Research Report

China's Urbanization Levels: Reconstructing a Baseline from the Fifth Population Census*

Zhou Yixing and Laurence J. C. Ma

ABSTRACT China's fifth population census taken on 1 November 2000 reveals that the mainland had a total population of 1,265.83 million, of which 455.94 million were urban residents (*chengzhen renkou*). This suggests that the level of urbanization was 36.09 per cent. Whereas this is a reasonable figure that appears to fit well the general rising trend of urbanization shown in the previous four censuses, the levels of urbanization reported in the five censuses are not really comparable because the criteria used to enumerate "urban" population have been different for different censuses. Before the State Statistical Bureau produces a set of comparable figures on the levels of China's urbanization based on a set of uniform criteria, the problem of data incomparability concerning the levels of urbanization will continue to baffle users. This report analyses the statistical criteria defining China's urban population used in the 2000 census, compares them with the criteria of the previous censuses and presents two sets of adjusted and internally coherent time-series data to remedy the problem of data incomparability.

On 28 March 2001, China's State Statistical Bureau (SSB) issued a communiqué announcing the major figures of the fifth population census taken on 1 November 2000.[1] It reports a total population of 1,265.83 million (excluding Taiwan, Hong Kong and Macau), of which 455.94 million were urban residents and 807.39 million were rural residents, which respectively account for 36.09 and 63.91 per cent of the total population on the Chinese mainland.[2] It was pointed out that "compared with the 1990 population census [taken on 1 July], the proportion of urban residents rose by 9.86 percentage points." With a net gain of almost 160 million urban residents and an increase of nearly 10 percentage points from the 1990 census, China's urban population has shown steady growth in the last decade. At about 456 million, the size of China's urban population today is much larger than the *total* population of any other country in the world except for India.[3]

* We would like to thank Yu Haibo and Jiang Shiguo of Beijing University and Wong Tingbor and Chen Daode of the University of Hong Kong for their cartographic assistance.

1. State Statistical Bureau (SSB, since 1998 the National Bureau of Statistics, NBS), "Communiqué on major figures of the 2000 population census (No. 1)," http://www.stats.gov.cn/english/p2000.htm.

2. The total of 1265.83 million includes 2.5 million servicemen who are not differentiated by either urban or rural places of residence. The figure of 39.09% was given by the SSB without specifying that it was based on a total population of 1263.33, which does not include the 2.5 million servicemen, and on an urban population of 455.94 million.

3. In mid-2000, India's population reached 1 billion and the population of the United States, the third largest country in the world, was estimated to be 275.6 million. See Population

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China's urban population and urbanization level have attracted a great deal of scholarly attention in recent years.[4] The intense interest in the two related subjects is attributable to the importance of urbanization as a process of urban growth involving the speed, cause and mechanism of urban population change through rural–urban migration and/or natural increase. Measured normally in terms of the size of urban population as a percentage of a nation's total population, the level of urbanization has been widely used as an indicator of national economic growth. In most non-socialist countries, the level of urbanization and the rate of economic growth have been positively correlated and tend to evolve temporally in a parallel fashion. According to the statistics published by the Population Reference Bureau (PRB), the world in 2000 was 45 per cent urban and the average level of urbanization for the "less developed" countries (excluding China) was 40 per cent.[5] The levels of urbanization vary greatly among nations, ranging from 5 per cent for Rwanda in East Africa to 100 per cent for Singapore, Kuwait, Nauru and Monaco. For most of the advanced capitalist countries the levels today are higher than 75 per cent. The level for China was given by PRB as 31 per cent, an estimate made before the release of the 2000 census results. Compared with other transitional economies such as Russia (73 per cent), Hungary (64 per cent) and Poland (62 per cent), China's urbanization level of 36.1 per cent reported in the 2000 census is still extremely low. It is even lower than the socialist states of Cuba (75 per cent) and North Korea (59 per cent).[6] This raises the question as to why China is still so much "under-urbanized," given the fact that its economy has experienced remarkable growth

footnote continued

Reference Bureau, *2000 World Population Data Sheet* (Washington, DC: Population Reference Bureau, 2001), section 1, "Population mid-2000."

4. Kam Wing Chan and Xueqiang Xu, "Urban population growth and urbanization in China since 1949: reconstructing a baseline," *The China Quarterly*, No. 104 (1985), pp. 583–613; Richard J. Kirkby, *Urbanization in China: Town and Country in a Developing Economy 1949–2000* (New York: Columbia Press, 1985); Zhou Yixing, "Guanyu mingque woguo chengzhen guannian he chengzhen renkou tongji koujing de jianyi" ("Suggestions regarding the clarification of the concepts of China's urban places and on the statistical criteria for the urban population"), *Chengshi guihua* (*China City Planning Review*), No. 3 (1986), pp. 10–15; Laurence J. C. Ma and Gonghao Cui, "Administrative changes and urban population in China," *Annals of the Association of American Geographers*, Vol. 77, No. 3 (1987), pp. 373–395; Yixing Zhou, "Definitions of urban places and statistical standards of urban population in China: problems and solution," *Asian Geographer*, Vol. 7, No. 1 (1988), pp. 12–28; Zhou Yixing and Sun Ying, "Dui woguo disici renkou pucha shizhen renkou bizhong de fenxi" ("An analysis of the ratio of the population of cities and towns in China's fourth population census"), *Renkou yu jingji* (*Population and Economy*), No. 1 (1992), pp. 21–27; Kam Wing Chan, *Cities with Invisible Walls* (Hong Kong: Oxford University Press, 1994); Zhou Yixing, *Chengshi dilixue* (*Urban Geography*) (Beijing: Shangwu yinshuguan, 1995); L. Zhang and Simon X. B. Zhao, "Re-examining China's 'urban' concept and the level of urbanization," *The China Quarterly*, No. 154 (1998), pp. 330–381; urbanization as a process can also be applied to the expansion of urban space, a topic we will not examine in this report.

5. Population Reference Bureau, *2000 World Population Data Sheet*, section 3, "percent urban."

6. In the absence of standardized international criteria defining urban places and urban population, no attempt is made here to assess the accuracy or comparability of these figures.

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and that millions of peasants have migrated to the cities since the 1978 reforms.[7]

The confusion over the meanings of China's urban population has long been known and will not be repeated here.[8] Nor will this report address the interesting questions of why the level of urbanization in China has been so low, and the relationship between urbanization and economic transition. Instead, it focuses on the problem of data incomparability in terms of China's urbanization levels over time and reconstructs a comparable time-series data set on China's urbanization levels.

We begin with the question of the latest census data. Relative to the previously published levels of urbanization, is the reported level of urbanization of 36.09 per cent for 2000 reasonable and acceptable? Table 1 shows, first, the levels of urbanization as reflected in the percentage of urban population in the national total as reported by the five official censuses of population and, secondly, the adjusted levels of urbanization reported by the State Statistical Bureau or calculated from its data. At first glance, without intercensal annual data, the five figures in the top tier (13.26, 14.10, 20.55, 26.23 and 36.09) appear reasonable enough as they show steady increase over time. However, they are not really comparable because the criteria of enumerating "urban" population have been different for different censuses, and no criteria have been used twice in a row without change. With the release of each census, the SSB has been obliged to make adjustments to the percentages of urban population for all previous years using the newly released population data as a base. However, the census data of the percentages of the "urban" population do not match the adjusted yearly percentage urban figures. For example, the adjusted figure of 18.40 per cent for 1964 is based on the criteria of the 1953 census, and yet the 1964 census reported that the official figure was 14.10 per cent, a difference of 4.3 percentage points.

The confusion over China's urban population data pervades all five censuses. If one compares the SSB's estimate of China's 1999 year-end urban ratio of 30.89 per cent (Table 2, column A) with the 2000 census figure of 36.09 per cent for 1 November, the nation's urban population

7. The thesis of under-urbanization has been examined by Gy Konrad and I. Szelenyi, "Social conflicts of underurbanization," in M. Harloe (ed.), *Captive Cities* (London: Wiley, 1977), pp. 157–173, and by Örjan Sjöberg, "Underurbanisation and the zero urban growth hypothesis: diverted migration in Albania," *Geografiska Annaler*, Vol, 74B, No. 1 (1992), pp. 3–19. For rural–urban migration, see Delia Davin, *Internal Migration in Contemporary China* (London: Macmillan Press, 1999); Thomas Scharping (ed.), *Floating Population and Migration in China: The impact of economic reforms* (Hamburg: Institut für Asienkunde, 1997); Kam Wing Chan and Li Zhang, "The *hukou* system and rural–urban migration in China: processes and changes," *The China Quarterly*, No. 160 (1999), pp. 818–855; K. W. Chan, "Post-Mao China: a two-class urban society in the making," *International Journal of Urban and Regional* Research, Vol. 20 (1996), pp. 134–150; C. Cindy Fan, "Migration in a socialist transitional economy: heterogeneity, socioeconomic and spatial characteristics of migrants in China," *International Migration* Review, Vol. 33 (1999), pp. 493–515; Flemming Christiansen, "Social division and peasant mobility in mainland China the implications of hu-k'ou system," *Issues and Studies*, Vol. 26, No. 4 (1990), pp. 78–91; Laurence J. C. Ma and Biao Xiang, "Native place, migration and the emergence of peasant enclaves in Beijing," *The China Quarterly*, No. 155 (1998), pp. 546–581.

8. Chan and Xu, "Urban population growth."

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Table 1: **Incomparability of the Census Data on the Levels of Urbanization as Reflected by the Percentage of "Urban" Population**

Census date	*Percent of urban population in national population*
30 June 1953[a]	13.26
	↓
30 June 1964[b]	(18.40) → 14.10
	↓
1 July 1982[c]	(14.40) → 20.55
	↓
1 July 1990[d]	(53.21) → 26.23
	↓
1 November 2000[e]	(31.39) → 36.09

Note:

Figures without parentheses are official census data, while the figures in parentheses are percentages for the years listed using the criteria of the preceding census. Vertical arrows indicate the resulting levels of urbanization if the criteria of the preceding census were used. Figures to the left and right of the horizontal arrows show that they lack continuity and temporal comparability because they are based on different sets of criteria.

Sources:

a. "Communiqué of the State Statistical Bureau of the People's Republic of China on the results of the national population census and registration," 11 October 1954. Text in Chinese, see http://www.stats.gov.cn/sjk/rk01.html.

b. The figure 14.1 is calculated from the "Major figures of the second national population census" published in State Statistical Bureau, *Zhongguo renkou tongji nianjian, 1988* (*China Population Statistical Yearbook, 1988*) (Beijing: Zhongguo zhanwang chubanshe, 1988), p. 331. The figure 18.4 is from State Statistical Bureau, *Zhongguo tongji nianjian, 1983* (*Statistical Yearbook of China, 1983*) (Hong Kong: Xianggang jingji daobaoshe, 1983), p. 104.

c. The census of 1982 does not have mid-year or census day data on the non-agricultural population of cities and towns, which was the basis for the 1964 criteria. But such data are available for 1981 and 1982 year-ends, given as 14.31 and 14.48 respectively in SSB, *China Population Statistics Yearbook, 2000* (Beijing: China Statistics Press, 2000), p. 448. 14.40 is the average of the two figures. The census figure of 20.55 is from Population Census Office under the State Council and State Statistical Bureau, *Zhongguo 1982 nian renkou pucha ziliao* (*1982 Population Census of China*) (Beijing: China Statistics Press, 1985), p. 27.

d. Both figures are from Population Census Office under the State Council and State Statistical Bureau, *Zhongguo 1990 nian renkou pucha ziliao* (*Tabulation on the 1990 Population Census of the People's Republic of China*) (Beijing: China Statistics Press, 1993), Vol. 1, pp. 14–18.

e. The first figure, 31.39, is our calculation using the 1999 year-end figure of 30.89% as a base and adding 0.5 percentage points to it. See text for explanation. The second figure, 36.09, is from http://www.stats.gov.cn/english/p2000.htm, p. 2.

increased suddenly by 5.2 percentage points in a matter of ten months. This raises the question of data accuracy and comparability of China's censuses and the SSB's yearly estimates in terms of urban population and urbanization level. To shed more light on this problem, we will first discuss the problem of urbanization levels for the 1953, 1964 and 1982 censuses, followed by a separate discussion on the problem for the 1990 and 2000 censuses. To facilitate the understanding of the trend of

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urbanization since the 1982 census which was taken shortly after the 1978 reforms, we have constructed two sets of adjusted and internally coherent time-series data on the levels of China's urbanization, one for the period 1990–2000 and the other for 1982–2000. The first series covers 11 years (Table 2) that reflects more accurately the rates of urbanization during the 1990s but leaves out the pre-1990 period, whereas the second series is more comprehensive covering 19 years (Table 3) but the adjusted rate of 28.35 per cent for 1990 is nearly two percentage points higher than that of the officially announced figure, 26.41 per cent (Table 3, columns E and A respectively). In general, we prefer the second series of data.

Urban Population Statistics in the 1953, 1964 and 1982 Population Censuses

Part of the reason for the confusion is the lack of standardized definitions of terms associated with China's urban population and urbanization. Indeed, even to this date, the term "urbanization" is not an official statistical indicator although the SSB has recently mentioned it in the latest population statistical yearbook.[9] Nor has the SSB consistently used a set of stable criteria to count the size of the population of cities and towns. Furthermore, the definition and meaning of "city" is also ambiguous in that it can refer to the densely populated city proper or the entire administrative area under jurisdiction of a city where a large number of rural villagers reside.[10]

In China's five censuses, the SSB has used different criteria to count the population of urban places. Prior to 1982, the urban and rural populations were categorized as "city and town population" (*chengzhen renkou*) and "rural population" (*xiangcun renkou*), but since the 1982 census, the terms have been changed to "total population of cities and towns" (*shizhen zongrenkou*) (TPCT) and "total population of rural areas" (*xiangcun zonrenkou*) respectively. Both terms for the urban population can cause a great deal of confusion because the population under either *chengzhen renkou* or TPCT may contain a large number of rural agricultural people.

As in other countries, the Chinese census has always used geographic/administrative units such as cities, counties and townships for enumeration. Historically, no criteria existed before 1954 for the division of city and county or for defining urban and rural places. In the first census taken in 1953, the enumerated urban population (*chengzhen renkou*) included the total population found within the administrative boundaries of cities and towns. The census reported that the urban population accounted for 13.26 per cent of the total population. In the 1964 census, only the

9. SSB, *Zhongguo renkou tongji nianjian* (*China Population Statistics Yearbook*) (Beijing: China Statistics Press, 2000), pp. 527–534.

10. The complexity of the criteria defining what is "urban" for the period 1953–93 has been studied in detail by Zhang and Zhao, "Re-examining China's 'urban' concept," pp. 330–340.

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non-agricultural population within the borders of cities and towns was counted as urban. This was because, in the wake of the failure of the Great Leap Forward (1958–60), the state wished to reduce the size of the nation's urban population to whom the state was obliged to provide grains and other daily goods. Thus in 1963 the State Council issued a "Directive on the adjustment of [the criteria of] establishing cities and towns and on reducing suburban districts of cities."[11] As a consequence of this policy, the urban population enumerated in the 1964 census accounted for only 14.10 per cent of the national population total. This level reflects mainly the size of the non-agricultural population of cities and towns who were entitled to the state's supply of "commodity grains" (*shangpinliang*) and it clearly under-represented the real level of urbanization. However, this figure is rarely seen in official publications as all subsequent SSB statistical yearbooks give 18.4 per cent for 1964, an adjusted figure based on the criteria of 1982. Since 1982, the SSB has published annual figures for the nation's TPCT and its percentage in the national total.

In the 1982 census, the official term used to designate urban population was changed to *shizhen renkou* (city and town population), with separate statistics listed under *shi renkou* (city population) and *zhen renkou* (certified town population). The published urban ratio of 20.55 per cent included the total population found within the administrative borders of cities and towns. As the size of the agricultural population within the administrative boundaries was small, the ratio was widely seen as a fair representation of the level of urbanization at that time.

But shortly after the beginning of economic reforms, the Chinese government felt that cities and towns had difficulty expanding outward spatially and their potential to lead economic development in their hinterlands was curtailed because their administrative power was limited to the area within their administrative boundaries. City and town boundaries had been established when cities and towns were formed from the traditional process known as *qiekuai sheshi* which literally means "cut a block [of urbanized land] to form a city." Thus to encourage the growth of cities and towns and to facilitate urban–rural integration, a new policy known as "abolishing county and changing it to city" (*chexian gaishi*) was adopted in 1983 which has since become the dominant process of establishing cities. In 1984, the state introduced the policy of "abolishing township and changing it to [certified] town" (*chexiang gaizhen*) by lowering the criteria of establishing certified towns.[12] This policy quickly enabled a large number of townships (*xiang*) to become certified towns.[13] In 1986, the criteria for establishing cities were lowered, resulting in a sudden increase in the number of "cities."[14] Local governments embraced these administrative changes because urban status is not only more

11. Ma and Cui, "Administrative changes and urban population in China," pp. 375–378.
12. *Ibid*. pp. 384–385.
13. Zhang and Zhao, "Re-examining China's 'urban' concept," p. 333.
14. *Ibid*.

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prestigious, it can also better attract investment for industrial development. From 1983 to 1998, some 380 "cities" were established through this process, accounting for 90 per cent of all cities formed during that period.[15] These "cities" and "certified towns" contain a large proportion of agricultural population, and the TPCT ratios published in SSB's annual statistical yearbooks for the years 1983–89 show a dramatic upswing, from 23.5 to 51.7 per cent in six years.[16] Clearly these grossly inflated figures of "urban" population do not reflect the true levels of China's urbanization. In 1989, for example, the agricultural population of cities and towns was as high as 63.5 per cent of the national total population, exceeding the non-agricultural population ratio of 36.5 per cent by a large margin.[17]

Comparing the 1990 and 2000 Censuses

Recognizing the problems of previous censuses and the inflation of the urban population statistics described above, the SSB adopted two sets of criteria for the enumeration of the populations of cities, towns and counties for the 1990 census.[18] The first set of criteria is as follows: city population (*shi renkou*) refers to the total population within the administrative boundaries of a city's districts (*shiqu*), including the population of certified towns that are under the jurisdiction of the city but excluding the counties under the city's jurisdiction (*shixiaxian*); town population (*zhen renkou*) refers to the total population of a certified town which is under the jurisdiction of a county (*xianxiazhen*); county population (*xian renkou*) refers to the population of the townships (*xiang*) under a county. The second set of criteria is more restrictive: city population (*shi renkou*) includes for cities that have districts (*shequ de shi*), the population of their districts (*qu*), and for cities that do not have districts (*bu shequ de shi*), the population of their subdistricts (*jiedao banshichu*); town population (*zhen renkou*) includes for towns that are under the jurisdiction of a city without city districts, the population of the towns' residents' committees (*jumin weiyuanhui*), and for towns that are under the jurisdiction of a county, the population of the towns' residents' committees; county population (*xian renkou*) incorporates the rest of the country's population not counted in the preceding two categories.

The 1990 census used both sets of criteria to enumerate the populations of cities and towns. The first yielded a total of 601.56 million, 53.21 per cent of the total population of the nation. This figure is clearly too high

15. Dai Junliang, *Zhongguo shizhi* (*Administrative Systems of China's Cities*) (Beijing: China Map Publishing House, 2000), p. 67.

16. See SSB, *Zhongguo tongji nianjian, 1990* (*Statistical Yearbook of China, 1990*) (Beijing: China Statistics Press, 1990), p. 89. These figures were adjusted downward to 21.6% to 26.2% in the 1991 yearbook, based on the 1990 census returns.

17. Zhou and Sun, "Analysis of the ratio of the population," p. 21.

18. Population Census Office under the State Council and SSB, *Zhongguo 1990 nian renkou pucha ziliao* (*Tabulation on the 1990 Population Census of the People's Republic of China*) (Beijing: China Statistics Press, 1993), Vol. 1, p. 2.

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to be acceptable as a reasonable level of China's urbanization. The total population of cities and towns enumerated under the second set of criteria was 296.15 million, or 26.23 per cent of the nation's total population. This figure is a much more realistic indicator of the level of China's urbanization because the criteria counted the residents only of densely populated and urbanized areas. It should be noted here that the first set of criteria was the same as the 1982 criteria which produced the exaggerated rate of 53.21 per cent for 1990 (Table 1). If applied to 1999, the rate would jump to the unthinkable level of 73 per cent.

The bulk of the data in the 1990 census are based on the second set of criteria, but there are some problems. In general, in the data using the second set of criteria listed above, there was overcount for "cities with districts" as the enumeration was based on the total population of city districts. On the other hand, there was undercount for "cities without districts" and for certified towns because only the populations of their urban neighbourhoods and residents' committees were counted. In other words, essentially, for larger cities at the provincial level (Beijing, Shanghai and Tianjin) and at the level of the prefecture (*dijishi*), the census counted the total population of city districts, including their agricultural population; however, for smaller cities, mainly cities at the county level (*xianjishi*), and for certified towns, it counted essentially the populations of their subdistricts and residents' committees who were largely non-agricultural. On balance, the effects of overcount and undercount for the two types of cities cancelled each other out. In general, the reported level of 26.23 per cent slightly under-represents the real level of urbanization, but it is a fairly reasonable and acceptable indicator.

The 1990 level of urbanization based on the second set of criteria, 26.23 per cent, goes quite well with the 1982 level of 20.55 per cent. However, the 1990 census criteria do not solve the basic problem of urban population enumeration caused by the administrative changes of cities and towns beginning in the 1980s, that is, the changes of counties to cities, townships to towns, and counties to city districts. Apart from the problems of overcount and undercount, the 1990 census is also complicated by the fact that the statistics for cities and for towns are not comparable because the criteria of enumeration are different. In addition, the data for different provinces are not comparable because of the diverse ways that provinces adopted urban administrative changes.

Recognizing these problems, the 2000 census changed the criteria of enumerating urban population. As in the 1990 census, cities are classified into two types: cities with districts and cities without districts. For both types of cities, urban population refers to the resident population (*changzhu renkou*) of the place of enumeration who had resided there for more than six months on census day.

More specifically, in the 2000 census, for cities with districts (essentially province- and prefecture-level cities), urban population refers to: the total population within the boundary of any city-administered district (*shixiaqu*) where population density is at least 1,500 persons per square kilometre; or, where the population density of a city-administered district

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is less than 1,500 persons per square kilometre, either the population within the administrative boundaries of the subdistricts (*jiedao banshichu*) in the district, including the subdistrict where the district government (*quzhengfu zhudi*) is located, or, if the built-up areas of the subdistrict serving as the district seat have extended to the surrounding townships and/or towns, the total population within the boundaries of such townships and/or towns.

For cities without city districts (county-level cities), the population of the following places was counted as urban: the population within the administrative boundaries of the subdistricts of the city, including the subdistrict or town serving as the seat of the city; and, if the built-up areas of the subdistrict or town that serves as the seat of a city have extended to the surrounding townships and/or towns, the total population within the administrative boundaries of such townships and/or towns.

For certified towns, the population of the following places was enumerated as urban:[19] the population within the boundaries of the town's residents' committees (*jumin weiyuanhui*), including the one where the town government is located; and, if the built-up areas of the residents' committee that serves as the town seat have extended to the seats of the surrounding villagers' committees (*cunmin weiyuanhui*), the total population within the boundaries of such villagers' committees.

Apart from the above criteria, the 2000 census also classified the population of the following special places as urban if the resident population exceeds 3,000: mining districts, economic development districts (*kaifaqu*), tourist districts, places of scientific research, universities and colleges. The population of all other places is classified as rural population.

The gist of the rather cumbersome and complex 2000 census criteria given above can be summarized as follows. First, the new census uses population density to separate the "cities with districts" into two types. For city districts with more than 1,500 persons per square kilometre, which generally refer to the urban core and inner suburban districts, their entire population is counted as urban. For city districts with less than 1,500 persons per square kilometre, which mainly refer to outer suburban districts, only the population in the built-up areas of the city districts is counted as urban. These criteria partially corrected the problem of overcount for "cities with districts" found in the 1990 census in which the enumeration was based on the total population of city districts. Secondly, for county-level cities and for certified towns, the population of city subdistricts and residents' committees that are typically urbanized places is counted as urban. Also counted as urban are the population of a town seat (normally a residents' committee) and the total population within the boundaries of the villagers' committee if the town seat's built-up areas have extended to the seat of the villagers' committee. As these criteria

19. The following two stipulations also apply to the certified towns located within the administrative boundaries of "cities with districts" as well as of "cities without districts."

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include the vast majority of the non-agricultural population in the areas under the jurisdiction of smaller cities without districts and for certified towns, they to a significant extent correct the undercount problem of the 1990 census discussed earlier. Such changes of criteria enabled the 2000 census to enumerate the urban population much more realistically than the 1990 census.

To facilitate the understanding of the differences between the 1990 and 2000 censuses, the areas where the population was counted as urban are shown schematically in Figure 1. It should be noted that because of the complexity of the criteria, it would take at least a dozen maps to show all of the conditions under which the population was counted as urban, here condensed into four maps.

Figure 1 further shows that there was overcount in the district population in the 1990 census, a problem which was significantly rectified by the 2000 criteria.

Explaining the Difference in the Urban Ratios of the 1990 and 2000 Censuses

From the discussion above, it is clear that the criteria of the 2000 census are superior to those of the 1990 census. Since 1990, the SSB has conducted annual sample surveys of the nation's urban population using the 1990 census criteria and published annual statistics on the nation's urban population size and its percentage share of the national population. The SSB has also used the 1990 criteria to correct the problem of overcount for the period 1982–89. At the end of 1999, the TPCT of the nation stood at 388.92 million, which accounts for 30.89 per cent of the national population total.[20] The 2000 census, taken on 1 November, gave the TPCT as 455.94 million, or 36.09 per cent of the total population. Thus the difference between 2000 based on 2000 criteria and 1999 based on 1990 criteria is 5.2 percentage points. Assuming the year-end statistics published by the SSB for 1990–99 are accurate, then China's urbanization during the nine-year period increased by an average of 0.50 percentage point per year ([30.89–26.41]/9 = 0.49777). Assuming further that the rate of urbanization in 2000 was the same as that of the previous nine years and ignoring the two months between 1 November and 31 December 2000, then the rate of urbanization on the day of the 2000 census based on the 1990 criteria should be 31.39 per cent (30.89 + 0.5 = 31.39). Thus the difference of the level of urbanization at the end of 2000 based on the criteria of 2000 and 1990 is 4.7 percentage points (36.09 − 31.39 = 4.7), which accounts for 13 per cent of year 2000's 36.09. This difference is not large and can be explained.

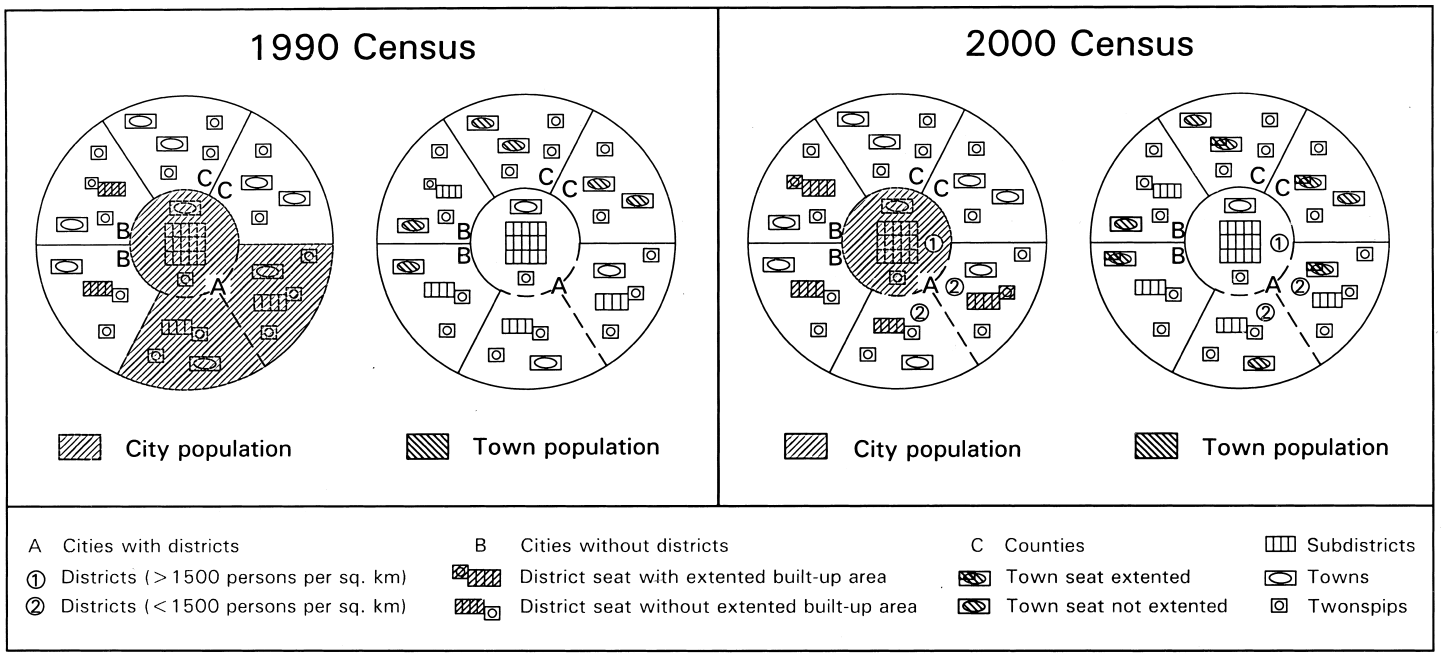
The 1990 and the 2000 censuses were both based on the resident population of the enumerated places and both included migrants (*wailai renkou*, literally, "people from the outside") who have constituted an

20. SSB, *Zhongguo tongji nianjian, 2000* (*Statistical Yearbook of China, 2000*) (Beijing: China Statistics Press, 2000), p. 95.

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Figure 1: **Schematic Representation of the Areas where the Population was Enumerated as Urban by the 1990 and 2000 Censuses**



increasingly large share of the urban population. However, the two censuses differed in how the migrants were counted. In the 1990 census, migrants were counted in the resident population of the place where they were residing on census day if they had left the place of their household registration for a year or more.[21] But in the 2000 census, the time criterion was shortened to six months, thereby including more migrants. For the purposes of this report, it does not really matter whether six months or one year would make a better criterion for enumerating the migrants as urban. However, our view is that enumeration criteria should not be changed frequently as each change makes the population statistics more complicated and less comparable.

The 2000 census made two kinds of improvement over the 1990 census. First, the census considered the following places as urban if their resident population exceeded 3,000: mining districts, economic development districts, tourist districts, and places of scientific research and college towns. This shows that the SSB recognized the importance of a place's economic function as a criterion for enumeration, a development that breaks the rigid census tradition of tying urban population only with the administrative/spatial system of China's cities and towns. Secondly, many economically advanced villages have become increasingly urban in physical appearance, in people's lifestyle and in economic and occupational structure as a result of rural industrialization, but their population had not been counted as urban until the 2000 census.

It is our view that the factors analysed in the preceding two paragraphs adequately account for the 4.7 percentage point discrepancy produced if the criteria of 1990 are applied to the 2000 urban population with due consideration given to the growth rate in the intercensal years. Unfortunately it is impossible to ascertain the relative importance of each of the factors in affecting the outcome of the urban population data.

A Set of Comparable Time-Series Data for China's Urbanization Level

The SSB's 28 March 2001 communiqué on the 2000 census states: "Compared with the 1990 population census, the proportion of urban residents rose by 9.86 percentage points."[22] This is a simplistic statement that does not mention the fact that the urban data of the two censuses are not comparable because the criteria of enumeration are different. As

21. More specifically, migrants would be counted as resident population of the place where they were residing if they had left the place of their original household registration and had resided at the place of enumeration for more than a year on census day, or if they had resided at the place of enumeration for less than a year but had left their place of household registration for a year or more on census day. This stipulation helps avoid double counting at both the place of residence and the place of original household registration. For example, a migrant could have left the place of his/her original registration and lived at place A for three months. S/he then moved to place B and lived there for four months. Then s/he moved to place C and lived there for five months. It was at place C when the census day arrived. As s/he had already left his/her place of original registration for a year, s/he was counted only at place C, not at the place of original household registration.

22. SSB, "Communiqué," p. 2, section VIII.

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pointed out earlier, the level of urbanization in the 2000 census, 36.09 per cent, differs by 5.2 percentage points from SSB's estimated level of 30.89 per cent for 1999 based on the criteria of the 1990 census. Accepting the average annual rate of increase in the level for the nine years from 1990 to 1999 as the rate of increase for 1999–2000, then the discrepancy between the two becomes 4.7 percentage points. These 4.7 percentage points must be distributed to previous years if a set of comprehensive, up-to-date, logical and standardized time-series data on China's urban population level is to be constructed. This means that we should apply the 2000 census criteria backward in time to adjust the urban population statistics of previous years, in the same manner as Zhou and Sun had used the 1990 census criteria to modify the levels of urbanization for the pre-1990 years.[23] Such a new data set would ensure comparability of the urban population statistics over time and avoid the erratic dips and peaks in the distribution of urban population ratios produced by the changes in the definitions of urban places or by the adoption of new criteria for the enumeration of urban population. We endeavour to accomplish this task in this section.

We employ the "United Nations method" of estimating and projecting urban population.[24] This method has been widely used to forecast the levels of urbanization in various countries, including China.[25] Essentially, it uses the urban and rural population sizes of two census years and seeks to determine their growth rate difference. If the growth rate difference is kept stable for the period of estimation, then the theoretical and adjusted proportions of the urban population in the total population for the years between the two census years can be obtained through extrapolation. First, the urban/rural growth difference between the two census years can be obtained by:

$$\mathrm{URGD} = \mathrm{In}\frac{PU(2)/[1 - PU(2)]}{PU(1)/[(1 - PU(1)]} /n \qquad (1)$$

where $URGD$ = urban/rural population growth rate difference, $PU(1)$ = urban population ratio of the earlier census year, $PU(2)$ = urban population ratio of the later census year, and n = number of years between the two census years. Then the urban population ratio of year t can be estimated by:

$$\frac{PU(t)}{1 - PU(t)} = \frac{PU(1)}{1 - PU(1)} * e^{URGD*t} \qquad (2)$$

where $PU(t)$ = urban population ratio of year t after the previous census year.

23. Zhou and Sun, "Analysis of the ratio of the population."
24. United Nations, *Patterns of Urban and Rural Population Growth* (New York: United Nations, 1980), pp. 9–13.
25. Zhou and Sun, "Analysis of the ratio of the population."

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It should be pointed out that, in our case, the growth rate of China's urban population ratios for the years to be adjusted varied from year to year, and the actual urban or rural population growth rate difference was not as uniform as the United Nations method assumes. Thus it is necessary to employ published statistics to readjust the theoretical values.

We have developed two sets of time-series data on China's urban population ratios, one beginning with 1990 and the other with 1982, to iron out the problem of data discrepancy, that is, the difference of 4.7 percentage points in urban population ratios discussed above. As many of the problems of China urban population statistics stem from administrative changes in the status of cities and towns described above that began only after the 1982 census, and as the pre-1982 urban ratios reflect fairly well the levels of urbanization of the pre-reform era, there is no need to adjust the pre-1982 statistics. In addition, our adjusted values for the post-1982 years fit quite well the trend of urbanization of the pre-1982 years published by the SSB that are readily available in the *Statistical Yearbooks of China*. If our adjusted data are accepted, then there is a complete set of internally coherent, logical and comparable statistics on China's urbanization level for the period 1949–2000.

Adjusted Levels of Urbanization, 1990–2000

China's urban population as a percentage of the national total for the period 1990–2000 has been published by the SSB in the annual *China Statistical Yearbook* (Table 2, column A). From this column, we apply 0.2623 (for 1 July 1990), 0.3609 (for 1 November 2000) and $n = 10.33$ to Equation (1). We get URGD = 0.44766612, which is then applied to Equation (2) and we get the adjusted theoretical values for the period using the United Nations method (Table 2, column B). The data in column B require adjustment again based on published ratios and time difference. Applying the 1990 census value of 26.23 per cent, the 1999 year-end value of 30.89 per cent which the SSB has estimated based on the 1990 census criteria, and the number of years between the two dates, $n = 9.5$, to Equation (1), we get URGD = 0.024082255. This value is then applied to Equation (2) to obtain the theoretical values for the period based on the 1990 census criteria using the United Nations method (Table 2, column C). The next step is to calculate the ratios between the actual and theoretical values (Table 2, column D), which represent the trend in the growth rates of China's urbanization between 1990 and 1999 and which can be used as coefficients of adjustment. The last step is to multiply the values in column B by the adjustment coefficients to obtain our suggested levels of urbanization (Table 2, column E).

The strength of this adjusted time-series statistics on China's year-end urbanization level lies in the fact that it preserves the integrity of the 1982, 1990 and 2000 censuses. But it suffers from the fact that it does not cover the pre-1990 period. Also, the estimation distributes the 4.7 percentage point difference created by the different criteria of urban population enumeration in the 1990 and 2000 censuses to the decade of the

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Table 2: **Adjusted Levels of Urbanization, 1990–2000**

	A *Official SSB level*	*B* *Theoretical level using UN method of adjustment (%)*	*C* *Theoretical level based on 1990 criteria and using UN method of adjustment (%)*	*D* *Adjustment coefficient (D = A/C)*	*E* *Final adjusted level (E = B*D) (%)*
1990, 1 July	(26.23)	(26.23)	(26.23)	–	(26.23)
1990 year-end	26.41	26.67	26.46	0.9981	26.62
1991 year-end	26.37	27.55	26.93	0.9792	26.98
1992 year-end	27.63	28.45	27.41	1.0080	28.68
1993 year-end	28.14	29.37	27.89	1.0090	29.63
1994 year-end	28.62	30.31	28.38	1.0085	30.57
1995 year-end	29.04	31.26	28.87	1.0059	31.44
1996 year-end	29.37	32.23	29.37	1.0000	32.23

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1997 year-end	29.92	33.22	29.87	1.0017	33.28
1998 year-end	30.40	34.22	30.38	1.0007	34.24
1999 year-end	30.89	35.23	(30.89)	–	35.23
2000, 1 Nov.	(36.09)	(36.09)	–	–	(36.09)
2000 year-end	–	36.26	–	–	36.26

Note:

SSB's 1995 1% national population sample survey conducted on 1 October indicates that the urban ratio was 28.85%. Our 1995 year-end figure given above is 0.19 percentage points higher, which is due to population change in the last three months of the year. As the 1% survey was also based on the 1990 criteria, we did not single it out for special consideration. That the 1% survey was based on the 1990 criteria is indicated by "Zhonghua renmin gongheguo guojia tongjiju guanyu 1995 nian quanguo 1% renkou chouyang diocha zhuyao shuju de gongbao" ("Communiqué on the major figures of the 1995 1% national population sample survey"), in SSB, *Zhongguo renkou tongji nianjian, 1995* (*China Population Statistical Yearbook, 1995*) (Beijing: China Statistics Press, 1996), p. 5.

Sources for A:

The official level of urbanization for 1 July 1990 census is 26.23%, which is calculated from Population Census Office under the State Council and SSB, *Tabulation on the 1990 Population Census of the People's Republic of China* (Beijing: China Statistics Press, 1993), Vol. 1, pp. 16–18. The official level for the 1 November 2000 census is 36.09%, which is from SSB, "Communiqué on major figures of the 2000 population census (No. 1)," http://www.stat.gov.cn/english/p2000.htm, p. 2. Year-end data for 1990–99 are from SSB, *China Statistical Yearbook, 2000* (Beijing: China Statistics Press, 2000), p.95.

1990s, giving rise to an average annual urbanization growth rate of 0.96 percentage points which exceeds the SSB's published rate of 0.7 for the 1982–90 period as well as the average growth rate of 0.50 for 1990–99 found in the SSB statistics discussed earlier. However, it is our view that our adjusted values represent the best approximation of the actual levels of urbanization for the period 1990–2000 and they reflect well the accelerated tempo of urbanization in the second decade of China's economic reforms.

Adjusted Levels of Urbanization, 1982–2000

To rectify the problems identified above, we extend the period backward to 1982 and reconstruct a set of more comprehensive time-series statistics with consistent and comparable criteria. As in the previous estimation, we apply PU(1) = 0.206 (the result of 1982 census), PU(2) = 0.3609 (the result of 2000 census) and n = 18.33 to Equation (1) to obtain URGD = 0.0424226 which is then applied to Equation (2) to obtain the theoretical adjusted values (Table 3, column B). Applying PU(1) = 0.206, PU(2) = 0.3089 and n = 17.5 to Equation (1), we get URGD = 0.03108231 which is then applied to Equation (2) to obtain the theoretical values according to the 1990 census criteria (Table 3, column C). With A/C, we get the coefficients of adjustment (column D). Our final adjusted values of urbanization level are obtained by B * D (column E).

This set of adjusted statistical series begins with 1982, the third year of economic reforms, and it presents an internally logical, comparable, up-to-date and complete picture of the trend of China's urbanization under economic restructuring. It preserves the integrity of the enumeration criteria of the 1982 and 2000 censuses although the result of the 1990 census, 26.23 per cent as of 1 July 1990, does not fit in. In general, we prefer this set of statistics to the previous one.

Concluding Comments and Suggestions

We conclude this report with a few comments and suggestions on China's urban population statistics. As the SSB has not published China's urban population ratios at the provincial and local levels since the 1990 census, a major question that demands scholarly attention is whether the announced urban population ratio of 36.09 per cent can match the final tabulations of the 2000 census.[26] It is suggested that the SSB should take the opportunity of tabulating the 2000 census to establish a complete set of standardized statistics on provincial urban population for the years after 1982 (or at least after 1990) that can truly reflect China's urbanization. This would provide policy makers at the national and provincial

26. Provincial urban population data are available in SSB, *Zhongguo renkou tongji nianjian* (*China Population Statistical Yearbook*) (Beijing: China Statistics Press, 2000), pp. 449–452. But as such data are based on 1982 criteria of counting TPCT, they cannot be used to reflect China's urbanization levels. This source shows that the urban ratio was 20.8% in 1982, 52.3% in 1990 and 73.0% in 1999.

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Table 3: **Adjusted Levels of Urbanization, 1982–2000**

	A *Official SSB level (%)*	*B* *Theoretical level using UN method of adjustment (%)*	*C* *Theoretical level based on 1982 and 1999 figures and using UN method of adjustment (%)*	*D* *Adjustment coefficient (D = A/C)*	*E* *Final adjusted level (%) (E = B * D)*
1982, 1 July	(20.55)	(20.55)	(20.55)	–	(20.55)
1982 year-end	21.13	20.95	20.86	1.0129	21.22
1983 year-end	21.62	21.66	21.37	1.0117	21.91
1984 year-end	23.01	22.39	21.90	1.0507	23.52
1985 year-end	23.71	23.13	22.44	1.0566	24.44
1986 year-end	24.52	23.90	22.98	1.0670	25.50
1987 year-end	25.32	24.68	23.54	1.0756	26.55
1988 year-end	25.81	25.47	24.10	1.0710	27.28
1989 year-end	26.21	26.29	24.67	1.0624	27.93
1990 year-end	26.41	27.12	25.26	1.0455	28.35

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1991 year-end	26.37	27.97	25.85	1.0201	28.53
1992 year-end	27.63	28.83	26.45	1.0446	30.12
1993 year-end	28.14	29.71	27.06	1.0399	30.90
1994 year-end	28.62	30.60	27.67	1.0343	31.65
1995 year-end	29.04	31.51	28.30	1.0261	32.33
1996 year-end	29.37	32.43	28.94	1.0149	32.91
1997 year-end	29.92	33.37	29.58	1.0115	33.75
1998 year-end	30.40	34.32	30.23	1.0056	34.51
1999 year-end	30.89	35.28	(30.89)	–	35.28
2000, 1 Nov.	(36.09)	(36.09)	–	–	(36.09)
2000 year-end	–	36.25	–	–	36.25

Note:

The year-end figures for 1982–89 were adjusted by the SSB according to the criteria of the 1990 census.

Sources for A:

For 1 July 1982 census, Population Census Office under the State Council and SSB, *Zhongguo 1982 nian renkou pucha ziliao* (*1982 Population Census of China*) (Beijing: China Statistics Press, 1985), p. 27; for 1982–84, SSB, *Zhongguo tongji nianjian, 1991* (*China Statistical Yearbook, 1991*) (Beijing: China Statistics Press, 1991), p. 79; for 1985–99, SSB, *China Statistical Yearbook, 2000* (Beijing: China Statistics Press, 2000); for 1 November 2000 census, SSB, "Communiqué on major figures of the 2000 population census (No. 1)," http://www.stats.gov.cn/english/p2000.htm, p. 2.

levels with an important guide in the formulation of urbanization policies and benefit scholarly analysis of China's urbanization.

Secondly, scholars have long criticized the problems with China's urban population statistics.[27] It is highly undesirable for any nation to shift its statistical criteria and to make frequent adjustments to the published statistics which cause confusion, render the statistics incomparable, make them difficult to use and reduce their value. We hope that China's urban statistics can one day be standardized and spared the pains of going through frequent changes. Whereas we have no objection to minor adjustments periodically, major shifts in the definition of urban places and their population and in enumeration criteria should be avoided.

Thirdly, in the five national censuses taken thus far, China has never employed the same set of urban population criteria twice in a row. This has been caused in part by the lack of co-ordination between changes in the administrative set-ups of cities and towns and the collection of their population statistics in the censuses. Whereas the 2000 criteria have basically solved the problem of overcount for cities with districts for now, it remains unclear, for cities without districts and for designated towns, if future changes in the establishment of cities and towns would not gradually shift the existing problem of undercount to overcount in the future. We have this fear because, in the drive for urban development in the last few years aimed at making cities, large and small, the motors of urban–rural integration and regional economic development, the administrative set-ups of cities and towns and the status of counties and townships have been significantly altered. This includes: an increasing number of counties and county-level cities that have been changed to "districts" of larger cities; more and more townships that have merged with towns, especially the smaller and economically weak townships; and many seats of county-level cities and counties which have enlarged their areas of jurisdiction to include more adjacent townships and towns, with the annexed townships turned into subdivisions and their village residents' committees changed to residents' committees. Such changes of administrative status from rural to urban places can lead to an overcount of their population as urban. The problem of overcount, of course, will not surface if the populations of such places are truly urban in location, occupation and lifestyle. However, the problem will certainly intensify as

27. Leo A. Orleans, "China's urban population: concepts, conglomeration and concerns," Joint Economic Committee, US Congress, *China Under the Four Modernizations*, Part I (Washington, DC: US Government Printing Office, 1982), pp. 268–302; Leo A. Orleans and Ly Burnham, "The enigma of China's urban population," *Asian Survey*, Vol. 24, No. 7 (July 1984), pp. 788–804; Chan, *Cities with Invisible Walls*; Zhang and Zhao, "Re-examining China's 'urban' concept." Zhou Yixing and Shi Yulong, "Toward establishing the concept of physical urban area in China," *The Journal of Chinese Geography*, Vol. 5, No. 4 (December 1995), pp. 1–15; Zhou Yixing and Shi Yulong, "Guanyu woguo shizhen renkou de ji ge wenti" ("Several questions regarding China's urban population"), *Renkou yu jingji* (*Population and Economy*), No. 6 (1990), pp. 9–13 and 39; Laurence J. C. Ma, "Preliminary results of the 1982 census in China," *Geographical Review*, Vol. 73, No. 2 (1983), pp. 198–210; Laurence J. C. Ma and Allen G. Noble, "Chinese cities: a research agenda, *Urban Geography*, Vol. 7, No. 4 (1986), pp. 279–290; and Clifton W. Pannell, "Recent increase in Chinese urbanization," *Urban Geography*, Vol. 7, No. 4 (1986), pp. 291–310.

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more and more places that have a large number of rural residents are merely statistically reclassified as urban places or as their populations are counted as urban.

Finally, although the 2000 year-end level of China's urbanization, which we have calculated at 36.25 per cent, is higher than any time in the past, it still represents considerable "under-urbanization," a condition long recognized by scholars.[28] Although the low urbanization level has been due mainly to the previous policy of socialist industrialization with controlled urbanization, the problems of collecting urban population statistics discussed in this report are also partially responsible. Shortly before and after the 2000 census, the targets of urban growth and urbanization for the Tenth Five-Year Plan (2001–2005) period were set by the central and local authorities. But as the results of the 2000 census were not yet released at the time, the central as well as local governments had to use the criteria and results of the 1990 census to set the targets of urbanization for the Tenth Five-Year Plan. With the release of the results of the 2000 census, governments at various levels must now adjust their targets for urban growth during the new Plan period. We hope that our analysis of the problems of urban population statistics and our suggested time-series data on the nation's urbanization levels for various years will provide them with a solid baseline to make sound decisions regarding the future of China's urbanization at the national as well as local levels. We also hope that the SSB will either adopt our adjusted time-series data presented here or use our approach to data adjustment, which is internally coherent and temporally comparable, to produce a set of official statistical series on China's urbanization levels.

28. Zhou Yixing and Cao Guangzhong, "Gaige kaifang jin ershi nian lai Zhongguo chengshihua jincheng" ("The progression of China's urbanization in the two decades since economic reforms and open-door"), *Chengshi guihua* (*City Planning Review*), No. 12 (1999), pp. 8–15; Zhou Yixing, *Chengshi dilixue* (*Urban Geography*) (Beijing: Shangwu yinshuguan, 1995), pp. 134–36; Wang Yiming *et al.*, "Guanyu jiakuai chengzhenhua jincheng de ruogan wenti yanjiu" ("A study of the issues of accelerating the progression of urbanization"), *Hongguan jingji yanjiu* (*Macroeconomics Research*), No. 2 (2000), pp. 3–11; M. X. Ran and B. J. L. Berry, "Underurbanization policies assessed: China, 1949–1986," *Urban Geography*, Vol. 10, No. 2 (1989), pp. 111–120.

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