China's 2004 Economic Census and 2006 Benchmark Revision of GDP Statistics: More Questions Than Answers?

In 2006, China's National Bureau of Statistics undertook a benchmark revision of national income and product accounts statistics based on the findings of the 2004 economic census. The benchmark revision covers primarily the years 1993-2004 with revised economy-wide and sectoral output values. The new data have three implications. (i) Despite all the hype only a few years ago about data falsification by local statistical authorities in China, the 2004 economic census results validate the provincial aggregate output values and invalidate the center's national ones. (ii) At the national level, economy-wide as well as sectoral nominal values were revised but real growth rates of some sectors remained unchanged. That is not plausible, and implies that at least the secondary sector real growth rates are erroneous. (iii) The benchmark revision raises questions about the quality and meaning of a large body of official statistics. Ultimately, it casts doubt on the professionalism and sincerity of China's statistical authority.

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Statistical data are rarely etched in stone. China's national income and product accounts statistics are no exception. The National Bureau of Statistics (NBS) revises most national income and product accounts data one year after they are first published. Following the 1993 tertiary (service) sector census, it conducted a benchmark revision of 1978-93 data; tertiary sector value added of 1993 was revised upward by 32 per cent, and thereby gross domestic product (GDP) by 10 per cent. A second benchmark revision occurred in early 2006, following the 2004 economic census of the secondary sector (industry, construction) and of the tertiary sector, with revisions primarily to the 1993-2004 data. Year 2004 GDP was revised upward by 16.8 per cent, making China, as of 2006, the world's fourth-largest economy. But these new data, in full published in the *Statistical Yearbook 2006*, come with a number of questions marks.[1]

Are the provincial data better than the national ones?

National GDP should equal the sum of provincial GDP (provincial gross value added). But prior to the 2006 benchmark revision, the sum of provincial GDP routinely exceeded national GDP. The discrepancy between the sum of provincial GDP and the NBS's national GDP figure increased continuously from 1996 through 2004. By 2004, the sum of provincial GDP was 19 per cent larger than the national value reported by the NBS (part B of Table 1). The national values are consistently lower than the sum provincial values in the secondary and tertiary sector.

The rising discrepancy coincided with a wave of reports on local data falsification in 1997 through approximately 2001. In response, the NBS, with support of the State Council and the Disciplinary Commission of the Chinese Communist Party Central Committee, in 1997/98 started a campaign against local data falsification. The continuing discrepancy between the national data and the sum provincial data all the way up through 2004 would suggest that the campaign against the "wind of falsification and embellishment" was not successful.[2]

In 2004, the then NBS commissioner, Li Deshui (李德水), offered a mix of technical reasons and corrections of exaggerated data as explanation of the discrepancy: provinces use 1990 base year prices when calculating real growth, while the NBS makes adjustments to this

procedure based on a price index (and starting in 2004 the NBS fully switched to a price index); provinces double-count cross-provincial economic activities; provinces still use (presumably questionable) report forms for industrial enterprises with annual sales revenue below 5m yuan RMB; provinces use the opportunity of the as yet incomplete measurement of tertiary sector activities to adjust tertiary sector output upward such that the sectoral data add up to their desired aggregate output value; and provinces have incentives to exaggerate output (due to growth targets, comparisons of different localities by their output growth rates, and the use of statistics to measure local cadres' "achievements").[3]

The benchmark revision national data suggest that the pre-economic census provincial GDP values were rather close on target, contrary to Li Deshui's arguments in favor of the original national values over the provincial ones. If the 2004 economic census results are correct, provinces *under-reported* tertiary sector value added (where Li Deshui claimed over-reporting), had accurate data for the primary sector (agriculture), and over-reported in industry and especially in the small sector construction. Overall, the sum of pre-economic census provincial GDP in 2004 was only 2.1 per cent larger than the revised national figure (part C of Table 1).

The pre-economic census national data, on the other hand, turned out to be rather inaccurate. The revised nominal GDP figure for 2004 is 16.8 per cent higher than the originally published one (part D of Table 1). Most of this increase is due to an almost 50 per cent upward revision to national tertiary sector value added. The annual revisions to primary sector value added across all years (1993-2004) remain below 1 per cent and those to industry below 4 per cent, while construction value added is reduced by up to 9.2 per cent.

Post-economic census provincial GDP values for 2004 and 2005 are available in the *Statistical Yearbook 2006*. In 2004 and 2005, the sum of these provincial values is 4.8 per cent and 8 per cent higher than national post-economic census GDP (part E of Table 1). I.e., discrepancies between sum provincial and national data continue. The NBS has recently stated its intention to move to its own calculation of provincial GDP values, which would then presumably side-track data that come out of the provincial statistical bureaus altogether.[4]

But does the benchmark revision not perhaps suggest that the NBS should, at least for aggregate GDP, drop its own calculations and rely on the sum provincial data?

Statistical break(s)

The benchmark revision changed the nominal value added of *all* sectors in 1993-2004 (part D of Table 1), even though the primary sector was not part of the economic census. One potential explanation for the revision of primary sector nominal value added is the reclassification of economic activities among sectors due to the adoption of a new sectoral classification system. The sectoral classification "standard" (*guobiao*) GB/T4754-2002 (in the following abbreviated "GB2002"), issued in 2002, modifies the GB1994 (of 1994).[5] The economic census stipulation requires the economic census to classify data in accordance with the GB2002.[6]

The GB2002 incorporates a number of innovations in comparison to the GB1994. For example, in the GB2002 'logging and transport of timber and bamboo' and 'preliminary processing of textile fibers' move from industry into agriculture. In the agricultural sector, 'household sideline business' is dissolved into the corresponding other (including industrial) sectors. The three main economic sectors thus are only approximately compatible between the GB1994 and the GB2002.

The national income accounts section of the *Statistical Yearbook 2006*, which incorporates the benchmark revision of 1993-2004 values, does not specify which classification system the data of the individual years follows. A note to the first table in the section (p. 57, note b) for two sub-sectors of the tertiary sector explicitly lists a number of reclassifications that start in 2005 only; these de facto correspond to the GB1994 to GB2002 transition. It also states that agricultural services are included with agriculture only since 2005.[7] The exclusion of agricultural services from agriculture violates *both* the GB1994 (as already previously known for the pre-economic census data) *and* the GB2002. If these two signals were indicative of all sectoral data, then they imply a statistical break in all sectoral value added between 2004 and 2005 due to the switch to the GB2002.

The revisions to primary sector nominal value added of 1993-2004 would then still need to be explained. The coverage of economic activities in the economic census was expanded to newly include (i) economic activities previously ignored, such as those occurring in sub-ordinate units outside the main business of an enterprise, and (ii) economic activities captured through statistical compilations outside the economic census (and previously not included in GDP), such as home-owners renting out housing, home teaching, or childcare services. The NBS also used the opportunity of the benchmark revision following the economic census to introduce various innovations, including the allocation of interest on household savings deposits to the sector that produced the particular value added.[8] Perhaps one or more of these innovations or of the expansions in coverage affected primary sector value added.

The NBS adjusted 1993-2004 data using the new 2004 data. According to Xu Xianchun (许宪春), head of the National Income Accounts Division of the NBS, in revising pre-2004 values, the NBS followed OECD advice and used the "trend-difference" method: the 1992-04 trend is established twice, using the pre-economic census (original) 2004 value as well as the post-economic census (new) 2004 value, and the annual relative divergence from the original trend is then applied to the new trend line to obtain annual post-economic census values for 1993-2003.[9]

If the revised data of 1993-2004 in the *Statistical Yearbook 2006* were to indeed follow the GB1994, then the NBS must, before applying the trend-difference method, have rearranged its post-economic census 2004 data according to the GB1994 before applying the trend-difference method. If it did, then the statistical break in sectoral value added due to the adoption of the GB2002 occurs in 2005, while the statistical break due to extended coverage and various innovations is distributed across the years 1993-2004. If the NBS applied the trend-difference method to year 2004 data that follow the GB2002, then all statistical breaks, including reclassifications among sectors, are distributed across the years 1993-2004 (which would in part contradict the note in the *Statistical Yearbook 2006*).

Spurious real growth rates

The 2006 benchmark revision changed the real growth rates of tertiary sector value added and of GDP, but not those of the primary and secondary sectors. That is not plausible, and in one respect outright erroneous.

Primary and secondary sector real growth rates 1993-2004. The post-economic census adjustments to primary sector nominal value added increased the previously published value of 1993 by only 0.1 per cent, but that of 2004 by 0.9 per cent (with a continuous increase in the years in between, see part D of Table 1). I.e., the value of newly added agricultural activities between 1993 and 2004 increases significantly faster than the value of original agricultural activities, and if the newly added activities were subject to a similar deflator as the original ones, the resulting new real growth rate of total agricultural activities should go up. What the NBS has done, instead, by not changing the real growth rates, is to impose an upward revision on the implicit deflator. (The NBS publishes nominal values and real growth rates; these together imply a particular deflator.) One could believe a constant real growth rate series if the 1993 nominal primary sector value had been revised by the same percentage as the 2004 primary sector value, but that is not what the statistics show.

Compared to the primary sector, the revisions to 2004 value added in the secondary sector are much larger (+3.8 per cent for industry, -9.2 per cent for construction). But the pattern of change over time is similar to the primary sector in that the revisions to the *1993 values* are also significantly smaller (+0.3 per cent, -0.8 per cent) than those to the 2004 values. I.e., the two secondary sector sub-sectors have experienced changes in nominal output that differ significantly from the pattern inherent in the previously published data, and one would expect the real growth rates to change correspondingly, but those have remained unchanged. The implication of not changing real growth rates is that the NBS raised the implicit deflator of industry, and lowered that of construction.

There are two possible interpretations of this pattern. One, the NBS used the opportunity of the 2006 benchmark revision to in agriculture, industry, and construction switch to a new deflator. The census was about year 2004 nominal secondary and tertiary sector data, in particular output data, and not about the collection of comprehensive *price* data *for 1993-*

2004 across *all three sectors*. The new deflators, thus, would have to come from some other source. But where should such new deflators come from? Why should they cover only the period 1993-2004 and not 1978-92?[10] And why should they be of exactly that size which keeps the real growth rates of all years unchanged and thus causes a 1:1 change in nominal values, when the economic census was about collecting *new* nominal output data for industry and construction (and the tertiary sector), and new data was, according to Xu Xianchun of the NBS, indeed collected?[11] This scenario is not plausible.

A second possible interpretation is that the implicit deflators are not changed. Then either the revised 1993-2004 nominal values or the unchanged real growth rates (or both) must be *incorrect*. To take the case of industry, the 2004 economic census resulted in an increase of 2004 nominal value added of industry by 3.8 per cent, and no change in the *1992* value.

Suppose that *all* of the 2004 adjustment were due solely to reallocations among sectors. Then the reduction in reallocations to zero in 1992 is not plausible. More likely than not, the reallocation should occur in roughly the same proportion in each year. Reducing the revisions to zero in 1992 would simply be a matter of convenience. The implication would be that the earlier in the reform period, the (unnecessarily) less accurate are sectoral value added data.

Alternatively, suppose that all of the 2004 adjustment were due to an expanded coverage of economic activities in the economic census. The revised data of 2004 then may simply reflect the inability of the NBS to in *recent* years capture the proliferation of economic activities. But in that case, real growth rates should have been revised, which they were not.

Inconsistent calculation of secondary sector real growth rates 1993-2004. The fact that the NBS retained the pre-economic census *secondary sector* real growth rates implies an inconsistency. The secondary sector real growth rate is a weighted average of the real growth rates of industry and construction, with as weights the shares of industry and construction in secondary sector nominal value added. Retaining the pre-economic census secondary sector real growth rates implies that the NBS did not change the weights of industry and construction in the calculation of secondary sector real growth rates. This is despite the *increase* in nominal value added of industry and the *decrease* in nominal value added of

construction, and even though these changes are sufficiently large to at least in some years change the real growth rate of the secondary sector, calculated with one decimal and using a Törnqvist index or previous-year weights. This appears an outright mistake.

It is not an outright mistake only if the NBS uses pre-1993 nominal weights to aggregate sectoral real growth rates. However, that would amount to gross misspecification because inappropriate weights would be applied to sectoral growth rates. It would also mark a severe deviation from earlier practice in that the official pre-economic census GDP real growth rates are best matched by applying previous-year weights to sectoral real growth rates or by using a Törnqvist index.

Tertiary sector real growth rates 1978-2004. In the tertiary sector, economic census results led to upward revisions to both the nominal values and the real growth rates of 1993-2004. There is, thus, no issue of unrevised real growth rates.

The revisions to tertiary sector data extended further, to the nominal values of 1978-1992.[12] Perhaps these revisions reflect an expansion of the coverage of economic activities, limited to the tertiary sector.[13] The corresponding real growth rates remained unchanged, implying changes to the implicit tertiary sector value added deflator of these years. Because the proportion of the change to tertiary sector value added is rather similar in 1978 and 1992, with 2.5 per cent and 3.1 per cent upward revisions, retaining the old real growth rates appears a simplifying assumption with limited consequences.

Impact on GDP 1993-2004. In the years 1993-2004, with only the tertiary sector real growth rates allowed to increase, the overall effect on real GDP growth is smaller than the increase in nominal 2004 GDP of 16.8 per cent over the original figure would suggest. The original average annual real growth rate between 1992 and 2004 is 9.4 per cent and the revised one is 9.9 per cent.[14] (See Table 2 for the annual real growth rates.) However, a "mixed" real growth rate that combines the revised sectoral nominal data with the deflators implicit in the pre-economic census data, using a Törnqvist index of real GDP growth, is 10.7 per cent.[15] In other words, the official post-economic census real GDP growth rate was revised upward by

0.5 percentage points per year, but should in all likelihood have been revised upward by 1.3 percentage points.[16]

Creating havoc across a wide range of statistical data

In the expenditure approach to the calculation of GDP, which is not the official approach to calculating GDP in China, the NBS chose to revise all nominal values back to 1978. In comparison to the (official) production approach value of GDP (discussed above), the revised expenditure approach value is now 1.1 per cent lower in 1978, and 2.4 and 2.3 per cent higher in 1992 and 2004. In the expenditure approach, real growth rates (and thus implicit deflators) are not available except for per capita household consumption.

Table 3 reports the revisions to nominal data. Expenditure approach GDP in 2004 was revised upward by 12.6 per cent. This comprises, first, a 15.4 per cent upward revision to final consumption, which in turn reflects an 8.2 per cent upward revision to household consumption and a 41.1 per cent upward revision to government consumption. Within household consumption, rural consumption was revised downward by 26.6 per cent and urban consumption upward by 31.9 per cent. Second, gross capital formation was revised upward by 10.0 per cent, which in turn reflects a 4.4 per cent upward revision to gross fixed capital formation and a 673.2 per cent upward revision to inventory investment.

The accuracy of the expenditure approach has been questioned before: calculating expenditure approach household consumption in accordance with the NBS explanations on how the NBS does it, one is unable to replicate the NBS's results.[17] The 2006 benchmark revision confirms the earlier suspicions. The opposing revisions to rural vs. urban nominal consumption reflect (i) a redefinition of who is "rural" vs. "urban" as well as (ii) changes to the real growth rates. Figure 1 shows how the (unchanged) *total* population is newly split into rural vs. urban for all years since 1978 with the relabeling of a large share of the "rural" as "urban" population in the most recent years; the urban citizen consumes more than the rural one, and thus average consumption increases.[18] Per capita real growth rates were revised slightly in all years (1978-2004), rising from an average annual 7.03 per cent to 7.35 per cent for the total population, falling from 6.24 per cent to 5.71 per cent for the rural population,

and falling from 6.28 per cent to 6.18 for the urban population. The implicit deflators are unchanged.

The revisions to government consumption are very large and one may wonder where the 41.1 per cent upward revision could possibly come from. Does the government have many more people on its payroll than it officially admits, or did it spend many times more on the military than originally thought?

The seven-fold upward revision to inventory investment suggests that this item is a rather meaningless residual in the NBS's calculations. This implies, for example, that the data on inventory change cannot serve as a measure of macroeconomic cycles.

A third approach to the calculation of GDP, beyond the production and the expenditure approaches, is the income approach where GDP equals labour remuneration, net taxes on production, depreciation, and the operating surplus. These data have always been published at the provincial level only, and only in nominal form. Retrospectively revised income approach data are not available. From 1978 through 2003 (no data are available for 2004), the shares of each of the four components in income approach GDP are approximately constant. But, as Figure 2 shows, in 2005 the share of labour remuneration drops from its 2003 level of 0.50 to 0.41 (the absolute, nominal value increases), and the share of operating surplus jumps from 0.20 to 0.30. In other words, the NBS has previously overestimated labour remuneration by 25 per cent and underestimated operating surplus by 50 per cent. Because the official value added data for the tertiary sector are mostly derived from income data, the revisions to the income approach data have to square with the upward revision to tertiary sector value added in the production approach;[19] given that the tertiary sector is relatively labour-intensive, one would expect an increase in tertiary sector value added to go hand in hand with an increase in the economy-wide share of labour remuneration in GDP, rather than with the *decrease* documented in Figure 2.

Conclusions

The fact that the 2004 economic census validates original *provincial* GDP data and invalidates original *national* GDP data raises questions about the capacity of China's national

statistical authority to accurately compile national data. Statistical breaks are not explained. Primary and secondary sector real growth rates of 1993-2004 should have been revised but were not; those of the secondary sector are now logically wrong. The official revised average annual real GDP growth rate of 1993-2004 may be 0.8 percentage points too low.

The 2006 benchmark revision opens a window on how the NBS operates. First, the NBS is either incapable or unwilling to properly explain how the 2006 benchmark revisions were conducted, where the statistical breaks are, when they occur, and of what size they are. Second, in recent years the NBS has repeatedly dropped hints of under-reported national tertiary sector value added, which suggests it knowingly reported false GDP data for at least the most recent years. Third, by not revising secondary sector real growth rates, the NBS shows itself incapable of adding up two and two. It appears as if the NBS simply did *not want to* increase the real growth rates in these two sectors. At that point, the NBS reveals itself as, at best, a political propaganda organ—don't revise GDP growth rates up too much—with scarce, or no regard for the compilation of accurate statistics. "Cooking the data" substitutes for logical mathematical operations.[20]

The size of some of the revisions to expenditure approach data and of the innovations in the case of the income approach data appear very much out of proportion. If the statistics published by NBS are that much off, where the national income and product accounts are at the core of China's statistical data, then what does that mean for related and, perhaps even worse, for unrelated and less "important" statistics? Is every one of the thousand pages of the *Statistical Yearbook* taking us for a ride?

With a solid basis in form of the 2004 economic census, one would expect future data to be more reliable. But reports from the grassroots suggest that the economic census was, at least in some localities, poorly organized, possibly severely under-funded, and in several respects not suited to capture the value of economic activities.[21] If the economic census were indeed a complete waste of time and money (unlikely), then the possibility arises that the NBS had good reason to retain its earlier real growth rates in the primary and secondary sector. But that still means that the NBS works with sectoral (and GDP) real growth rates that are inconsistent, fudges statistical breaks, and moves mountains in the expenditure and

income approaches. In the end, one may begin to wonder about the possibility and likelihood of professional statistical work in China. For the time being, the 2006 benchmark revision implies that Chinese statistics have to be taken with a *rock* of salt.

Table 1. Pre- Vs. Post-Economic Census Nominal Value Added

	GDP	Primary sector	Secondary sector	# Industry	# Construction	Tertiary sector
A. Nominal values (b yuan RMB), post-economic census						
1978	364.52	101.84	174.52	160.70	13.82	88.16
1992	2692.35	580.00	1169.95	1028.45	141.50	942.40
1993	3533.39	688.73	1645.44	1418.80	226.65	1199.22
2004	15987.83	2095.58	7390.43	6521.00	869.43	6501.82
2005	18308.48	2307.04	8704.67	7691.29	1013.38	7296.77
B. Percentage difference in sum provincial pre-*economic census values vs. national* pre-*economic census values*						
1993	-1.17	-0.66	-0.77	0.09	-6.08	-2.08
1994	-2.94	-1.98	-3.73	-2.92	-8.94	-2.37
1995	-1.46	-0.39	-5.50	n.a.	n.a.	4.24
1996	1.03	0.69	-5.03	-4.04	-11.43	11.24
1997	3.35	2.87	-3.11	-2.63	-6.31	14.08
1998	5.66	2.17	-0.08	-0.09	-0.02	16.48
1999	6.83	1.04	0.49	-0.02	3.79	19.43
2000	8.65	1.48	1.89	1.12	7.01	22.33
2001	9.71	0.84	2.27	1.09	10.15	24.79
2002	12.22	0.61	4.88	3.51	13.90	28.18
2003	15.46	1.47	8.39	6.94	17.81	32.56
2004	19.26	0.62	13.89	12.77	21.29	37.00
C. Percentage difference in sum provincial pre-*economic census values vs. national* post-*economic census values*						
1993	-3.13	-0.74	-0.92	-0.22	-5.32	-7.54
1994	-5.84	-2.13	-4.05	-3.52	-7.47	-10.47
1995	-5.21	-0.61	-5.96	n.a.	n.a.	-6.90
1996	-3.64	0.39	-5.66	-5.23	-8.54	-3.12
1997	-2.55	2.49	-3.93	-4.14	-2.48	-3.29
1998	-1.92	1.72	-1.07	-1.94	4.91	-4.73
1999	-2.24	0.51	-0.67	-2.18	9.78	-5.29
2000	-2.02	0.87	0.50	-1.38	14.10	-6.06
2001	-2.63	0.16	0.69	-1.71	18.39	-7.30
2002	-1.92	-0.15	3.10	0.33	23.41	-7.89
2003	-0.21	0.63	6.37	3.33	28.67	-7.76
2004	2.10	-0.28	11.56	8.62	33.53	-7.87
D. Percentage difference in post-*economic census national values vs.* pre-*economic census national values*						
1978	0.58	0.00	0.00	0.00	0.00	2.45
1979	0.60	0.00	0.00	0.00	0.00	2.82
1980	0.62	0.00	0.00	0.00	0.00	2.88
1981	0.60	0.00	0.00	0.00	0.00	2.75
1982	0.54	0.00	0.00	0.00	0.00	2.50
1983	0.48	0.00	0.00	0.00	0.00	2.12
1984	0.52	0.00	0.00	0.00	0.00	2.10
1985	0.58	0.00	0.00	0.00	0.00	2.02
1986	0.72	0.00	0.00	0.00	0.00	2.48
1987	0.80	0.00	0.00	0.00	0.00	2.74
1988	0.77	0.00	0.00	0.00	0.00	2.54
1989	0.49	0.00	0.00	0.00	0.00	1.54
1990	0.65	0.00	0.00	0.00	0.00	2.06
1991	0.76	0.00	0.00	0.00	0.00	2.27

1992	1.07	0.00	0.00	0.00	0.00	3.12
1993	2.02	0.08	0.16	0.31	-0.80	5.90
1994	3.08	0.15	0.33	0.63	-1.59	9.05
1995	3.96	0.23	0.50	0.94	-2.38	11.96
1996	4.85	0.30	0.66	1.26	-3.16	14.82
1997	6.06	0.38	0.86	1.57	-3.93	17.96
1998	7.73	0.45	1.00	1.89	-4.69	22.27
1999	9.27	0.53	1.17	2.21	-5.46	26.10
2000	10.89	0.60	1.38	2.53	-6.21	30.22
2001	12.68	0.68	1.56	2.85	-6.96	34.61
2002	14.41	0.75	1.73	3.17	-7.70	39.15
2003	15.70	0.83	1.90	3.49	-8.44	43.71
2004	16.81	0.90	2.10	3.81	-9.17	48.71

E. Post-economic census: percentage difference in sum provincial vs. national values

2004	4.82					
2005	8.03	-0.29	11.35	11.07	13.48	6.71

# denotes a sub-category.

Pre-economic census national values from the *Statistical Yearbook 2005* have typically undergone the single annual revision one year after they were first published; all *Statistical Yearbook* data quoted in the table incorporate the benchmark revision following the 1993 tertiary sector census. Pre-economic census provincial values of each year are only published once in the *Statistical Yearbook* series, when they first become available (and thus no revised values are available, although in the early years the provincial data were released a year late, i.e., might incorporate an annual revision). Provincial values would also have been available for 1991 and 1992 (and for provincial GDP only, without subcategories, for 1988-90) from the *Statistical Yearbook* series, but these are pre-tertiary sector census data; compared to pre-tertiary sector census national data, the sum provincial GDP values are always lower, by up to 4%. *GDP 1952-95* (NBS, *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)) has provincial values for other years, but since the compilation of national income accounts following the System of National Accounts only began in the second half of the 1980s, the comparison of national and sum provincial data would have to be based on retrospectively compiled values.

Sources: *Statistical Yearbook 2006*, pp. 57, 63f.; pre-economic census national values: *Statistical Yearbook 2005*, p. 51; pre-economic census provincial values: each year's issue of the *Statistical Yearbook*.

Table 2. Original Vs. Revised (Post-Economic Census) Real Growth Rates

	GDP			Primary sector			Secondary sector		
	Orig.	Rev.	Mixed	Orig.	Rev.	Mixed	Orig.	Rev.	Mixed
1993	13.5	14.0	15.9	4.7	4.7	4.8	19.9	19.9	20.0
1994	12.6	13.1	13.7	4.0	4.0	4.1	18.4	18.4	18.4
1995	10.5	10.9	11.3	5.0	5.0	5.1	13.9	13.9	14.0
1996	9.6	10.0	10.3	5.1	5.1	5.2	12.1	12.1	12.2
1997	8.8	9.3	9.7	3.5	3.5	3.6	10.5	10.5	10.4
1998	7.8	7.8	9.2	3.5	3.5	3.6	8.9	8.9	9.1
1999	7.1	7.6	8.4	2.8	2.8	2.9	8.1	8.1	8.2
2000	8.0	8.4	9.2	2.4	2.4	2.5	9.4	9.4	9.5
2001	7.5	8.3	9.2	2.8	2.8	2.9	8.4	8.4	8.7
2002	8.3	9.1	10.0	2.9	2.9	3.0	9.8	9.8	10.1
2003	9.5	10.0	10.9	2.5	2.5	2.6	12.7	12.7	12.9
2004	9.5	10.1	11.0	6.3	6.3	6.4	11.1	11.1	11.3

	# *Industry*			# *Construction*			*Tertiary sector*		
	Orig.	Rev.	Mixed	Orig.	Rev.	Mixed	Orig.	Rev.	Mixed
1993	20.1	20.1	20.5	18.0	18.0	17.0	10.7	12.1	17.2
1994	18.9	18.9	19.3	13.7	13.7	12.8	9.6	11.0	12.9
1995	14.0	14.0	14.4	12.4	12.4	11.5	8.4	9.8	11.3
1996	12.5	12.5	12.8	8.5	8.5	7.6	7.9	9.4	10.7
1997	11.3	11.3	11.6	2.6	2.6	1.8	9.1	10.7	12.1
1998	8.9	8.9	9.2	9.0	9.0	8.1	8.3	8.3	12.3
1999	8.5	8.5	8.8	4.3	4.3	3.4	7.7	9.3	11.1
2000	9.8	9.8	10.1	5.7	5.7	4.9	8.1	9.7	11.6
2001	8.7	8.7	9.0	6.8	6.8	6.0	8.4	10.2	12.1
2002	10.0	10.0	10.3	8.8	8.8	7.9	8.7	10.4	12.4
2003	12.8	12.8	13.2	12.1	12.1	11.2	7.8	9.5	11.3
2004	11.5	11.5	11.8	8.1	8.1	7.2	8.3	10.0	12.1

# denotes a sub-category

Orig.: original, pre-economic census real growth rates as published in the *Statistical Yearbook 2005*.

Rev.: revised real growth rates following the 2004 economic census.

Mixed: revised nominal values from 2004 economic census combined with implicit deflators from *Statistical Yearbook 2005*; secondary sector real growth rates are aggregates of industry and construction real growth rates (using a Törnqvist index, with post-economic census nominal values as weights); real GDP growth rates are compiled from those of the three main economic sectors.
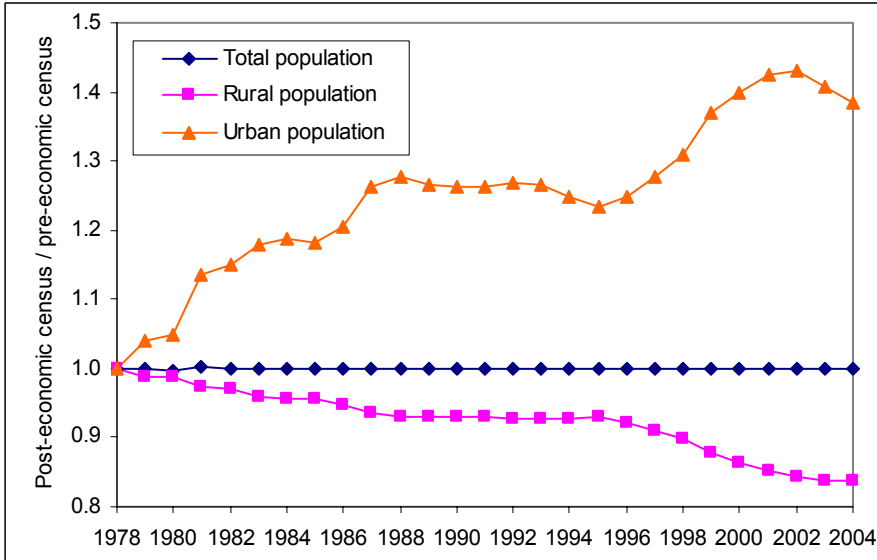
Sources: *Statistical Yearbook 2005*, pp. 51, 53; *2006*, pp. 57, 59.

Table 3.   Ratio of Post- to Pre-Economic Census Expenditure Approach Value Added

|	GDP	--- --- --- Final consumption --- --- ---				Gov.	Gross capital formation			Net exports
		Total	Household				Total	Fixed	Change in inventories	
			Total	Rural	Urban					
1978	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1979	1.005	1.005	1.003	0.995	1.017	1.013	1.003	1.002	1.009	1.020
1980	1.009	1.011	1.006	0.989	1.034	1.027	1.006	1.003	1.019	0.993
1981	1.022	1.016	1.009	0.983	1.052	1.041	1.031	1.069	0.887	1.513
1982	1.018	1.021	1.012	0.979	1.071	1.054	1.014	1.007	1.052	0.999
1983	1.023	1.026	1.015	0.974	1.091	1.068	1.017	1.008	1.067	1.000
1984	1.028	1.032	1.018	0.969	1.109	1.083	1.019	1.010	1.073	1.000
1985	1.032	1.037	1.021	0.962	1.126	1.097	1.021	1.012	1.054	1.001
1986	1.037	1.043	1.025	0.953	1.141	1.112	1.025	1.013	1.072	1.000
1987	1.042	1.047	1.028	0.945	1.157	1.127	1.032	1.015	1.144	0.939
1988	1.047	1.051	1.031	0.933	1.169	1.142	1.037	1.017	1.146	1.000
1989	1.051	1.058	1.034	0.924	1.184	1.157	1.039	1.019	1.090	1.001
1990	1.056	1.064	1.037	0.913	1.197	1.172	1.047	1.020	1.121	1.000
1991	1.061	1.072	1.040	0.901	1.208	1.188	1.047	1.022	1.140	1.000
1992	1.066	1.078	1.043	0.888	1.217	1.204	1.047	1.024	1.192	1.000
1993	1.071	1.085	1.047	0.872	1.223	1.220	1.048	1.025	1.194	1.000
1994	1.076	1.091	1.050	0.861	1.235	1.236	1.056	1.027	1.260	1.000
1995	1.080	1.093	1.053	0.851	1.248	1.252	1.067	1.029	1.282	1.000
1996	1.085	1.098	1.056	0.848	1.273	1.269	1.071	1.031	1.341	1.000
1997	1.090	1.105	1.059	0.836	1.283	1.286	1.053	1.032	1.212	1.242
1998	1.095	1.112	1.063	0.819	1.286	1.303	1.060	1.034	1.433	1.189
1999	1.100	1.119	1.066	0.804	1.290	1.320	1.073	1.036	1.977	1.056
2000	1.105	1.127	1.069	0.789	1.296	1.338	1.072	1.037	n.a.	1.067
2001	1.105	1.135	1.072	0.778	1.306	1.356	1.062	1.026	3.112	1.054
2002	1.115	1.142	1.075	0.765	1.314	1.374	1.077	1.041	5.000	1.107
2003	1.120	1.148	1.079	0.747	1.313	1.392	1.086	1.043	9.858	1.113
2004	1.126	1.154	1.082	0.734	1.319	1.411	1.100	1.044	7.732	1.000

The year 2000 value of the change in inventories is -12.4b yuan RMB in the pre-economic census series, and 99.84b yuan RMB in the post-economic census series.

Sources: *Statistical Yearbook 2005*, pp. 63f., *2006*, pp. 68f.

Sources: for aggregate (nominal) values see sources to Table 3; per capita (nominal) values: *Statistical Yearbook 2006*, p. 73; *2005*, p. 68; *2003*, p. 72; *2001*, p. 66.

Figure 1.   Post- Vs. Pre-Economic Population Numbers Implicit in Aggregate and Per Capita Household Consumption Values
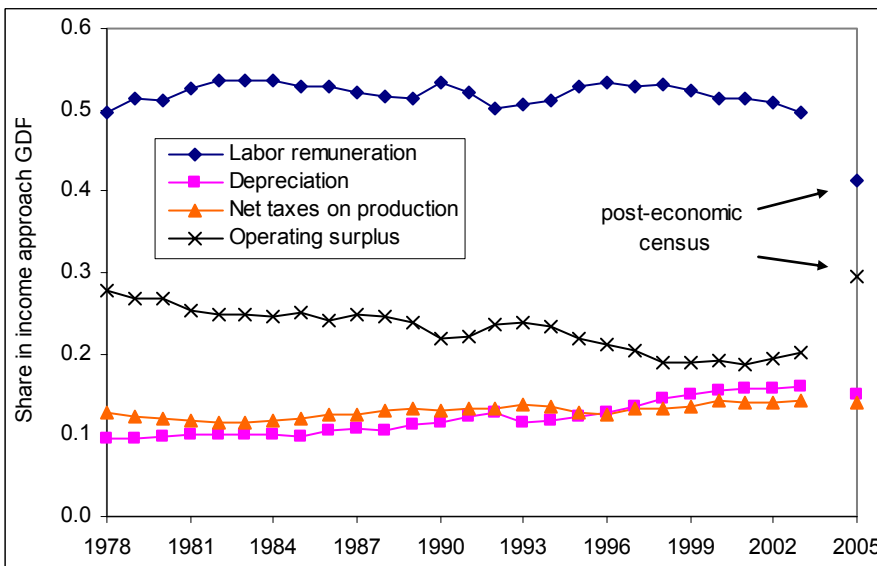
All data are sum provincial (nominal) data. National values have not been released.
1978-2003 are pre-economic census values; these have not been revised. 2004 values are not available. The 2005 values are post-economic census values.
Sources: 1978-1995: *GDP 1952-95*; 1996-2005: individual issues of the *Statistical Yearbook 1997* through *2006*.

Figure 2.   Shares of Individual Components in Income Approach GDP

Notes

[1]   The benchmark revision was announced by the NBS on 9 January 2006 with revised nominal values and real growth rates in the production approach to the calculation of GDP for 1993-2004; a follow-up notice on 8 March 2006 elaborated further (http://www.stats.gov.cn/tjdt/zygg/t20060109_402300176.htm and http://www.stats.gov.cn/zgjjpc/cgfb/, both accessed on 27 April 2006). A four-volume compendium solely on the 2004 economic census became available from the NBS in June 2006: *Zhongguo jingji pucha nianjian—2004 (China Economic Census Yearbook—2004)* (Beijing: Zhongguo tongji chubanshe, 2006). The *Statistical Abstract 2006* of May 2006 and then the *Statistical Yearbook 2006* of September 2006, both by the NBS, incorporated and extended the earlier announced revisions; *Zhongguo tongji zhaiyao 2006 (China Statistical Abstract 2006)* (Beijing: Zhongguo tongji chubanshe, 2006), and *Zhongguo tongji nianjian (China Statistical Yearbook)* (Beijing: Zhongguo tongji chubanshe, 2006 and other years).

[2]   The issue of data falsification in the late 1990s is presented, among others, by Thomas G. Rawski, "What Is Happening to China's GDP Statistics," *China Economic Review*, Vol. 12, No. 4 (2001), pp. 347-354, and for national level data contested by Carsten A. Holz, "'Fast, Clear and Accurate:' How Reliable Are Chinese Output and Economic Growth Statistics," *China Quarterly*, No. 173 (March 2003), pp. 122-163.

[3]   Li Deshui, "Guanyu GDP de ji dian sikao" ("Some considerations on GDP"), *Jingji yanjiu*, No. 4 (2004), pp. 26-8

[4]   *Xinbao* (a Hong Kong daily newspaper), 22 May 06.

[5]   For a summary of the major changes see first through seventh 2003 issues of the NBS magazine *Zhongguo tongji*. The official GB classifications are not available and have to be gleaned from other sources, such as the population censuses with their data on labourers (as done in Carsten A. Holz, "Measuring Chinese Productivity Growth, 1952-2005," mimeo, 22 July 2006, Hong Kong University of Science & Technology, available at http://ihome.ust.hk/~socholz).

[6]   State Council and NBS, 5 Sept. 2004, "Quanguo jingji pucha tiaoli" ("National economic census stipulation"), in the rules and regulation database of China Infobank (http://www.chinainfobank.com).

[7]   In 2003, the most recent year for which the data are available (pre-economic census values), value added in agricultural services was equivalent to 1.85% of primary sector value added (*Statistical Yearbook 2005*, pp. 51, 55).

[8]   See p. 17 in Xu Xianchun, "Guanyu jingji pucha niandu GDP hesuan de bianhua" ("Changes in the calculation of annual GDP in the economic census"), *Jingji yanjiu*, No. 2 (February 2006), pp. 16-20.

[9]   Ibid., p. 19.

[10]   The years 1978-93 were subject to the previous benchmark revision following the 1993 tertiary sector census; that census largely retained the earlier published implicit deflators.

[11]   See p. 8 in Xu Xianchun "Dui woguo jidu guonei shengchan zongzhi hesuan de sikao" ("Thoughts on the calculation of quarterly GDP in China"), *Zhongguo tongji*, No. 6 (June 2006), pp. 8f., where he reports that "the economic census led to the discovery that the previous data sources were missing a lot so that many economic activities were left out."

[12]   This is a measure potentially unrelated to the 2004 economic census. It was not mentioned in any of the announcements on the 2004 economic census.

[13]   Another possible explanation of the revisions to 1978-92 tertiary sector value added which, due to its length, is not provided here is based on the fact that the previous benchmark revision following the 1993 tertiary sector census failed to incorporate *revised* data for Guangdong province.

[14]   *Statistical Yearbook 2005*, p. 54, and *Statistical Yearbook 2006*, p. 60. Harry X. Wu, in a paper that I came across after submission of this article, examines in greater detail the official retrospective adjustment method to nominal value added (and GDP); he is particularly interested in the fact that the 1998 real GDP growth rate is the only one that has not been adjusted (Table 2). ("The Chinese GDP Growth Rate Puzzle: How Fast Has the Chinese Economy Grown." Undated paper downloaded 1 Sept. 2006 from a conference website that is no longer available; a seemingly identical version, dated July 2006, is available at http://hi-stat.ier.hit-u.ac.jp/research/discussion/2006/pdf/D06-176.pdf, accessed 20 February 2007.)

[15]   The calculation assumes that the sectoral reallocations do not change the appropriateness of the earlier implicit sectoral deflators.

[16]   The upward revision contrasts sharply with Angus Maddison's *downward* revisions to China's reform period real growth rates in *Chinese Economic Performance in the Long Run* (Paris: Development Centre of the Organisation for Economic Co-operation and Development, 1998). (Carsten A. Holz, "China's Reform Period Economic Growth: How Reliable Are Angus Maddison's Estimates?," *Review of Income and Wealth*, Vol. 52, No. 1 (March 2006), pp. 85-119, argues that Maddison's revisions are not justified.)

[17]   Carsten A. Holz, "Deconstructing China's GDP Statistics," *China Economic Review*, Vol. 15, No. 2 (2004), pp. 164-202

[18]   The newly adopted rural-urban population data implicit in the aggregate and per capita household consumption data closely match the rural-urban population data published in the *Statistical Yearbook* series. Holz, "Deconstructing," discusses the two sets of population data—those used by the NBS in deriving the (earlier) household consumption data and those in the *Statistical Yearbook*—and points out the rise in consumption values that would follow from adopting the latter (as now done by the NBS, in the 2006 benchmark revision).

[19]   On the use of the income approach in the calculation of value added in several tertiary sector sub-sectors see Table 3 in Carsten A. Holz, "China's Statistical System in Transition: Challenges, Data Problems, and Institutional Innovations," *Review of Income and Wealth*, Vol. 50, No. 3 (Sept. 2004), pp. 381-409.

[20]   Xu Xianchun, "Changes," p. 17, perhaps hints at the reason for avoiding revisions. He explains that the new treatment of financial sector value added has been on the agenda for a long time, but the resulting large change in the value of financial sector value added would have created a statistical break which would have been "not easy for the relevant departments and society to accept," while retrospective revisions of earlier data require a suitable opportunity, "otherwise everybody disapproves."

[21]   See, among others, Xie Haiqiu and Zhang Lihua, "Dui shouci jingji pucha ruogan wenti de sikao yu jianyi" ("Thoughts and suggestions regarding some problems in the first economic census"), *Tongji jiaoyu*, No. 2 (2006), pp. 11-3, who suggest that in their locality, Hunan Province Zhuzhou Municipality (株洲市), GDP may well be 8% higher than the economic census suggests.