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Index Number in Chinese National Accounts and Its Further Development

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Abstract

The paper briefly introduces price indexes and methods of compiling them for Chinese GDP accounts at constant prices by production approach, and respectively compares Chinese year-on-year data, year-to-year data, fixed-base data, after these data are released from *China statistical yearbook*, with corresponding data of standard term of international indexes, and then discovers the difference in meanings between both kinds of data. In addition, by introducing current system of statistical price methods of NBS, some problems on compiling price indexes can be found, so some advices will be put forward about promoting GDP accounts at constant prices by production approach and upgrading the international comparability for account data and price statistics.

The paper includes four sections: section one is the introduction of related background; section two is a list of price indexes after released in *China statistical yearbook*, and the analysis about difference or relation between these data and the corresponding indexes of international standard term; section three introduces current methods of compiling price indexes for GDP accounts at constant prices by production approach in china; section four puts forward the problems about GDP accounts at constant prices by production approach and compiling methods of corresponding price indexes, and discovers the direction of further improvement.

I. Introduction

GDP growth rate of china is an important indicator, which can be used to describe increasing status of Chinese economy, so the indicator would be paid much attention. GDP growth rate can be derived from GDP of adjacent years at constant prices, nevertheless GDP at constant prices can be calculated depending on various price indexes. Hence, in order to understand the meanings of GDP at constant prices and judge data quality and international comparability, it is very important to understand the methods of compiling price indexes, computation formula and utility manners for national accounts.

Production approach is a main accounting approach for both gross accounts and

growth rate accounts in china, so in this paper, computation processes of GDP at constant prices and price indexes used in the processes will be introduced by production approach. In 1985, GDP accounts at constant prices by production approach began to use. Although accounts degree had been becoming more particular along with time passing and improvement of basic data, accounts approaches was kept in steadiness until 2004. In 2004, there was much change for accounting method of industrial and agricultural value added at constant prices, while the proportion of value added of these industries is 70 percent of GDP in china. For agriculture, single-indicator price indexes deflation method replaced primary double-indicator combination method. For industry, single-indicator price indexes deflation method also replaced original single-volume indicator extrapolation method. The research about data comparison of each area from 2001 to 2003 shows that the change for accounting method of industrial and agricultural value added at constant prices can affect greatly growth rate of value added, and affection extent reaches 10 percent in some area. In order to benchmark data obtained by new methods to historical data, National Bureau of Statistics of China (NBS) decides that some technical disposal be made temporarily for data obtained by new method, and the whole series of all data at constant prices be adjusted after economical census data are available.

GDP at constant prices by production method can be derived by deflating each industrial data respectively and aggregating these data. Industry classification follows up to the new edition of *The Standard Classification of National Economic Industry* (GB/T4754-2002). Particular content of accounts can also to see *Handbook of GDP Accounting of China*. Price indexes used for GDP accounts at constant prices by production method come from various price indexes, which are compiled according to price statistical schemes from Urban Survey Organization of NBS (USO) and Rural Survey Organization of NBS (RSO). The designs, which are compiled by USO, include *Prices Investigation Design of Industrial Products, Statistical Prices Investigation Design of Currency and Consumption, Statistical Prices Investigation Design of Real Estate, and Statistical Prices Investigation Design of Investment in Fixed Assets*. Designs, which are compiled by RSO, include *Prices Investigation Design of Agricultural produce.*

In a summary, current various price indexes compiled by NBS are all year-on-year price indexes, and so far China don’t compile international standard fixed-base price indexes and annual change indexes indirectly calculated. In order to avoid the confusion, price indexes, which are released in *china statistical yearbook* and others official publication, are all called Chinese style price indexes, i.e. Chinese fixed base price indexes, Chinese year-to-year price indexes, Chinese year-on-year price indexes, so these price indexes can be distinguished from international standard fixed base price indexes and annual change indexes indirectly calculated. Computation formulae of Chinese style price indexes compiled by NBS are either Laspeyres formulae or Passche formulae, and Fisher formula is not used. Seasonal and qualitative adjustment is not made in the process of compiling various price indexes. Weights used in indexes computation process are replaced once per five year.

The history of compiling price indexes in China is very short, except for consumer price indexes. The works of compiling price indexes of agricultural mean of production (by category) and purchase price indexes of agricultural products (by category) began in 1995; the works of compiling producer price indexes of agricultural products (by industry) began in 2002; the works of compiling ex-factory price indexes of industrial products (by category and by industry) and purchase price indexes of raw material, fuel and power (by category) began in 1985; the works of compiling price indexes of investment in fixed assets (by category) began in 1994; the works of compiling price indexes of real estate (by category) began in 1997. The abundance and improvement of Chinese price indexes is related closely to the innovation course of market system of china. Before 1984, when the innovation of price system was not made, various prices of important material were set down by administrations and these prices were hold for long time, so the function of price indexes is limited. After 1985, the price mechanism have been improving with the introduction of the dual-price system, where a commodity is transferred at both market price and central-planned price, and then the function of price collocating resource is becoming more and more important, so the public can pay attention to price change and make some decisions about product and investment according to price trend and change

extent. Now for GDP accounts at constant prices by production method, price indexes and methods of compiling them will be introduced in the next part.

II. Difference and Relation Between Price Indexes Listed in *China statistical yearbook* and the Corresponding Indexes with International Standard Term

A price indexes list released in *China statistical yearbook* can be seen from table 1:

Table 1 A price indexes list released in *China statistical yearbook*

title of price indexes	**design based on compiling indexes**
price indexes of agricultural mean of production (by category)	*Prices Investigation Design of Industrial Products*
ex-factory price indexes of industrial products (by category and by industry)	*Prices Investigation Design of Industrial Products*
purchase price indexes of raw material, fuel and power (by category)	*Prices Investigation Design of Industrial Products*
price indexes of land trade (by category)	*Statistical Prices Investigation Design of Real Estate*
price indexes of selling houses (by category)	*Statistical Prices Investigation Design of Real Estate*
price indexes of renting houses (by category)	*Statistical Prices Investigation Design of Real Estate*
price indexes of investment in fixed assets —price indexes of investment in construction and installation —price indexes of equipment, instrument and implement —price indexes of material in construction and installation —price indexes of manpower fee —price indexes of machine fee	*Statistical Prices Investigation Design of Investment in Fixed Assets*

—price indexes of investment in other fee	
consumer price indexes —urban consumer price indexes —rural consumer price indexes (by category) retail price indexes (by category)	*Statistical Prices Investigation Design of Currency and Consumption*

In table 1, price indexes are released by two forms: “the previous year = 100” and fixed base. These forms are always mistaken as annual change price indexes and fixed base price indexes with international standard term. In fact, there are great difference between these price indexes of china and standard price indexes, so the comparisons are unreasonable. Now standard meaning of related concept of international standard term and the definition of Chinese style price indexes are introduced and explained by comparison.

Common price indexes with international standard term are as follows:

a. fixed base price indexes, marked PI_t^F

b. annual change price indexes, marked PI_t^{DC}

c. year-to-year indexes (also chain or link price indexes), marked PI_t^{LC}

d. chained price indexes, marked PI_t^C

Mathematic formulae of four price indexes are:

Fixed Base Price Indexes PI_t^F

$$PI_t^F = \frac{\sum P_{i,t}Q_{i,0}}{\sum P_{i,0}Q_{i,0}} = \sum w_{i,0}\frac{P_{i,t}}{P_{i,0}} \quad \cdots\cdots\cdots\cdots\cdots\cdots(1)$$

in which， $w_{i,0} = \frac{P_{i,0}Q_{i,0}}{\sum P_{i,0}Q_{i,0}}$ is the proportion of sale (or purchases, consumption) of product i at base period (period 0) to total sale (or purchases, consumption) of all product at same period，and it is the weight of price relative number, $\frac{P_{i,t}}{P_{i,0}}$.

$Q_{i,0}$ is the sale volume (or purchases volume, consumption volume) of

product i at base period;

$P_{i,t}$ is average price of product i at current period (period t);

$P_{i,0}$ is average price of product i at base period (period 0);

In equation (1), base period of fixed base indexes is period 0; the weight of relative price indexes of product i is the proportion of sale (or purchases, consumption) of product i at base period to total sale (or purchases, consumption) of all product at same period; in computation process, the relative price indexes of product i is the ratio between average price at period t and at period 0 of product i.

Annual Change Price Indexes PI_t^{DC}

If the price change between years wants to be reflected, the ratio of fixed base indexes of adjacent years can be used, and it is as follow:

$$PI_t^{DC} = \frac{PI_t^F}{PI_{t-1}^F} \quad \text{.....(2)}$$

$$= \frac{\sum P_{i,t}Q_{i,0}}{\sum P_{i,0}Q_{i,0}} / \frac{\sum P_{i,t-1}Q_{i,0}}{\sum P_{i,0}Q_{i,0}}$$

$$= \frac{\sum P_{i,t}Q_{i,0}}{\sum P_{i,t-1}Q_{i,0}}$$

$$= \sum w_{i,t-1}\frac{P_{i,t}}{P_{i,t-1}} \quad \text{.....(3)}$$

$$= PI_t^{DC} = \frac{\sum P_{i,t}Q_{i,0}}{\sum P_{i,t-1}Q_{i,0}} = \sum w_{i,t-1}\frac{P_{i,t}}{P_{i,t-1}}$$

in which, $w_{i,t-1} = \frac{P_{i,t-1}Q_{i,0}}{\sum P_{i,t-1}Q_{i,0}}$ is the proportion of one number to another number: one number is the product of price of product i at a period previous current period (period t-1) and sale volume (or purchases volume, consumption volume) of product i at base period (period 0), and another number is the sum of the product of price of all kinds of products with same scope at a period previous current period (period t-1) and sale volume (or purchases

volume, consumption volume) of all kinds of products at base period (period 0). $w_{i,t-1}$ is also the weight of price relative number $\frac{P_{i,t}}{P_{i,t-1}}$ at adjacent periods.

$Q_{i,0}$ is the sale volume (or purchases volume, consumption volume) of product i at base period (period 0);

$P_{i,t}$ is the average price of product i at current period (period t);

$P_{i,t-1}$ is the average price of product I at a period previous current period (period t-1);

In equation (3), the base period of annual change indexes is period 0; the weight of price relative number of product i is the proportion of one number to another number: one number is the product of price of product i at period t-1 and sale volume (or purchases volume, consumption volume) of product i, and another number is the sum of sale (or purchases, consumption) of all kinds of products with same scope; in the process of calculating indexes, price relative number of product i is the ratio between average price of product i at period t and average price at period t-1.

It can be found from equation (1) and (2) that fixed base indexes PI_t^F and annual change indexes PI_t^{DC} can be transformed each other. The relationship of transformation is as follows:

$$PI_t^{DC} = \frac{PI_t^F}{PI_{t-1}^F} \quad \cdots\cdots (4)$$

or equaling to

$$PI_t^F = \prod_{i=1}^{t} PI_i^{DC} \quad \cdots\cdots (5)$$

The meaning of equation (4) is that annual change indexes equals to the quotient of fixed base indexes at adjacent periods; The meaning of equation (5) is that fixed base indexes equals to the product of several annual change indexes. Essentially, annual change indexes PI_t^{DC} calculated indirectly and fixed base indexes PI_t^F are equivalent. Hence,

for both kinds of indexes, there are some problems, which are that the renovation of weights is slow and the representation is not good at some years distant from base period.

At present, the above fixed base indexes and annual change indexes calculated indirectly are adopted for most countries, but chain / link price indexes and chained price indexes, which are introduced in next part, are recommended to use by UN in 1993. Theoretically, these indexes are regarded extensively as innovation direction of price indexes computation.

Chain Price Indexes (or link price indexes) PI_t^{LC}

$$PI_t^{LC} = \frac{\sum P_{i,t}Q_{i,t-1}}{\sum P_{i,t-1}Q_{i,t-1}} = \sum w_{i,t-1}\frac{P_{i,t}}{P_{i,t-1}} \quad \cdots\cdots\cdots\cdots\cdots\cdots (6)$$

in which, $w_{i,t-1} = \frac{P_{i,t-1}Q_{i,t-1}}{\sum P_{i,t-1}Q_{i,t-1}}$ is the proportion of sales (or purchase volume, consumption volume) of product i at a period previous current period (period t-1) to total sale (or purchases, consumption) of all kinds of products at period t-1, so $w_{i,t-1}$ is the weight of price relative number $\frac{P_{i,t}}{P_{i,t-1}}$ at adjacent periods.

$Q_{i,t-1}$ is the sales (or purchase volume, consumption volume) of product i at a period previous current period (period t-1);

$P_{i,t}$ is the average price of product i at current period (period t);

$P_{i,t-1}$ is the average price of product i at a period previous current period (period t-1);

In equation (6), the base period of weight of year-to-year indexes (also chain or link price indexes) is the period previous current period (t-1), i.e. weight of price relative number of product i is the proportion of sale (or purchases, consumption) of product i at a period previous current period (period t-1) to total sale (or purchases, consumption) of all kinds of products at period t-1; In process of compiling indexes, price relative number of product i is the ratio of average prices at period t-1 and average prices at period t.

Chained Price Indexes PI_t^C

According to the definition, chained indexes equal to the product of a series of year-to-year indexes, i. e.

$$PI_t^C = \prod_{i=1}^{t} PI_i^{LC} \qquad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (7)$$

Equation (7) shows that chained price indexes, in which period 0 is reference period and period t is at current period, equal to the product of a series of year-to-year indexes from period 1 to period t.

By comparing equation (7) with equation (5), it can be found that the similar aspect between chained price indexes PI_t^C and fixed base indexes PI_t^F is that both indexes are the product of a serial of short term indexes, and chained price indexes equal to the product of a series of year-to-year indexes and fixed base indexes equal to the product of a series of year change indexes calculated indirectly. In other words, both indexes reflect price change of long term by accumulating price change of short term.

But there are some difference between chained price indexes PI_t^C and fixed base indexes PI_t^F. The difference is as follows:

Firstly, chained indexes only have reference period and don't have base period, but fixed base indexes have both reference period and base period. Secondly, the relationship between fixed base indexes and annual change indexes calculated indirectly is that fixed base indexes are calculated at first and then annual change indexes are calculated indirectly by equation (4); The relationship between chained indexes and year-to-year indexes is that year-to-year indexes are calculated at first and then chained indexes are calculated indirectly by equation (7). Thirdly, the most essential difference is that chained indexes can strengthen the representation of weights by updating weights and consequently price indexes can reflect price change in economic activities, but fixed base price indexes can't do and great error may appear by using fixed base indexes to reflect price change at some period distant from base period.

In China, formulae used in compiling "Chinese year-to-year price indexes" and

"Chinese fixed base price indexes" are different from the above formulae, so there is not comparability between Chinese price indexes and those price indexes calculated according to standard definition. Users should be careful to use price indexes. Computation formulae of "Chinese year-to-year indexes" and "Chinese fixed base indexes" are briefly introduced in next part.

Chinese Style Chain Price Indexes $PI^{年中环}$

Chinese style chain price indexes (annual year-to-year price indexes) are price indexes with "the previous year = 100" published in *china statistical yearbook*, and can be derived from simple arithmetic average for year-on-year monthly indexes of 12 month, i.e.:

$$PI^{年中环} = \frac{\sum_{m=1}^{12} PI_m^{月同比}}{12} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (8)$$

$$PI_m^{月同比} = \sum_{i=1}^{n} w_i \frac{P_{i,m,y}}{P_{i,m,y-1}}$$

$$w_i = \frac{P_{i,y_o} Q_{i,y_o}}{\sum_{i=1}^{n} P_{i,y_o} Q_{i,y_o}}$$

Of which, $PI_m^{月同比}$ is year-on-year price indexes of each month, and it is the ratio between the prices of month m in a year and the prices of same month in previous year.

$P_{i,m,y}$ is the average price of product i at month m of year y;

w_i is the weight of year-on-year price relative number $\frac{P_{i,m,y}}{P_{i,m,y-1}}$ of product i. In other words, w_i is the proportion of sales (or purchase value, consumption value) of product i at base year to total sales (or purchases value, consumption value) of kinds m of products.

P_{i,y_o} is annual average price of product i at base year (year y_0);

Q_{i,y_o} is average sale volume (or purchase volume, consumption volume) of product i at base year (year y_0).

From the equation (8), it can be found that essentially, Chinese (annual) year-to-year indexes are year-on-year annual Laspeyres indexes with fixed base. The meaning of year-on-year is that the indexes can be derived from month-on-month indexes; the reason of fixed base is that the weights of price relative number are fixed in one year and don't change in some time; the meaning of Laspeyres is that weights are fixed in base period rather than current period.

In addition, by comparing equation (8) with equation (2) and equation (6), it can be found that Chinese (annual) year-to-year indexes calculated by equation (8) are different with annual change indexes calculated by equation (2) and standard year-to-year calculated by equation (6).

Chinese Style Fixed Base Price Indexes $PI_{y_0}^{中定}$

Chinese fixed base price indexes $PI_{y_0}^{中定}$, published in *china statistical yearbook*, can be calculated by equation (9):

$$PI_{y_0}^{中定} = \prod_{y=y_0}^{y_{0+T}} PI_y^{年中环} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (9)$$

in which, $PI_y^{年中环}$ is Chinese fixed base price indexes in year y.

Therefore, essentially, Chinese fixed base price indexes are not standard fixed base price indexes by equation (1) but the product of Chinese year-to-year price indexes of every year from the reference year.

It should be emphasized that Chinese fixed base price indexes by equation (9) are similar formally to chained indexes by equation (7), but real time series data are not established by multiplying continuously Chinese fixed base price indexes because Chinese year-to-year price indexes are year-on-year indexes.

In a summary, 'Chinese year-to-year indexes" should not be regarded simply as "year-to-year indexes"; "Chinese fixed base indexes" also should not be regarded simply

as “fixed base indexes”, otherwise confusion would be resulted in.

In order to accord with international tradition, media-term innovation plans have be set down by USO and RSO, and the target is that China will compile fixed price indexes with standard item meaning in five years.

III. Methods of Compiling Price Indexes for GDP Accounts at Constant Price by Production Approach

At present, price indexes used for GDP accounts at constant price by production approach include producer price indexes of agricultural products, ex-factory price indexes of industrial products, price indexes of selling houses, price indexes of investment in construction and installation, price indexes of investment in fixed assets, retail price indexes, and consumer price indexes. Except for retail price indexes and consumer price indexes, other price indexes are compiled according to *Prices Investigation Design of Agricultural produce, Prices Investigation Design of Industrial Products, Statistical Prices Investigation Design of Real Estate, Statistical Prices Investigation Design of Investment in Fixed Assets.* The methods of compiling price indexes about four kinds of designs will be introduced in next part.

Prices Investigation Design of Agricultural produce

Price statistical work began in 1994, and national RSO is in charge of compiling related price indexes. Price indexes compiled by *Prices Investigation Design of Agricultural produce* are producer price indexes of agricultural products (by category, by industry). Producer price indexes of agricultural products are year-on-year quarterly Laspeyres indexes, and year-on-year quarterly price indexes and accumulative quarter price indexes (from Q1 to current quarter) are compiled at the same time. The weights used in the process of compiling indexes can be calculated by sales of agricultural products at base period, and base period is switched every a five year. At present, the base period of weights is 2001 because compiling work just began. Producer price indexes of agricultural products are compiled in terms of quarters. Original data and accumulative

data must be reported from regional RSO to national RSO, and reporting time is before 25th day of last month of one quarter. The time of indexes publication is from 25th day to 26th day of month after corresponding quarter, and the time of indexes publication for annual data is from 25th day to 26th day of month after corresponding year. At present, the publications, where producer price indexes of agricultural produce are released, include *China Statistical Objective*, but *China Statistical Yearbook* and *China Monthly Economic Indicators* don't release the price indexes.

The coverage of investigation about prices of agricultural produce includes units of agricultural product and management and commerce market of agricultural produce. Investigation method of prices combines farmer keeping records (diary) with interviewing. The content of investigation is main agricultural produce produced and sold by investigation units, and main agricultural produce are decided in terms of *Reference Catalogue of Agricultural Produce*. *Reference Catalogue of Agricultural Produce* is benchmarked to *The Standard Classification of National Economic Industry* (GB/T4754-2002). Prices used in price collection are the income per product unit for agricultural producers when they sell their product by first hand price (directly).

The detailed methods of compiling producer price indexes of agricultural products are as follows:

First is to select representative products for investigation according to *Reference Catalogue of Agricultural Products*

In the last vision of *The Standard Classification of National Economic Industry* (GB/T4754-2002), there are 4 divisions (GB 2-digital code), i.e. farming, forestry, animal husbandry and fishery, 14 groups (GB 3-digital code) and 31 Classes (GB 4-digital code), and *Reference Catalogue of Agricultural Produce* is set down by national RSO in terms of the classification. Then, representative products can be selected from *Reference Catalogue of Agricultural Produce*. The coverage of representative products should arrive at 90 percent of all Classes so that producer price indexes of agricultural produce are able to reflect direction and extent of price change of all kinds of agricultural products. Besides the coverage, other factors, such as affection for national economy and people's livelihood,

output of products, sale volume, stability, forecasting, and characteristics of region, should be taken into account. After selected, representative products should be kept in stabilization in a five-year period. If special occasion happens, such as rapid adjustment of products structure, the modification for representative products can be made ahead of schedule, but representative products can't be modified in a year in principle. The number of representative products in the national level is 180, and sales of these products account for more than 70 percent of total sales of agricultural products. When producer price indexes of agricultural products are compiled in every region, representative products are selected according to *Reference Catalogue of Agricultural Produce* and actual condition. If some important products for local area are not included in *Reference Catalogue of Agricultural Produce*, these products should be reported to national RSO and can be used after obtaining uniform codes.

Second is to draw out some investigation units as a sample, including farm and farmer, according to *Sample Methods for Prices of Agricultural Products Survey.*

Third is to calculate producer price indexes of agricultural products gradually from bottom to top, and the detailed processes are as follows:

Step 1: calculating individual price indexes of representative products

Given that number of representative products is m and number of sample units is n, $PI_{ij}^{\uparrow}$ is individual price index of representative products i in sample units j, and computation formulae of $PI_{ij}^{\uparrow}$ is as follows:

$$PI_{ij}^{\uparrow} = \frac{\overline{P}_{ij}^{1}}{\overline{P}_{ij}^{0}}$$

$$\overline{P}_{ij} = \frac{\sum_{t} P_{ijt} Q_{ijt}}{Q_{ijt}}$$

P_{ijt} is the sell price at time t for representative product i in sample unit j.

Q_{ijt} is the sell volume at time t for representative product i in sample unit j.

$\overline{P}_{ij}$ is the average price of representative product i in sample unit j at accounts

period.

$\overline{P}_{ij}^{1}$ is the average price of representative product i in sample unit j at current period.

$\overline{P}_{ij}^{0}$ is the average price of representative product i in sample unit j at base period.

Step 2：calculating price indexes of representative products

Given that $PI_{ij}^{产品}$ is the average price of representative product i for n sample units, and computation formula is as follows:

$$PI_{ij}^{产品} = \sqrt[n]{\prod_{j=1}^{n} PI_{ij}^{个}}$$

Step 3: calculating price indexes of Class

Given that $PI_{j}^{小类}$ is the price indexes of Class, and computation formula is as follows:

$$PI_{j}^{小类} = \frac{\sum_{i} V_{ij}^{产品} PI_{ij}^{产品}}{\sum_{i} V_{ij}^{产品}} = \sum_{i} w_{ij}^{产品} PI_{ij}^{产品}$$

$PI_{ij}^{产品}$ is the average price of representative product i for n sample units.

$V_{ij}^{产品}$ is sales of representative product i in Class j.

$\sum_{i} V_{ij}^{产品}$ is the sum of sale of representative products in Class j.

$w_{ij}^{产品}$ is the proportion of sales of representative product i to the sum of sales of representative products in Class j, and the process of proportion computation can see appendix 2: a table about weights computation example of producer price indexes of agricultural products.

Step 4: calculating price indexes of group.

Step 5: calculating price indexes of division.

Step 6：calculating total price indexes of agricultural products.

The computation formulae of price indexes of group, price indexes of division, and

total price indexes are same to that of price indexes of Class.

Prices Investigation Design of Industrial Products

Trial works of compiling price indexes of industrial products began in 1984, and formal compiling works began in 1985. From 1985 to present, the development process of works can be divided into three phases: phase 1 is from 1985 to 1995, phase 2 is from 1996 to 2000, and phase 3 is from 2000 to present.

Investigation spots were increasing and content were broadening during phase 1 (1985-1995). In 1985, there were 78 cities, 3000 corporations and more than 400 products (780 specification), and in 1995, there were 114 cities, more than 5000 corporations and more than 400 products (1500 specifications). The frequency of investigation was month rather than quarter. Collected prices were unit value prices. Investigation manner was that investigated corporations sent data to local statistical bureau by report forms, and then aggregative report forms of corporations were sent to national USO by regional USO. National USO is in charge of compiling price indexes of industrial products.

During phase 2 (1996-2000), the third edition of *Prices Investigation Design of Industrial Products* was accomplished. Spots and content of investigation were increasing. Investigated products increased to 1,140 (3,120 specification), investigated cities to 200 and investigated corporations to 10,000. Some adjustments for price indexes of industrial products were made in virtue of data of the third industry census in 1995. National USO compiled the first edition of *Prices Investigation Design of Industrial Products* in order to standardize and improve statistical work about price indexes of industrial products. Main progress of phase 2 for compiling methods was: a. original data were sent by long-distance transmission, instead of report forms; b. central-planned prices, floating prices and market prices were cancelled from report forms, and unit value prices were sent directly; c. average price method was cancelled in the process of compiling price indexes of specification, and indexes method was adopted.

Phase 3 (2000-present). In 2001, the fourth edition of *Prices Investigation Design of Industrial Products* was accomplished. “Some important technical modification and

improvement were made in the third edition, and investigated products were increasing to 2,700 (6,000 specification), investigated cities to 410 and investigated corporations to 50,000. At present, the new design can cover 186 industrial groups, so the proportion of coverage reaches 94 percent of total 197 industrial groups and the proportion of production value reaches 95 percent of total value. Price indexes of industrial products are calculated before 3rd day after report month. Main progress of phase 3 includes: a. the investigation of unit value prices for every month are cancelled, and the investigation of time spot price at two time spot in a month are adopted; b. weighted average method is not used to calculate price indexes, instead of geometric average method, which is to geometrically average all ex-factory price indexes of same specification; c. the new edition of *Prices Investigation Design of Industrial Products* is put into practice from 2003." (statistical work handbook of price of industrial production); d. in 2002, china joined formally GDDS data dissemination system of IMF. Some related information is sent to Dissemination Standard Bulletin Board (DSBB) of IMF.

Indexes compiled according to *Prices Investigation Design of Industrial Products* include ex-factory price indexes of industrial products (by category and by industry) and purchase price indexes of raw material, fuel and power (by category). Ex-factory price indexes of industrial products are year-on-year monthly Laspeyres indexes, and at the same time year-on-year monthly / year-on-year quarterly indexes and accumulative monthly / quarterly (from M1 to current month or from Q1 to current quarter) indexes are compiled. Quarterly indexes (Year-on-year annual indexes) are the simple average of monthly indexes of 3 month; annual indexes (year-on-year annual indexes) is the simple average of monthly indexes of 12 month. Weights can be calculated in terms of sales of industrial productions at base period and the base period can be transformed after a five-year period. Up to present, base years of weights are 1985, 1990, 1995 and 2000. Initial weights are data of the second industries census in 1985. Because the frequency of industries census is once per 10 year, it is necessary to adjust weights in virtue of special statistical data between 1985 and 1995. The second general adjustment for weights was made in 1995, which are based on the data of the third industries census. Adjustment time

of weights is reconciled with the time of economy census for the future. The coverage of compiling price indexes of industrial products includes all industrial activities. The time of price collection is 8th and 18th of each month, and prices used during price collection are selling unit price on collection day. Price indexes of industrial products are monthly indexes, and the time of dissemination is 20th day after corresponding month, and the time of dissemination for annual data is 30th day after corresponding year. The publications, where producer price indexes of agricultural produce are released, include *China Information, China Monthly Economic Indicators and China Statistical Yearbook.*

The detailed methods for compiling ex-factory price indexes of industrial products are as follows:

Firstly, representative products of investigation and specification are selected according to *Investigation Catalogue of industrial Production*, and then investigated corporations of investigated cities are sampled by probability proportional to size. In the new investigation designs, the sorts of investigated products reach to 2,714 (5,751 specifications), investigated cities to 415 and investigated corporations to 50,000. Investigation sample will be updated every a-five year, and during the period, some adjustment may be made. Investigation sample covers 186 of groups of *The Standard Classification of National Economic Industry* (GB/T4754-2002), so the proportion of coverage reaches 94 percent of total 197 industry groups and the proportion of production value reaches 95 percent of total value.

Secondly, data are reported gradually from bottom to top and ex-factory price indexes of industrial products for Class, Group, Division and Section can be compiled respectively.

Step 1: calculating the average price $\overline{P}_{xij}$ of specification j of representative product x in investigated unit j, and calculating price index $PI_{xij}^{\uparrow}$ （price relative number)

$$\overline{P}_{xij} = \frac{P_{xij1} + P_{xij2}}{2}$$

$$PI_{xij}^{\uparrow} = \frac{\overline{P}_{xij}^{1}}{\overline{P}_{xij}^{0}}$$

P_{xij1} is the price , by which specification i of representative product x in investigated unit j is sold at first time (ex-factory price).

P_{xij2} is the price , by which specification i of representative product x in investigated unit j is sold at second time (ex-factory price).

$\overline{P}_{xij}$ is the average of P_{xij1} and P_{xij2} for specification i of representative product x in investigated unit j at accounting period (ex-factory price).

$\overline{P}_{xij}^{1}$ is the average of P_{xij1} and P_{xij2} for specification i of representative product x in investigated unit j at current period (ex-factory price).

$\overline{P}_{xij}^{0}$ is the average of P_{xij1} and P_{xij2} for specification i of representative product x in investigated unit j at base period (ex-factory price).

$PI_{xij}^{\uparrow}$ is the price index of specification i of representative product x in investigated unit j at current period

Step 2: calculating geometry average price index of specification i of representative product x in all investigated units, marked PI_{xi}^{S}.

Mathematic formula of PI_{xi}^{S} is $PI_{xi}^{S} = \sqrt[n]{\prod_{x=1}^{n} PI_{xij}^{\uparrow}}$

i.e. the price index of specification i of representative product x is geometry average of all price indexes of specification i of investigated corporations (the number of investigated corporations is n)

Step 3: calculating price index of representative product x, marked PI_{x}^{p}.

Mathematic formula of PI_{x}^{p} is $PI_{x}^{p} = \frac{\sum_{i=1}^{i_1} PI_{xi}^{s}}{i_1}$

i.e. the price index of representative product x is the arithmetic number for all price

indexes of specification included representative product x (the number of specification included representative product x is i_1).

Step 4: calculating price index of Class j, marked PI_j^c

Mathematic formula of PI_j^c is:

$$PI_j^c = \frac{\sum_i V_{ij}^p PI_{ij}^p}{\sum_i V_{ij}^p} = \sum_i w_{ij}^p PI_{ij}^p$$

$$w_{ij}^p = \frac{V_{ij}^p}{\sum_i V_{ij}^p}$$

PI_{ij}^p is the price index of representative product i in Class j.

V_{ij}^p is the sales of representative product i in Class j.

$\sum_i V_{ij}^p$ is the sum of sales of all representative products in Class j.

w_{ij}^p is the proportion of the sales of representative product i to the sum of sales of all representative products in Class j. The detailed methods of w_{ij}^p are same to the methods for price indexes of agricultural products.

Step 5: calculating ex-factory price index of industrial products for Group PI_j^g.

Step 6: calculating ex-factory price index of industrial products for Division PI_j^d

Step 7: calculating ex-factory price index of industrial products for Section PI_j^{se}

Step 8: calculating total ex-factory price indexes of industrial products PI

The methods of compiling ex-factory price indexes of industrial products for Group, Division, Section and total price indexes are same to that of price indexes for Class, i.e. price indexes of current level is the arithmetic average for previous level.

Statistical Prices Investigation Design of Real Estate

Statistical work about prices of real estate began 1997, and national USO is in charge

of compiling price indexes. According to *Statistical Prices Investigation Design of Real Estate*, price indexes of land trade, price indexes of selling houses and price indexes of renting houses are compiled. Price indexes of real estate is year-on-year Paasche indexes, and at the same time year-to-year indexes are also compiled. Price indexes of real estate can reflect total trend and extent of price change of real estate, and collected prices are exchange prices of house property and land of activities units (real estate management organs of all levels、real estate developers, real estate agents, related corporations and corporations, governments and social organizations, and partial households). Prices of real estate are collected by combining key-point investigation and typical investigation. The manners of investigation are interview and report form. The frequency of investigation is once per month. Quarterly data are the sum of monthly data. Quarterly volume and sales can be obtained by summing up real trade numbers for three month of one quarter, and quarterly prices are the arithmetic average for sample prices of three month. The compiling period of price indexes of real estate is a quarter. Original data and accumulative result are reported on 5^{th} after corresponding quarter by FTP / OPENMALL long-distance techniques from local USO to national USO. The released time of quarterly data is on 25^{th} after corresponding quarter and the released time of annual data is on 30^{th} after corresponding year. At present, price investigation works only are made in 35 cities, and the activities of real estate development and management in countries are not calculated. Investment in real estate of the 35 cities reach to more than 70 percent of total countrywide investment in real estate.

Prices indexes of real estate are divided into three sets of price indexes, i.e. price indexes of selling houses, price indexes of renting houses and price indexes of land trade, which are compiled respectively. The methods of compiling these sets of price indexes are similar because methods such as computation and accumulation gradually from bottom to top are also adopted. The computation process is from investigation item (specification) to basic classification (basic heading / product, Class, Group, Division) and finally to total indexes. Price indexes under Group level are weighted harmonic average of price indexes (item price indexes, Class price indexes, Group price indexes) of corresponding level, and

weights are trade sales of corresponding level at current period. Division indexes and total indexes can be calculated by weighted arithmetic average formula with fixed weights. The detailed compiling methods will be introduced in next part with taking price indexes of selling houses for example.

Step 1: calculating investigation item price index PI_i^s.

Individual index of investigation item (investigation object) is

$$PI_i^s = \frac{P_{1i}}{P_{0i}}$$

P_{1i}, P_{0i} are the price of investigation item i at current period and at base period

PI_i^s is the individual price index (price relative number) of investigation item (specification).

Step 2: calculating basic classification price index PI_i^b

$$PI_i^b = \frac{\sum W_i^s}{\sum \frac{W_i^s}{PI_i^s}}$$

W_i^s is the sales of investigation item i at current period.

$\sum W_i^s$ is the sum of sale of all investigation items in the same basic classification.

PI_i^b is the price indexes of basic classification i (basic heading / product), and it is the weighted harmonic average of price indexes of all investigation items in the same basic classification.

Step 3: calculating Class price index PI_i^c

$$PI_i^c = \frac{\sum W_i^b}{\sum \frac{W_i^b}{PI_i^b}}$$

W_i^b is the sale of basic classification i at current period.

$\sum W_i^b$ is the sum of sales of all basic classification in the same Class at current period.

PI_i^b is the price index of Class i, and it is the weighted harmonic average of price indexes of all basic classifications in the same Class.

Step 4: calculating Group price index PI_i^g

$$PI_i^g = \frac{\sum W_i^c}{\sum \frac{W_i^c}{PI_i^c}}$$

W_i^c is the sales of Class i at current period.

$\sum W_i^c$ is the sum of sales of all Classes in the same Group at current period.

PI_i^g is the price index of Group i, and it is the weighted harmonic average of price indexes of all Classes in the same Group.

Step 5：calculating Division price indexes PI_1^d

$$PI_1^d = \frac{\sum W_i^g PI_i^g}{\sum W_i^g}$$

W_i^g is the sales of Group i at current period.

$\sum W_i^g$ is the sum of sales of all Groups in the same Division at current period.。

PI_1^d is the price index of Division 1, and it is the weighted arithmetic average of price indexes of all Groups in the same Division.

By the above five steps, price indexes of selling houses (Division) can be calculated, and the same principle to other kinds of price indexes, i.e. price indexes of renting houses PI_2^d and price indexes of land trade PI_3^d.

Step 6: calculating total price indexes of real estate PI

$$PI^{季} = \frac{W_1 * PI_1^d + W_2 * PI_2^d + W_3 * PI_3^d}{W_1 + W_2 + W_3}$$

W_1， W_2， W_3 are sale of houses, renting house income and land trade sale.

$PI^{季}$ is the total price indexes (quarter) of real estate.

Annual price indexes of real estate is the simple arithmetic average of quarterly indexes, i.e.:

$$PI^{年} = \frac{PI^{季1} + PI^{季2} + PI^{季3} + PI^{季4}}{4}$$

Statistical Prices Investigation Design of Investment in Fixed Assets

Statistical works of fixed assets investment price began in 1990, and USO of NBS are in charge of compiling these indexes. According to *Statistical Prices Investigation Design of Investment in Fixed Assets*, price indexes of investment in fixed assets, price indexes of construction and installation, price indexes of equipment and instruments, and price indexes of investment in other expenditure are compiled. Price indexes of investment in fixed assets is year-on-year Paasche price indexes. It is compiled per quarter. The frequency of price collection is once per month. Quarterly data are accumulative data of corresponding months. Quarterly amount and value can be derived from the sum of the real exchange amount of the three months. Quarterly prices are the arithmetic average of sample prices of the three months of the quarter. The original data and collected results are transmitted to the USO of NBS from the regional USO through FTP/OPENMAIL on 1st after corresponding quarter. Quarterly indexes are released on 25th day after corresponding quarter, and annual indexes are released on 30th day after corresponding quarter.

Price investigation of investment in fixed assets begins from partner B (the corporations of construction, installation and decoration). The investigation to the construction and installation and the investigation to other fees are made respectively. For the construction and installation, the price investigation includes the prices of main construction material, such as steel, wood, cement, electrical material, chemical material

etc., which are bought in current year and used for completed project and project under construction. These prices refer to purchase prices or settlement prices. Generally speaking, the sum of production value of sample corporations accounts for 50 percent of the production value of construction and installation of local region. For sample selection, in order to ensure the representative of price indexes of investment in fixed assets, it needs to consider the sampling coverage, the type of project, economic types of corporations, the importance of investment activity, the representative of investment activity and etc. For other fees, the content of price investigation includes the residual between the production values of construction projects under construction of sample corporations at current period (investment in construction project by partner A) and production values of construction and installation projects, i.e. the 24 items of fees in the financial system. The selection of spots and prices for the construction and installation and the selection of spots and prices for other fees are conducted respectively.

For price investigation of fixed assets investment, the processes of sample selection from construction and installation corporations are: firstly, to find construction corporations (partner A) based on the catalogue of national and regional important projects, and then to select construction units (partner B). For fixed assets investment price investigation, the principle and process of selecting sample spots for the other fees is generally the same as the sample corporations' selection of construction and installation. But in practice, as it is not easy to obtain the data of other fees, it is necessary to use key-point investigation and typical investigation as an assistance or to obtain data from management department.

The method of compiling price indexes of fixed assets investment is that, the price index is decomposed into three kinds of price indexes, i.e. price indexes of construction and installation (investment), price indexes of equipment and instruments (investment), and price indexes of other fees, and then the total price indexes of investment in fixed assets can be derives by taking the average of the three indexes. The detailed methods of compiling the three decomposed price indexes of the fixed assets investment will be introduced below.

Price index of construction and installation

For the construction and installation, material fees, manpower fees and machine fees account for over 90 percent, so the average of corresponding price indexes of the three fees can be looked as price index of construction and installation. The methods of calculating the three fees are similar, which are calculated by gradually aggregating data from bottom to up. As an example, the methods of calculating price index of material fee will be introduces in the next part.

Step 1: calculating price indexes of a specification of some kind of material PI_i^s

—specification

Price index of a specification of some kind of material is the weighted harmonic average of price indexes of a specification in all sample projects. The formula is:

$$PI_i^s = \frac{\sum_j W_{i,j}}{\sum_j \frac{1}{PI_{i,j}^s} W_{i,j}}$$

$W_{i,j}$ is the purchase value of the specification i of this kind of material in sample project j at current period.

$\sum W_{i,j}$ is the purchased value of the specification i of this kind of material in the total sample project at current period.

$PI_{i,j}^s$ is the individual price index of the specification i of this kind of material in sample project j.

PI_i^s is the price index of specification i s of this kind of material.

Step 2: calculating price index of some kind of material (basic heading)

The price index of some kind of material is the simple average of price indexes of the n kinds of specification of this kind of material. The formula is:

$$PI_i^b = \frac{PI_1^s + PI_2^s + ... + PI_n^s}{n}$$

PI_j^s is the price index of specification j of material i, $j = 1,2,...n$.

PI_i^b is the price index of material i.

Step 3: calculating price index of material fee PI^c

Price index of material fee is the weighted harmonic average of price index of all kinds of materials. The formula is:

$$PI^c = \frac{\sum W_i}{\sum \frac{1}{PI_i^b} W_i}$$

W_i is the sum of purchase value of material i in all the sample projects at current period.

$\sum W_i$ is the sum of purchase value of all kinds of material in all the sample projects at current period.

PI_i^b is the price index of material i.

PI^c is the price index of material fee.

There are many kinds of material, which are consumed in the construction and installation, so it is impossible to calculate one by one. In practice, the main materials are selected, such as steel, wood, cement, electrical material and chemical material that also have great values. The total value of selected material should amount for more than 70% of all the material fees. The unit price of the material includes transportation fee and commission charge of the distribution department. The type of weights used in price indexes of investment in construction and installation is direct weight, and there is no distributed proportion process such as in appendix 2.

In terms of the same principle, we can calculate the price index of manpower fee and the price index of machine fee. After separately getting the price index of material fee, the price index of manpower fee and the price index of machine fee, the total price index of construction and installation can be calculated by weighted arithmetic average method.

The formula is:

$$PI^{建安} = \frac{W_C * PI^C + W_h * PI^h + W_m * PI^m}{W_C + W_h + W_m} = r_C * PI^C + r_h * PI^h + r_m * PI^m$$

PI^C is the price index of material fee.

PI^h is the price index of manpower fee.

PI^m is the price index of machine fee.

$PI^{建安}$ is the total price index of construction and installation.

W_c is the sum of purchase value of material fee (calculated by purchased price or settlement price) of all sample projects at current period.

W_h is the sum of expenditure of manpower fees of all sample projects at current period, which are chosen from sample project data.

W_m is the sum of expenditure of machine fees of all sample projects at current period, which are chosen from sample project data.

r_C is the proportion of the sum of all the materials of sample project accounting for three fees (material fee, manpower fee, machine fee), i.e. $r_C = \frac{W_c}{W_c + W_h + W_m}$, which are chosen from sample project data.

r_h is the proportion of the sum of the manpower fee of all the sample projects accounting for the three fees (material fee, manpower fee, machine fee), i.e. $r_h = \frac{W_h}{W_c + W_h + W_m}$, which are chosen from sample project data.

r_m is the proportion of the sum of the machine fee of all the sample projects accounting for the three fees (material fee, manpower fee, machine fee), i.e. $r_m = \frac{W_m}{W_c + W_h + W_m}$, which are chosen from sample project data.

IV. The Problems and Further Improvements About GDP Accounting at Constant Price and Related Price Indexes

For the processes of compiling price index, there exist some problems as follows:

Firstly, there is not comparability between the formulae of price indexes and international formulae; because product catalogue are out of date, weights are updated slowly and absent of representative, the substitute effect on the economic life is unable to reflect well; there is no qualitative adjustment and seasonal adjustment; because there is no enough personnel in grass roots and their burden is heavy, all these bring problems in practice, such as the problems in sampling, price collection, investigation, reporting and etc. Especially, the behavior of using subjective sample instead of random sample violates the basic principle of statistical inference, and results in the great bias in the inference result.

Secondly, the coverage of compiling indexes is not perfect. At present, there is a large gap in China's price indexes system. For example, producer price index of services industry (output), and price index of services of foreign trade are not compiled.

Thirdly, the process of compiling price indexes is not matching with the national accounts. There is some difference between the collected prices for compiling indexes and producer price and user price defined in the national accounts. So GDP at constant prices by production approach and GDP at constant prices by expenditure approach that are calculated based on such price indexes can't meet the relationship in theory.

For GDP accounts at constant price, there are problems below:

The national accounts level is low, and price indexes used in the national accounts is lack of pertinency; especially in the services industry, the price indexes are substituted by the related components of the consumer price indexes, and the price indexes are not adjusted according to the change caused by the change of value-added tax and sale tax, etc. All the problems above will affect the accuracy of GDP at constant price by a great extent.

There is no consistency in time dimension between among series of GDP at constant price. There experienced 20 years from the start of GDP accounts in 1985 up to the present. During the 20 years, method system, scope and classification standard of national

accounts and specialty statistics are improving constantly. Sometime, as the change of accounting methods, accounts data fluctuate greatly so that the data of different years can't compare with each other. For example, in 2004, the transformation in the accounts methods of industrial and agricultural value added at constant price by production approach resulted in the great difference in growth rate between new and old methods. Before 2004, industrial value-added at constant prices by production approach is calculated by single-volume index extrapolation method, and volume index used in extrapolation method is Laspeyres output index at fixed base. According to indexes theory, because of the substitute effect, Laspeyres output index will underestimate the growth rate of industry along with time passing. And the price index used in the new method is similar to Laspeyres price index at fixed base, so it is possible to overestimate the growth rate of the industry value-added obtained indirectly. On the other hand, under the situation that intermediate consumer price index is far above output price index, the use of single-indicator deflation method will increase the overestimated extent of industrial growth rate. Therefore, from this point of view, the transformation of the accounts method of industry value-added at constant price will lead to the great change of growth rate. Because of the change of accounts method, the incompatibility of history data should be considered greatly when GDP history data are revised.

In addition, there is potential mixed base period problem for GDP at constant price by production approach. GDP at constant price by production approach is calculated by departments, and the accounts methods used by different section are also different. These methods include extrapolation , deflation， and mixed methods. Under this situation, the base periods of different indexes will affect the data of GDP at constant price. Therefore, once base periods used by different index are different, the aggregated GDP at constant price becomes mixed base period data. The real meaning of constant prices also becomes unclear. So the reform of different price indexes must match with each other in order to reduce the influence of mixed base period. In addition, the updating frequency for base period of GDP at constant price (once per 10 year) and price statistics (once per 5 year) is different. How to link together is also a problem that should be considered.

Thirdly, GDP at constant price can't be compared internationally to some extent. This is caused partly by the problems that exist in the process of calculating GDP at constant price by production approach, and partly by price indexes used in the accounts at constant price that can't be compared internationally. In addition, during the compiling process, the adjustments about quality of price indexes are made, which will lead to overestimate growth rate of GDP.

Fourthly, the use of single-indicator price index deflation method predicates that the fluctuation trend and range of the output prices and intermediate input prices is same. In practice, the assumption above is not correct. Hence, in order to improve the credibility of GDP at constant price, double-indicator deflation method should be used. If price indexes can't meet the qualification, single volume index extrapolation should be used, because it is a reasonable assumption that the structure of output at constant price is relatively stable.

In order to solve the problems above, some improvement should be made in GDP accounts and price statistics in the future and these improvement are:

a. Improving GDP accounts at current price scope range and improve the quality of GDP current price calculating in order to reform statistics system.

The national accounts and specialty accounts should be considered as a whole about method and system design. Specialty system improvement should be made under condition of consistent with the whole national accounts system, and the problems on specialty statistics should be solved in order to provide stable base for current price calculating.

b. Dividing GDP accounting at current price, and designing the frame system of GDP accounts and input-output accounts

The indexes that can match with the national accounts should be compiled, and especially, the work of compiling price index of services production and price index of foreign trade should be improved. The method of compiling price indexes should meet the international standard as soon as possible. It is necessary to compile fixed base index，annual change index calculated indirectly, chain index and chained index, and these indexes is consistent with the meanings of standard term. At the same time, the research

on index theory should be strengthened, and index theories achievement and advanced experience of other countries should be absorbed as much as possibly. And we should consider the situation of our country, and can't use foreign countries' experience blindly. Under the situation that China's producing structure and consuming structure change rapidly and the prices fluctuate greatly, it is reasonable for these ideas that fixed base price index be compiled firstly and then it is replaced by chained price index with adequate comparability and research.

c. Price indexes reform should match themselves. Otherwise it will increase the problems of mixed base period about GDP accounting at constant prices. If some indexes change their mixed base period once per 5 year, some indexes once per 1 year, some indexes compiled by the internationally universal methods, and some indexes compiled by methods with Chinese characteristic, GDP accounts at constant prices became a hodgepodge.

d. While calculating the growth rate of GDP at constant prices, the incomparability of time dimension, should be considered in order to ensure that the growth rate could reflect the development of national economy with high accuracy.

e. Documents of national accounts at constant prices and methods of compiling related indexes should be strengthened in order to ensure that the content of literature could be precise and the record could be timely and accurate. This is beneficial to aggregation, improvement and advancement.

(Translated by WANG Shaohui)

Appendix 1

GDP at constant price by production approach by industry and department

industry and department	Basic calculating methods	Price index or volume index
Farming, Forestry, Animal Husbandry and Fishery	mixed methods：extrapolation method for output；deflation method for intermediate input	Total output：Farming, Forestry, Animal Husbandry and Fishery total output at constant price volume index；intermediate input： production material price index correspond with 13 types of intermediate input and other price index
Industry	single-indicator deflation method	Output price index，adjusted to the price fluctuation of raw materials
Construction	single-indicator deflation method	Based on “price index of construction and installation” in the price index of investment of fixed assets，and adjusted to the difference of price index of manpower fee and material fee
Farming, Forestry, Animal Husbandry and Fishery	single-indicator deflation method	Service price index of consumer price index
Geological prospecting and water conservancy	single-indicator deflation method	Service price index of consumer price index
Transport, Storage, Post and telecommunication Services	Single-indicator extrapolation method	Transport and Storage：index of traveler and goods turn ； Post and telecommunication Services：index of total amount of Post and telecommunication Services
Wholesale and Retail Trade and Catering Services	single-indicator deflation method	Retail price index
Finance and Insurance	single-indicator deflation method	Weighted average of consumer price index and fixed assets investment index，weighted by the proportion of final consumption expenditure and gross capital formation
Real Estate	single-indicator deflation method	Value-added of real estate：selling price index of houses； Value-added of real estate management：consumer price index； Newly-increased owned house deduction：price index of investment of fixed assets； Original owned house deduction：adjusted to ones owned house’s deduction at constant price of preceding year

Social Services	single-indicator deflation method	Net value-added：service price index of consumer price index（especially bus ticket, 洗理 hairdressing fee、repair and other service fees）; Original fixed assets deduction：adjusted to ones owned house's deduction at constant price of preceding year; Newly increased fixed assets deduction of that year：price index of that year
Health Care, Sports and Social Welfare	single-indicator deflation method	Net value-added：price index of service in consumer price index（especially price index of health care）; Original fixed assets deduction：adjusted to ones owned house's deduction at constant price of preceding year; Newly increased fixed assets deduction of that year：price index of that year
Education, Culture and Arts, Radio, Film and Television	single-indicator deflation method	Net value-added：price index of service in consumer price index（especially price index of culture, entertainment 学杂保育费）; Original fixed assets deduction：adjusted to ones owned house's deduction at constant price of preceding year; Newly increased fixed assets deduction of that year：price index of that year
Scientific Research and Polytechnic Services	single-indicator deflation method	Net value-added：price index of service in consumer price index; Original fixed assets deduction：adjusted to ones owned house's deduction at constant price of preceding year; Newly increased fixed assets deduction of that year：price index of that year
Government Agencies, Party Agencies and Social Organizations	single-indicator deflation method	The same as above
Others	single-indicator deflation method	The same as above

Reference Source：

1. 许宪春，2002 年 10 月，中国国内生产总值核算，《经济学（季刊）》第 2 卷第 1 期。

Xu, X (2003, September 4), China's Gross Domestic Product Estimation, China Economic Review, North-Holland.

2. 许宪春，2002 年 10 月，中国服务业核算及其存在的问题研究，《经济学（季刊）》第 2 卷第 1 期。

Appendix 2 ：

weights computation example of producer price indexes of agricultural products

Type and name of Production	code	sales（10 thousand yuan）	Weight of division	Ratio of group in division‰	Weight of group	Ratio of Class in group‰	Weight of class	Ratio of product in class‰	Weight of product
甲	乙	1	2	3	4	5	6	7	8
Farming, Forestry, Animal Husbandry and Fishery	A	10,372,675							
（sum of division）	B	10,372,675	1000						
1 agriculture	C	4,209,775	405.85						
（sum of group）	D	3,541,643		1000					
1.1 cereal and others	E	1,369,544		386.7	156.94				
（sum of class）	F	1,368,891				1000			
1.1.1 cereal	G	872,566				637.43	100.4		
（sum of production）	H	859,569						1000	
1.1.1.1wheat	I	11,749						13.67	1.37
1.1.1.2rice	J	840,589						977.92	97.83
1.1.1.3corn	K	7,231						8.41	0.84
1.1.2tubers	L	227,121				165.92	26.04		
1.1.3oil-bearing crops	M	85,877				62.73	9.85		
1.1.4beans	N	71,648				52.34	8.21		
1.1.7sugar	O	28,331				20.7	3.25		
1.1.8Tobacco	P	83,348				60.89	9.56		
1.2vegetable、gardening	Q	1,039,272		293.44	119.09				
1.3fruit、nut、drink、spicy	R	1,132,827		319.86	129.81				
2 Forestry production	S	822,932	79.34						
3 Animal Husbandry production	T	2,081,790	200.7						
4 Fishery production	U	3,258,178	314.11						

B1=C1+S1+T1+U1　　C2=(C1/B1)*1000　　G6=(E4*G5)/1000

D1=E1+Q1+R1　　E3=(E1/D1)*1000　　I7=(I1/H1)*1000

F1=G1+L1+M1+N1+O1+P1　　E4=(C2*E3)/1000　　I8=(I7*I6)/1000

H1=I1+J1+K1　　G5=(E1/F1)*1000

Source：investigation scheme of farm product price，Rural Survey Organization of NSB，2003.8.

Reference

1. 《中国工业品价格统计工作手册》，2003 年 10 月，中华人民共和国国家统计局城市社会经济调查总队。

2. 《工业品价格调查方案》，2002 年 10 月，中华人民共和国国家统计局城市社会经济调查总队。

3. 《中国对外贸易指数需求方案（海关版）》，2003 年？？，中华人民共和国海关总署，综合统计司。

4. 《农业产值综合统计报表制度》，2003 年 8 月，中华人民共和国国家统计局农村社会经济调查总队。

5. 《农村统计调查业务工作手册》，2002 年 10 月，中华人民共和国国家统计局农村社会经济调查总队。

6. 《房地产价格统计调查方案》，2001 年 8 月，中华人民共和国国家统计局城市社会经济调查总队。

7. 《固定资产投资价格统计调查方案》，2002 年 8 月，中华人民共和国国家统计局城市社会经济调查总队。

8. 许宪春（1），2002 年 10 月，中国国内生产总值核算，《经济学（季刊）》第 2 卷第 1 期。
Xu, X (2003, September 4), China’s Gross Domestic Product Estimation, China Economic Review, North-Holland.

9. 许宪春（2），2002 年 10 月，中国服务业核算及其存在的问题研究，《经济学（季刊）》第 2 卷第 1 期。

10. 张怡, 2002 年 12 月 24 日，《关于价格指数法计算工业发展速度的探讨》，北京市城市社会经济调查队，http://uso.stats.gov.cn/WebFront/article.asp?AS=PROREFORM;20021224002