report by the TAC on SPCL and its subsequent approval and appropriate direction of the COS; the Office of the Economic Adviser through press release introduces the revised series of WPI.

15) Data Management and Dissemination System

The ultimate use of the index compilation will depend upon the quality of data management and data dissemination. Though due to improved computer facilities it has now become easier to compile, store and transmit WPI data. As SDDS norms of IMF are applicable to WPI, every effort is made to ensure timeliness and transparency in release of the indices. Weekly WPI are released to the press on every Friday. Dissemination of Weekly press release is also done through official website simultaneously. Time series data are also made available to users through print and electronic media on request. Report of the last Working Group is also placed on the office website i.e. <http://www.eaindustry.nic.in/>