

## THE ESTABLISHMENT, REFORM, AND DEVELOPMENT OF CHINA'S SYSTEM OF NATIONAL ACCOUNTS

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This paper provides a systematic and comprehensive account of the establishment, reform, and development of China's System of National Accounts, focusing on important changes in concepts and methods in national accounting during China's transition from the Soviet-type Material Product System to the United Nations System of National Accounts, as well as existing problems and challenges that must be faced in the further development of the system.

### 1. INTRODUCTION

From the early years of the foundation of the People's Republic to the initial stage of the economic reform and opening up, China's System of National Accounts (CSNA) was based on the Material Product System (MPS) that was devised and used by the former Soviet Union and its satellite states. These countries were characterized by their highly centralized planning economies (CPEs). Following the reform and the opening up of the economy, China gradually introduced the United Nations System of National Accounts (SNA) used by countries that adopted the market economy system, while maintaining the conventional MPS. Along with the development of the socialist market economy, the SNA gradually replaced the MPS as the official accounting system in China. Hence, the evolution of CSNA can be divided into three stages: (i) the establishment and development of the MPS; (ii) the transition from the MPS to the SNA; and (iii) the development of the SNA.

Starting in 1952, the first stage is characterized by the establishment of the accounting for the gross production value of industry and agriculture as defined in the MPS. Starting in 1985, the second stage is characterized by the establishment of GDP accounting, as defined in the SNA, as a supplementary measure to national income in the MPS. Starting in 1993, the last stage is characterized by the abolishment of the MPS and the adoption of the SNA. Both the establishment of the MPS and the transition from the MPS to the SNA are of great historical importance. The adoption of the MPS was to meet the needs of national planning and management under China's highly centralized planning system, whereas the transition from the MPS to the SNA was to meet not only the needs of

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macroeconomic analysis and management in China's transition toward the market system, but also the needs of international comparison given the world's changing economic and political situation. During the third stage, China carried out the first Economic Census in 2004 (hereafter the 2004 Census), which constitutes a milestone in the development of CSNA. By means of the 2004 Census, the National Bureau of Statistics (NBS) extended data sources, disaggregated basic classifications, and improved the methods of estimation and the quality of the data, all of which were measures that resulted in further development of the CSNA. To understand the development of the CSNA in depth, the third stage can be further divided into three sub-stages: before, during, and after the first Economic Census.

It should be noted that despite tremendous efforts made in the transition, the latest CSNA is still some distance from the SNA, the practices of developed countries, and the requirements by macroeconomic management, civil society and international organizations. The CSNA still faces many problems and challenges, and thus requires further revision and development.

The remainder of the paper is organized as follows. In Section 2, we trace the establishment and development of the MPS in China, focusing on the basic conceptual framework and accounting methods. In Section 3, we review the transition from the MPS to the SNA. In Sections 4, 5, and 6, we present the development of the CSNA prior to the first Economic Census, in the year of the first Economic Census, and after the first Economic Census, respectively, focusing on changes of the key concepts and accounting methods in details. In Section 7 we conclude the paper by discussing the problems and challenges faced by the CSNA.<sup>1</sup>

## 2. ESTABLISHMENT AND DEVELOPMENT OF THE MPS IN CHINA

The national accounts of the People's Republic started at the beginning of the 1950s. In 1952, the newly-founded NBS launched a nationwide survey of the gross production value of agriculture and industry, and established the corresponding accounting system for the two sectors. Later on, the accounting coverage was expanded to five material production sectors, including agriculture, industry, construction, transport, post and telecommunications, and commerce (including catering services), i.e. the social gross production value accounts. In 1954, following the theory and method of national income that was developed and used by the former Soviet Union, the NBS began to compile the accounts for production, distribution, consumption, and accumulation of national income. After having sent a delegation to the former Soviet Union to comprehensively survey its national accounts in 1956, the NBS fully adopted the MPS and implemented it in China. The implementation resulted in the compilation of a series of balance tables for such matters as the following: the production, accumulation, and consumption of social product; the production, distribution, and redistribution of social product and national income; and labor resources and allocation. Unfortunately, in the initial stages, the compiling work came under the scrutiny of the anti-dogmatism movement during the Great Leap Forward campaign (1958–59). The work was

<sup>1</sup>Due to the limited space available, the discussion of the development of China's institutional sectors accounts and their problems has been removed. It is however available on request. The reduced current version of the paper concentrates on problems in GDP estimation.

criticized and the compilation of most of these balance tables was ordered to cease on the grounds that they were trivial or overloaded with details. This was the first major setback suffered by China's national accounts. During the period of the Cultural Revolution (1966–76), China's national accounts suffered a second major setback: all of the statistical offices were disbanded and their staff were transferred to perform physical labor in the countryside; of course, the compilation of national accounts halted completely. China's national accounting work recovered gradually after the ending of the Cultural Revolution. The work on national income in the MPS was retrieved first. Moreover, by collecting and processing lost data again, the time series of national income that had been interrupted for 10 years were estimated in a makeup way. Subsequently, the MPS-type input–output tables were compiled.

In what follows, we will mainly concentrate on the basic conceptual framework and accounting methods of the CSNA under the MPS.

### 2.1. *The Production-Side National Income Estimation*

To elaborate the production-side national income accounting under the MPS we should start with the measure of the gross production value for each of the five material sectors, which is the basis for the estimation of national income. To be conceptually accurate, we use gross material product or GMP for the gross production value. The GMP of agriculture is the gross value of agricultural products produced in a given period, which is measured by the “product method,” i.e. the quantitative output of agricultural products times their corresponding prices. The GMP of industry (including mining; manufacturing; and electricity, gas and water supply) is the gross value of the industrial products and works produced in a given period, which is measured by the “factory method,” under which an industrial enterprise is treated as a whole and only the “final products” at the factory gate are counted while products manufactured for the enterprise's own intermediate consumption are excluded. The GMP of construction is the gross value of the construction activities conducted in a given period, which includes the values of construction, equipment installation, and repairing of buildings and other structures. The GMP of transport, post, and telecommunications in a given period is (a) the gross values of the transport services provided, which include receipts from freight transport, pipeline transport, loading and unloading services, and transport agencies, plus (b) the gross value of revenues from post-telecommunication services provided. The GMP of commerce and catering services consists of (a) the trade margin, i.e. the balance of the sales and the purchases, and (b) the business revenues of catering services (NBS, 1985a).

The net production value (i.e. national income<sup>2</sup>) or net material product (NMP) is defined as the gross production value or GMP minus material consumption (MC) that includes material products, material services<sup>3</sup> and the depreciation of fixed assets. There are two approaches for measuring the NMP: the production

<sup>2</sup>The concept of “national income” in the MPS is different from that in SNA as clearly discussed in this section.

<sup>3</sup>“Material products” refers to agricultural and industrial products, and construction, while “material services” refers to services of transport, post and telecommunications, and commerce and catering services.

approach and the income approach. The CSNA under the MPS used the two approaches in the production accounting interchangeably, but for most years of the period the production approach was used for agriculture while the income approach was used for other sectors.

Let us begin with the production approach, assuming conceptually it is applied to the whole economy, which can be expressed in a given period  $t$  as follows:

$$(1) \quad NMP_t = GMP_t - MC_t = \sum_i NMP_t^{i(MPS)}$$

where  $i$  (MPS) stands for the industrial classification under MPS (which differs significantly from the classification under SNA), that is, agriculture (A), industry (I), construction (C), transport, post, and telecommunications (T) and commerce and catering services (S). Therefore,

$$(1a) \quad \sum_i NMP_t^{i(MPS)} = NMP_t^A + NMP_t^I + NMP_t^C + NMP_t^T + NMP_t^S.$$

Taking a view of the income approach, NMP is equal to the income paid to all production factors used in material production, that is, for all material sectors the NMP can be defined as:

$$(2) \quad NMP_t = \sum_i NMP_t^{i(MPS)} = \sum_i W_t^i + \sum_i WF_t^i + \sum_i \pi_t^i + \sum_i \tau_t^i + \sum_i \kappa_t^i + \sum_i \omega_t^i$$

where  $W$  stands for wages and salary of employees,  $WF$  are funds payable set aside proportionally by the state for employees' welfare,  $\pi$  stands for receivable profits,  $\tau$  stands for various indirect taxes paid by the material production sectors,  $\kappa$  stands for (net) interests, i.e. the balance of interest payable and interest receivable, and  $\omega$  refers to all other incomes (NBS, 1985a). Equations (1) and (2) show the coherent consistency of the production and income approaches in accounting for the production of national income under the MPS. Note that unlike the SNA the depreciation of fixed assets is excluded in both equations, which is one of the distinct differences of the MPS compared with the SNA.

The aforementioned estimation of national income refers to the estimation at current prices. Because of different production features of each material sector and different data sources, the approach for measuring NMP at constant prices also differed among sectors. Specifically, a double deflation approach was used in agriculture;<sup>4</sup> a single-deflation approach was used typically in industry; a similar deflation approach was also used in construction and commerce; and a volume index approach was used in transport, postal and telecommunication services. Below, the estimation of NMP at the 1980 constant price for the industrial sector is given as an example:

$$(3) \quad NMP_t^{I(80p)} = NMP_t^I \cdot \left[ \frac{GMP_t^I}{GMP_t^{I(80p)}} \right]^{-1}.$$

<sup>4</sup>The material consumption of agriculture at constant prices was first calculated by multiplying the consumed quantity of seeds, feed, fertilizers, pesticides, and fuels by corresponding constant prices. The results were then subtracted from the total output measured at constant prices.

A specific set of constant prices for industry, e.g. the 1980 prices, was part of the Soviet-type “comparable price” system adopted under the MPS for the estimation of national income at constant prices. In cooperation with relevant authorities of the State Council, the NBS regularly worked out the fixed prices of various industrial products at a base year (e.g. 1980), which were supplemented by provincial authorities. Then, individual enterprises applied them to their products of different types to calculate their gross production value (i.e. GMP) at constant prices. These data were subsequently aggregated through regional bureaus of statistics at different levels to arrive at the national industrial GMP at constant prices. Note that through the same reporting system the NBS also obtained the national industrial GMP at current prices at the same time. So far, there have been five sets of constant prices of industrial products with base years of 1952, 1957, 1970, 1980, and 1990, respectively. The data for the industrial GMP at constant prices are available from the *Annual Report of Industrial Statistics* (NBS, 1985a; Xu, 2001).

## 2.2. The Expenditure-Side National Income Estimation

The expenditure of the national income under the MPS or the net material expenditure (NME) in a given period consists of total consumption ( $C$ ), i.e. material products and services consumed in final use including household consumption and social consumption, and total accumulation ( $A$ ), i.e. material products accumulated for material production including fixed assets accumulation and working assets accumulation. The NME can be expressed by the following equation:

$$(4) \quad NME_t = C_t + A_t = (HC_t + SC_t) + (FA_t + WA_t)$$

where  $HC$  stands for household consumption that is defined as the value of own account products (typically by rural households), commodities, culture and recreation services, and housing, water, and electricity consumed by household;  $SC$  stands for social consumption defined as the value of office supplies, fuel, water, and electricity, as well as transport, postal, and telecommunication services consumed by the non-material sectors such as government, education, culture, health, sports, science and technological research, and social welfare;  $FA$  stands for fixed assets accumulation that is defined as the value of fixed assets that are acquired minus the depreciation of fixed assets; and  $WA$  stands for working assets accumulation defined as the change in value of various working assets including the value of raw materials, materials and fuels reserved for production, work-in-progress and semi-finished products in the production process, finished or semi-finished products ready for sale, as well as inventories held by commercial enterprises (NBS, 1985a).

However, it should be noted that in the CSNA under the MPS the expenditure of the national income is not exactly equal to the production of the national income because the net export (net value of goods and material services traded or  $EX - IM$ ) is excluded in the system. Therefore, we can have the following relationship when examining the balance between production and expenditure in the CSNA under the MPS:

$$(5) \quad NMP_t - NME_t = EX_t - IM_t.$$

However, under the MPS China did not develop proper price indices for different expenditure components. In particular, there was no consumer price index and fixed assets investment price index. The price index of gross production value of construction, price index of machinery and equipment, price indices of gross production value of agriculture and industry were used for deflating investment expenditure; cost of living index and retail price index including both producer and consumer products were used for deflating household and social consumption expenditure (for details see NBS, 1985a, pp. 32–6).

### 3. TRANSITION FROM THE MPS TO THE SNA

#### 3.1. *The Establishment of GDP Estimation*

Along with the market-oriented reforms, the non-material service sectors, such as finance and insurance, real estate, and education, developed quickly and made an increasing impact on the national economy. Therefore, macroeconomic policy making required information about these services to set up appropriate policies for the healthy development of these non-material services that could coordinate with other sectors. In response to such needs, the NBS began to add annual GDP estimation that included all economic activities, material and non-material. This was implemented through a series of arrangements between 1985 and 1992.<sup>5</sup>

The establishment of GDP estimation marks the start of the transition of CSNA from the MPS to the SNA. The transition progressed gradually. In the early years of transition, NMP (i.e. national income in the MPS) was still the core indicator, while the GDP played a supplementary role and was used mainly to show the production outcomes of the non-material services. Toward the end of this period, GDP had evolved into a core indicator in CSNA, while NMP became an indicator that was used mainly to compare with the historical data. In 1993, the abandonment of the MPS marked the end of the CSNA transition from the MPS to the SNA.

#### 3.2. *Changes in the Standard of Industrial Classification*

The transition from the MPS to the SNA was also accompanied by a change in the Chinese standard of industrial classification (CSIC). The previous CSIC, typically the 1972 version of CSIC (DITS, 1989, annex 4), served the needs of the MPS and thus was no longer suitable to the transition. The new CSIC that promulgated in 1984 (SPC, 1984) was designed for the transition but confined to the available data sources of the time. The 1984 CSIC facilitated the estimation of production-side GDP in the following non-material services: finance & insurance; technology & production services; household services; public utilities; real estate; health, sports & social welfare; education, culture & arts, and radio & television; scientific research; government & party agencies, and social organizations; and others (NBS, 1990).

<sup>5</sup>Annual production-side GDP estimation began in 1985 (NBS, 1985b, 1985c), annual expenditure-side GDP estimation started in 1989 (DBS, 1990), and quarterly production-side GDP estimation began in 1992 (NBS, 1992b).

Accordingly, the expenditure-side GDP changed to coordinate the changes in the production-side GDP, that is, the expenditure on non-material services was now counted as part of the total expenditure. The classification of the expenditure-side GDP was also altered to facilitate the change. While the total consumption was still made up by “household consumption” and “social consumption,” under the total investment the old fashioned “accumulation” changed to “fixed asset formation” and “change in inventories.” In addition, net export of goods and (all) services was added to the total expenditure estimation. These changes can be compared with equations (4) and (5) (NBS, 1992a).

### 3.3. Methods of GDP Estimation

#### The Production-Side GDP Estimation

In the early years of transition from the MPS to the SNA, the estimation of the GDP was based on the national income estimates in the MPS. Firstly, at the sector level the NMP at current prices was adjusted to derive the gross value added (GVA) at current prices, which is given as follows:

$$(6) \quad GVA_t^{i(MPS)} = NMP_t^{i(MPS)} - NMC_t^i + \delta_t^i$$

where NMC denotes non-material consumption as part of the intermediate inputs that is kept in the NMP accounting under the MPS (see equation (1)) and  $\delta$  denotes the depreciation of fixed assets. We add “MPS” to the superscripted  $i$  to indicate this calculation only refers to the traditional material sector. As defined by equation (6), the GVA at current prices of the  $i$ -th material sector was measured by deducting the non-material service expenditures (e.g. expenditures on finance and insurance service, advertisement, consultation, etc) from its NMP, and adding fixed assets depreciation (DBS, 1990).

$$(7) \quad GDP_t = \sum_i GVA_t^{i(MPS)} + \sum_i GVA_t^{i(SNA-MPS)}$$

Equation (7)<sup>6</sup> implies that to obtain the estimation of the total GDP for the country, estimation of gross value added by the non-material sectors should be added to the GVA estimates of all the material sectors.

To obtain the GVA at constant prices for the material sectors we use the implicit NMP deflator that can be derived from equation (3) to deflate the results of equation (6). Still using the industrial sector as an example, the GVA in the 1980 constant yuan is estimated as

$$(8) \quad GVA_t^{i(MPS)(80p)} = GVA_t^{i(MPS)} \cdot \left[ \frac{NMP_t^I}{NMP_t^{I(80p)}} \right]^{-1}$$

where the second factor of the right-hand side of the equation is directly derived from equation (3).

<sup>6</sup>Here we use “SNA minus MPS” in the superscript to indicate the non-material sectors that were excluded in the MPS.

With regard to the estimation of the GVA of the non-material production sectors at constant prices, we deflate their gross value-added at current prices based on the service components of the consumer price index (CPI) plus the retail price index (RPI) (DBS, 1990).

#### The Expenditure-Side GDP Estimation

The expenditure-side GDP or gross domestic expenditure (GDE) at current prices is estimated by the following adjustments: firstly, the household consumption and social consumption (*HC* and *SC*, see equation (4)) are adjusted by adding expenditures on non-material services; secondly, the depreciation of fixed assets ( $\delta$ , equation (6)) is added to the fixed assets accumulation (*FA*, equation (4)); lastly, the net export of goods and services is added to the total expenditures (DBS, 1990).

The GDE at constant prices is estimated by relevant price indices newly constructed or improved for household consumption, social consumption, fixed assets formation, and changes in inventories, respectively. With regard to the import and export of goods and services, they are deflated by the price indices of imported and exported goods, respectively, which are constructed using quantity and value of traded goods in the Customs Statistics, assuming that changes in prices of traded services are the same as those in traded goods (DBS, 1990; NBS, 1992a).

#### 3.4. *Reconstruction of the Historical GDP*

In order to satisfy the needs of macroeconomic analysis and management for consecutive and comparable statistical data, China made two major reconstructions of historical GDP by filling the gaps in time series. The first reconstruction was conducted during 1986–88 for the period 1978–84. The second was conducted during 1988–97 for the period 1952–77. These two reconstructions included both production-side and expenditure-side GDP estimations at both current and constant prices.<sup>7</sup> The coverage and methods used in reconstruction as well as deflation are exactly the same as those which were discussed earlier (DNA, 1997c; Xu and Tian, 1997; OECD, 2000).

The results of the first reconstruction were first published in a reduced form in the *China Statistical Yearbook 1988* (NBS, 1988); the results of the second reconstruction were published in 1997 in detail in a specific volume for China's historical GDP in 1952–95 (DNA, 1997c).

#### 3.5. *Establishment and Development of China's Input–Output Tables*

The input–output table began in practice from the 1970s to meet the needs of inter-industry coordination in the national planning. In cooperation with the Chinese Academy of Science (CAS) and the former State Planning Commission (SPC), the NBS compiled China's first national input–output table in physical units for 1973 (Electronic Computing Center of SPC, 1979). In the early 1980s,

<sup>7</sup>Here we refer to “comparable prices” that link various constant prices used in history. See equation (3) and related discussion.

in response to the requirement of the planning authorities, the NBS, together with the SPC and other government agencies, compiled another two national input–output tables for 1981 and 1983, respectively (Economic Forecasting Center of SPC and DBS, 1983; DBS, 1985). These tables used the framework of the MPS, of which the 1981 Input–Output Table was constructed in monetary and physical units and the 1983 Input–Output Table was constructed in monetary units.

During the period of transition from the MPS to the SNA, the construction of input–output tables also began a transition toward the SNA, aiming to incorporate the rapid development of the non-material sector into the input–output framework. This resulted in China’s first input–output table for 1987 that incorporated SNA standards in an MPS–SNA hybrid framework. The 1987 Input–Output Table distinguishes the material and non-material production sectors; hence, it can be converted into either MPS or SNA in national input–output relations. It can illustrate the features of the transition from the MPS to the SNA from the viewpoint of input–output accounting.

In 1987 the government decided to introduce a nationwide, regular large-scale input–output survey when the year number ends with 2 or 7, based on which a full input–output table would be constructed. Between the full tables a nationwide small-scale survey was to be carried out when the year number ends with 0 or 5, based on which, together with an adjustment of the coefficients of the full tables, a simplified version of the national input–output table would be constructed (General Office of the State Council, 1987).

#### 4. FURTHER DEVELOPMENT OF CHINA’S SYSTEM OF NATIONAL ACCOUNTS UNDER THE SNA

The period beginning with China’s formal adoption of the SNA in 1993 to the eve of China’s first Economic Census in 2004 saw further important development of the CSNA, which was marked by China’s first tertiary census-based GDP adjustment in 1995, including an adjustment to the time series of 1978–90, a revision of CSIC—the implementation of the 1994 CSIC, measures to standardize the sources of data for GDP estimation, the adoption of the full SNA principles in the input–output accounts, the implementation of institutional sector accounts and the balance sheet, and the 2002 version of the CSNA.

##### 4.1. *Development of the CSNA*

###### Adjustment Based on the First Tertiary Sector Census

As a strong legacy of the MPS, statistics on material production received much more attention than non-material service. As a result, the tertiary sector statistics of China had been very weak for a long time. During 1993–95, China conducted the first Tertiary Sector Census (for years 1991 and 1992), which provided relatively complete tertiary sector statistics for the first time and filled the gaps in data sources. In 1995, the NBS revised the GDP estimates for 1991 and 1992 according to the census data. In 1995–96, to ensure the comparability of

historical data,<sup>8</sup> the NBS carried out a comprehensive revision of its GDP time series from 1978 to 1990, using the results of this census as a benchmark (DNA, 1997c; Xu, 1998, 2006b).

#### Adjustment According to the 1994 CSIC

In 1994, China introduced a new version of the Standard of Industrial Classification, i.e. the 1994 CSIC (NBTS, 1994), in line with which the NBS further adjusted the industrial classification of annual production-side GDP estimation (see NBS, 1994; DNA, 1997a). Compared with the GDP classification based on the 1984 CSIC used during the MPS to SNA transition, the 1994 CSIC-based adjustment has the following features: (1) services for farming, forestry, animal husbandry and fishery, geological prospecting and water conservancy were separated from comprehensive technical and production services; (2) storage was separated from commerce and catering services and grouped with transport, postal and telecommunication services; (3) social services were separately set up with public utilities and household services; (4) comprehensive technical services and scientific research were now grouped together rather than mixed up with production services. In addition, some newly emerging activities were taken into account in the new classification.<sup>9</sup> Furthermore, names of some sectors were changed (DNA, 1997a). All other sectors remained the same as those in the previous period.

#### Standardization of Data Sources and Methods in GDP Estimation

During this period NBS made continual efforts to standardize data sources and methods in the GDP estimation to improve the quality of the estimation. This is reflected by a series of publications in 1997 on the standards of the GDP estimation based on the knowledge gained from these experiences (DNA, 1997a, 1997b). These CSNA standards were later incorporated in an English version published by OECD in 2000. In 2001 the NBS also compiled the *Manual of GDP Estimation in China* (DNA, 2001). In 2003, the 2002 version of China's System of National Accounts was released (NBS, 2003a), which was a milestone in the development of the CSNA.

#### Procedures for GDP Estimation, Revision and Dissemination

In 2003, the NBS decided on a three-stage procedure for annual and quarterly GDP estimation and dissemination: "preliminary estimation," "first revision" and "final revision." The NBS also decided that related data should be published systematically at the same time as the release of the GDP and that explanations of methods used should also be published when necessary (NBS, 2003b).

<sup>8</sup>The GDPs of 1991 and 1992 were revised upward by 143.0 billion yuan (an increase of 7.1 percent) and 227.5 billion yuan (an increase of 9.3 percent), respectively.

<sup>9</sup>For example, real estate broker and agency are added to real estate, and management of natural protected areas, leasing services, computer application services, and market management services are added to social services (DNA, 1997a).

## Periodic Economic Censuses and Regular Revision of Historical GDP

Also in 2003, the State Council decided to conduct an economic census every five years in the 3rd and the 8th year of each decade (State Council, 2003). The NBS decided to establish a formal system for revising GDP historical series that is carried out when new basic data sources arise or when the methods and basic classifications are changed during successive censuses (NBS, 2003b).

### 4.2. Improvement of GDP Estimation

#### Improvement of the Production-Side GDP Estimation

During this period, the NBS still employed a mixed approach that combined the production approach, the income approach, and relevant indicator extrapolation in the production-side GDP estimation. For those sectors or those parts of sectors for which sufficient data was available, the production approach or income approach was preferred, while for those sectors or those parts of sectors for which data was incomplete, the relevant indicator extrapolation was adopted. Table 1 summarizes in principle the estimation approach used in different sectors or components of sectors.

Table 1 is self explanatory. But it should be emphasized that the use of indirect indicators in the estimation of the sectors and components of sectors for which direct data are not available implies strong assumptions; hence estimation bias was inevitable (DNA, 2001; Xu, 2004).

While the transition to the SNA in the “production approach” is straightforward (see equation (6)), the transition to the SNA in the “income approach” differs significantly from the MPS approach as defined in equation (2). This is given in equation (9):

$$(9) \quad GDP_t = \sum_i GVA_t^{i(SNA)} = \sum_i LC_t^i + \sum_i \tau_t^i + \sum_i \delta_t^i + \sum_i \pi_t^i$$

where  $LC$  denotes labor compensation,  $\tau$  denotes net production taxes,  $\delta$  denotes the depreciation of fixed assets and  $\pi$  denotes the operating surplus or profits. Note that the “SNA” in the superscript indicates the difference in classification compared with the MPS, implying the adjustment that is discussed in Section 3.3.

In 2002, the method for measuring the GVA at constant prices of agricultural and industrial sectors underwent significant changes. Prior to 2002, the deflation method was basically similar to that for measuring the NMP at constant prices in the MPS (see equation (3) and related text). Since 2002, agricultural producer price indices (agricultural PPI) have been used to deflate the GVA at current prices in farming, forestry, animal husbandry and fishery, whereas the ex-factory price indices (i.e. industrial PPI) have been used to deflate the industrial GVA at current prices. The volume movement-based extrapolation method has been used for transport, storage, post, and telecommunications. As for all other sectors, the single deflation method has been used in the estimation of their GVA at constant prices (DNA, 2001; Xu, 2004).

TABLE 1  
THE PRODUCTION-SIDE GDP ESTIMATION APPROACH AND SOURCES OF DATA

Approach	Sectors or Components of Sectors
Production approach	<ul style="list-style-type: none"> <li>Farming, forestry, animal husbandry and fishery (gross value of output and input costs available)</li> <li>Industrial enterprises above a certain <i>threshold</i><sup>1</sup> (production, sales and financial statistics available)</li> </ul>
Income approach	<ul style="list-style-type: none"> <li>Construction enterprises with an <i>official qualification</i><sup>2</sup> (complete, annual statistics available)</li> <li>The <i>state</i> components of transport, storage, post and telecommunication services (complete, annual statistics available)</li> <li>Wholesale &amp; retail trade, and catering service enterprises above a certain <i>threshold</i><sup>3</sup> (complete, annual statistics available)</li> </ul>
Indicator extrapolation	<ul style="list-style-type: none"> <li>Industrial enterprises below the <i>threshold</i><sup>1</sup> (sample survey based indicators)</li> <li>Construction enterprises without an <i>official qualification</i><sup>2</sup> (fixed assets investment statistics together with the value added ratios of construction enterprises with an official qualification)</li> <li>The <i>non-state</i> components of transport, storage, post and telecommunications (statistics on turnover volumes)</li> <li>Wholesale &amp; retail trade, and catering service enterprises below the <i>threshold</i><sup>3</sup> (statistics on retail sales)</li> </ul>

*Notes and Source:*

<sup>1</sup>The threshold consists of all state-owned industrial enterprises plus other industrial enterprises with annual sales of 5 million yuan and above. From 2006 onwards, it changes to all incorporated industrial enterprises with annual income of above 5 million yuan from principal operation (NBS, 1997, 2006d).

<sup>2</sup>The official qualification consisted of all construction enterprises that satisfy the requirements of the *Technical Capability Grade of Construction Enterprises* jointly formulated by the Ministry of Construction and related ministries including the Ministry of Transportation, the Ministry of Water Conservation, the Ministry of Information Industry, and the Civil Aviation Administration of China (MOC, 2001).

<sup>3</sup>The threshold for wholesale enterprises is those enterprises with 20 or more workers and with annual sales of at least 20 million yuan (international trade enterprises are all included in the wholesale industry). The threshold for retail enterprises is those enterprises with 60 or more workers and with annual sales of at least 5 million yuan. Catering services enterprises above the threshold are defined as those with 40 or more workers and with annual sales of at least 2 million yuan (NBS, 1998).

### Improvement of the Expenditure-Side GDP Estimation

In this period, the names of some components of the expenditure-side GDP were different from those in the transition period from the MPS to the SNA. For example, “total consumption” was revised to “final consumption,” “social consumption” to “government consumption,” “total investment” to “gross capital formation,” and “fixed assets formation” to “gross fixed capital formation.” All these revisions are based on the names of components of the expenditure-side GDP as in the 1993 SNA. The revised formula for the expenditure-side GDP or GDE at current prices is then as follows:

$$(10) \quad GDE_t = FC_t + GCF_t + NE_t = (C_t + G_t) + (FCF_t + IVN_t) + (EX_t - IM_t).$$

As defined in equation (10), GDE is made up of three components: “final consumption” ( $FC$ ); “gross capital formation” ( $GCF$ ); and “net exports” ( $NE$ ), which can be further decomposed into “household consumption” ( $C$ ) plus “gov-

TABLE 2  
THE EXPENDITURE-SIDE GDE ESTIMATION APPROACH AND SOURCES OF DATA

GDE Component	Data Sources or Estimation Approach	Deflation Approach
Household consumption ( <i>C</i> )	<ul style="list-style-type: none"> <li>• Commodity consumption estimated by retail sales of consumer goods and household survey data</li> <li>• Own account consumption and consumption of income in kind estimated using household survey data</li> <li>• Culture &amp; recreation services, and housing, water, electricity &amp; gas estimated using household survey data</li> <li>• Consumption of free medical care and collective welfare estimated using the statistics of insurance and welfare</li> <li>• Consumption of owner-occupied dwelling services estimated using the floor space of owner-occupied dwellings and their construction costs</li> <li>• Consumption of financial intermediation services and insurance services estimated using the output of finance and insurance and related statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Retail price indices (urban and rural)</li> <li>• Agricultural producer price index and urban retail price index</li> <li>• Consumer price indices (relevant components)</li> <li>• Urban consumer price indices (relevant components)</li> <li>• Price index of housing sales</li> <li>• CPI and price indices of fixed assets investment</li> </ul>
Government consumption ( <i>G</i> )	<ul style="list-style-type: none"> <li>• Estimated mainly using the final fiscal budgetary accounts</li> </ul>	<ul style="list-style-type: none"> <li>• Retail price indices, CPI, and price indices of fixed assets investment</li> </ul>
Gross fixed capital formation ( <i>FCF</i> )	<ul style="list-style-type: none"> <li>• Estimated mainly using the statistics of fixed assets investment</li> </ul>	<ul style="list-style-type: none"> <li>• Price indices of fixed assets investment</li> </ul>
Changes in inventories ( <i>INV</i> )	<ul style="list-style-type: none"> <li>• Estimated using enterprise accounts from some ministries and related statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural and industrial producer price indices</li> </ul>
Exports ( <i>EX</i> ) & imports ( <i>IM</i> )	<ul style="list-style-type: none"> <li>• Estimated using the statistics of Balance of Payments (BOP)</li> </ul>	<ul style="list-style-type: none"> <li>• Export and import price indices</li> </ul>

Source: DNA (2001), Xu (2004).

ernment consumption” (*G*), “gross fixed capital formation” (*FCF*) plus “changes in inventories” (*INV*), and “exports” (*EX*) minus “imports” (*IM*), respectively.

The estimation approach, sources of the data used in estimation, and price indices used in estimating the GDE at constant prices are summarized in Table 2.

### Improvement of Regional GDP Estimation

In 1985, provinces, autonomous regions, and municipalities, in addition to the nation as a whole, began to estimate the GDP.<sup>10</sup> The basic rule was that the NBS should promulgate a uniform method for estimating the GDP, while regional statistics bureaus of all levels should estimate the GDP of the corresponding region. As with national GDP estimation, regional GDP estimation was conducted both annually and quarterly. The annual estimation included both

<sup>10</sup>The GDP estimation in the Tibet autonomous region began a little late. The test annual GDP estimation began in 1985, while the official estimation began in 1987. Quarterly GDP estimation began in 1999.

production-side and expenditure-side estimation at current prices and at constant prices, while the quarterly estimation only included production-side estimation.

#### 4.3. *Improvement of China's Input–Output Tables*

Since the early 1990s, in order to adapt to the market economic conditions and to support the macroeconomic management, the NBS has continued to improve the methods for input–output surveys and compilation methods. The NBS has compiled four full-scale national input–output tables in the SNA framework for 1987, 1992, 1997, and 2002, also known as benchmark tables, and four simplified tables for 1990, 1995, 2000, and 2005.

The Chinese input–output tables consist of the supply table, the use table, and the symmetric table (product  $\times$  product table). The number of products and sectors in the supply and use tables is the same. The product and sector classification in the benchmark tables is more detailed than that in the simplified tables.<sup>11</sup>

In most countries, input–output tables are compiled by first compiling the supply and use tables and then deriving the symmetric input–output table using the former two tables as a basis. The practice in China is different: the NBS first compiles the supply table and the symmetric input–output table and then derives the use table using the former two tables as a basis. The main reason for this is that the basic statistical units for production in China are enterprises rather than establishments. Some enterprises, especially large-scale ones, produce multiple products. Compared with the establishment, the principal product of a large enterprise may be insignificant and its output may lack homogeneity. The adoption of a conventional input–output compilation procedure would invariably result in biased symmetric input–output tables.

The compilation method of symmetric input–output tables in China is referred to as the “direct decomposition” method. Under this procedure, an enterprise individually classifies the various products into different product groups based on the uniform product-group classification formulated by the NBS. It then decomposes its input costs into intermediate inputs and primary input components of various product groups according to the uniform requirements of the NBS. The NBS uses the input component data sources provided by enterprises, combined with other related sources, to compile symmetric input–output tables. Since 1987, most provincial bureaus of statistics have used the method formulated by the NBS and thus compile their own regional input–output tables simultaneously.

### 5. REFORM OF CHINA'S SYSTEM OF NATIONAL ACCOUNTS IN THE YEAR OF THE FIRST ECONOMIC CENSUS

The first Economic Census, conducted in 2004, is the most comprehensive census in the history of China in terms of its coverage. It covered all sectors except agriculture, i.e. industry, construction, and all service sectors except service activities for agriculture, and hence provided a relatively comprehensive data source for

<sup>11</sup>The number of products and sectors in the benchmark input–output tables was 117, 118, 124, and 122 in 1987, 1992, 1997, and 2002, respectively, and the number of products and sectors in simplified tables was 33, 33, 40, and 42 in 1990, 1995, 2000, and 2005 respectively.

improving China's GDP estimation. Taking this opportunity, the NBS introduced several important revisions to GDP estimation, which include data sources, production coverage, basic classification, estimation methods, and the treatment of some specific issues. Besides, the 2004 Census also improved institutional sector accounts (DNA, 2007a, 2007b; Xu, 2006a).

### 5.1. *Revisions to Data Sources for GDP Estimation*

#### Revisions to Data Sources for Production-Side GDP Estimation

- (1) *Revisions to the financial statements of enterprises*: The revisions targeted the enterprises that were not covered by the NBS annual statistics including construction enterprises without an official qualification, enterprises in wholesale, retail trade, and catering services below the threshold, renting and business services enterprises, computer and information transmission service enterprises, and household services enterprises, etc. The 2004 Census included questionnaires on the financial situation and operating status of these enterprises, which enabled the NBS to derive their value added more directly (Census Office, 2004).
- (2) *Revisions to data sources for administrative and public institutional units*: Annual value-added estimates for administrative and public institutional units were based mainly on statistics on the compensation of employees and final fiscal budget statements, which was insufficient. In order to minimize this gap, the 2004 Census designed a questionnaire to obtain data on the financial situation of these institutional units that allowed a comprehensive estimation of their value added (Census Office, 2004).
- (3) *Revisions to data sources for household unincorporated enterprises*: Annual estimates of value added by household unincorporated enterprises were mainly based on indirect indicators, which could not reflect their production activities accurately. The 2004 Census designed a questionnaire for all such enterprises by sector, so as to provide a better data source for the estimation of their value added in the census year (Census Office, 2004).
- (4) *Revisions to data sources for those establishments whose activities differ from the principal activities of the enterprises to which they belong*: Annual statistics provided very limited data on such establishments. In the 2004 Census, a questionnaire was designed specifically to obtain the estimates of value added by those establishments (Census Office, 2004).

#### Revisions to Data Sources for Expenditure-Side GDP Estimation

- (1) *Revisions to data sources for household consumption expenditure*: Annual estimates of aggregate rural and urban household consumption expenditures were mainly based on the value of retail sales of consumer goods, which had three shortcomings. Firstly, annual statistics could not separate the retail sales of consumer goods sold to rural and urban households from those sold to enterprises and administrative and public institutional units. Secondly, the retail sales of consumer goods also included construction materials sold to rural and urban households for the construction of

their houses, which should be correctly classified as investment rather than consumption. Thirdly, analysis of the structure of household consumption expenditure was difficult with such aggregate estimates. In the year of the 2004 Census, the primary data source for household consumption expenditure was changed to the rural and urban household income and expenditure surveys to tackle these problems.

- (2) *Revisions to data sources for the government consumption expenditure:* Estimation of government consumption expenditure has to be based on current in-budgetary and extra-budgetary expenditures in final fiscal statements. Annual statistics had to rely on rough extrapolations because of the lack of a detailed breakdown of expenditure items in the in-budgetary statements. It was worse in the case of the extra-budgetary accounts that had to rely on very arbitrary assumptions. The Ministry of Finance recently broke down the items of in-budgetary and extra-budgetary outlay in final fiscal statements that were directly used in the estimation of government consumption expenditure in the year of the first Economic Census.
- (3) *Revisions to data sources for changes in inventories:* This revision is mainly for those industry enterprises and wholesale and retail trade enterprises below the respective threshold. Annual estimation of changes in inventories of these enterprises relies on rough extrapolations using indirect indicators due to a lack of direct information on inventories. However, the 2004 Census obtained actual inventory information and enabled changes in inventories to be estimated directly.

### 5.2. *Revisions to Production Coverage*

In the year of the Economic Census, the production coverage of the GDP expanded as follows. (1) On the basis of the financial information of all types of service enterprises provided by the Census, some enterprise service activities that are not covered in annual statistics can now be included in the GDP estimation. (2) On the basis of the information collected by the Census, service activities of administrative and public institutional units that had not been included in annual statistics can now be included in the GDP estimation. (3) On the basis of the information collected by the Census, production activities of those household unincorporated enterprises that did not register with the authorities can now be included in the GDP estimation. (4) On the basis of the information collected by the Census, the establishments whose activities differ from the principal activities of the enterprises to which they belong can now be included in the GDP estimation.

In addition, the GDP estimation in the year of the Census expanded its coverage of production activities using data from the household survey in the following two respects: (1) housing rent services from households were included; and (2) domestic and personal services produced by employing paid domestic staff that had not previously been estimated, were included.

### 5.3. *Revisions to the Basic Classifications*

The basic classifications that had been used to estimate the annual GDP were revised in the year of the Census covering both production and expenditure

classifications. Compared with the 15 sector classification in annual estimation, the production-side GDP estimation in the year of the Census extended it to 94 sectors. It now corresponds closely to the two-digit level in the 2002 CSIC (NBQS, 2002). The revisions to the classification of the expenditure components broke down rural and urban household consumption expenditures on the basis of separate consumption expenditure items from rural and urban household surveys. A better classification of imports and exports of goods and services that was based on data from the Balance of Payments was also implemented. Rural household consumption expenditure and urban household consumption expenditure were broken down into 11 and 12 groups, respectively, to include such items as expenditure on food, clothing, and dwelling services. The breakdown of the export of goods included the export of general goods, the export of goods for processing, and the export of other goods not elsewhere classified. The breakdown of the exported services included eight groups, consisting of transportation, travel, communication services, etc. The breakdown of the import of goods and services was the same as the export. Such breakdowns had never been possible in the annual GDP estimation.

#### 5.4. *Revisions to the Methods of GDP Estimation*

The methods used for estimating the GDP in the year of the Census were revised in three respects. (1) As a result of accessing new data sources for enterprises, administrative and public institutional units, household unincorporated enterprises, and auxiliary establishments, which were lack of financial data in annual statistics, value added and changes in inventories could now be directly estimated rather than using the rough indicator extrapolation approach in the annual GDP estimation. (2) Based on the changes of data sources for household and government consumption expenditure, new methods were designed and introduced that replaced the old extrapolation approach using indirect indicators. (3) In the year of the Census three GDP estimation methods were used simultaneously—i.e. the production approach, the income approach, and the expenditure approach—and provided three, more or less independent, GDP estimates. In annual GDP estimation these three approaches were only partially used. In particular, it was not possible to estimate the value added by both the production and income approaches for each sector. As described in Section 4.2, the estimation of value added for agriculture and industrial enterprises above the threshold used the production approach, while for industrial enterprises below the threshold and other sectors, the income approach or rough extrapolations were used.

#### 5.5. *Revisions to the Treatment of Some Specific Issues*

In order to comply with recommended international standards and thereby make China's GDP more comparable internationally, NBS introduced new or improved treatments of specific issues, such as the following.

- (1) *Revisions to FISIM (Financial Intermediation Services Indirectly Measured) estimates*: In annual estimation, the net interest of various sectors was treated as intermediate input and the deposit interest of households was treated as part of the value added of the financial sector. In the year of the Census, FISIM was distributed across sectors and final users, either

as intermediate input for corresponding sectors or as final use, respectively. The deposit interest of households was no longer treated as value added by the financial sector.

- (2) *Revisions to computer software treatment:* In annual GDP estimation, there was no definite rule as to whether the acquisition of computer software should be treated as intermediate input or fixed capital formation. However, in the year of the Census, the acquisition of computer software was treated as fixed capital formation.
- (3) *Revisions to the method for estimating the depreciation of owner-occupied dwellings:* First, the estimation of the value of owner-occupied dwellings was now based on current construction costs (replacement value) rather than historical costs. Second, the rate of depreciation for rural household owner-occupied dwellings was changed from 2 to 3 percent, and the rate of their urban counterpart from 4 to 2 percent, on the basis of the service life of rural and urban household owner-occupied dwellings using information from the household surveys.

These changes that have just been documented had a significant effect on the estimation of the GDP by the production, income, and expenditure approaches.

#### 5.6. *Revisions to the GDP Estimates*

Compared with GDP estimation in the annual statistics, the revisions that were made in the year of the Census to data sources, production coverage, estimation methods, and the treatment of specific issues resulted in an increase in the production-side GDP of 2.3 trillion yuan, 16.8 percent more than the unrevised GDP. The value added in the tertiary sector rose by 2.13 trillion yuan or 48.7 percent, representing 92.6 percent of the total increase. The share of the tertiary sector in the GDP rose from 31.9 to 40.4 percent.

The expenditure-side GDP in the year of the Census also increased by close to 1.8 trillion yuan or 12.6 percent more than the unrevised figure. Final consumption expenditure contributed 1.2 trillion yuan to this increase, rising by 15.4 percent. Gross capital formation increased by 10.0 percent to generate an extra 0.6 trillion yuan. The increases in final consumption expenditure and gross capital formation accounted for 64.8 and 35.2 percent of the total increase, respectively. The share of final consumption expenditure went up from an unrevised estimate of 53.0 to 54.3 percent, while the share of gross capital formation went down from the unrevised estimate of 44.2 to 43.2 percent. The differences underline the fact that the Economic Census provided a more substantive data basis for revising the production, rather than the expenditure, estimates.

## 6. THE NEW DEVELOPMENT OF CHINA'S SYSTEM OF NATIONAL ACCOUNTS AFTER THE FIRST ECONOMIC CENSUS

### 6.1. *Revision to Historical GDP Estimates*

We have seen that data sources, production coverage, estimation methods, and treatment for some specific issues improved significantly in the year of the

Economic Census. As a result, the GDP estimates also underwent great change, which required an adjustment to the historical GDP data to ensure consistency.

### Revisions to the Production-Side Historical GDP

After considering available data and feasibility in classification over such a long history, the NBS confined the production-side GDP revisions to the following eight sectors: (1) agriculture, (2) industry, (3) construction, (4) transport, storage, post & communications, (5) wholesale, retail trade and catering services, (6) finance & insurance, (7) real estate, and (8) other services.

The revisions are necessary for two reasons: firstly, the Census-based expansion in data sources had filled some important gaps in annual estimates; secondly, changes in the treatment to FISIM, and to the pricing and depreciation of owner-occupied dwellings in the estimation of housing services had improved estimates in those services. Of the above eight sectors, changes in the value added of industry, construction, transport, storage, post and communications, wholesale, retail trade and catering services, and other services were primarily the outcome of improved data sources, while changes in the value added of agriculture, finance and insurance, and real estate were mainly a result of better methods.

The revisions to transport, storage, post & communications, wholesale, retail trade and catering services, and other services apply from 1993 to 2003, because the 2.3 trillion yuan additional GDP that was generated by revisions in the year of the Economic Census mostly occurred in these sectors. After the first tertiary census for 1991–92, the NBS had revised the historical GDP estimates for these sectors for the years 1978 to 1990. The changes to methods affect not only historical data from 1993 onwards, but also historical data before 1993; hence, revisions to the value added of finance & insurance and real estate were applied to the years from 1953 to 2003. Given that changes in the value added of agriculture, industry, and construction are not significant, revisions were applied to the years from 1993 to 2003, the same applied to transport, storage, post & communications, wholesale, retail trade and catering services, and other services.

Revisions to current price estimates were implemented using a “trend deviation” approach. This method is simple and transparent and maintains the original trends of historical data series. Basically, the compound growth rates of the old and new series for the value added of each sector during the revision period are calculated first. Then the original value added of each sector in the base year 1992 (or 1952) is extrapolated to obtain the trend values of these two series based on the respective compound growth rates that have been estimated. Third, the ratio of the trend value to actual value of the original series (called trend deviation ratio) from 1993 (1953) to 2003 is calculated. Fourth, a revised series is obtained by multiplying the trend deviation ratio of the original series by the new trend series. Last, the revised series for the eight sectors are aggregated to arrive at a revised series of GDP estimates at current prices.

To derive the new series at constant prices, the original deflators are adjusted according to the detailed structural changes in value added that were identified in the Census. The revised deflators are applied to the new series at

current prices and the resulting aggregate at constant prices for the eight sectors yields the revised historical GDP series at constant prices (NBS, 2006a).

#### Revisions to the Expenditure-Side Historical GDP

The classification of expenditure for the revised historical GDP is the same as that before the 2004 Census. The revision covers the period 1979–2003 and the method of revision is similar to that for the production-side historical GDP (NBS, 2006a).

#### 6.2. Reform and Development of Annual GDP Estimation

The problems identified from the Census have encouraged the NBS to reform or improve methods used for annual GDP estimation. In 2008, it formulated *Methods of GDP Estimation in the Year of Non-Economic Census* (hereinafter *Methods* in short) (DNA, 2008). The *Methods* normalizes and regulates the classification of sectors, expenditure items, data sources, and estimation methods of the GDP in those years when an economic census is not taken. The *Methods* in particular takes into account the cost structure survey data in the 2007 input–output survey (for details see DNA, 2008).

#### Reform and Development of Service Sector Statistics

As a result of the first Economic Census it was realized that there was a shortage of annual statistics covering the service sectors in China. To remedy this situation as quickly as possible, the NBS accelerated the reform and development of statistics for the service sectors after the Census. First, a financial statistics sample survey system has been established for 11 services sectors, including business, rental, computer, and household services (NBS, 2005). Second, a pilot financial statistics sample survey has been conducted for enterprises in wholesale and retail trade, hotels and catering services below the threshold, and real estate property management and intermediary services (NBS, 2006b, 2006c). Third, together with 17 state authorities, including the Ministry of Education, Ministry of Culture, and Ministry of Health, the NBS designed *Financial Report Forms on Service Sectors* for collecting data on services under these state authorities (NBS, 2008).

#### Establishing a Survey System for the Cost Structures of Industrial Enterprises

Previously, the annual statistical reports of industrial enterprises above the threshold required enterprises to break down their costs and estimate value added in line with a method of estimation formulated by the NBS. This was an arduous and time-consuming exercise because some of the statisticians in enterprises did not possess the requisite professional skills and understanding. As a result, it was difficult to identify and correct all mistakes made at enterprise level in estimating the value added. The NBS thus decided to reform the statistical system in 2007 by canceling the estimating and reporting of value added by enterprises and shifting the responsibility to the statisticians in government statistical offices based on data from cost structure surveys of the key industrial enterprises (NBS, 2007a).

### 6.3. *Improvement of Input–Output Tables*

#### Compilation of 2002 Input–Output Table

The 2002 Input–Output Table uses the data for both the production-side and expenditure-side GDPs that were updated following the first Economic Census. This is to ensure that the 2002 Input–Output Table is consistent with the revised GDP data for the same year.

#### Revisions to Historical Data of Benchmark Input–Output Tables

After the historical GDP were revised based on the Census results, the NBS has also updated the benchmark input–output tables for 1987, 1992, and 1997 to ensure consistency with the GDP for those years as well as the 2002 Input–Output Table. These benchmark input–output tables are revised using the Kuroda Approach (Kuroda, 1988; see also Wilcoxon, 1988). The industrial classifications for these tables are also made consistent with identical 96 sectors.

#### The 2007 National Input–Output Survey

Using the experiences of input–output surveys in past years and the pilot input–output survey for 2007 as a basis, the 2007 input–output survey has been improved further compared with previous surveys, in the following three aspects (NBS, 2007b). First, the 2007 Input–Output Table divides the national economy into 144 sectors, which is the most detailed classification yet attempted in China, with five in the primary sector, 93 in the secondary sector, and 46 in the tertiary sector. Second, questionnaires for service sectors on cost structures and profits have been added. Third, questionnaires for inter-regional flows have been added to satisfy the need for constructing regional input–output tables and national non-competition input–output tables.

## 7. THE PROBLEMS AND CHALLENGES FACED BY CHINA'S SYSTEM OF NATIONAL ACCOUNTS

As noted in the Introduction, although China's system of national accounts quickly approached international standards, there is still some distance to go compared with the latest SNA, with developed country practice, and with the requirements of macroeconomic management, civil society, and international organizations. We conclude this study by summarizing the key problems and challenges facing the CSNA as followings.

### *Annual Statistics for Services*

Annual statistics for the service sectors remain weak. The results of the 2004 Census showed that the shortcomings of annual statistics for the service sectors have had a significant adverse effect on the accuracy and comprehensiveness of the GDP estimates. Although the NBS made considerable efforts to improve these statistics after the 2004 Census, there remains a considerable gap in data sources for the annual GDP estimation. For instance, despite having conducted a pilot

survey, the NBS has not developed a formal system for conducting sample surveys for the financial statistics for those service enterprises in the wholesale and retail trade, hotels and catering services below the threshold, and in real estate property management and intermediary services. Further, there are still no financial statistics data for private-funded and foreign-funded enterprises that are engaged in road and water transport.

#### *Statistics for Price Indices*

For example, there is a lack of producer price indices (PPIs) for the service sectors. Some related components from the CPI have been used as rough proxies for the estimation of the value added at constant prices in these sectors. There is also a lack of price indices for the export and import of services. China has not yet compiled any price indices for service trade. The price indices for the import and export of goods and some related service price indices at home and abroad have been used in deflation exercise but they are inaccurate.

#### *Quarterly GDP Estimation*

First, quarterly GDP estimation in China has only been production-side GDP estimation. There has not yet been quarterly GDP estimation using the expenditure approach. Beginning in 2000, the NBS conducted a trial estimation of quarterly expenditure-side GDP. However, due to gaps and inconsistencies in data sources the differences between the production-side and the expenditure-side GDP are enormous. Second, quarterly GDP estimation in China is on a cumulative, rather than an individual period, basis. Cumulative quarterly GDP estimates can only provide GDP data from the first quarter to the current quarter, whereas individual quarterly GDP estimation provides GDP data for each distinct quarter. The discrete basis gives a better and more useful indication of economic trends in specific quarters than the cumulative estimates and so provides important and timely information for short-term macroeconomic analysis and management. The main reason for continuing to estimate and publish cumulative quarterly GDP is that the available statistics do not meet the requirement for individual quarterly GDP estimation. In particular, there is a lack of quarterly data on construction and a lack of some relevant quarterly price indices.

#### *Regional GDP Estimation*

Since the GDP began to be estimated at both national and regional levels, the national GDP and the summation of regional GDPs have differed to some extent. In order to improve the quality of regional GDP estimates and minimize the difference between national estimates and the summation of regional estimates, the NBS began in 1999 to jointly evaluate and check the quality of regional data. Some progress has been made in standardizing and regulating regional GDP estimates and in improving the quality of the estimates. In 2005, the NBS cooperated with provincial statistical offices to estimate the 2004 provincial GDP according to the Census data, and arrived at better results. However, this problem has not been completely solved. Indeed, the difference has increased again recently.

The difference is mainly caused by the following factors. First, it is inevitable because the regional GDPs and national GDP are estimated by different statistical authorities. Second, there is some double counting between different regions because with the rapid development of the market economy, there are more and more enterprises operating across regional borders and hence value added by both parent company and its subsidiaries located in different regions may be recorded in GDP estimates of the region where it locates. Third, gaps in data sources at different administrative levels may affect the estimation differently. Lastly, we cannot rule out that GDP-motivated local governments may exaggerate growth estimates through data fabrications.

### *Construction of Input–Output Tables*

The method of direct decomposition places a heavy burden on enterprises; a burden that some are not willing to assume and thus ignore. The degree of cooperation from enterprises in input–output surveys has thus declined significantly. The NBS is considering abandoning the method of direct decomposition in constructing symmetric input–output tables, and using instead the method adopted by most countries that involves first compiling supply and use tables, and then deriving symmetric input–output tables. For this purpose the basic statistical unit for production needs to be changed from an enterprise to an establishment, which will involve an enormous adjustment to the present statistical system and will be a hugely difficult task.

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