

this will not be through the full and immediate recognition of the supremacy of shareholder meetings, consistent with western corporate governance standards. Instead, the process will be much more incremental and less tangible in nature.

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INSTITUTIONAL CONSTRAINTS ON THE QUALITY OF STATISTICS IN CHINA

CARSTEN A. HOLZ*

When adopting the Soviet model of economic development in the 1950s, the People's Republic of China also embraced the Material Product System (MPS) to organize its national income accounts. The MPS covers the five material production sectors of agriculture, industry, construction, transportation and communications, and commerce; the service sector was largely subsumed within these material production sectors. The compilation of statistics closely matched the structure of the planning apparatus. Production units in the various sectors reported their statistics to their superordinate government department, which passed them on to the local statistical bureau and, where relevant, to higher-level government departments under the same central line ministry. To meet the needs of the planning apparatus, a fair share of the data collected were of a technical nature, such as the physical inputs and outputs as well as the technology level of the production process.

The introduction of market-oriented economic reforms posed a severe challenge to the traditional statistical system. When the rural communes were abandoned in the early 1980s and enterprises in private and foreign ownership began to multiply in the second half of the 1980s, the statistical reporting system struggled to measure the economic activities of several hundred million farmers and the many newly established enterprises. Furthermore, in 1992, after 14 years of economic reform, the MPS was abandoned in favor of the United Nation's "1993" version of the System of National Accounts (SNA). By the early 1990s, China's statistical authority faced two tasks, namely improving the method of data compilation and implementing unfamiliar statistical concepts.

Prior to the reform period, Li Choh-Ming, writing in 1962, contended that data quality had been severely compromised in the Great Leap Forward of the late 1950s, but had subsequently improved and become adequate. Similarly, Dwight H. Perkins in 1966, Thomas G. Rawski in 1976, and Gregory C. Chow in 1986 all found China's official data after the Great Leap Forward quite reliable.¹ Yet by 1989 the National Bureau of Statistics (NBS) organized its first large-scale investigation into statistical reporting in the reform period, followed by

* Carsten A. Holz is associate professor in the Social Science Division at the Hong Kong University of Science & Technology.

¹ Li Choh-Ming, *The Statistical System of Communist China* (Berkeley and Los Angeles: University of California Press, 1962); Dwight H. Perkins, *Market Control and Planning in Communist China* (Cambridge, Mass.: Harvard University Press, 1966); Thomas G. Rawski, "On the Reliability of Chinese Economic Data: Discussion," *Journal of Development Studies* 12, no. 4 (1976): 438-41; Gregory C. Chow, "Chinese Statistics," *The American Statistician* 40, no. 3 (Aug. 1986): 191-96.

similar investigations in 1994, 1997, and 2001.² Prime Minister Zhu Rongji explicitly requested "fast, clear, and accurate" (*kuai, jing, zhun*) statistics.³

This article examines the quality of China's statistics, given the various institutional constraints on the statistical reporting system. These constraints include such factors as the size of the shadow economy, the process of economic development and transition, the technical capabilities of the statistical authority, and the organization of statistical compilation with data collection across several tiers of government and division of labor between the statistical authority and other government departments. Data quality has two aspects. One is the extent of statistical coverage of economic activities, and the second is the accuracy of the data collected. Limited coverage may also impact on the accuracy of aggregate data when data on those units not covered in the periodic data collection process are estimated.

Some authors writing on the pre-reform period, such as Li Choh-Ming in 1962 or Alexander Eckstein in 1980, saw an intricate link between institutions and the quality of statistics. Yet in the literature on China's statistics in the reform period, the institutional factor has been largely ignored. Thus Huang Yasheng in 1996 contrasted China's statistical agency with that of the former Soviet Union, but he did not link institutional features to the issue of data quality. One exception is James E. Nickum who in his 1995 analysis of measures of irrigation in China 1931–91 included a chapter linking data quality to statistical reporting agencies.⁴ The purposeful falsification of some output data has received much attention, but reflects only one constraint on data quality among several.⁵

The following section reviews some of the constraints on statistical coverage and data accuracy relevant for all countries, but especially for China as a developing and transition country. The third section examines China's problems in compiling data on one particular variable, gross domestic product (GDP); since GDP measures the value added created in all economic activities across the economy, problems in compiling GDP data are illustrative of many of the

² In 1998 the *Zhongguo tongjiju* changed its English name from State Statistical Bureau to National Bureau of Statistics (NBS). In the following, the current English name is used throughout.

³ NBS Industry and Transport Division, *Xinbian gongye tongji gongzuo zhinan* (New guide to industrial statistics) (Beijing: Zhongguo tongji chubanshe, 1999), 3.

⁴ Li, Statistical System; Alexander Eckstein, *Quantitative Measures of China's Economic Output* (Ann Arbor: University of Michigan Press, 1980); Huang Yasheng, "The Statistical Agency in China's Bureaucratic System," *Communist and Post-Communist Studies* 29, no. 1 (March 1996): 59–75; James E. Nickum, *Dam Lies and Other Statistics: Taking the Measure of Irrigation in China, 1931–91*, East West Center Occasional Papers, Environment Series, no. 18 (Jan. 1995).

⁵ See, e.g., Cai Yongshun, "Between State and Peasant: Local Cadres and Statistical Reporting in Rural China," *The China Quarterly*, no. 163 (Sept. 2000): 783–805; Thomas G. Rawski, "China By the Numbers: How Reform Has Affected China's Economic Statistics," *China Perspectives*, no. 33 (Feb. 2001): 25–34.

issues encountered in the compilation of other statistics. The fourth and fifth sections present two different organizational dimensions that affect data quality in China: central–local cooperation within the statistical system, and the reliance of statistical departments on other government departments for data collection and compilation; each section provides examples related to GDP, and draws conclusions about the implications of the particular organizational feature. The sixth section, using the example of the sector industry, outlines some of the improvements that have been implemented in recent years. The last section presents final conclusions.

Shadow Economy, Economic Development, and Transition Experience

Questions about the quality of official statistics are not limited to China. Shadow economies exist in all countries, and data on the shadow economy are notoriously difficult to obtain. Statistical authorities in developing and transition economies furthermore face the challenge of adapting their methods of data collection and compilation to a rapidly changing economy.

In a survey of the literature on the shadow economy, Friedrich Schneider and Dominik H. Enste offer a "commonly used working definition" of the shadow economy as "all economic activities that contribute to the officially calculated (or observed) gross national product but are currently unregistered."⁶ They then go on to focus on illegal activities and those legal activities unreported for purposes of tax avoidance and tax evasion. But the methods used to estimate the extent of the shadow economy capture *all* activities on which the statistical authority does not collect data, regardless of whether these activities are illegal or legal, and if they are legal, irrespective of the reasons why they are not collected.⁷ The broad scope of the definition of the shadow economy, also embedded in the measurements of the shadow economy, is particularly relevant for developing countries which may not have the funds or the expertise to compile statistics on all legal economic activities in the country.⁸

Across the OECD countries, official GDP is estimated to underreport actual GDP by 8 to 30%, with a low of 8–10% for countries such as the U.S. or

⁶ Friedrich Schneider and Dominik H. Enste, "Shadow Economies: Size, Causes, and Consequences," *Journal of Economic Literature* 38, no. 1 (March 2000): 77–114, quotation from p. 78.

⁷ Procedures traditionally used to measure the shadow economy include, e.g., a comparison of the results of different approaches to GDP calculation, or an examination of the amount of unexplained cash in an economy.

⁸ Simon Johnson, Daniel Kaufmann, and Andrei Shleifer, "The Unofficial Economy in Transition," *Brookings Papers on Economic Activity*, no. 2 (1997), 159–221, writing about the unofficial economy during economic transition, explicitly define the unofficial economy as constituting activity that is not reported to the state statistical office.

Japan, and a high of 24–30% for countries such as Greece, Italy or Spain.⁹ Italy in 1987 went as far as to adjust the official GDP figures upwards by 18% to account for the missing output.¹⁰ Estimates of China's shadow economy are not available. The NBS does not consider illegal activities in its calculation of GDP,¹¹ but attempts to capture all other economic activities as much as possible.

Illegal activities and tax avoidance or evasion are as relevant for China as for other countries; the World Bank in 1996 estimated that compliance with the value-added tax is only 70%, and with the individual income tax only 50%.¹² While these problems imply that official GDP data are biased downward, many state-owned enterprises as well as some collective-owned enterprises are under pressure to meet government-determined output targets; they may over-report output if actual production does not meet the target. In some localities it may even be possible to de-link tax calculations, such as the value-added tax, from statistics on output. The literature on China tends to focus on over-reporting only. The literature on Eastern Europe and Russia, on the other hand, in trying to explain the drastic drop in reported output at the outset of economic reforms, tends to focus on the issue of under-reporting.¹³

The volume of incomplete or inaccurate data is likely to be more sizeable in developing countries than in developed countries. In developing countries the agricultural and the urban informal sector are likely to be large, and economic activities in the formal sector are likely to be less concentrated than in industrialized economies. Thus the imputation of the rental value of a yurt in Tibet, located several thousand kilometers from the provincial capital, may well appear somewhat fantastic. Collecting data on the annual change in the size of the yak herd owned by the same family may be close to impossible, or at least not cost-efficient.

Some of the difficulties in collecting data from the informal sector and from widely dispersed and varied economic activities could be overcome through random sample surveys. Yet the educational level of statistical personnel in developing economies is likely to be insufficient to conduct sophisticated surveys. For example, the Beijing statistical bureau found that in its training courses for

⁹ See Schneider and Enste, "Shadow Economies," 80.

¹⁰ *The Economist*, "Light on the Shadows," 1 May 1997.

¹¹ Xu Xianchun, "Wo guo GDP hesuan yu xianxing SNA de GDP hesuan zhijian de ruogan chayi" (Some discrepancies between the calculation of GDP and the calculation of GDP in the SNA), *Jingji yanjiu* (Economic research), no. 11 (Nov. 2001): 64.

¹² World Bank, *The Chinese Economy: Fighting Inflation, Deepening Reforms* (Washington, D.C.: The World Bank, 1996), 42.

¹³ See, e.g., for the case of Poland, Andrew Berg, "Measurement and Mismeasurement of Economic Activity During Transition to the Market," in *Eastern Europe in Transition: From Recession to Growth? Proceedings of a Conference on the Macroeconomic Aspects of Adjustment, Cosponsored by the International Monetary Fund and the World Bank*, World Bank Discussion Papers, no. 196, ed. Mario I. Blejer, Guillermo A. Calvo, Fabrizio Coricelli, and Alan H. Gelb, (Washington, D.C.: World Bank, 1993), 39–63.

statistical personnel of enterprises and administrative facilities, out of almost one thousand participants only 32 had some knowledge of statistics; statistical personnel of township and village enterprises are likely to have had no more than one or two years of primary school education. A member of the rural survey team in a county in Zhejiang Province thinks that the statistical personnel at the grassroots level typically have had no more than primary school education, and are often older than 50 if not 60 years. This is especially true at the village level. Statistical reports can at most require multiplication; division is said to be not feasible.¹⁴

Grassroots-level statistical staff furthermore are sometimes claimed to be overworked, or at least not in a position to double-check the data that are reported to them. In Jiangxi Province the statistical staff of a typical township, presumably in 1997, faced 597 requests for statistical reports from 46 county-level or higher units, covering altogether 22,559 data points.¹⁵ While such facts, regularly published in the official NBS magazine *Zhongguo tongji* (China statistics), may not be perfectly representative of the average statistical personnel, it is still true that with 20,708,863 township and village enterprises distributed across the 44,741 townships in China, the average township has 463 enterprises; yet in a typical township, usually only one person is in charge of statistics, and that person's brief covers more than just enterprises.¹⁶ Not astonishingly, many data collection tasks are "outsourced" to other government departments.

In a rapidly developing economy, migration is yet another issue. For example, Thomas G. Rawski and Robert W. Mead showed that the statistical authorities in China do not account for the "disappearance" of approximately 100 million farmers¹⁷ who are listed as farmers but not actually working as farmers; the NBS employment statistics are not capable of properly capturing migration.

¹⁴ *Zhongguo tongji* (China statistics) no. 3 (2000), 34; no. 10 (2000), 34.

¹⁵ *Zhongguo tongji* no. 7 (1998), 20.

¹⁶ *Zhongguo tongji nianjian 2000* (China statistical yearbook 2000) (Beijing: Zhongguo tongji chubanshe, 2000), 369, in the following referred to as "*Statistical Yearbook 2000*" and similarly for other years; *Zhongguo xiangzhen qiye nianjian 2000* (Township enterprise yearbook 2000) (Beijing: Zhongguo nongye chubanshe, 2000), 113, in the following referred to as "*Township Enterprise Yearbook 2000*" and similarly for other years. An anonymous referee in response to an earlier version of this article has pointed out that "many of these statistical staff are local elites, such as accountants and cadres, who have an intimate knowledge of local affairs. Their estimates should be in the ballpark in terms of basic statistics, if there is no intentional twist due to potential interests. Secondly, they might not be overworked as suggested by the figures; most of the time, they may just send the same data report to multiple government agencies." Sensational reporting about the poor educational level of local statistical staff and their heavy workload may constitute an attempt to pressure governments into providing more funds to hire more and better qualified local statistical staff.

¹⁷ Thomas G. Rawski and Robert W. Mead, "On the Trail of China's Phantom Farmers," *World Development* 26, no. 5 (May 1998): 767–81.

These 100 million laborers, accounting for almost 15% of the labor force, could be missing not only from the labor statistics, but also from the output statistics. If these migrant laborers are engaged in some form of manufacturing in their new location, their output is probably included in the output of the enterprise by which they are employed. But if these migrant laborers are engaged in informal sector services, e.g., as household maids, their value added may not be included in GDP; if they are engaged in black market activities, their value added is certainly not included.

The process of transition from a socialist towards a market-oriented economy causes additional difficulties in compiling accurate nationwide statistics.¹⁸ The MPS was based on comprehensive periodic reporting that encompassed the 26,000 communes in agriculture and the predominantly state- and collective-owned production units in the other four material production sectors. Government departments in charge of agriculture and enterprises reported the statistics on their production units up to the next higher-level government department within the same line ministry, and simultaneously to the local statistical bureau (which then also passed the data on to the next higher-level statistical bureau).

The end of the commune system in the early 1980s shifted the compilation of statistical data on agriculture from the commune level to the village if not household level. Similarly, industrial reform in the mid-1980s caused a proliferation in the number of enterprises and ownership forms. The reform period also brought rapid growth in the service sector, in particular the private service sector, which the MPS was not designed to capture; services were covered by the MPS only if they occurred in or were paid for by units in one of the five material production sectors.

For example, in 1978 the NBS collected data on 348,400 industrial enterprises, 24.02% of which were state-owned and 75.98% collective-owned (Table 1). The total number of enterprises rose to 437,200 in 1984 thanks to an increase in the number of collective-owned enterprises. Data for the years prior to 1985 do not include village-level collective-owned industry and individual-owned industry; enterprises in these ownership forms played only a minor role in the economy, and no data may have been collected. Since 1985 these data are available, leading to a more than tenfold rise in the total number of industrial enterprises from the 437,200 in 1984 to 5,185,300 in 1985. Individual-owned industrial enterprises accounted for just 1.85% of gross output value of industry in 1985 but 64.56% of the total number of industrial enterprises.¹⁹ The number of

¹⁸ On the experience in the former Soviet Union and Eastern Europe see Berg, "Measurement and Mismeasurement"; Kasper Bartholdy, "Old and New Problems in the Estimation of National Accounts in Transition Economies," *Economics of Transition* 5, no. 1 (May 1997): 131–46.

¹⁹ Village-level collective-owned enterprises in 1986, the first year for which separately listed data on these enterprises are available, accounted for 7.49% of gross output value of industry and 8.42% of the total number of industrial enterprises (*Statistical Yearbook*

individual-owned industrial enterprises doubled between 1985 and 1987, as did their still small share of gross output value of industry. (Since then the number of individual-owned industrial enterprises has not changed dramatically, but their output share rose to 18.18% in 1999.)

Figure 1 shows the development of the sectoral shares in GDP over time. Of special interest is the tertiary sector whose data are particularly difficult to collect. The share of the tertiary sector rose from initially slightly above 20% to around 30%. The fluctuations in the tertiary sector share, such as the four percentage-point rise in 1985 or the slight drop in 1991 suggest data problems rather than developments in the real economy; the pre-1993 data were constructed retrospectively in the early 1990s based largely on the available MPS data.

The process of transition also involves changes in the variables on which data are collected. Statistical compilation in China traditionally served a planning apparatus which needed data on physical inputs and outputs as well as technology levels. In a more market-oriented economy, macroeconomic policy, replacing much of central planning, requires data on such variables as GDP, employment, and price indices, or on matters such as social insurance, which previously was handled by individual enterprises and communes rather than the central government. In 1992 China adopted the United Nation's System of National Accounts (SNA) as the new national income accounting framework. The SNA asks for the compilation of data on numerous new variables—e.g., tertiary sector value added—that neither statistical personnel nor reporting units were familiar with prior to 1992.

Data compilation issues ranging from unmeasured economic activities to new statistical concepts all impact on the quality of statistical data. The following section uses the example of GDP to illustrate some of the resulting data problems.

Limitations to Data Compilation: The Example of GDP

GDP is the final market value of all goods and services produced in an economy in a given period of time. A compendium on the compilation of GDP statistics issued by the NBS National Accounts Division in 1997 defines the three approaches to calculating GDP and explains in detail how the (nominal) data are to be obtained.²⁰ The definitions follow international practice and are as follows.

1988, 324). Gross output value data on the individual-owned economy for the years prior to 1985 (also reported in Table 1) became available retrospectively only.

²⁰ NBS National Accounts Division, *Zhongguo niandu guonei shengchan zongzhi jisuan fangfa* (Calculation of China's annual gross domestic product) (Beijing: Zhongguo tongji chubanshe, 1997). OECD, *National Accounts for China: Sources and Methods* (Paris: OECD, 2000), covers some similar ground, but in less detail.

Production approach:

GDP = sum of value added across all sectors of the economy, where sectoral value added = gross output value - the value of intermediate inputs in the particular sector.

Expenditure approach:

GDP = consumption + gross capital formation + net exports, where consumption = household consumption + government consumption, and gross capital formation = fixed capital formation + inventory investment.

Income approach:

GDP = labor remuneration + net production taxes + depreciation + operating surplus.

Annual GDP production approach data were first published in the *Statistical Yearbook* of 1993, including re-constructed data for the years 1978 through 1992.²¹ Reporting on "national income" (as the sum of the net material product of the five material production sectors) and "gross output value of society," the two key national income indicators in the MPS, ended with the 1993 data. The *Statistical Yearbook 1995* began to report GDP calculated using the expenditure approach, covering the years 1978 through 1994, as well as GDP calculated using the income approach, for 1993 only. Since then, GDP data following all three approaches have been regularly published in the *Statistical Yearbook*. GDP data for the years prior to 1978 were finally published in a special volume (in the following labeled *GDP 1952-1995*) in 1997.²²

²¹ Data on gross national product (GNP) were first published in the *Statistical Yearbook 1988*, covering the years 1978 through 1987. In the years 1978 and 1979 GDP equals GNP.

²² NBS National Accounts Division, *Zhongguo guonei shengchan zongzhi hesuan lishi ziliao 1952-1995* (Historical data on China's gross domestic product, 1952-1995) (Dalian: Dongbei caijing daxue chubanshe, 1997). This volume reconstructs GDP calculated using the production as well as the expenditure approach for all years since 1952, including all individual provinces of China. GDP calculated using the income approach is available in *GDP 1952-1995* for all provinces beginning with the year 1978; a nationwide total is not provided but can be derived as the sum of the provincial data. (Data on some provinces are incomplete.)

Xu Xianchun and Tian Xiaoqing, "Zhongguo guonei shengchan zongzhi lishi shuju (1952-1977 nian) de ziliao shouji he cesuan fangfa" (Compilation and estimation of data used in establishing China's GDP (1952-1977)), *Jingji yanjiu* no. 9 (Sept. 1997): 65-71, explain in detail how the pre-1978 GDP data were retrospectively constructed using the data available in the MPS as well as additional sources of data. Others, such as Hsueh Tien-tung and Li Qiang, *China's National Income, 1952-1995* (Boulder, Col.: Westview Press, 1999), independently reconstructed pre-1978 GDP data; Harry X. Wu, "The 'Real' Chinese Gross Domestic Product (GDP) for the Pre-Reform Period 1952-

The published GDP data are problematic. First, the three approaches to calculating GDP are not used independently, depriving the NBS of a powerful check on the quality of its GDP data. Second, each of the three approaches is fraught with its own shortcomings, raising questions about the quality of the published GDP data. Third, changes to the definition of GDP are occurring continuously (but these are not publicly documented); the published GDP data thus are time-inconsistent.

Interdependence of the Three Approaches in regard to GDP Calculation

In theory, the three different approaches to calculating GDP yield three independent results. However, in China the three approaches are not used independently. According to NBS explanations of 1997, the production approach is the dominant approach to calculating GDP in some sectors of the economy (such as agriculture and industry), and the income approach in others (such as some services).²³ In those sectors where the production approach prevails, income approach GDP is simply set equal to production approach GDP; the reverse holds for the sectors in which the income approach is dominant. In the aggregate, production approach GDP perfectly equals income approach GDP. (On the use of the income approach in calculating production-approach GDP see, e.g., the production approach to agricultural services or the income approach to transport and communications in Table 2 which in rather selective fashion summarizes some aspects of GDP calculation in China that are of interest here.)

At least the expenditure approach, following the NBS explanations, should reflect independent calculations and thus offer a valid counter-check on production and income approach GDP.²⁴ However, *GDP 1952-1995* in an introduction explicitly states that many provinces are unable to compile net export data and therefore calculate net exports as a residual by subtracting consumption and gross capital formation from the provincial GDP value obtained using the production method.²⁵ In as far as nationwide aggregate expenditure approach

77," *Review of Income and Wealth* 39, no. 1 (March 1993): 63-86, estimated the relationship between GDP and net material product in the years 1978 through 1990, for which both values are available, and then used this relationship to derive pre-1978 GDP from the available pre-1978 net material product data. For an overview of studies attempting to reconstruct China's GDP see Harry X. Wu, "China's GDP Level and Growth Performance: Alternative Estimates and the Implications," *Review of Income and Wealth* 46, no. 4 (Dec. 2000): 475-99.

²³ See NBS National Accounts Division, *Zhongguo niandu guonei shengchan zongzhi jisuanshan fangfa*, 12f.

²⁴ *Ibid.*

²⁵ See *GDP 1952-1995*, 2. The practice of deriving the n^{th} of n sub-categories by subtracting $n-1$ sub-categories from the total, could be widespread. Expenditure data for Henan in 1994 in one table give final consumption as RMB 119.886 billion, with final

GDP is derived from provincial expenditure data, the three approaches to GDP are not independent of each other at the national level.

While *GDP 1952-1995* suggests that net exports in the expenditure approach are calculated as a residual, Kasper Bartholdy notes that in many Eastern European countries inventory investment is obtained as a residual; the World Bank in a 1995 joint report with the Government of the Russian Federation State Statistics Committee on Russia's national accounts explicitly recommended calculating inventory investment as a residual until there is substantial improvement in the direct basic data sources on expenditures.²⁶ If inventory investment in China is not calculated as a residual (since net exports are reportedly calculated as a residual, at least at the provincial level), Chinese aggregate data on inventory investment are likely to be of poor quality. A fair share of aggregate inventory investment may have been calculated based on the ratio of inventory investment to output obtained from state-owned and collective-owned enterprises and then applied to enterprises in other ownership forms (see capital formation in the expenditure approach).

The published data on the three GDP measures are indeed identical across almost all provinces. Table 3 shows that since 1995 income approach GDP equals production approach GDP across all provinces, and expenditure approach GDP matches these values in three quarters of all provinces. (In 1993 income approach GDP was set equal to expenditure approach GDP—or vice-versa—in all provinces except one, while production approach GDP differed significantly across almost all provinces.²⁷)

Shortcomings in the Three Approaches in Regard to GDP Calculation

None of the three approaches to calculating GDP is without complications. In the production approach, accurate data on intermediate inputs are notoriously difficult to obtain. The NBS frequently has available no more than gross output value data, and then applies a multiplier to obtain value added. This multiplier can be derived from the state-owned units in the particular sector where good data are usually available, from base year census data, or from surveys; for some econom-

consumption plus capital formation plus net exports adding up to total GDP (which in turn matches production approach GDP), whereas in a second table with details on final consumption this is given as RMB 119.19 billion, with the sub-categories of final consumption adding up to this total. (*Statistical Yearbook 1996*, 48 and 50) If the second table were correct, then final consumption in the first table may have been obtained as a residual. If final consumption in the first table were correct, but then incorrectly copied to the second table, then one sub-category of final consumption in the second table may have been derived as a residual.

²⁶ See Bartholdy, "Old and New Problems," 137-40.

²⁷ The comparison is for the years since 1993, when GDP data calculated using the expenditure approach first became available in the *Statistical Yearbook*.

ic activities, the method of calculation is not specified (see, e.g., construction in the production approach to GDP in Table 2).

When the production approach is not feasible at all, the NBS resorts to income approach data. For example, value added of agricultural services is only obtained using the income approach.²⁸ But these income approach data in turn are themselves frequently based on rough estimations (see agricultural services in the income approach).

Imputation of some data occurs in all three approaches to the calculation of GDP, but it is especially cumbersome in the expenditure approach. Both the rental value of owner-occupied housing and the value of self-produced and self-consumed goods are imputed²⁹ (see final consumption by households in the expenditure approach). The rental value of owner-occupied housing in the countryside is imputed based on the number of rooms, historical average construction cost per room, and an assumed 2% depreciation rate; in urban areas the depreciation rate is taken to be 4% and the calculations are based on floor space as well as historical construction costs. These rather conservative assumptions imply an underestimation of household final consumption expenditures, thus biasing expenditure approach GDP downward. In as far as these imputations matter in the calculation of household income, and income data then are substituted for production approach data, GDP values across all three approaches are biased downward.³⁰

In 1952 the value of goods produced by households and self-consumed by the same households accounted for almost 30% of GDP, and for close to 45% of total household consumption (see Figure 2). In the years thereafter this value

²⁸ Agricultural services range from rural energy conservation activities to the economic activities of such units as the agricultural mechanization promotion office. For a detailed list see NBS National Accounts Division, *Zhongguo niandu guonei shengchan zongzhi jisuanshang*, 48.

²⁹ The issue of imputation appears particularly severe in China due to the large size of the agricultural population. In the U.S. in the early 1980s, four types of imputations accounted for 8% of GDP: imputed rental income of owner-occupied housing, the value of food and fuel consumed on farms, the value of food and clothing provided to the military, and banking services rendered without payment to depositors. See, e.g., Richard Ruggles, "The United States National Income Accounts, 1947-1977: Their Conceptual Basis and Evolution," in *The U.S. National Income and Product Accounts: Selected Topics*, ed. Murray F. Foss (Chicago and London: The University of Chicago Press, 1983), 15-96. What items should be imputed is an issue of discussion. See, e.g., Robert Eisner, *The Total Incomes System of Accounts* (Chicago: The University of Chicago Press, 1989), 40.

³⁰ OECD, *National Accounts for China*, 52-55. On the housing issue also see Albert Keidel, "Practical Issues in Using the Chinese Statistical System," *China Perspectives*, no. 33 (Jan./Feb. 2001): 35-41. Real estate items that due to a lack of data are omitted altogether from the income approach GDP calculation in the real estate sector are listed in OECD, *National Accounts for China*, 41, and also in NBS National Accounts Division, *Zhongguo niandu guonei shengchan zongzhi jisuanshang*, 98.

fell almost continuously, except for the period of the Great Leap Forward in 1958–1960 and its aftermath, to 5.69% in 1994 (with 12.62% for the share in household consumption). In 1995 it rose sharply to 6.98% (14.90%) and in 1996, the most recent year for which the data are available, it fell back to 6.63% (13.86%). The more than one percentage point upward adjustment in the GDP share of imputed self-produced and self-consumed goods by households in 1995 appears a rather drastic change, questioning the time consistency of the imputations.

Data on capital formation in the expenditure approach are highly incomplete. Some data are estimated, e.g., much of inventory investment (if they are not in fact obtained as residual). Other data are not available and therefore excluded, such as urban household non-housing investment (see capital formation in the expenditure approach).

Net export data in the expenditure approach suffer from a problem of multiple data sources for one and the same variable, none of which provides reliable data. Provincial net exports comprise net exports abroad and net exports to other provinces. Net exports to other provinces can be calculated based on statistics compiled by various institutions, such as the commercial system or banks (see net exports in the expenditure approach). No two sources are likely to yield the same results.

In the income approach, data on rural household income are compiled by three different institutions, namely by the county statistical department through surveys, by the county rural economy committee (*xian nongcun jingji weiyuanhui*) through complete reporting based on village-level accounts, and by the rural survey team through surveys. The results of all three differ.³¹

Incentives to misreport data appear particularly strong in the income approach to GDP. Households are unlikely to be enthusiastic about revealing all their income, especially if it is taxable. Localities may wish to under-report net taxes on production in the countryside in order to conform to the central government's instructions to keep the tax burden on the rural population low.

Across some sectors, approximation of income data appears the norm (see transport and communications in the income approach). Operating surplus is sometimes obtained as a residual, starting with production approach value added and subtracting all other income items (agriculture in the income approach), or attributed to labor remuneration and thus assumed to be zero (commerce in the income approach).

Depreciation values tend to be an underestimate as depreciation rates are low and are applied to the historical cost rather than the current value of the fixed asset. In enterprise accounts, the underestimation of depreciation implies an overestimation of operating surplus and thus it does not affect value added. How-

³¹ *Zhongguo tongji* no. 7 (2000), 18. The *Statistical Yearbook* reports only the data compiled by the rural survey teams. In all three cases, reported income is likely to underestimate actual income (*Zhongguo tongji* no. 10 (1999), 20f).

ever, in those instances where operating surplus data are not available, under-estimated depreciation implies that value added is also underestimated. This is the case with imputations of the rental value of owner-occupied housing, and across much of the tertiary sector (transport and communications, and commerce in the income approach).

A separate issue beyond the compilation of nominal data on production, expenditure, and income approach GDP is the deflator used by the NBS to derive the *real* GDP growth rate which is currently published only for production approach GDP. The NBS uses base year prices (adjusted every decade) to calculate real GDP growth of the primary and secondary sector, and price indices for the tertiary sector.³² The use of base year prices tends to underestimate inflation, and thus to exaggerate real growth.³³ Albert Keidel compares the GDP deflator implicit in the published production approach nominal GDP and real GDP growth data with a constructed expenditure approach GDP deflator. The latter exceeds the former in 1992, 1993, and 1996–99. If the constructed expenditure approach GDP deflator were an accurate measure of the GDP deflator, reported (production approach) real GDP growth in these years was exaggerated by up to 2 percentage points, except in 1993 when the discrepancy was a very large 5.6 percentage points. But the constructed expenditure approach GDP deflator falls short of the published (implicit) production approach GDP deflator in the years 1990, 1991, 1994, 1995, and 2000, which would imply that the official real GDP growth rate underestimates the actual real growth rate, also by up to close to 2 percentage points.³⁴

Time Inconsistencies in the Definition of GDP

Gradual adoption of SNA practices and repeated improvements in GDP calculations cause time inconsistencies in aggregate GDP data.³⁵ In 1994, the World

³² Wu Pibin, "Dui woguo jingji zengzhanglu jisuan fangfa de kanfa" (Some views on the calculation of China's economic growth rate), *Jingji yanjiu* no. 4 (April 1999): 72–6 (p. 74).

³³ A number of reasons related to the application of the prices of approximately 2000 products in the base year to today's products account for this bias. For a detailed overview see, e.g., Harry X. Wu, "China's GDP Level." Susan Powers, "Statistical Needs in Eastern Europe," *Monthly Labor Review* 115, no. 3 (March 1992): 18–28, provides an overview of the issue of deflators in transition economies.

³⁴ Albert Keidel, "China's GDP Expenditure Accounts," *China Economic Review* 12, no. 4 (2001): 355–67. The expenditure approach GDP deflator was constructed by applying different (available) price indices to the comparable expenditure categories in order to construct a real measure of expenditure approach GDP. Real expenditure approach GDP growth then is immediately available. Comparing this time series to the official nominal expenditure approach GDP data yields the expenditure approach GDP deflator.

³⁵ The sectoral breakdown of aggregate GDP data is also inconsistent. Sectoral GDP data are inconsistent over time as the NBS is adopting the SNA only gradually. In the allocation of interest income (see finance in the income approach to GDP in Table 2), the tran-

Bank in its publications adjusted China's official per capita GDP upward by 34.3% and continued to adjust official Chinese data in the following years. Xu Xianchun, currently director of the NBS National Accounts Division, has given an account of the World Bank's reasoning from an internal report, and he also documented the changes in China's statistical system that have taken place between 1992 and 1998³⁶ (see Table 4).

In 1999, the World Bank accepted the official Chinese GDP data for its own publications, presumably beginning with the 1998 data, thus effectively certifying current official Chinese GDP statistics as sufficiently accurate by World Bank standards. If the World Bank calculations had yielded the one correct GDP value for 1992, then the disappearance of the discrepancy of 34.3% over presumably six years implies that 5.04 percentage points of the annual growth in China's nominal GDP as reported in official Chinese statistics is due solely to adjustments to China's GDP calculation practices. If one considers that half of the adjustments the World Bank made to the 1992 GDP data are irrelevant for *real* GDP growth—18.3 of the 34.3 percentage point adjustment to 1992 GDP was due to the application of alternative prices—the adjustments would still account for 2.67 percentage points of annual real GDP growth.

But as Xu Xianchun points out, not all corrections undertaken by the World Bank are justified (Table 4). For example, the upward adjustment to China's GDP due to the NBS underestimation of arable land may not be fully justified because some of this additional land is of lower quality or in non-agricultural use. World Bank corrections to what it viewed as underestimation of GDP by the NBS also overlooked the point that various GDP components were at the same time overestimated by the NBS. The fact that since 1998 the World Bank no longer corrects NBS data thus need only partly reflect adjustments by the NBS to its GDP data compilation; some of the World Bank adjustments may not have been justified in the first place. Definitional changes to GDP adopted by the NBS should thus account for less than 2.67 percentage points of annual real GDP growth. Nevertheless, even at lower values, the issue of GDP re-definition remains a relevant one, with the NBS not offering any explanations about adjustments to its GDP compilation methods.

Statistical compilation practices are likely to evolve further in the future. Xu Xianchun lists five areas in which adjustments are needed: valuation of housing services, government subsidies, enterprise-internal social welfare activities,

sition is to occur gradually over five to ten years, with all other sectors likely to be affected; this implies that the definition as to what is included in the value added of a particular sector changes over time.

³⁶ Xu Xianchun, "Shijie yinhang gaogu zhongguo GDP shuju" (The World Bank estimates China's GDP to be higher), *Zhongguo guoqing guoli* (The state of China), no. 1 (Jan. 1999): 7–10; "Shijie yinhang dui zhongguo guanfang GDP shuju de tiaozheng he chongxin renke" (The World Bank first adjusted China's official GDP data, and later accepted them), *Jingji yanjiu*, no. 6 (June 1999): 52–8.

rural industrial statistics, and agricultural statistics.³⁷ While individual items are as large as 3.3% and minus 3.8% of GDP, the net effect of adjustments calculated by Xu Xianchun for 1997 is an upward adjustment of GDP by only 0.2%. He advocates further consideration of these issues before the corrections are officially adopted.

The NBS claims to conduct regular "benchmark" revisions.³⁸ Following the 1993 census of the tertiary sector, GDP data on the tertiary sector published in the *Statistical Yearbook* of 1995 (and later issues) were retrospectively revised for all years since 1978. The 1995 industrial census led to retrospective revisions of the 1991–94 data on the gross output value of various ownership groups in industry by up to 25%, yet aggregate industrial value added in the GDP statistics did not undergo a corresponding revision.³⁹ The GDP data of 1991–94 remain inflated. The extent of benchmark revisions thus appears limited.

Official data also undergo a regular annual process of revision. The NBS in the *Statistical Yearbook* series offers one revision of annual GDP data. Thus each edition of the *Statistical Yearbook* contains GDP data on the most recent year, and revised GDP data for the second-most recent year. GDP data going back more than two years were already revised once in previous editions of the *Statistical Yearbook*; these earlier revised data are reprinted in the current *Statistical Yearbook*.⁴⁰ The first block of data in Table 5 reports the ratio of a particular year's production approach GDP as given in the *Statistical Yearbook 2001* (revised data) divided by the production approach GDP as first reported in the corresponding year's *Statistical Yearbook*; Table 6 covers expenditure approach GDP. (Nationwide income approach GDP data are not available; only provincial-level data are, with no retrospective revisions.) Year 1993 production approach GDP was retrospectively revised upward by more than 10%, largely because of a 33.45% upward revision to tertiary sector value added following the 1993 tertiary

³⁷ Xu Xianchun, "Zhongguo guonei shengchan zongzhi hesuan zhong cunzai de ruogan wenti yanjiu" (Some problems in the calculation of China's GDP), *Jingji yanjiu*, no. 2 (Feb. 2000): 10–16.

³⁸ OECD, *National Accounts for China*, 11.

³⁹ On the retrospective revisions see Carsten A. Holz and Yi-min Lin, "Pitfalls of China's Industrial Statistics: Inconsistencies and Specification Problems," *The China Review* 1, no. 1 (Fall 2001): 50.

⁴⁰ The first GDP estimates of every year are published in "China's Statistical Communiqué" in February of the following year, and then in more detail in "A Statistical Survey of China" published in May. "First confirmed" estimates are published in the *Statistical Yearbook* in September. In the second year, "A Statistical Survey of China" carries the "second confirmed" (and last) estimates, which are then also published in the second year's and the following years' *Statistical Yearbook*. (OECD, *National Accounts for China*, 11)

sector census.⁴¹ (Tertiary sector value-added accounts for one-third of GDP; see third block in Table 5.) Similar data on year 1993 expenditure approach GDP are not available.

Later revisions were all minor, with the largest one a downward correction by 1.32% of 1998 expenditure approach GDP. The varying but often large revisions to inventory investment (in the expenditure approach) suggest considerable problems in obtaining accurate data on inventory investment. But since inventory investment accounts for only a small share of GDP (third block of data in Table 6), the impact of these revisions on aggregate GDP is small.

The numerous shortcomings in the compilation of statistical data and the various reasons for time inconsistencies in the published data raise severe questions about the meaning of the published GDP and GDP growth data. A fair share of any growth percentage could simply be due to changes in what is counted as GDP, and in how it is counted. A corresponding retrospective revision to earlier data appears to have occurred only following the 1993 census of the tertiary sector. GDP is "re-defined" continuously as statistical bureaus across the country improve their data collection methods and as the NBS tries to follow the SNA recommendations more closely.⁴²

Central-Local Complications in Data Collection

The compilation of complete and accurate statistics is further complicated by the fact that China's statistical system stretches across five levels of government. Apart from the NBS (as a bureau of the central government), statistical departments are part of provincial, municipal (including prefectural), county, and township governments; at the township level all statistical work may be conducted by one staff only. Statistical data are collected at each tier and passed on to the next higher-level statistical department.

Nationwide GDP can be contrasted with the sum of provincial GDP, and the GDP of each province in turn with the sum of municipal or county GDP within the particular province. Yet these data are not compiled independently. The calculation of GDP is primarily a provincial endeavor. In the production approach, value added is obtained as the difference between gross output value and the value of intermediate inputs, but an accurate value of intermediate inputs is widely recognized as difficult to obtain through the direct reporting system. In as far as estimates of the ratio of intermediate inputs to gross output value are

⁴¹ Tertiary sector value added was first revised in the *Statistical Yearbook 1995*, and then a second time (which is unusual), by a very minor amount, in the *Statistical Yearbook 1996*. (The value in the latter has been reprinted in later editions.)

⁴² Xu Xianchun, "Wo guo GDP hesuan," 68, makes this ongoing process of re-definition explicit when he states that "following the continuous improvement in China's basic statistical work, the difference in how GDP is calculated in China vs. in the 1993 SNA will gradually decline."

used, these are largely obtained through surveys at the provincial level. Since household expenditure surveys are only conducted at provincial level, the expenditure approach is only feasible at the provincial and national tiers. For the municipal and county level, the income approach is often the only feasible approach to calculating GDP.⁴³

In calculating nationwide GDP the central tier relies on provincial data which it adjusts. The second block of data in Table 5 and Table 6 compares nationwide production approach and expenditure approach GDP to the sum of the corresponding provincial GDP data. The sum of provincial GDP since 1997 sharply exceeds nationwide GDP. Provincial over-reporting of GDP has become a well-accepted fact and is usually attributed to central government growth targets for provinces. Provinces then report data that reach or even exceed the target.⁴⁴ Yet the system of growth targets and thus the issue of data quality extends further all the way to the lowest-level administrative units.

Significant evidence on data falsification is available for the countryside, where statistical bureaus often rely on estimates rather than comprehensive reporting. Estimates can easily be biased upwards; some evidence of outright data falsification is also available, mostly by non-statistical personnel (such as a reporting unit), or by a local leader overruling the local statistical bureau.⁴⁵ County, municipal, and provincial statistical bureaus then have all been reported to "squeeze the water content" out of the data they receive from the immediate lower-level government's statistical bureau. The provincial data themselves thus are already the result of revisions, the foundation of which is not publicized.⁴⁶

The comparison of the sum of provincial production approach data with nationwide production approach data reveals that the adjustments undertaken by the NBS are far from uniform across sectors. The NBS consistently adjusts provincial tertiary sector value added downward when compiling nationwide tertiary sector value added, and it adjusted provincial construction sector value added upward in the years 1994-98, and downward since 1999. Since tertiary sector data are not well suited to comprehensive reporting, the NBS with its extensive network of survey teams may be in a better position to gather accurate data. In the construction sector, the annual change in the value of investment under construction is always difficult to measure using the production approach.

In the expenditure approach, the NBS consistently marks up household consumption, and in recent years has begun to mark down government consumption. The upward adjustment to household consumption in the years 1993 through 1995 is equal to slightly above 90% of the value of self-produced and self-consumed household consumption. Thus adjustments could reflect the impu-

⁴³ For some of the difficulties local statistical departments face in compiling local GDP data, see *Zhongguo tongji* no. 7 (1999), 12.

⁴⁴ See, e.g., Thomas G. Rawski, "China By the Numbers."

⁴⁵ See, e.g., Cai Yongshun, "Between State and Peasant."

⁴⁶ *Zhongguo tongji* no. 7 (1999), 12.

tation of consumption of self-produced goods by the NBS only. There would also be a link between the upward corrections to household consumption and the downward corrections to government consumption if government expenditures for household consumption were transferred by the NBS into the household consumption category.

Across all years, nationwide gross capital formation is significantly lower than the sum of provincial gross capital formation, and much of this difference is due to adjustments to inventory investment.⁴⁷ In 1999, provinces reported a more than sixfold increase for inventory investment over the final NBS-published nationwide figure. In 2000, provinces reported an increase in inventories, while the NBS reported a small decrease. The sum of provincial net export data also differs from nationwide net export data, but the differences are small compared to those in inventory investment.

The explanation for the large corrections to the sum of provincial inventory investment is possibly that the NBS calculates nationwide inventory investment as a residual, rather than as the sum of the provincial data. The NBS is unlikely to have available independent data on inventory investment, but somewhat accurate data on net exports. Since inter-provincial trade cancels out in the nationwide aggregate, nationwide net exports simply reflect China's international balance of trade in goods and services.⁴⁸

⁴⁷ Fixed capital formation data can be checked against investment data provided in *Zhongguo guoding zichan touzi tongji nianjian* (China fixed asset investment yearbook) (Beijing: Zhongguo tongji chubanshe, various years); the data match consistently with only very minor discrepancies.

⁴⁸ Net export data in the GDP statistics come close to the net export data in the balance of payments (also reported in the *Statistical Yearbook*), which are compiled independently by the State Administration of Foreign Exchange. (See Table 2, net exports in the expenditure approach, for the use of balance of payments data compiled by the State Administration of Foreign Exchange.) Net exports in the GDP statistics are within approximately 15% of the value of net exports of goods and services reported in the balance of payments in the years 1993, 1994, 1997, 1998, and 1999. In 1995 net exports in the balance of payments are close to zero while net exports in the GDP statistics are roughly in line with the previous and next years' values. In 1996 net exports in the GDP statistics are three times the value of net exports in the balance of payments. (The balance of payments reports USD values, which then have to be translated into RMB using the average annual exchange rate.) On net exports as part of the GDP statistics see *Statistical Yearbook 2000*, 65; on the balance of payments and exchange rates see the relevant annual issues of the *Zhongguo jinrong nianjian* (Almanac of China's finance and banking) (Beijing: Zhongguo tongji chubanshe, various years). The match with trade data from the Customs Office, which are sometimes different from those compiled by the State Administration of Foreign Exchange, is better still. The *Statistical Yearbook* reports Customs Office net export data on goods only (not including services), these match the net export data in the GDP statistics within an about 10% range in most years, with a maximum discrepancy of 43% in 1996 (*Statistical Yearbook 2001*, 61, 586).

The NBS corrections to inventory investment imply that the share of inventory investment in GDP is lower throughout all years than the corresponding sum of provincial values. The mean share of inventory investment in provincial GDP of 5.69% in 2000 (third block of data in Table 6), already down from 10.65% in 1993, is relatively large by international standard. In the U.S., the change in business inventories tends to be around 1% of GDP, a level which China reaches after the NBS corrections.

While the NBS offers no detailed explanation on how it adjusts provincial GDP data, Liu Hong, the then head of the NBS in February 2000 stated in just two sentences that the NBS adjusts provincial GDP data based on two sets of information. It contrasts provincial GDP data with key economic data obtained through sample surveys in each province. The NBS also has available data on variables related to GDP, and assumes that the values of these variables cannot grow at a speed that is much different from that of GDP.⁴⁹

The NBS has few means to improve data quality in the regular statistical reporting system via the statistical departments at all tiers. Each statistical department is financed by the government of the particular tier and only receives professional/business guidance by the higher-level statistical department (with the NBS at the apex of the hierarchy). While the Statistics Law in its 1996 revision and the implementing instructions of 2000 explicitly prohibit local government interference in the compilation and reporting of statistics, under threat of heavy penalties, the NPC has no direct control over personnel choices for local statistical bureaus.⁵⁰ The NBS only has a veto right over the (provincial-level) appointments of the head, deputy heads, and chief statisticians of the provincial

⁴⁹ See a news item in *China Infobank*, an internet database at <http://www.chinainfobank.com>, on 29 February 2000 entitled "Zhongguo tongjiju zhang 'bama' tongji shuzi" (The head of China's statistical office "gets a grip" on the statistics). The NBS in 1992 issued a first regulation on the type of double-checks to be conducted for a series of important variables. "Guanyu kaizhan zhuyao tongji zhibiao shuju zhiliang pinggu gongzuo de tongzhi" (Circular on launching an appraisal of the quality of all important economic indicators), 17 June 1992, in *Zhongguo tongji gongzuo nianjian 1993* (China statistical work yearbook 1993), in the following referred to as "*Statistical Work Yearbook 1993*" and similarly for other years (Beijing: Zhongguo tongji chubanshe, 1993), IX, 17-25. A 1999 publication, NBS Industry and Transport Division, *Xinbian gongye tongji gongzuo zhinan*, 13f., for the case of industrial value-added lists a number of control variables ranging from investment in fixed assets to energy consumption and transportation volume.

⁵⁰ NPC, 15 May 1996, "Zhonghua renmin gongheguo tongji fa" (PRC statistics law), revision of original 8 December 1983 PRC Statistics Law, in *China Infobank*; NBS, 2 June 2000, "Zhonghua renmin gongheguo tongji fa shishi xize" (Detailed implementation instructions for the PRC Statistics Law), revision of original regulation of 19 January 1987, approved by the State Council, in *China Infobank*.

statistical bureaus.⁵¹ However, in professional matters, such as the establishment of a nationwide regulatory framework, NBS instructions take precedence over those of the local government.⁵²

The NBS in recent years increased its reliance on survey teams reporting directly to the center. Already in 1984 the NBS established urban and rural survey teams as administrative facilities directly under its control. Today it has rural survey teams in 857 of China's 2,109 counties, and urban survey teams in 226 of the 663 municipal or county-level cities. In 1994 the NBS began to add enterprise survey teams, which culminated in the establishment of 210 central city enterprise survey teams, linked by a computer network, in 1997 and 1998.⁵³ Sur-

⁵¹ NBS, 2 June 2000, Art. 23 and 29; State Council General Office Secretariat and the Comprehensive Division of the Chinese Communist Party Central Committee Institutional Design Committee's General Office, *Zhongyang zhengfu zuzhi jigou* (Central government institutions) (Beijing: Gaige chubanshe, 1998), 398.

⁵² In the Chinese literature there has been much discussion about ways to strengthen the NBS' authority. Proposals include the switch to direct central leadership over local statistical departments (*chuzhi*), the permanent dispatch of supervisors by the NBS to local statistical departments, and the establishment of a double system where provincial statistical bureaus as well as the NBS each have their own lower-level tier statistical departments. (See, e.g., *Zhongguo tongji* no. 11 (1999), 25; and no. 2 (2001), 8f. Much earlier, the journal *Jingji yanjiu cankao ziliao* in an issue dated 28 August 1988, devoted solely to China's statistical system, already raised such institutional questions.) These proposals all appear inferior to the solution chosen by the NBS and explained in the next paragraph of the text. Local governments have their own statistical needs and thus need some control over local statistical departments; direct central leadership would also imply that all costs of maintaining the statistical system have to be borne by the center. Dispatched central supervisors might be coopted by the locality over time. A double system appears to be a waste of resources.

⁵³ On the issue of survey teams see NBS, 16 June 1997, "Guanyu jin yi bu gaohao qiye diaocha dui zhejiang gongzuo de tongzhi" (Circular on further implementing the enterprise survey team establishment), in *Statistical Work Yearbook 1998*, 106; NBS, 14 July 1997, "Guanyu di yi pi zhongxin chengshi qiye diaocha dui jigou bianzhi fenpei fang'an de tongzhi" (Circular on the distribution of the first batch of central city enterprise survey teams), in *Statistical Work Yearbook 1998*, 107; NBS, 8 December 1997, "Guanyu diaocha dui guanli tizhi gaige de shishi yujian" (Suggestions on the administrative reform of the survey teams), in *Statistical Work Yearbook 1998*, 146-8; NBS, 11 December 1997, "Guanyu jin yi bu mingque quanguo qiye diaocha dui gongzuo renwu de tongzhi" (Circular further clarifying the tasks of the nationwide enterprise survey teams), in *Statistical Work Yearbook 1998*, 141; NBS, 29 December 1997, "Guanyu di er pi zhongxin chengshi qiye diaocha dui jigou bianzhi fenpei fang'an de tongzhi" (Circular on the distribution of the second batch of central city enterprise survey teams), in *Statistical Work Yearbook 1998*, 107; <http://www.stats.gov.cn/zwgk.htm>. *Fujian shengzhi tongjizhi* (Fujian provincial almanac statistics volume) (Fuzhou: Fangzhi chubanshe, 2000), 15-18, has details on the survey teams in Fujian Province until 1995. Two standard tasks of the enterprise survey teams are to conduct surveys of enterprises at village level and below, and to check through surveys the validity of important enterprise indicators in general.

vey teams comprise about one dozen staff each, which makes them equal in size to the county statistical department.

These survey teams allow the NBS to bypass the lower-level-tier statistical departments either to check on the quality of data, or to obtain selective data quickly. The head of the NBS in 1997 claimed that 60% of all statistical information going to the general offices of the Chinese Communist Party Central Committee and the State Council was compiled by survey teams. Presumably data collected by the survey teams play a major role in the adjustment of provincial GDP figures. The NBS may increasingly be able to question and revise the data obtained from provincial statistical departments. The fact that nationwide GDP data differ from the sum of provincial GDP data since 1997 reflects progress, if it implies that the NBS only now has available alternative data, presumably survey data, that allow corrections to the GDP data reported by the provinces; it need not indicate the absence of provincial output exaggeration prior to 1997.

NBS Reliance on Other Government Departments for Data Collection

The NBS relies on central line ministries and other government departments for the compilation of some statistics. This is largely a historical legacy. As long as state-owned enterprises and urban collective-owned enterprises are organized under line ministries extending from central to local tiers, the respective line ministry (or government department) is likely to collect data on its enterprises.⁵⁴ The statistical division of a line ministry then directly corresponds with the relevant division of the NBS. In the case of industry, e.g., statistical departments in industry-related line ministries and state companies (conglomerates) communicate with the NBS Industry and Transport Division.⁵⁵ The reliability of data ob-

But in 1997 they also conducted surveys on enterprise reform, and on losses in large and medium-sized enterprises.

⁵⁴ In recent years many line ministries were turned into companies (conglomerates) directly subordinate to the State Council. Similarly, some provincial government departments were turned into companies directly subordinate to the provincial government. The principle of professional leadership by these companies, however, still applies.

⁵⁵ The other functional divisions out of a total of eleven NBS divisions are the National Accounts Division, the Investment in Fixed Assets Division, the Trade And Foreign Economy Division, and the Population, Social Welfare and Science Division. Like the Industry and Transport Division, they are linked to other government departments in charge of collecting statistics. See State Council, *Zhongyang zhengfu zuzhi jigou*, 397-401.

One extreme example to illustrate the reliance of the NBS on other government departments is the sector transport and communications. Gross output value data in the production approach to the calculation of value added are collected from the Railway Ministry (Bureau), the Communications Ministry (Bureau), the Aviation Bureau, the Post and Telecommunications Ministry (Bureau), the Township Enterprise Bureau of the Agricultural Ministry, the Industry and Transport Division within the NBS, and the

tained from other government departments in the collection of statistics varies from sector to sector. One of the most problematic is rural industry.

The Township Enterprise Bureau of the Agricultural Ministry collects detailed data on township-run and village-run collective enterprises, and basic statistics on cooperative enterprises, private enterprises and individual-owned enterprises, altogether called "township and village enterprises" (TVEs).⁵⁶ The NBS relies on the Township Enterprise Bureau's data and has no independent regular reporting system for rural enterprises. It assists the Township Enterprise Bureau in the design of the statistical reporting forms, the Township Enterprise Bureau then collects the data and reports it to the NBS.⁵⁷ TVEs operate in all sectors of the economy, with a comprehensive set of data available for industrial TVEs.

The industrial census of 1995 provides the most detailed enterprise classification and probably offers the most accurate data on industry.⁵⁸ The *Statistical Yearbook* for 1995 data mostly relies on this industrial census. (Data in the two sources are almost identical.) In other years, when no census data are available, the NBS has to rely on the Township Enterprise Bureau for data on rural industry. These data, reported in the *Township Enterprise Yearbook*, differ. Thus the total number of TVEs as well as the number of township-run and village-run enterprises reported in the *Township Enterprise Yearbook* is larger than the num-

ber reported in the industrial census or the *Statistical Yearbook* (see Table 7; the relevant data are in bold).

The largest discrepancy between the industrial census and the *Statistical Yearbook* on the one hand and the *Township Enterprise Yearbook* on the other hand occurs in the gross output value data. New stipulations came into effect in 1995 requiring that in the future gross output value data exclude the value-added tax. The *Township Enterprise Yearbook* does not state whether it calculates 1995 gross output value following the old or the new stipulations. Comparing gross output value calculated following the old stipulations, across all TVEs as well as across the township-run, village-run, and private and individual-owned enterprises, gross output value of TVEs as reported in the *Township Enterprise Yearbook* exceeds that reported in the *Statistical Yearbook* (and in the industrial census) by approximately 50%. This discrepancy is even larger if the gross output value reported in the *Township Enterprise Yearbook* has been calculated following the new stipulations (i.e., excluding the value-added tax).

If the industrial census presents the most accurate data, gross output value as compiled by the Township Enterprise Bureau of the Agricultural Ministry is highly inflated, but the NBS has to rely on the latter data in the years in which no censuses are conducted. The NBS when publishing data on rural industry in the *Statistical Yearbook* then either directly uses the Township Enterprise Bureau's data, or applies an unknown method to obtain corrected output values. Perhaps the central survey teams provide selective data that are then used to correct the nationwide data collected by the Township Enterprise Bureau. Value added obtained as gross output value minus the value of intermediate inputs is equally affected. The *Statistical Yearbook* does not offer separate TVE value-added data to allow a comparison with the data published in the *Township Enterprise Yearbook*.⁵⁹

In Xu Xianchun's proposal for future revisions to China's GDP compilation, rural industrial output is revised downward from the published figures by 8.8% in 1996 as well as in 1997, the most recent year for which adjustment suggestions are offered, which implies a 3.8% reduction in GDP in 1996 and a 3.7% reduction in GDP in 1997.⁶⁰ Corrections to rural output could be one of the main reasons for the downward adjustments to the sum of provincial GDP data in deriving nationwide GDP.

Although the NBS relies on other central government departments for much of the data it reports, its authority vis-à-vis other government departments is weak. The NBS as a bureau directly under the State Council (government) is half a rank below that of central government ministries and provincial govern-

ment departments within the Finance Ministry. These departments do not fully cover the relevant sub-sectors. Gross output value data on road and water transportation by transport and communications enterprises which are not part of these departments are imputed. (NBS National Accounts Division, *Zhongguo niandu guonei shengchan zongzhi jisuan fangfa*, 59; for other examples of the institutions involved in collecting statistics also see Table 2.)

According to the Agricultural Ministry in a circular dated 17 July 1998, "Nongyebu guanyu qieshi jiaqiang xiangzhen qiye tongji gongzuo de tongzhi" (Circular on conscientiously strengthening the township and village enterprise statistical work), Nongyefa no. 8 (1998), in *China Infobank*, TVEs comprise township-run enterprises (*xiang [zhen] ban qiye*), village-run enterprises (*cun [cunmin xiaozu] ban qiye*), jointly run enterprises (*tianhu [zufen hezu] ban qiye*), and household enterprises including individual-owned and private enterprises (*hu [geti, sijing] ban qiye*). These can be grouped into the two categories: "collective" (*jiti*) and "private" (*sijou*). Enterprises must (i) have a fixed production organization, location, equipment and management, (ii) be in operation at least 3 months per year, (iii) keep independent accounts, and (iv) hold a business license (except enterprises in agriculture).

The statistical reporting forms carry a note that the institution responsible for the reporting form is the Agricultural Ministry, while the form has been "approved" by the NBS. See, e.g., Agricultural Ministry, *Zhongguo xiangzhen qiye caiwu tongji baobiaozhidu 1997* (China township and village enterprise financial and statistical reporting system 1997) (Beijing: Agricultural Ministry, 1997).

Zhonghua renmin gongheguo 1995 nian di san ci quanguo gongye pucha ziliao huibian (Material on the PRC's third industrial census in 1995), 3 vols. (Beijing: Zhongguo tongji chubanshe, 1997).

For value added, the *Statistical Yearbook* only reports industrywide values, with a further breakdown for the group of "directly reporting (industrial) enterprises" (defined below).

Xu Xianchun, "Zhongguo guonei shengchan zongzhi hesuan zhong cunzai de ruogan wenti yanjiu," 14f.

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For value added, the *Statistical Yearbook* only reports industrywide values, with a further breakdown for the group of "directly reporting (industrial) enterprises" (defined below).

Xu Xianchun, "Zhongguo guonei shengchan zongzhi hesuan zhong cunzai de ruogan wenti yanjiu," 14f.

ments, with no authority to issue binding orders to either of the two. Consequently, the NBS according to the 1996 Statistics Law is only responsible for "leading and coordinating" the nationwide statistical work rather than for conducting it.⁶¹

What the NBS has available are indirect channels through which to influence data compilation in other central government departments. First, the statistical divisions within other government departments are under the professional leadership of the NBS, which implies that they are to follow NBS guidelines in all matters related to compiling statistics. The NBS also has a say in personnel appointments in the statistical divisions of other government departments. Second, all statistical surveys by central government departments or units under their jurisdiction must be reported to the NBS, and any survey that extends beyond the particular department requires NBS approval.⁶² The NBS finally can employ its own survey teams to double-check the data provided by other central government departments.

Recent Improvements in Data Collection Methods: The Example of Industry

While the coverage and accuracy of statistical data may in the reform period have initially deteriorated, the NBS has made numerous efforts to improve data quality. A prime example is the data on the sector industry.

The *Statistical Yearbook* reports data on two major groups of industrial enterprises. For all industrial enterprises it reports the number of enterprises, their gross output value, the aggregate contribution to GDP, and limited employ-

⁶¹ Given its "leading and coordinating" task, the NBS has few staff. The institutional reform of 1998 left the NBS with only 280 regular employees (State Council, *Zhongyong zhengfu zuzhi jigou*, 401). But the NBS has several administrative facilities whose employees are not included in the number of 280 regular employees; nor are the staff of the central survey teams included. At the sub-central tier, e.g., in Fujian Province, statistical staff in 1995 numbered only 1139, of which 110 worked at the provincial level. If all other 1029 staff had been located at the county level (rather than at municipal/prefectural, county, and township level), this would imply 17 staff in each of the 61 county-level statistical departments; it also implies that there are 189 industrial enterprises to each county tier staff, while industrial statistics account for only one part of a statistical department's tasks. In comparison, central bank staff numbers in Fujian Province in 1995 were five times higher (*Fujian shengzhi tongjizhi*, 13, 319, 371; *Zhongguo jinrong nianjian* 1996, 544).

⁶² On these two points see NPC, 15 May 1996, Art. 18; NBS, 2 June 2000, Art. 29; NBS, 27 October 1999, "Bumen tongji diaocha xiangmu guanli zanzheng banfa" (Temporary administrative measures for departmental statistical surveys), NBS decree no. 4 (1999), in *Zhonghua renmin gongheguo guowuyuan gongbao*, no. 967 (10 Feb. 2000): 36-39, Art. 16. The same pattern of authority is repeated at local level; thus the provincial statistical departments enjoy the same authority vis-à-vis other provincial government depart-

ment data. For a group of directly reporting industrial enterprises the yearbook reports detailed output, balance sheet, and profit and loss account data; the coverage of directly reporting industrial enterprises was adjusted in 1998.

The pre-1998 industrial reporting system covered all "industrial enterprises with independent accounting system on township level and above." In 1998 the level of jurisdiction was replaced by a size criterion and the new coverage then extended to all "industrial state-owned enterprises with independent accounting system plus industrial non-state enterprises with independent accounting system and with annual sales revenue in excess of RMB 5 million." The NBS thereby reduced by two-thirds the number of reporting enterprises while keeping the aggregate output volume covered approximately constant. This change in coverage had four consequences, all of which constitute unambiguous improvements in data quality.

First, the enterprises that dropped out of the category of directly reporting industrial enterprises are the small enterprises, mostly township-run enterprises, which are noted for their poor data quality. Many of them may never have had a proper accounting system.⁶³ Second, the statistical break offered a chance to eliminate in one stroke all past exaggeration that may have had to be upheld to guarantee time consistency.⁶⁴ Third, the directly reporting industrial enterprises are now supposed to directly report to the statistical bureau, reducing the opportunities for data falsification; previously, in many localities the state-owned industrial enterprises reported to the statistical departments through their subordinate government departments or the economic and trade commission, and the

⁶³ In 1997, the directly reporting industrial enterprises, following the old definition, comprised 468,506 enterprises; 319,438 of these were collective-owned, with presumably a majority of often relatively small township-run enterprises (*Statistical Yearbook 1998*, 444). In 1998, the directly reporting industrial enterprises, following the new definition, numbered 162,033; only 42,585 of these were collective-owned (*Statistical Yearbook 2000*, 414). In one county-level city in Jiangxi, the number of directly reporting enterprises fell from 505 to 67, including only 6 township-run enterprises. Not only did the enterprises with the probably poorest data drop out, but given the small number of township-run enterprises that continue to report directly to the statistical departments, the statistical departments now have the time to double-check that the township-run enterprises no longer simply report target output figures as results (see *Zhongguo tongji* no. 2 (2000), 28). On the issues in this paragraph and the next also see *Zhongguo tongji* no. 6 (1998), 23; no. 2 (2000), 31f.; no. 6 (2000), 30, 35 and 38; no. 7 (2000), 46f.; no. 2 (2001), 32.

⁶⁴ Guangxi Province, e.g., in its 1999 provincial statistical yearbook retrospectively (and without any explanation) revised downward its GDP figures for 1993-97 by approximately 10%. Changes in industrial value-added accounted for the bulk of the corrections.

collective-owned industrial enterprises through the second light industry department or the township enterprise department.⁶⁵

Fourth, a byproduct of the change in coverage is that data on small enterprises may now be more accurate than before. Enterprises prefer to not have to report to the statistical departments every month, in contrast to the directly reporting industrial enterprises, and thus have an incentive not to exaggerate output if they come close to the size criterion. The non-state industrial enterprises with annual sales revenue below RMB 5 million are covered in an *annual report* only, with the number of such enterprises, their gross output value (or business income if gross output value data are not available), tax payments, equity (capital) and the year-end number of laborers. The annual report is compiled by the county-level statistical department (with the help of other government departments), and estimations based on a "representative" sample are permissible.⁶⁶ As the statistical departments gain more experience with random sampling, data on these "below-size" enterprises may also improve over time.⁶⁷ In 1998, the Finance Ministry for the first time allocated funds to cover "TVE statistical survey costs" incurred by the Township Enterprise Bureau; the Agricultural Ministry encouraged provincial and sub-provincial governments to establish similar accounts in their budgets.⁶⁸

One drawback of the change in the definition of the directly reporting industrial enterprises, however, is that several provinces have been slow to adopt the new classification. For example, the year 2000 provincial statistical yearbooks of Beijing and Shanghai reported data on the industrial enterprises with independent accounting system only (without any size requirement), the yearbook of Xinjiang Province only reported data on industrial enterprises on township level and above, and that of Tibet only on enterprises following the pre-1998 classification. A similar pattern of inconsistencies is in some provinces repeated at the sub-provincial tier.⁶⁹ If for the compilation of nationwide aggregate data no other data than the published provincial data were available, overall data accuracy is impaired over several years as some provinces implement the changes in classification only with a time lag.

⁶⁵ On the enterprises that do not meet the size criterion, limited data are collected by the township enterprise bureau, the industrial and commercial administration, and the tax office.

⁶⁶ NBS Industry and Transport Division, *Xinbian gongye tongji gongzuo zhinan*, 38.

⁶⁷ A chapter on sampling in NBS Industry and Transport Division, *Xinbian gongye tongji gongzuo zhinan*, 107–27, provides details on sampling techniques in an attempt to keep sampling errors below 10%, but the quite sophisticated sampling procedures outlined appear rather unrealistic given the level of statistical expertise one can expect in the countryside, where these enterprises are located. Many counties do not even have a complete list of all industrial enterprises (*Zhongguo tongji* no. 6 (2000), 38).

⁶⁸ Agricultural Ministry, 17 July 1998.

⁶⁹ See, e.g., *Zhongguo tongji* no. 6 (1998), 23, for Jiangsu Province.

In late 1998, the State Council approved a joint reform proposal of the NBS and the State Economic and Trade Commission to streamline the industrial reporting system.⁷⁰ Since 1999, the monthly statistical reports of the directly reporting industrial enterprises have been sent to the local statistical office, verified by the provincial statistical bureau, and then reported to the NBS both individually and as provincial aggregates. In addition, 5000 selected key industrial enterprises since April 2001 directly report their economic data to the NBS via the internet.⁷¹ The tentatively chosen 5000 enterprises in 1999 accounted for 49% of industrial assets, 43% of industrial sales revenue, and 83% of industrial taxes and profit. The first reform reduces the potential for data manipulation at lower-level tier statistical departments, while the second reform eliminates the possibility of data manipulation during the transfer of data from the enterprise to the NBS altogether.

Statistical data are also becoming subject to increasing scrutiny in the process of data compilation by the statistical departments. In industry, value added calculated using the income approach has to currently reach at least 90% of the value added calculated using the production approach. If this level of correspondence cannot be reached, the components of the income approach as well as intermediate inputs in the production approach must be re-examined. Reported industrial output growth is also checked against a variety of other indicators ranging from retail sales to energy use. The NBS has in recent years begun to publish very detailed instructions on statistical compilation that should further diffuse statistical knowledge.⁷² Yet the sheer complexity of variable definitions and compilation methods implies that implementation in particular at lower-level tiers may be far from perfect.

Similar reforms are taking place in other sectors of the economy. For example, enterprise coverage in the construction sector changed from an administrative to a size classification in 1996. In commerce, complete enterprise coverage was replaced in 1998 by limited coverage based on a size criterion. One thousand two hundred enterprises in wholesale and retail trade and 3,000 enterprises in the real estate sector now directly report to the NBS.⁷³ By adopting a core of large enterprises—which account for possibly half of total output in their

⁷⁰ NBS, 13 November 1998, "Guanyu zuohao tongji zhidu gaige de yijian" (Suggestions on the reform of the statistical system), issued together with the State Economic and Trade Commission and approved by the State Council General Office, in NBS Industry and Transport Division, *Xinbian gongye tongji gongzuo zhinan*, 275–78.

⁷¹ For the starting date, see a news item dated 11 April 2001 in *China Infobank* entitled "Zhongguo wu qian jia gongye qiye lianwang zhibao xitong zhengshi kaitong" (China's 5000 industrial enterprises' direct electronic reporting system officially began operation).

⁷² See, e.g., NBS National Accounts Division, *Zhongguo niandu guonei shengchan zongzhi jisuan fangfa*, as part of a larger series, or NBS Industry and Transport Division, *Xinbian gongye tongji gongzuo zhinan*, on industrial statistics.

⁷³ *Statistical Yearbook 2000*, 467, 553; *Zhongguo tongji* no. 12 (2000), 9.

sector—the NBS can guarantee high-quality data that are available quickly.⁷⁴ To cover small enterprises adequately it has switched to sample surveys increasingly conducted by its own, presumably well-qualified survey teams.

Conclusions

Judgments on the quality of China's statistics are often implicitly based on the standards set by statistical systems in highly developed and relatively stable market economies. This appears unfair. As a rapidly developing country and an economy in transition, coverage of economic activities is necessarily incomplete, with low accuracy of the data collected. The case of GDP, a measure of all economic activities nationwide, illustrates the numerous problems that beset the compilation of statistics in China. Data on many economic activities that are included in GDP are not (yet) available and thus need to be estimated by often crude methods. (Illegal activities are not covered at all.) The range of potential double-checks on GDP has not yet been fully developed. The gradual adoption of the SNA and gradual improvements in statistical coverage and compilation methods imply that GDP is redefined every year, severely questioning the feasibility of time series comparisons.

Data quality is further constrained by varying incentives to misreport data. Some enterprise may wish to avoid tax payments and thus underreport value added, while others may wish to report the successful achievement of output targets. Local governments may try to manipulate statistical reporting. But the NBS is increasingly trying to bridge the central-local divide and to reduce its reliance on questionable data provided by other government departments. The key is the establishment of a three-tier data collection system.

First, the largest production units in each sector report directly to the NBS, bypassing all lower-level tier statistical bureaus and other government departments. Data thus collected are as good as the underlying accounting system in use in these production units and the intention of these production units to report accurate data.

⁷⁴ A further step would be to have those of the 162,033 directly reporting industrial enterprises in 1999 which are not part of the group of 5000 key enterprises also directly submit their data to the NBS. With the spread of the internet this should increasingly become feasible. On the other hand, local statistical offices may serve a useful purpose in vetting the data. The aggregate output growth rate derived from the directly reporting industrial enterprises' individual monthly reports must match the aggregate local output growth rates reported up from provincial statistical departments. Any region reporting a monthly growth rate above 20% must provide a separate report explaining the growth rate. Local statistical departments are to regularly choose a sample of reporting enterprises and to check on the data accuracy (NBS Industry and Transport Division, *Xinbian gongye tongji gongzuo zhinan*, 13f.).

Second, all enterprises meeting a certain requirement report directly to their local statistical bureaus. For most sectors, such as for industry since 1998, this requirement is now a size requirement. This implies that only enterprises with a somewhat formal accounting system are included.

Third, the NBS has in recent years drastically increased the scope of survey work to capture the smallest production units. This transition is still incomplete. The organizational arrangement with three different types of central survey teams, each established over time as a particular need for accurate data became urgent, appears wasteful, and there are signs that they may be merged in the future into a single survey team. With provincial and even lower-level tier statistical departments also establishing their own survey teams, some counties host both a central and a local survey team, while others do not have a single survey team. Attempts have been made to avoid setting up both central and local survey teams in one and the same county, but the division of labor between central and local survey teams needs further clarification. Despite these still immature organizational arrangements the trend towards sample surveys appears irreversible. By mid-2001, an employee of the NBS claimed that steady progress had been made in the sample surveys of small industrial enterprises (those not reporting directly to the statistical departments), while sample surveys of the wholesale and retail trade as well as the catering sector after four years of hard work are finally in place across all 31 provinces.⁷⁵

The revised Statistics Law of 1996 goes as far as to proclaim sample surveys the "main component" (*zhuti*) of China's statistical system. Regular reports are regarded as merely a supplement (*buchong*)—a statement that, to judge from numerous reports in the NBS magazine *Zhongguo tongji*, is only gradually sinking in at the lower-level tier statistical departments. Periodic censuses finally are claimed to be the foundation (*jichu*) of China's statistics. China currently conducts five censuses, of which four take place every ten years (i.e., censuses on population, the tertiary sector, industry, and agriculture), and one census every five years on basic statistical units.⁷⁶ In the reform period, censuses have come to

⁷⁵ *Zhongguo tongji* no. 11 (2001), 8–10. On the awareness of the increasing importance of sample surveys see, e.g., numerous reports in *China Infobank*, such as a report on 27 December 2000 entitled "2001 nian zhongguo tongji zhidu fangfa gaige kewang shixian xin tupo" (Reform of China's statistical methods can attain a new break-through in 2001), with excerpts of a speech by Zhu Zhixin, head of the NBS, at the national meeting of statistical department heads, or a report on 25 April 2001 entitled "Jiangsu nantong shi tongji ju dadan tupo gesi tongji" (Nantong municipality in Jiangsu Province has achieved a bold breakthrough in the statistics on private and individual-owned units). Progress reports on sample surveys also appear in almost every issue of *Zhongguo tongji*.
⁷⁶ NPC, 15 May 1996, Art. 10. The censuses, in the order listed in the text are conducted in the years with the following last digit: 0, 3, 5, 7, and then 1 and 6 for the basic statistical unit census. (*Zhongguo tongji* no. 12 (1999), 27f.) On the issue of censuses also see the *Fujian shengzhi tongjizhi*, and several issues of the *Statistical Work Yearbook*. The agricultural census of 1997 is covered in detail in the *Statistical Work Yearbook 1997*.

serve a powerful role as double-check on the comprehensiveness and accuracy of China's statistical work. The industrial census of 1995 with the ensuing up to 25% retrospective downward corrections to the gross output value of non-state industrial enterprises sounded a wake-up call for improvements in the compilation of industrial statistics.

In 1994 the United Nations Statistical Commission issued ten "fundamental principles of official statistics." Although China's statistical system has come a long way, the NBS still does not meet three of these ten principles. The three principles are:

Principle 2: To retain trust in official statistics, the statistical agencies need to decide according to strictly professional considerations, including scientific principles and professional ethics, on the methods and procedures for the collection, processing, storage and presentation of statistical data.

Principle 3: To facilitate a correct interpretation of the data, the statistical agencies are to present information according to scientific standards on the sources, methods and procedures of the statistics.

Principle 7: The laws, regulations and measures under which the statistical systems operate are to be made public.⁷⁷

Starting with the seventh principle, while national laws on statistics and some NBS regulations have been published, many rules and regulations regarding the statistical system are still considered internal. Details on how the NBS and the local statistical bureaus operate and how they interact with each other and other government departments have not yet entered the public realm.

The NBS, let alone local statistical bureaus, rarely present information on the sources, methods and procedures of the statistics (third principle). The NBS in the *Statistical Yearbook* currently offers approximately one page of general explanations for each section (such as the industry section) on how the data in the particular section were compiled; each section also comes with a list of variable definitions. Yet the general explanations are often sparse, changes in compilation method over time are rarely made explicit, and the list of definitions tends to be highly incomplete; all too often, explanations and definitions appear

The industrial census of 1995 was governed by numerous regulations (*Statistical Work Yearbook 1996*, 112), none of which, however, is available. The NBS on 31 December 1998 established a census center in Beijing in charge of improving census design and implementation, and to link censuses to ongoing sample survey work (*Zhongguo tongji* no. 2 (1999), 43).

⁷⁷ For the ten principles see Tim Holt, "The Fundamental Principles and the Impact of Using Statistics for Administrative Purposes," *Statistical Journal* 15, no. 3/4 (1998): 203-12 (quoted from p. 211f.).

to have simply been copied from the previous issue of the *Statistical Yearbook* and occasionally these can be shown to be wrong (not matching the data or variables they claim to explain or define). In the second half of the 1990s the NBS has published a number of reference works which offer somewhat detailed explanations on how statistics are compiled. Yet one cannot but wonder whether these compendia, which invariably do not use real-world data for illustration, reflect what is happening in the real world of statistical work.

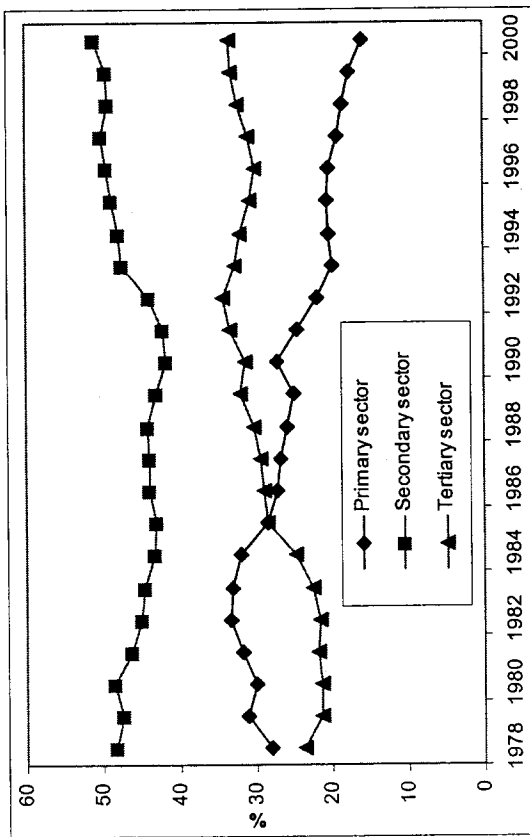
No hard evidence is available to judge how China scores on the second principle, that the statistical agency make decisions according to strictly professional considerations. Provincial GDP data are routinely revised downward by the NBS in the compilation of nationwide aggregate GDP, and this presumably means that provincial GDP data are inflated. Yet this does not necessarily imply that provincial or sub-provincial statistical bureaus inflate GDP data. It may well only reflect misreporting by production units (or their superordinate government departments) to the statistical bureaus; local statistical bureaus then are too weak to demand accurate reporting, and perhaps not qualified to make adjustments to the reported data themselves.

The 1996 PRC Statistics Law established a framework for sound statistical work. For example, "statistical personnel must seek truth from the facts, strictly abide by professional standards [*daode*], and have the necessary professional knowledge that qualifies them to carry out statistical work;" and "the leaders of localities, government departments, or production units may not order or ask statistical departments and statistical personnel to change or falsify statistical data."⁷⁸ Yet the rule of law may have to defer to party primacy. A 1995 NBS "work regulation" explicitly states that the NBS is to implement "important decisions and instructions of the Chinese Communist Party Central Committee and the State Council."⁷⁹ The head of the NBS is appointed by the Prime Minister, and the 1996 Statistics Law makes no mention of any operational independence from the government. The question of whether to trust the NBS to make decisions according to strictly professional considerations in the end hinges on whether this is in the interest of the Chinese Communist Party Central Committee and the State Council. If sound data are crucial for central leaders' decision-making processes, the NBS is likely to make decisions according to strictly professional considerations. The potentially large margin of error inherent in current data due to the various constraints outlined in this article remains.

⁷⁸ NPC, 15 May 1996, Art. 24 and 26.

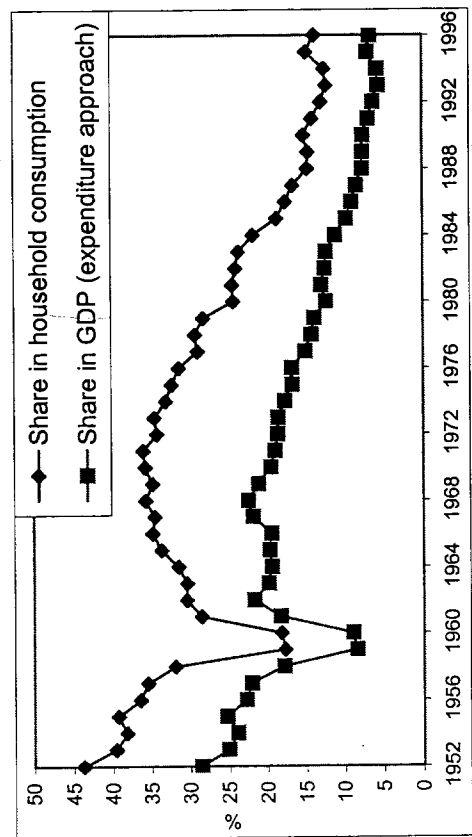
⁷⁹ NBS, 16 November 1995, "Guojia tongjiju gongzuo guize (xiuding)" (NBS work regulation (revised)), in *Tongji gongzuo zhongyao wenjian xuanbian 1991-1995* (Selected important documents on statistical work 1991-1995) (Beijing: Zhongguo tongji chubanshe, 1996), 1450-56.

Figure 1. Sectoral Shares in GDP



The secondary sector comprises industry and construction.
Source: *Statistical Yearbook 2001*, 50.

Figure 2. Consumption of Self-Produced Goods by Households



Sources: *GDP 1952-1995*, 25, 43; NBS National Accounts Division, *Zhongguo guonei shengchan zongzhi hesuan lishi zilitiao (1952-1996)*, zhaiyao, 4, 58.

Table 1. Growth of Non-State Industry

Year	Number of enterprises (thousand)				Share in GOVI (%)				
	Total	SOEs	COEs	IOEs	Other	SOEs	COEs	IOEs	Other
1978	348.4	83.7	264.7	77.63	22.37	77.63	22.37		
1979	355.0	83.8	271.2	78.47	21.53	78.47	21.53		
1980	377.3	83.4	293.5	75.97	23.54	75.97	23.54	0.02	0.48
1981	381.5	84.2	296.8	74.76	24.62	74.76	24.62	0.04	0.58
1982	388.6	86.0	301.9	74.44	24.82	74.44	24.82	0.06	0.68
1983	392.5	87.1	304.6	73.35	25.74	73.35	25.74	0.12	0.78
1984	437.2	84.1	352.1	69.09	29.71	69.09	29.71	0.19	1.01
1985	5185.3	93.7	1742.1	64.86	32.08	64.86	32.08	1.85	1.21
1986	7474.1	97.6	1819.3	62.27	33.51	62.27	33.51	2.76	1.46
1987	8105.6	99.1	1853.0	6148.1	34.62	59.73	34.62	3.64	2.02
1988	7980.7	102.3	1747.0	6124.2	7.2	56.80	36.15	4.34	2.72
1989	7957.8	104.4	1668.5	6176.0	8.8	56.06	35.69	4.80	3.44
1990	8079.6	104.7	1577.2	6386.7	10.8	54.60	35.62	5.39	4.38
1991	8079.6	104.7	1577.2	6386.7	10.8	56.17	32.99	4.83	6.01
1992	8612.1	103.3	1640.6	6854.0	14.2	51.52	35.07	5.80	7.61
1993	9911.6	104.7	1803.6	7971.2	32.1	46.95	34.02	7.98	11.06
1994	10017.1	102.2	1863.0	8007.4	44.5	37.34	37.72	10.09	14.85
1995	7341.5	118.0	1475.0	5688.2	60.3	32.61	35.55	14.55	17.29
1996	7986.5	113.8	1591.8	6210.7	70.2	28.48	39.39	15.48	16.65
1997	7922.9	98.6	1772.3	5974.7	77.3	25.52	38.11	17.92	18.45
1998	7974.6	57.3	1797.8	6033.8	85.7	21.57	38.41	17.11	22.91
1999	7929.9	52.1	1659.2	6126.8	91.8	20.31	35.37	18.18	26.14

SOEs: state-owned enterprises

COEs: collective-owned enterprises

IOEs: individual-owned enterprises

GOVI: gross output value of industry

Data for the years prior to 1985 exclude village-level industry and individual-owned industry. (This suggests that the gross output value data on individual-owned industry which began in 1980 at close to zero are only rough estimates. These data were published retrospectively only.)

The 1998 and 1999 data on state-owned enterprises were calculated as residual due to a statistical break in 1998. Gross output value of industry was re-defined in 1996 to exclude the value-added tax; the re-definition applies across all ownership forms. (For details on the 1998 statistical break see Carsten A. Holz and Yi-mun Lin, "The 1997-1998 Break in Industrial Statistics: Facts and Appraisal," *China Economic Review* 12, no. 4 (2001): 303-16; for details on the industrial statistics in general, see Carsten A. Holz and Yi-mun Lin, "Pitfalls of China's Industrial Statistics."

Sources: Enterprise numbers: 1978-85: *Statistical Yearbook 1985*, 305; 1985-90: *Statistical Yearbook 1992*, 403; 1991-95: *Statistical Yearbook 1996*, 401; 1996 and 1997: *Statistical Yearbook 1998*, 431; 1998 and 1999: *Statistical Yearbook 2000*, 407. GOVI: 1978-90: *Statistical Yearbook 1993*, 412; 1991-1994, 1996, 1997: *Statistical Yearbook 1998*, 433; 1995: *Statistical Yearbook 1997*, 413; 1998 and 1999: *Statistical Yearbook 2000*, 409.

Table 2. Problems in GDP Calculation

Production approach:

GDP = sum of value added across all sectors of the economy, where sectoral value added = gross output value - the value of intermediate inputs.

Construction
 *Gross output value is obtained as completed construction-related investment from four different statistical reports on investment (capital construction, technological updating and transformation, "others," and real estate), with two additions. First, investment activities valued at below RMB 50,000 and which are not included in the capital construction or technological updating and transformation plan are to be added from "total investment" compiled by the NBS National Accounts Division in its expenditure calculation of GDP. Second, the gross output value of real estate repairs as well as special real estate construction items and interior decoration are to be taken from the NBS Fixed Asset Investment Division's report on "construction enterprise production," but since this report does not cover all construction enterprises, corresponding (upward) adjustments are to be made (pp. 43ff.).

* The value of intermediate products is to be calculated as a percentage of gross output value. The percentage is determined by the NBS Fixed Asset Investment Division (pp. 44ff.).

Agricultural services

*Value added is calculated only according to the income approach. In order to obtain gross output value, this value added is multiplied by a multiplier determined using the data from the tertiary sector census [of 1992] (p. 49).

Transport and communications

*Gross output value data are obtained primarily from various statistical reports compiled by seven different *xitong* (line ministries/government departments). A focus on business income reflects an attempt to avoid double-counting across different provinces. Gross output value data on road and water transportation by transport and communications enterprises that are not part of these *xitong* are imputed. Basis of the imputation is distance covered and weight carried, times the ratio of business income to standardized physical output measures in those enterprises which are part of the *xitong*. The value of intermediate inputs of the road transportation enterprises which are not part of the *xitong* equals their gross output value minus their value added, which is obtained through the income approach (pp. 60-63).

Commerce

*Data on state-owned commercial units are obtained from the Finance Ministry, the Domestic Trade Ministry, the Foreign Economic and Trade Ministry, the Central Supply and Marketing Cooperative as well as through statistical reports compiled by the statistical departments on large and medium-sized wholesale and retail trade as well as catering; gross output value equals net sales revenue minus sales costs and various fees. For all other commercial units gross output value is set equal to total sales revenue with adjustments based on surveys; the data on sales revenue are compiled by the statistical departments (pp. 70-72).

Expenditure approach:

GDP = consumption + gross capital formation + net exports, where consumption = household consumption + government consumption, and gross capital formation = fixed capital formation + inventory investment

Final consumption by households

*Final consumption of households includes, among others, imputed rent on housing and self-produced consumption. The data are compiled by the NBS's and the regional statistical departments' urban and rural economy survey teams, and data are based on a combination of retail sales data and survey data. (The consumption of commercial goods according to surveys is smaller than the retail sales to households, and both are to be taken into consideration in computing final consumption by households of commercial goods.) The instructions on how to compile data on final consumption of households are product-specific and service-specific (pp. 138-53).

*The NBS recognizes several shortcomings in its calculation of final consumption by households. Data on consumption by mass organizations are not available but retail sales to these account for 9-11% of total retail sales; this share of retail sales has to be estimated by the trade and economic division in the statistical departments and it is then subtracted from total retail sales to obtain retail sales to households only. The urban-rural distinction in retail sales is based on the location where the transaction takes place; if a rural resident shops in urban areas, or temporarily lives in urban areas, rural consumption is underestimated. The urban-rural distinction is further complicated because the definitions vary from division to division within the statistical departments. The United Nations' guidelines on household surveys have already been adopted but relying solely on these surveys to calculate households' final consumption is said to be not yet possible due to the uncertainties about the definition of a rural vs. urban resident (pp. 161ff.).

Capital formation

*Data on investment by state-owned units that does not exceed RMB 50,000 are no longer systematically collected. Corresponding adjustments to state-owned units' investment are to be made using base year data and various other criteria (p. 165).

*The tertiary sector census [of 1992] revealed large under-estimation of fixed capital formation in the (state-owned) real estate sector. Adjustments to current data are to be made based on the census until fixed capital formation in the real estate sector can be fully captured in the current statistical compilation (pp. 167ff.).

*All value added accrued in the sale of urban housing due to a lack of detailed data is reported as value added of state-owned units, independent of ownership form (p. 168).

*Productive intangible assets are not included as no data are available (p. 168).
 *Urban household investment covers only housing; no data are available for all other forms of investment by urban households (p. 170).

*Due to a dearth of data on inventory investment, such data are compiled in only three general categories, namely for state-owned units, collective-owned units, and all others; data are obtained from 18 different statistical reports compiled by a similar number of ministries and departments (pp. 172ff.).

*Inventory investment of state-owned and urban collective-owned industrial enterprises other than those with independent accounting system are to be

calculated as a proportion of output value, where as proportion the one of the enterprises with independent accounting system is to be used. A similar rule applies to state-owned construction; the data are obtained through the Construction Bank of China. Proportional rules also apply to state-owned and collective-owned units in various other sectors; further details are provided for other sectors. For individual-owned, private or foreign-funded enterprises as well as shareholding enterprises, the instructions suggest using the same method as for urban collective-owned enterprises (pp. 173-80).

Net exports
 *Net exports comprise international transactions in goods and services as well as inter-provincial trade. Data on international transactions are obtained from the balance of payments compiled by the State Administration of Foreign Exchange. Net inter-provincial trade in services is assumed to be zero. Inter-provincial trade in goods is alternatively calculated from statistics of the commercial system, bank transfer data, or various data on inter-regional fiscal transfers, central government administrative units' transactions and net bank loans and cash flow as compiled by the Finance Ministry. Ideally, more than one method is used. If necessary, net exports are derived as the difference between GDP according to the production approach and "consumption plus gross capital formation" (pp. 183-88).

Income approach:

GDP = labor remuner. + net production taxes + depreciation + operating surplus

Agriculture

*Operating surplus is obtained as a residual by subtracting labor remuneration, production taxes, and depreciation from value added (p. 27).

Construction

*Since the construction statistics currently compiled by the NBS Fixed Asset Investment Division cover only construction enterprises with independent accounting system on township level and above, the shares of the four income items in total value added of these enterprises are applied to the total construction value added calculated via the production approach in order to obtain income data on all construction (p. 47).

Agricultural services

*Labor remuneration is the sum of (i) wages and welfare payments, (ii) material income, (iii) "other" income, and (iv) income of farmers who are partly employed in agricultural services. Wage data are obtained from the population and employment department's annual report on employment and labor remuneration in agricultural services; the wage data are multiplied by 1.14 to adjust for welfare payments. Other income is added through a further multiplier based on input-output calculations. Income of farmers from agricultural services is calculated as the average wage rate in the reported agricultural services times the share of (official) agricultural service laborers in total nation-wide employment times (presumably rural) "non-agricultural laborers minus laborers which have temporarily left the countryside." Adjustments can be made in each locality according to local conditions (pp. 50ff.).

*Since the agricultural services are not currently part of the regular statistical reporting system, data on production taxes and the operating surplus are not readily available. These values should therefore be derived based on the tertiary sector census [of 1992] and corresponding data for agriculture (p. 52).

Transport and communications

*Approximations are used in various instances, such as for the value added of road maintenance, which is simply the sum of labor remuneration and depreciation (p. 66).

*Value added of road and water transportation by enterprises which are not part of a *xitong* is calculated using the production approach, and then split into the four income components taking into consideration the corresponding shares in the enterprises that are part of a *xitong*, and the shares in rural collective-owned enterprises (p. 67).

Commerce

*Value added of individual-owned commerce is taken to consist of labor remuneration, net production taxes and depreciation only (any operating surplus is part of labor remuneration); the shares of these items in value added are based on the tertiary sector census [of 1992] or whatever more recent input-output data that are available. Since no financial data at all are available for commercial units with dependent accounting system, their value added and value-added components are based on the corresponding shares in gross output value in collective-owned commerce (p. 76).

Finance

*Interest on household deposits is currently viewed as value added of the financial sector. According to the United Nation's 1993 SNA, however, it should be attributed to the non-financial sectors. In order to avoid any drastic break in the statistics, the SNA is to be adopted gradually over a period of five to ten years (p. 90).

The production and income approach to GDP are both based on sectoral value-added data. The economy is split into 14 sectors: agriculture (comprising farming, forestry, husbandry, and fishery); industry; construction; agricultural services; geological prospecting and water administration; transport and communications, storage, and postal and communications services; wholesale and retail trade, and catering; finance; insurance; real estate; social services; "three services" (education, arts and literature, broadcasting and film); state and Party administration, and mass organizations; and "others." Each sector has its own data complications as outlined in the source; the examples given in the table are the ones that struck the author as interesting.

The term "department" is used as a generic term to refer to a government administrative unit. The Chinese term "*xitong*" denotes the government departments across all administrative tiers in charge of one particular type of economic activity, including the enterprises under their control. The term "line ministry" is used in the text.

The source frequently refers to "enterprises with independent accounting system on township level and above." Since 1998 this classification has changed to "all state-owned enterprises and all non-state enterprises with independent accounting system and annual sales revenue in excess of RMB 5 million."

Source: NBS National Accounts Division, *Zhongguo niandu guonei shengchan zongzhi*.

Table 3. Three Approaches to GDP Calculation (data in %)

	1993			1994			1995			1996			1997			1998			1999			2000		
	P/E	P/I	E/I	P/E	P/I	E/I	P/E	P/I	E/I	P/E	P/I	E/I	P/E	P/I	E/I	P/E	P/I	E/I	P/E	P/I	E/I	P/E	P/I	E/I
Beijing	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Tianjin	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Hebei	93	93	100	100	98	98	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Inner Mon.	91	91	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Shanxi	92	92	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Henan	95	95	100	100	99	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Shandong	97	97	100	102	100	98	98	101	100	99	99	100	100	100	100	100	100	100	100	100	100	100	100	100
Hubei	90	91	101	99	100	101	98	100	102	101	100	99	100	100	100	100	100	100	100	100	99	100	100	97
Hunan	93	93	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Guangdong	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Guangxi	88	88	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Hainan	87	87	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Chongqing	93	93	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Sichuan	93	93	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Guizhou	98	98	100	101	100	99	100	100	100	97	100	103	98	100	102	96	100	104	100	100	100	100	100	100
Yunnan	85	85	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Tibet	101	81	81	98	100	102	80	100	124	97	100	103	97	100	103	93	100	108	100	100	100	100	100	100
Shaanxi	92	92	100	104	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Gansu	96	96	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Qinghai	96	96	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Ningxia	94	95	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Xinjiang	95	95	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Minimum	85	81	81	82	98	98	80	100	98	96	100	97	97	100	97	93	100	97	99	100	97	98	100	96
Maximum	101	100	101	102	100	124	103	100	104	103	100	104	103	100	103	103	100	108	103	100	101	104	100	102
SD	4.17	4.50	3.50	3.91	2.02	3.95	4.82	0.00	5.87	1.46	0.00	1.46	1.35	0.00	1.36	1.69	0.00	1.77	0.75	0.00	0.74	1.12	0.00	1.09
Mean	94	93	99	99	98	98	99	100	102	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

P, E, I: Provincial GDP calculated using the production approach, expenditure approach, income approach, P/E: Provincial GDP calculated using the production approach divided by provincial GDP calculated using the expenditure approach. P/I and E/I are defined similarly. 1995 income approach GDP is obtained as the sum of its components. Sources: Statistical Yearbook 1994, 35; Statistical Yearbook 1995, 33, 38, 41; Statistical Yearbook 1996, 43, 48, 51; 1997, 44, 48, 51; 1998, 63, 66, 69; Statistical Yearbook 1999, 63, 66, 69; Statistical Yearbook 2000, 61, 64, 67; NBS National Accounts Division, Zhongguo guonei shengchan zongzhi hesuan lishi ziliao (1952-1999), Beijing (Historical data on China's gross domestic product, 1952-1996, summary) (Beijing: Zhongguo tongji chubanshe, 1998), 106, 132.

Table 4. World Bank Corrections to China's GDP 1992

World Bank reasons for adjustment (adjustment in % of 1992 GDP)

Evaluation

Price imputed to self-used grain is too low [+0.8%].

Since 1995 self-used grain is priced at sales prices.

Value of additions to inventories is exaggerated [-1.6%].

Value of enterprise-internal services is underestimated [+1.6%].

Recent enterprise reforms are likely to have reduced any bias.

Depreciation rate is too low [does not affect GDP calculated according to production or expenditure approach].

Matters for value added of administrative units and other non-enterprise units (presumably because only income approach is used).

Government subsidies to loss-making enterprises are not included [+1.6%].

Adjustments to gross output value [no data available]:

Grain production is underestimated as arable land is underestimated (while output per area is overestimated).

Correction is too large as some of the additional land is of lower quality (slopes) or used for non-agricultural purposes (roads).

Value of vegetable production is underestimated as high-price seasons are ignored.

The 1996 agricultural census revealed that meat production is overestimated by more than 20%.

Rural industrial output is underestimated (highly profitable activities under-reported, but also exaggeration by local officials).

The third industrial census [of 1995] revealed that 40% of reported rural industrial gross output value in 1995 was exaggerated.

Rural services are underestimated

The first tertiary sector census in 1993-1995 led to large adjustments.

Adjustments to final expenditures [+1.7%]:

Imputed rent on (in particular rural) housing is underestimated as based on historical (investment) cost; area underestimated.

Rural services are underestimated.

The first tertiary sector census in 1993-1995 led to large adjustments.

Adjustments to government-controlled prices [+18.3%].

No longer relevant; in November 1998 the domestic price of 22 out of 33 representative products exceeded the international price.

[Total: +34.3%]

Source: Xu Xianchun, "Shijie yinhang dui zhongguo."

Notes to Table 6: # Denotes a sub-category, ## a sub-category of a sub-category. The list of sub-categories, or sub-categories of sub-categories, is complete. 1993 is the first year in which GDP data calculated according to the expenditure approach became available.

Data in the first seven data rows are ratios of the relevant nationwide data published in the *Statistical Yearbook (SY) 2001*, divided by the same nationwide data as first published in the then current SY. 1993 expenditure data are not available in the SY 1994; a comparison of the 1993 expenditure data published in the SY 1995 and those published in the SY 2001 shows only two discrepancies: 1993 total expenditures in the SY 2000 are 0.9973 times the value published in the SY 1995, and for net exports the ratio is 1.1618. In the second block, for 1993 through 1995, provincial-level data were published only in the SY 1995, 1996, and 1997 (instead of in the 1994, 1995, and 1996 issues); this implies that provincial-level data could be revised data (while nationwide data are those as first published).

In 1993, in Beijing, Fujian, Shandong and Hunan the sum of final consumption, gross capital formation and net exports was different from aggregate provincial expenditures by -18.07%, 1.91%, 1.58%, and -2.82%, respectively. In Shaanxi, the sum of the two components of gross capital formation exceeded provincial aggregate gross capital formation by 15.15%. For a few other provinces, various checks of the sum of sub-categories yielded differences below 1%. 1994 data have two very minor discrepancies, plus a 7.73% discrepancy between gross capital formation and the sum of its components in Guangxi. 1997 data have one minor discrepancy.

Sources: *Statistical Yearbook 1994*, 32, 35; *1995*, 32f., 36-40; *1996*, 42f., 46-50; *1997*, 42, 44, 46-50; *1998*, 55, 62, 67-71; *1999*, 55, 63, 67-71; *2000*, 53, 60, 65-69; *2001*, 49, 57, 60-65; NBS National Accounts Division, *Zhongguo guonei shengchan zongzhi hesuan lishi ziliao (1952-1996)*, zhuoyao, 106 (for year 1996 provincial value-added data).

Table 7. Industrial Enterprises in 1995 across Three Data Sources

	Industrial Statistical Township	Census Enterprise	1995	1995	1995	1995	1995
	Number of enterprises	Gross output value (b RMB)	Ind. Census Statistical Township	Census Enterprise	1995	1995	1995
			(new stlp.)	(old stlp.)	(new stlp.)	(old stlp.)	(old stlp.)
Total	7341517	7341500	8229.663	9189.4	8229.7	2684.1	2925.3
State-owned enterprises	118000	118000	2684.051	3122.0	2684.1		
Collective-owned enterprises	1465628	1475000	2925.329	3362.3	2925.3		
County enterprises (xian (qi) shu qiye)	75014	75014	301.889	301.889			
Township-run enterprises (xiangban gongye)	228830	290000	980.709	1193.2	1754.766		
Village-run enterprises (cunban gongye)	680686	740000	1079.829	1184.7	1719.602		
Sum township- and village-run enterprises	909516	918700	2060.540	2377.9	3474.368		
Urban cooperative enterprises (chengzhen hezuojingying)	46666	1030000	50.326				
Rural cooperative enterprises (nongcun hezuojingying)	324922	520000	163.104				
Jointly run enterprises (lianban qiye)	371588	371600	213.430	213.4			
Sum urban and rural cooperative enterprises	109510	184700	349.472	771.0			
Residual including county enterprises	184524	184700	651.361				
Private enterprises (siying gongye)	287483		233.890				
Individual-owned "enterprises" (geti gongye)	5403643		963.253				
Sum private and individual-owned enterprises	5691126	5688200	1197.140	1182.1	1651.549		
Joint operation enterprises (lianying gongye)	5903		66.663				
Shareholding enterprises (gufenzhi gongye)	5873		275.034				
Foreign-invested enterprises (waishangji gang, ao, tai touzi gongye)	54045		1072.216				
Other enterprises (qita gongye)	942	60300	9.227	1523.1	1423.2		
Reference: TVEs [in industrial census labeled "Rural industry (industrial TVEs)" (nongcun gongye (xiangzhen gongye))]	6517818	7182000	3638.382	5125.9	5125.917		

All data calculated as residuals or sums are in italics. Sums that are given in the source are not in italics. Data referred to in the text are in bold. All data from the *Statistical Yearbook* are from the industrial section except the reference information in the last row, which is from the agricultural section. The separately listed item "Rural industry (industrial TVEs)" (*nongcun gongye (xiangzhen gongye)*) in the industrial census presumably comprises all township enterprises, village enterprises, and rural cooperative enterprises, as well as those private enterprises and individual-owned industry located in the countryside. Yet the gross output value of these enterprises together, plus the gross output value of private and individual-owned industry in urban areas (only data on all private and individual-owned industry are available) falls 5.98% short of the "Rural industry (industrial TVEs)" figure. (The enterprise number is 6.26% larger.) In 1995, new stipulations for the calculation of gross output value were issued. The one major innovation is that following the new stipulations value-added taxes are not included in gross output value. (For details see Holz and Lin, "Pitfalls.") Sources: *Industrial Census 1995*, 1; *Statistical Yearbook 1996*, 387, 389, 401; *Statistical Yearbook 1997*, 413 (for 1995 gross output value data following the new stipulations); *Township Enterprise Yearbook 1996*, 99, 112, 115, 151.