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Urbanization in China in the 1990s: New Definition, Different Series, and Revised Trends[*]

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Abstract

This paper tackles new problems concerning China's urban population figures and the annual urban population series arising from the use of a new Census 2000 urban definition. The paper extends existing research and incorporates crucial findings not available or previously overlooked. The paper assesses major competing urban annual series for the 1990s, including the latest released in the *Zhongguo tongji nianjian 2002* and checks empirically the different series of urban population estimates, by

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decomposing them and comparing the trends to those derived from migration and employment data from other sources. Based on the examination of several sets of data, revised urbanization and migration trends in the 1990s are presented. The paper also provides guidance on the use of the current urban population data and helps to establish a critical baseline for studying urbanization and migration in the 1990s, which was an important decade of urban change in China.

Introduction

Few would dispute that a rapid urban transformation has been under way in mainland China since the early 1980s. Indeed, China is probably one of the fastest urbanizing countries in the world.[1] Understanding the Chinese urban definitions and figuring out the urban population size will have many important implications for social science research. Obviously, China's huge population weight means that any reasonable continental or global forecast of urban growth cannot treat China lightly. To the scholarly community involved in research on China, many studies of Chinese society and economy rely instrumentally on being able to measure and classify meaningfully the urban and rural populations, on which other rural/urban variables (such as rural and urban employment and consumption) are based. To urbanists studying China, its urban growth and migration are also an important part of understanding this allegedly unique case of urban development.[2]

However, the task of figuring out China's urban growth and its trends does not seem to be an easy one. For more than two decades, students of Chinese urbanization have laboured diligently, and at times struggled, to deal with China's complex urban definitions, its urban population sizes and trends.[3] While scholars have already made tremendous progress in tackling this issue as far as previous data are concerned, mostly at the national level pertaining to the pre-1996 era, new developments in China and the accompanying changes in urban definition have again required us to revisit this subject and do further work on it.

In March 2001, in its first news release of the Census 2000 results, China's National Bureau of Statistics (NBS) reported that the urban population (excluding servicemen) in mainland China had reached 455.94 million, or 36.09% of the total population, on 1 November 2000. This set of figures, based on a new urban definition, reports a much larger urban population than we were aware of for the previous year, 1999 (year-end): 388.92 million, or only 30.89% of the total population (see Table 1,

Table 1: China's National Urban Percentages: Recently Published Statistics and Estimated Figures (Year-end), 1990–2000

	Published Statistics			Estimations			
	Census/ Mini-census	*TJNJ 2001*	*TJNJ 2002*	Estimation 1		Estimation 2	
				% Urban	Annual change in urban percentage	% Urban	Annual change in urban percentage
Year	% Urban	% Urban	% Urban				
	1	2	3	4	5	6	7
1990	26.23 (1 July)	26.41	26.41	26.41		26.41	
1991		26.37	26.94	26.94	0.53	27.00	0.59
1992		27.63	27.46	27.46	0.53	28.01	1.01
1993		28.14	27.99	27.99	0.53	29.27	1.26
1994		28.62	28.51	28.51	0.53	30.69	1.42
1995	28.62 (1 Oct., 1% sample)	29.04	29.04	29.04	0.53	31.72	1.03
1996		29.37	30.48	30.48	1.44	32.74	1.02
1997		29.92	31.91	31.91	1.44	33.59	0.85
1998		30.40	33.35	33.35	1.44	34.27	0.68
1999		30.89	34.78	34.78	1.44	35.15	0.88
2000	36.09 (1 Nov)	36.22	36.22	36.22	1.44	36.22	1.07

Sources of the published statistics:

State Council Population Census Office, *Zhongguo disici renkou pucha de zhuyao shuju* (Major Figures from the Fourth Population Census of China) (Beijing: Zhongguo tongji chubanshe, 1991), p. 43.

National Population Sample Survey Office, *1995 Quanguo 1% renkou qiuyang diaocha ziliao* (Data on 1995 National 1 Percent Population Sample Survey) (Beijing: Zhongguo tongji chubanshe, 1997).

NBS, *2000 nian diwuci quanguo renkou pucha zhuyao shuju gongbao (di yi hao)* (Communiqué on Major Figures of the 2000 Population Census [No. 1], 28 March 2001.

NBS, *Zhongguo tongji nianjian 2001* (*TJNJ 2001)* (Statistical Yearbook of China 2001). (Beijing: Zhongguo tongji chubanshe, 2001), p. 91.

NBS, *Zhongguo tongji nianjian 2002 (TJNJ 2002)* (Statistical Yearbook of China 2002). (Beijing: Zhongguo tongji chubanshe, 2002), p. 93.

Notes: Servicemen are included in the urban counts except Column 1. For explanations of the estimations, see the text. The urban percentage series in *TJNJ 2002* and that generated by Estimation 1 are the same.

Columns 1 and 2). The jump of more than five percentage points within ten months has obviously raised many questions about Chinese urban definitions, urban population statistics, and the new changes, and points to the need for understanding the complexity carefully, and adjusting them to bring about some consistency, if possible.[4]

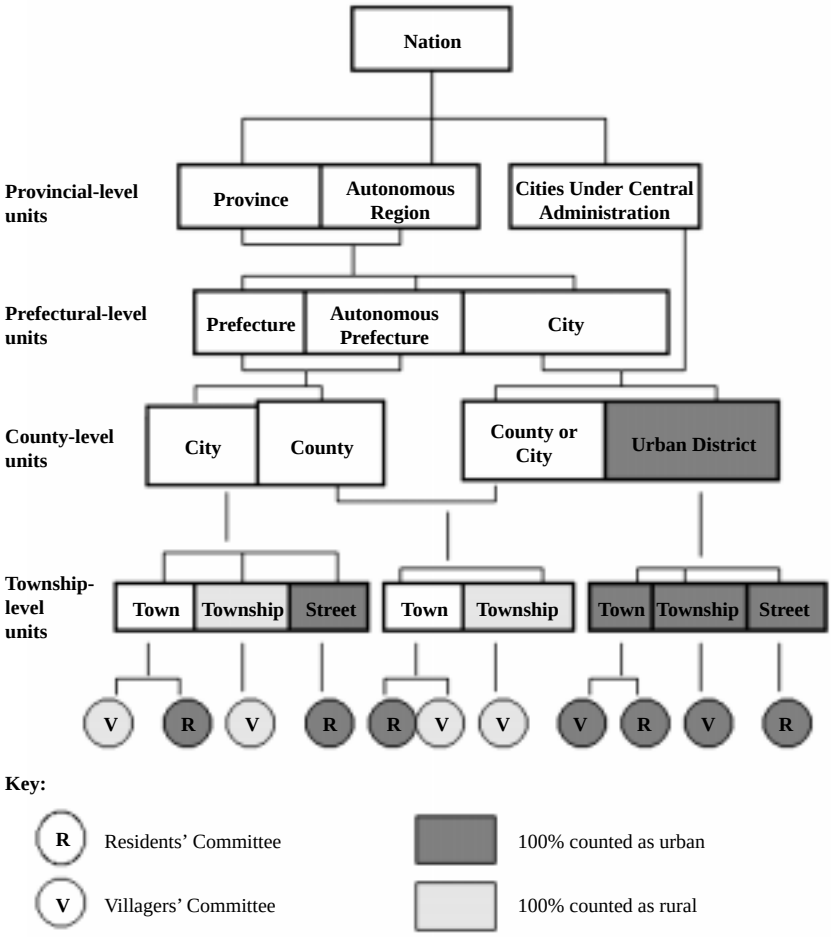
Zhou Yixing and his associates have recently begun to address the issues above.[5] This paper takes a few steps further in the same direction by using more comprehensive data and conducting analysis and empirical checks. We incorporate crucial findings (such as those by Yu Hongwen) which were not available or were overlooked; analyse major competing urban annual series for the 1990s, including the latest new series released in the *Zhongguo tongji nianjian* (hereafter, *TJNJ*) *2002*; check empirically the different series of urban population estimates, by decomposing them and comparing the trends to those based on migration data from other sources, to establish a usable series; and assess and revise the urbanization and migration trends in the 1990s. In this paper, we first briefly summarize the new definitional changes in the latest census in 2000, compared to the 1990 definitions. We then tackle the existing inconsistencies and re-estimate the urban population series of the 1990s, following this with an evaluation of the results. In the final section, we compare our results with the new official annual urban population series released by the NBS in late 2002 and use our findings to analyse the urbanization and migration trends in the 1990s. This paper helps to establish a critical baseline for studying the urban growth and migration trends of the 1990s, which was an important decade of urban change and voluminous migration in China.

Urban Definitions: 1990 and 2000

In general, urban population is defined as the resident population in "urban" areas. In the 1990 Census, the resident population was composed of the population who had local *hukou* and the non-*hukou* population who had been in the locale for at least one year prior to the census. Geographically, all "districts" under provincial- and prefectural-level cities were classified as urban. For county-level cities and towns, only areas where there were Residents' Committees were deemed urban (see Figure 1).[6] That approach to classifying urban areas was strictly administrative, in the sense that it relied on the administrative rank of the city and the boundary of an administrative unit.

While the 1990 definition was quite straightforward to implement and

Figure 1: Definition of "Urban" Areas in the 1990 Census



Source: Based on Chan (Note 2), p. 22.

was an improvement over the previous one used in 1982, the 1990 approach also suffered from several major drawbacks because the administrative boundaries and urban administrative designations in some cases reflected poorly the actual degree of urbanization and urban activities (mainly industrial development) on the ground. This problem became more serious in the 1990s, when urban designations and industrialization appeared to diverge even more in many places and regions.[7] In short, the

1990 approach resulted in significant overcounting of the urban population in many suburban districts (mostly in large cities) and in some county-level cities, but also serious undercounting in many townships, especially in the peri-urban regions and in coastal deltas. Despite this, these two factors tend to cancel each other out in the national urban totals, resulting in a still reasonable count at the national aggregate level, though there are many serious problems of undercounting or overcounting at sub-national levels.[8] At the broad, aggregate national level, the urban percentage based on the 1990 definition was considered reasonable and usable by most experts.[9]

In an attempt to rectify the shortcomings of the 1990 Census urban definitions, the 2000 Census initiated a new and rather sophisticated set of urban criteria, the major points of which are summarized in Appendix 1. As the details have been well covered elsewhere,[10] here we will outline only the main new points. The 2000 definition has introduced three new elements in defining urban areas at various geographic levels: (a) whether or not an area has an average population density of 1,500/sq.km; (b) whether or not the local government is located in the area; and (c) whether or not the area is contiguous to an area where the local government is located. This is not the place to fully assess the urban population numbers based on the new criteria because it is impossible at this point, owing to the lack of access to systematic and detailed disaggregated data. However, we concur with other authors that the three new considerations introduced are a substantial improvement over the 1990 definition.[11] The use of the administrative unit as the "accounting unit" is still not ideal from the point of view of measuring urbanization, but it has advantage of ease of implementation and likely concurrence with other social and economic data, most of which are tabulated based on administrative boundaries. The more tedious and nuanced approach has incorporated many components commonly used internationally in defining what is urban.[12] We applaud this new change by the NBS in addressing the nation's new circumstances in China and moving towards a framework closer to international practices, perhaps a reflection of the national policy of *guoji jiegui* ("aligning with the world"). This framework, when followed closely, is likely to generate more reasonably accurate counts of China's urban population at *both* the national and local levels than any of the previous definitions. Preliminary studies of urban numbers at the national level, and some studies at the subnational level, appear to confirm the above statement.[13]

Despite the obvious differences in urban definitions between the 1990 and 2000 censuses, one interesting result based on research by Yu

Hongwen, a senior statistician at the NBS, using disaggregated Census 2000 data to which he had access, concluded that the urban population figures in 2000, if based on the 1990 definition, would yield an urban percentage of 36.25%, marginally more than the 36.09% based on the 2000 definition.[14] This important finding was overlooked by Zhou and Ma, who, instead, used the urban annual series published in *TJNJ 2001*,[15] and estimated the 2000 urban percentage based on the 1990 definition to be 31.39%.[16]

The closeness of the two percentages under two different definitions (36.09% under the 2000 definition and 36.25% under the 1990 definition) are plausible given the co-existence of both overcounting and undercounting in the 1990 definition, as pointed out before.[17] The very small difference in urban percentage based on two different definitions allowed the NBS in its first communiqué of major figures from the Census 2000 to claim, by assuming that the 1990 and 2000 urban figures from the two censuses are broadly comparable, that the Chinese urban population had risen by 9.86 percentage points (as a percentage of the total population) during the 1990s.[18] Yu's findings (36.25% for 1 November 2000) calculated from the Census 2000 data also reveal that there is a wide discrepancy between them and the previous annual urban figures (e.g. 30.89% in year-end 1999) in *TJNJ 2001* (i.e. Column 2 in Table 1). One can surmise from Yu's research that there is a high likelihood of some very significant sampling or estimation errors in the *TJNJ 2001* annual urban population (and percentage) series for the 1990s.[19] Presumably because the series is flawed, it is replaced by a new one for 1991–1999 in *TJNJ 2002* (reported in Table 1, Column 3). We will examine these below.

Annual Urban Population Series for the 1990s

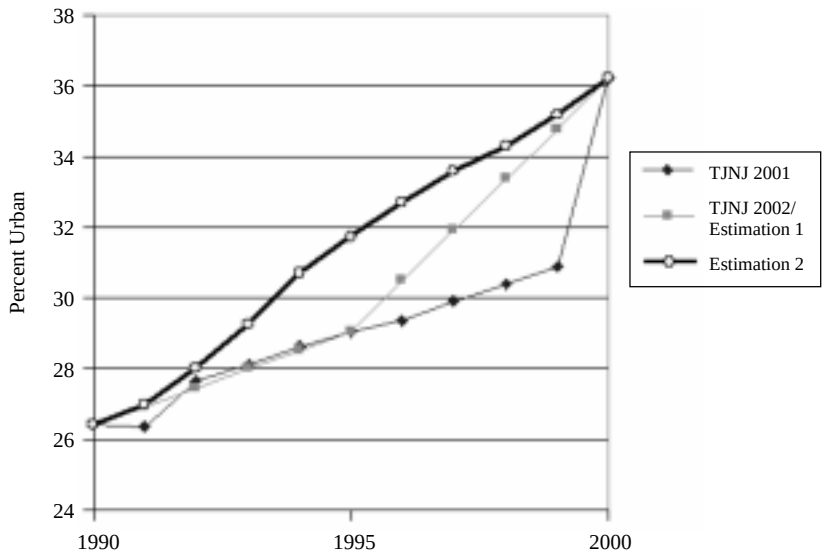
Given the discussion above and the broad comparability of the urban figures in the two censuses, 1990 and 2000, it is highly desirable to come up with a set of annual urban population figures for all the intervening intercensual years from 1991 to 1999, so that the data gap can be filled. The series will be useful for a variety of purposes, given the centrality of the urban percentage in many social science studies and the importance of being able to divide rural and urban in China research. The series will also allow us to have a baseline for studying urbanization trends and related issues. To this end, we have tried several estimations for the years between 1990 and 2000, using adopted standard interpolation techniques in estimating

and projecting urban proportions.[20] To capture the most useful in the interests of saving space, we will report and evaluate only two directly relevant and competing estimations produced.[21] We examine competing annual estimates, and their underlying assumptions and estimation methods.

Estimation 1: This is the much simpler, more straightforward estimation of the two. This estimation accepts the 1995 urban percentage (28.85%) derived from the 1995 mini-census (a 1% national sample), and interpolates linearly between the urban percentages in 1990 and 1995, and between 1995 and 2000. This simple method yields a constant annual increment in urban percentages ("average annual change in urban percentage point") within each of the two five-year periods (Table 1, Column 5). As we were trying out different estimations in late 2002, the NBS released its latest urban series in *TJNJ 2002*. It turned out that our Estimation 1 is exactly the same as that used by the NBS (compare Columns 3 and 4 in Table 1). Under this estimation, the pace of urbanization in 1990–95 was much slower than in 1995–2000. The numbers generated in Table 1 (Columns 4 and 5) show that the urban percentage increased annually at a fixed rate of 0.53 percentage points in the first half of the 1990s, and then by 1.44 percentage points in the second half of the decade. As will be shown below, this scenario does not accord with the trends revealed by other available data.

Estimation 2: In this different and more sophisticated approach, the existing 1995 urban figure from the 1% sample is abandoned. Moreover, annual figures for the intervening years are approximated by applying the popularly used United Nations method of "urban-rural growth difference," which also has some methodological advantages of treating the urban percentage curve as a logistic S-curve.[22] To fine-tune the urban figures derived, we want to be able to capture any possible annual fluctuations in the urban percentages (due to changes in urbanization policy changes, etc., if any). To do this, we apply an adjustment ratio generated by the published annual percentages of "non-agricultural" population in order to fine-tune the urban percentages produced by the "UN method." Details of the derivations are presented in Appendix 2.[23] As it turns out, these fine adjustments are small, as the adjustment ratios are very close to one. But the fine adjustments give more annual variations (which is more real) than the fixed or "smooth" rates without the adjustments. The summary results of Estimation 2 in Table 1, Columns 6 and 7 show that this estimation yields a faster pace of urbanization in most of the years in the first half of the 1990s than in the second half. This set of figures also gives some

Figure 2: Levels of Urbanization, 1990–2000



Source: Table 1.

significant annual variations in the changes of the urban percentage points. The levels of urbanization (percent urban) based on the three competing series are graphed in Figure 2.

Urbanization and Rural-Urban Migration Trends in the 1990s: An Evaluation

A comparison of the above two series shows two drastically different, almost opposite, rates of urbanization (measured by "annual change in urban percentage") and rates of urban growth in the first and second halves of the 1990s (see Table 2). This large difference is caused critically by whether or not the 1995 urban figure derived from the 1% national population sample was accepted. Also, because of the different assumptions used, Estimation 1 gives a fixed annual urban percentage increment in 1991–95 and 1996–2000, respectively, with a jump in 1995, while Estimation 2 has many more "natural" variations year by year, with a peak in 1994 and another upswing in 2000 (Table 2).

Table 2: Components of Urban Population Growth by Year, 1991–2000 (in millions)

Estimation 1

Year	Urban population (year-end)	Percent urban (%)	Annual change in urban percentage	Urban population increase	Urban growth rate (%)	Urban rate of natural increase (‰)	Urban natural increase	Net rural-urban migration	Rate of net urban in-migration (%)
1990	301.95	26.41							
1991	311.98	26.94	0.53	10.03	3.27	9.99	3.07	6.96	2.27
1992	321.78	27.46	0.53	9.79	3.09	9.70	3.07	6.72	2.12
1993	331.71	27.99	0.53	9.93	3.04	9.38	3.06	6.87	2.10
1994	341.74	28.51	0.53	10.03	2.98	9.60	3.23	6.80	2.02
1995	351.74	29.04	0.53	10.00	2.88	9.23	3.20	6.79	1.96
1996	372.99	30.48	1.44	21.26	5.87	8.82	3.20	18.06	4.98
1997	394.52	31.91	1.44	21.52	5.61	8.94	3.43	18.09	4.71
1998	416.05	33.35	1.44	21.54	5.31	7.55	3.06	18.48	4.56
1999	437.47	34.78	1.44	21.42	5.02	6.35	2.71	18.71	4.38
2000	459.06	36.22	1.44	21.59	4.82	5.10	2.29	19.31	4.31

Estimation 2

Year	Urban population (year-end)	Percent urban (%)	Annual change in urban percentage	Urban population increase	Urban growth rate (%)	Urban rate of natural increase (‰)	Urban natural increase	Net rural-urban migration	Rate of net urban in-migration (%)
1990	301.95	26.41							
1991	312.72	27.00	0.59	10.77	3.50	9.99	3.07	7.70	2.50
1992	328.20	28.01	1.01	15.47	4.83	9.70	3.11	12.37	3.86
1993	346.90	29.27	1.26	18.70	5.54	9.38	3.17	15.54	4.60
1994	367.82	30.69	1.42	20.92	5.85	9.60	3.43	17.49	4.89
1995	384.20	31.72	1.03	16.38	4.36	9.23	3.47	12.91	3.43
1996	400.46	32.74	1.02	16.26	4.14	8.82	3.46	12.80	3.26
1997	415.26	33.59	0.85	14.80	3.63	8.94	3.65	11.16	2.74
1998	427.56	34.27	0.68	12.30	2.92	7.55	3.18	9.11	2.16
1999	442.07	35.15	0.88	14.52	3.34	6.35	2.76	11.76	2.70
2000	459.06	36.22	1.07	16.99	3.77	5.10	2.30	14.69	3.26

Sources and Notes: The urban rates of natural increase for 1991–1999 are from *TJNJ 2001*, p. 91. The 1998 and 1999 rates are adjusted downward in view of the latest, lower national rates released in *TJNJ 2002*, p. 93. The rate for 2000 is derived by the authors based on unpublished estimates of the rural rates for that year. This table uses a standard urban population growth decomposition method. A general methodological treatment of these indexes is in United Nations, *Methods for Projections of Urban and Rural Population, ST/ESA/SER.A/55* (New York: United Nations, 1974), Chapters II and III. For detailed explanations of the procedures and uses with reference to China, see an earlier study by Kam Wing Chan, "Rural-urban Migration in China, 1950–1982: Estimates and Analysis," *Urban Geography*, Vol. 9, No. 1, (1988) pp. 53–84.

In lieu of direct evidence with which to assess the accuracy of the 1995 urban percentage estimate,[24] we have to resort to an indirect method to evaluate the plausibility of the above two estimations, by tapping into the wealth of information about rural-urban labour migration. Given that we have annual urban percentages (generated by the above estimations) and the annual urban rates of natural increase, we can then decompose urban population growth into two components: the urban natural population growth and net rural-urban migration (including urban reclassification). Such an exercise also enables us to derive two different annual series of net rural-urban migration estimates for the 1990s. The results are summarized in Table 2, and the net rural-urban migration trends are also graphed in Figure 3 (a).

Which series approximates to the "reality"? We here check their utility by comparing them to relevant migration-related data collected from sources independent of those for the urban figures. The existing literature has considered that rural-urban migration in China is closely correlated with rural-urban labour transfers, because a large portion of rural-urban migration is employment driven.[25] We expect the temporal variations of rural-urban migration to follow generally in the same direction as those of the rural-urban employment transfers and related statistics. From the statistics collected by the Ministry of Agriculture and Ministry of Labour and Social Security, based on different nationwide surveys, we were able to amass four different complete sets of annual stock and flow figures for the 1990s. Shown in Table 3, these are: the number of "rural" employees in urban work-units, the annual increase in the non-agricultural jobs held by "rural" workers, the number of urban labourers directly recruited from the rural areas, and the number of new urban labourers involving *nongzhuangfei* (conversion of their *hukou* status from agricultural to non-agricultural). While these statistics were collected from different sources for different purposes and measure some aspects of the rural-urban labour transfers, some broadly consistent trends throughout the 1990s are obvious, as shown in Figures 3(a) and (b). The curves all started fairly low in the early 1990s, peaked around 1993–95 and then slid back to a lower level in the second half of the 1990s, with most showing some upward movement at the turn of century. This is amazingly close to the trend of net rural-urban migration depicted by Estimation 2, lending strong support to the robustness of that estimation. The migration trend implied by Estimation 2 is also consistent with what has been portrayed in the general Chinese migration literature about the 1990s.[26] Furthermore, the interpolated urban

Figure 3a: Net Rural-Urban Migration and Related Rural/Urban Employment Trends, 1990–2000

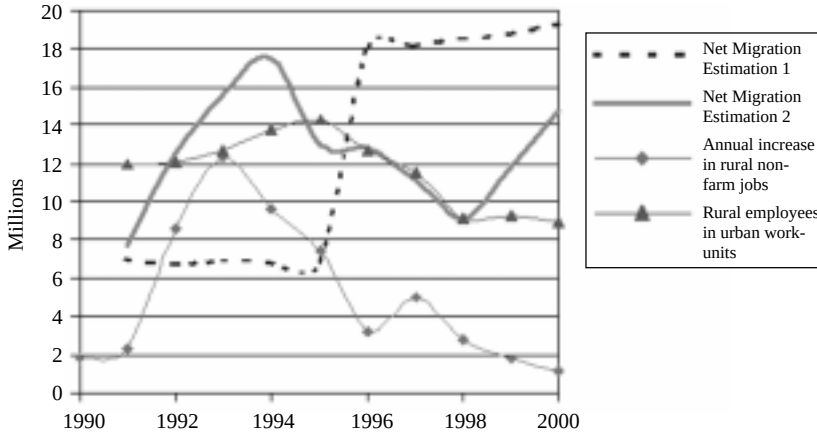
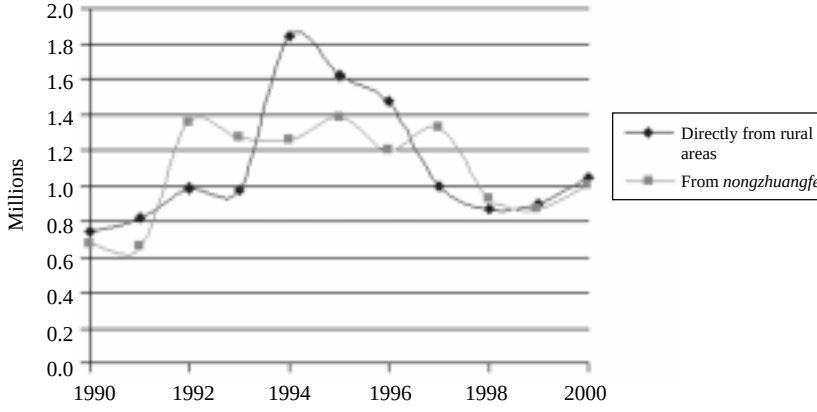


Figure 3b: New Urban Labor Supply, 1990–2000



Sources: Tables 2 and 3.

population figure for 1 October 1995 (about 380 million) generated by Estimation 2 is also very close to the urban population figure produced by 1995 (1 October) 1% sample survey (349 million), plus the estimated undercount population (24 million).[27] This triangulation and cross-check show that the rural-urban migration figures in Estimation 1 are quite out of

Table 3: Labour Statistics Related to Rural-Urban Migration, 1990–2000 (in millions)

Year	Rural employees in urban work-units	Annual increase in non-agricultural jobs held by rural labour	New urban labour supply	
			Directly from rural areas	From *nongzhuangfei*
	1	2	3	4
1990	NA	1.76	0.74	0.68
1991	11.98	2.33	0.82	0.66
1992	12.03	8.58	0.98	1.36
1993	12.71	12.33	0.98	1.27
1994	13.72	9.66	1.84	1.26
1995	14.31	7.43	1.62	1.39
1996	12.65	3.21	1.48	1.20
1997	11.53	4.99	1.00	1.33
1998	9.13	2.79	0.87	0.93
1999	9.29	1.79	0.90	0.87
2000	8.97	1.18	1.04	1.00

Sources: Cols. 1, 3 and 4 are from NBS and Ministry of Labour and Social Security, *Zhongguo laodong tongji nianjian* (Chinese Labour Statistical Yearbook), various years, (Beijing: Zhongguo tongji chubanshe).
Col. 2 is calculated from NBS, *Zhongguo nongcun tongji nianjian* (Chinese Rural Statistical Yearbook), various years, (Beijing: Zhongguo tongji chubanshe).

line; this leads us to reject Estimation 1 and the urban percentage based on the 1995 sample survey (since it was probably undercounted).[28] In other words, the usefulness of the newly revised NBS series for the 1990s in *TJNJ 2002* is open to serious doubts and must be rejected.

Having established Estimation 2, we proceed to examine the temporal change of annual rural-urban migration in greater detail and compare it to earlier periods. Table 4 extends the table by period first put together by Chan quite some years ago.[29] A number of urbanization and rural-urban redistribution indicators computed in Table 4 show that the 1990s share many characteristics of the reform era in general. The average urban growth rate is high, and just marginally lower than the other two post-1978 periods; the annual absolute increase is larger, because of the larger urban population base. Another indication of this sheer size is that the total net rural-urban migration in the decade of the 1990s was 125.5 million, which is only slightly below the aggregate of the same net migration for the previous four decades (134.4 million).[30]

On the other hand, the redistribution component in urbanization in

Table 4: Components of Urban Growth by Period, 1950–2000

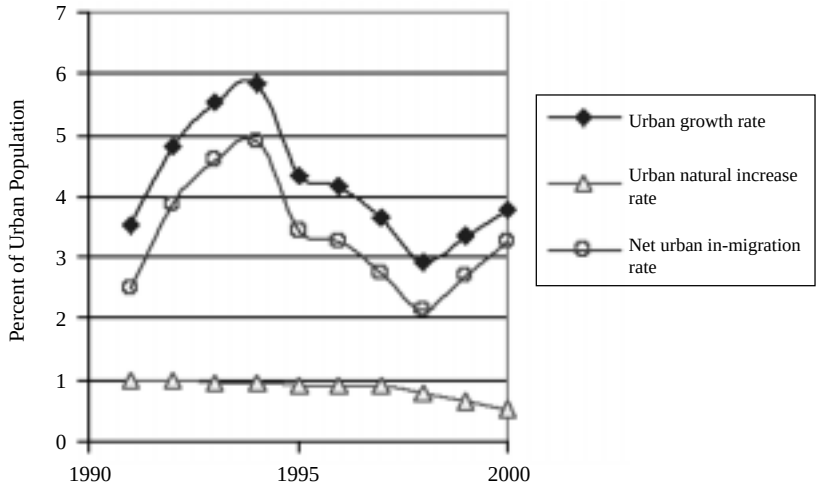
Period	No. of years covered	Average annual urban growth		Average annual change in urban percentage (%)	Components of urban growth			
					Natural increase		Net in-migration	
		Size (Millions)	Rate %		Average annual size	Share	Average annual size	Share
					Millions	%	Millions	%
1950–1957	8	5.6	7.2	0.59	2.26	40	3.35	60
1958–1960	3	10.4	9.1	1.45	1.91	18	8.50	82
1961–1965	5	–2.6	–2.1	–0.63	2.99	NA	–5.62	NA
1966–1977	12	3.0	2.0	–0.04	2.09	69	0.93	31
1978–1982	5	9.0	4.8	0.66	2.01	22	6.69	78
1983–1990	8	10.9	4.3	0.66	2.85	26	8.04	74
1991–2000	10	15.7	4.2	1.00	3.16	20	12.55	80
1950–2000	51	7.87	4.1	0.50	2.52	33	5.10	67

Sources and Notes: Urban population figures for 1950–90 are from Chan (see Note 2), p. 36. Those for 1991–2000 are from Estimation 2. See notes under Table 2 for technical details.

the 1990s is significantly more important, as indicated by the higher values of the "average annual change in urban percentage" and migration as a percentage of migration of urban growth.[31] The latter indicates that net migration now accounts for 80% of the urban population growth, a persistent tendency in the reform era, which has accelerated since the early 1990s partly because of the low and declining urban rates of natural increase. This basically migration-induced urban growth is quite different from situations in many other developing countries, where natural increase continues to be a significant component of urban growth.[32] In policy terms, recent urban growth in China is more about managing migrants than dealing with babies, with obviously a lot more pressure on urban jobs and housing than on schools and childcare.

On a year-by-year basis, because urban natural increase rates are quite low and stable, the annual vicissitudes of urban growth (and growth rate) are essentially determined by the net rural-urban migration (including urban reclassification), as shown in Figure 4. The annual urban growth rate was only 3.5% in 1991, but following Deng's famous tour of south China in 1992, the economy started to regain momentum and entered a period of rapid growth. This correlates with the rise in annual urban growth rate, climbing up to 4.8% in 1992 and reaching a peak in 1994 at 5.9%. 1994 is the year which showed the largest net rural-urban migration (17.5 million) in one single year in China's history.[33] Though declining, the rate was

Figure 4: Annual Urban Growth and Migration Rates (%)



Source: Table 2, Estimation 2.

maintained at a high level of above 4% per year in the mid-1990s. It finally dropped to 2.9% in 1998, as Asia was hit by a serious financial crisis and the ensuing economic recession. The state-owned enterprise reforms and the increasing pressures of urban unemployment have also led to more stringent measures against migration of rural workers to major cities.[34] Since 1999, however, there have been more *hukou* reforms and relaxations of the *hukou* restrictions, especially in towns and involving people with advanced degrees and money.[35] It is likely that these are related to the upswing in urban growth in 1999–2000.

So far our discussions of net rural-urban migration have necessarily included the urban reclassification component. Reclassification of former rural areas into new urban areas is obviously not a trivial part of urban growth in China in the last three decades, if not longer.[36] The net urban population added through reclassification in the 1990s is almost entirely due to the new (officially designated) towns.[37] An argument can be made that reclassification under an appropriate urban definition represents the physical expansion of urbanized areas and is part of urbanization. Many of the newly designated towns grew mainly by migrations from villages prior to their designation. Therefore reclassification is in many cases a posterior recognition of earlier migration from rural areas. In any event, it would be

useful to get some sense of how important this factor was in the urban population change under study. We provide a rough estimate in the following. At the end of 1990, there were 12,084 officially designated towns in China. This number went up to 20,312 at the end of 2000. In other words, there was a net increase of 8,439 towns in the 1990s. This would translate into roughly 30 million population based on the assumption that each newly designated town averaged about 3,500 people.[38] The 30 million figure is about 28% of the total net increase attributable to net rural-urban migration, or 22% of the total urban population growth in the 1990s. In other words, a great majority of the net migration in this period involves physical and spatial transfers of population.

Conclusion

Following the paths of previous endeavours on this topic, this condensed article is a systematic attempt to tackle some of the major issues arising from the new urban definition in China's Census 2000. Our work has moved beyond the limits of the existing research and added new insights to the literature. The article provides some systematic guidance in connection with the use of China's latest urban population statistics. Based on the comparison of the urban definitions used in the 1990 and 2000 censuses, we think that the new 2000 urban definition represents a major improvement over the previous definitions. The new definition has adopted some main features (population density and urban contiguity) also used by many other countries in the same kind of exercise. We concur with other authors that the urban percentage of 36.2% for the whole country for year-end 2000 appears to be reasonable. Of course, questions remain as to how closely and consistently the definitions were implemented in different provinces and within provinces, and how the "temporary" population (those without local *hukou*) in certain locations was treated in the counts of resident population.[39]

In order to fill the data gap caused by the change of definitions between 1990 and 2000 and to assess the methods used in the latest NBS urban annual series, we have conducted different estimations, and subjected them to empirical checks. We presented two annual urban population series and evaluated their usability by comparing the trends of net rural-urban migration derived independently from various migration and labour statistics collected from other sources. Our assessment has led us to question seriously the latest official series of intercensual urban population

figures (1991–99) in *TJNJ 2002*. On the basis of our second estimation, which shows migration trends closely in line with those depicted by other available systematic sets of migration figures, we studied the different components of urban growth in the 1990s. Our research shows that there was massive migration to the urban areas in the 1990s; the total net migration is almost equal to the sum of the previous four decades. Contrary to the trends depicted by the official urban figures, our estimates show that urban growth rates and rural-urban migration rates were significantly higher in the first half of the 1990s than in the second half. In other words, the first half of the 1990s was a more active phase of urbanization and migration, with a peak around 1993 and 1994, than the second half. An upswing appears to have started only in the late 1990s. The latest figures reported by the NBS shows that urban population grew by a high 4.7%, in 2001, and China's urban percentage had reached 37.66% by the end of that year.[40] In the same vein, a very recent report by the Ministry of Agriculture indicates that the volume of rural migrant labour has resumed to a high, and rising, level in 2002 and 2003, partly because of the improvement in the Chinese economy in the last 2–3 years.[41] We have also estimated that close to 60% of the 157 million urban population increase in the 1990s was generated by net rural-urban migration involving residential change, another 22% by urban reclassification, and 20% by urban natural increase. This structure of urban growth is similar to that of the 1980s and deviates modestly from other developing countries, where urban natural increase is still a significant source of urban demographic growth.

Notes

1. World Bank, *China 2020* (Washington, DC: The World Bank, 1997).
2. There is a voluminous literature on this topic. Examples are: Laurence Ma, "Anti-urbanism in China," *Proceedings, the Association of American Geographers*, Vol. 8 (1976), pp. 114–18; Kam Wing Chan, *Cities with Invisible Walls: Reinterpreting Urbanization in Post-1949 China* (Hong Kong: Oxford University Press, 1994); Victor Sit and Cai Jianming, "Yanjiu Zhongguo chengshihua lilun xuepai shuping," (A Review of Theories of Urbanization in China), *Dili xuebao* (Geographical Review), Vol. 17, No. 2 (1998), pp. 208–16.
3. Again, there is a huge body of literature on this. One of the earliest works is: 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. Some of the latest are: Yixing Zhou and Laurence

J. C. Ma, "China's Urbanization Levels: Reconstructing a Baseline from the Fifth Population Census," *The China Quarterly*, Vol. 173 (March 2003), pp. 176–96; Y. Zhu, "Changing Urbanization Processes and in situ Rural-urban Transformation: Reflections on China's Settlement Definitions," in *New Forms of Urbanization: Beyond the Urban-Rural Dichotomy*, edited by A. G. Champion and G. J. Hugo (Aldershot: Ashgate, 2003), pp. 207–28.

4. Despite the apparent anomaly in 1999–2000, K. H. Zhang has uncritically accepted the urban series in *TJNJ 2001* in full in his rather elaborate modelling exercise (See Kevin H. Zhang, "What Explains China's Rising Urbanization in the Reform Era?" *Urban Studies*, Vol. 39, No. 12 [2002], pp. 2301–15).
5. Zhou Yixing and Yu Haibo, "Dui woguo diwuci renkou pucha chengzhenhua shuiping de chubu fenxi" (A Preliminary Analysis of the Urbanization Level of China Based on the Fifth Census), *Guanli shijie* (Management World), No. 5 (2001), pp. 193 and 194. Zhou and Ma (Note 3).
6. See a detailed discussion in Chan (Note 2), Chapter 2, and also for an examination of the urbanization trends in 1950–90.
7. This has been well documented, see Zhu (Note 3) and Zhou and Ma (Note 3).
8. See Chan (Note 2); Li Zhang and Simon Xiaobin Zhao, "Reexamining China's 'Urban' Concept and the Level of Urbanization," *The China Quarterly*, No. 154 (June 1998), pp. 331–81; Zhou and Ma (Note 3). Another major concern about the 1990 approach was that the one-year length of stay requirements for non-*hukou* migrants was too long: it excluded many migrants who were actually a stable part of the urban population.
9. See Notes 7 and 8 above.
10. See Yu Hongwen, "Woguo renkou pucha zhong chengzhen renkou tongji koujing tantao," (A Discussion of the Urban Definitions in Chinese Population Censuses), *Renkou yu jingji* (Population and Economics), No. 6 (2002), pp. 3–8; Zhou and Ma (Note 3).
11. Ibid.
12. See United Nations, *Methods for Projections of Urban and Rural Population*, ST/ESA/SER.A/55 (New York: United Nations, 1974).
13. Examples of local studies are in Yu (Note 10), and Gao Baowang et al., "Liangci renkou pucha chengxiang tongji koujing bianhua dui Chongqing shi chengzhenhua jingcheng de yingxiang" (The Impact of the Changes in Urban/Rural Definition of the Two Censuses on Urbanization in Chongqing), *Renkou yanjiu* (Population Research), No. 1 (2002), pp. 10–14. Zhu (Note 3).
14. Yu Hongwen, "Cong 2000 nian renkou pucha kan woguo renkou zhuangkuang de jige tedian" (China's Population Characteristics as Seen from the 2000 Census), *Renkou yanjiu*, No. 4 (2001), p. 17.
15. As will be shown later, this series is very problematic and was abandoned later in 2002 by the NBS.

16. Zhou and Ma (Note 3), p. 185.
17. Zhou and Ma (Note 3), p. 187 instead argued that the 1990 and 2000 definitions would produce a 4.7 percentage discrepancy in urban percentage.
18. NBS, 2000 *nian diwuci quanguo renkou pucha zhuyao shuju gongbao (di yi hao)* (Communiqué on Major Figures of the 2000 Population Census [No. 1]), 28 March 2001.
19. Those figures are presumably based on information generated by the annual national population 1 per 1000 sample surveys. See note under Table 4-1, *TJNJ 2001*, p. 91 and William Lavely, "First Impressions from the 2000 Census of China," *Population and Development Review*, Vol. 27, No. 4 (2001), pp. 755–68. In fact, since 1991 the NBS has ceased to publish its usual year-end provincial urban population figures, indicating a high likelihood that these figures are neither available nor usable at the provincial level. It is almost certain that percentage estimates at the sub-national level have larger sampling errors.
20. The estimation methods are explained in detail in several United Nations monographs and methods manuals, notably United Nations (Note 12).
21. Some of our different estimations are reported in Hu Ying and Kam Wing Chan, "1990–2000 nian Zhongguo chengzhen renkou zengjialiang de goucheng yu biandong" (The Composition and Changes of China's Urban Population Growth in 1990–2000), *Zhongguo renkou kexue* (Population Science of China), No. 4 (2002), pp. 40–47.
22. The urban-rural growth difference, *URGD*, between two censuses is defined as

$$URGD = \frac{\ln\left(\dfrac{PU(2)}{1-PU(2)} \Big/ \dfrac{PU(1)}{1-PU(1)}\right)}{n}$$

$$\frac{PU(t)}{1-PU(t)} = \frac{PU(1)}{1-PU(1)} \cdot e^{URGD\text{-}t}$$

where *PU(1)* and *PU(2)* are the urban population percentage of the earlier and later censuses; *n* is the number of years between the two censuses; and *t* is the number of years from the earlier census. Zhou and Ma also used the same formula.

23. Our approach to annual fine adjustments is similar to that used by Zhou and Ma, but we believe that the "non-agricultural population" series released by the Ministry of Public Security (MPS) we use is superior to the urban population series in *TJNJ 2001* used by them (see their Table 2, Column A; the series was later abandoned in *TJNJ 2002*). The change in the MPS "non-agricultural" population numbers is a good indicator of *nongzhuangfei* (conversion of agricultural to non-agricultural household registers) policy, which was closely

linked to China's urbanization policy. Until very recently, a significant part of rural-urban migration involved *nongzhuangfei*. See Kam Wing Chan and Li Zhang, "The *Hukou* System and Rural-urban Migration: Processes and Changes," *The China Quarterly*, No. 160 (1999). pp. 818–55. Despite all the attention paid to migration involving rural peasants, migration with changes in household registration status (including *nongzhuangfei*) remained important in the 1990s, at a level of close to 20 million per year. (Kam Wing Chan, "Recent Migration in China: Patterns, Trends, and Policies," *Asian Perspectives*, Vol. 25, No. 4 [2001], pp. 127–55).

24. In an earlier article, Yu Hongwen reports that the 1995 1% population sample survey undercounted 24 million people, mostly of whom were migrants/ "floating population" (Yu Hongwen, "Zhongguo 2000 nian renkou pucha zhong liudong renkou de pucha dengji wenti" [Questions about Counting Floating Population in China's Census 2000], *Renkou yanjiu*, Vol. 24, No. 5 [2000], pp. 57–59). Cindy Fan of UCLA also raised the same undercounting issue in her recent unpublished work on migration (personal communications). Since most migrants/floating population were in urban areas, it is very likely that the 1995 sample undercounted the urban population and hence, the urban percentage.
25. See, for example, Ma Zhongdong, "Urban Labor Force Experience as a Determinant of Rural Occupation Change: Evidence from Recent Urban-Rural Return Migration in China," *Environment and Planning A*, Vol. 33 (2001), pp. 237–55; Zai Liang, "The Age of Migration in China," *Population and Development Review*, Vol. 27, No. 3 (2001) pp. 499–524.
26. See especially Zhao Shukai, "1997 nian mingong liudong: xinjieduan xinwenti" (The Mobility of Rural Labour in 1997: New Stage and New Issues," in *1998 nian: Zhongguo shehui xingshi fenxi yu yuce* (1998: Analysis and Forecast of the Social Situation of China) (Beijing: Shehui wenxian chubanshe, 1998), pp. 76–89, and Chan (Note 23).
27. The 349 million is derived from the 3.534 million urban population counted by the 1995 1.01267% sample (National Population Sample Survey Office, *1995 Quanguo 1% renkou qiuyang diaocha ziliao* (Data on 1995 National 1 Per Cent Population Sample Survey) (Beijing: Tongji chubanshe, 1997). The undercount population figure is from Yu (Note 24).
28. See Note 24 above.
29. Kam Wing Chan, "Rural-urban Migration in China, 1950–1982: Estimates and Analysis," *Urban Geography*, Vol. 9, No. 1 (1988), pp. 53–84.
30. The 1950–90 figure is from Chan (Note 2), Appendix 2.3.
31. Detailed explanations of these indexes are in United Nations, 1974, Chapters II and III, and UN, *Patterns of Urban and Rural Population Growth* (New York: United Nations, 1980).
32. Chan (Note 29), made the same point earlier. Drawing on T. McGee and C. J.

Griffiths' work, international experts at the World Resources Institute et al. believe that between 40% and 60% of annual population growth in the developing world is accounted for by rural-urban migration. Urban natural increase is still as important as migration in contributing to urban growth in the developing world in general. See The World Resources Institute et al., *The World Resources 1996–97* (New York: Oxford University Press, 1996), p. 11.

33. It surpasses estimates of the two other years with the highest volumes: 1984 (15.2 million) and 1959 (14.5 million), see Chan (Note 2), Appendix 2.3.
34. See for example, Cai Fang and Kam Wing Chan, "The Political Economy of Urban Protectionist Employment Policies in China," Working Paper Series No. 2, Chinese Academy of Social Sciences, Institute of Population Studies, 2000.
35. "Zhongguo huji zhidu gaige de xianzhuang ji weilai" (Current Situation and Future of Chinese Household Registration System Reform), http://news.sina.com.cn/c/2002-09-19/1911733689.html, 19 September 2002 (accessed 29 October 2002).
36. See Kam Wing Chan, "Urbanization and Rural-urban Migration in China since 1982: A New Baseline," *Modern China*, Vol. 20, No. 2 (1994), especially pp. 264–65. Laurence Ma and Gonghao Cui, "Administrative Changes and Urban Population in China," *Annals of the Association of American Geographers*, Vol. 77, No. 3 (1987) pp. 373–95. Another related issue is in situ urbanization, examined by Zhu (Note 3).
37. A very small number of the suburban agricultural population has also been reclassified as urban because of the conversion of suburban land for urban use.
38. The average population size in the urban areas of towns was 5,216 (computed from *Zhongguo minzheng tongji nianjian 2000*). The newly designated towns are expected to be smaller, but would be above the minimum of 2,000. We take the middle figure of 3,500.
39. See a discussion of the issue of defining "migrant" and "resident" in Census 2000 in the introduction of this issue, and Kam Wing Chan, "Migration in China in the 1990s: Past Data and Observations Based on Census 2000," paper presented at the Workshop on the Chinese Census 2000, University of Washington, Seattle, 22 August 2002. The official undercounting rate is 1.81% in Census 2000, which is much higher than any of those in previous censuses. An analysis of the undercounting issue in Census 2000 can be found in Zhang Weimin, "Census 2000: Problems and proposal for improvement," paper presented at the Conference on Chinese Population and Socioeconomic Studies, Hong Kong University of Science and Technology, 19–21 June 2002, and the article by Li Shuzhuo and Sun Fubin in this issue.
40. *TJNJ* 2002, p. 93.
41. See a summary of the report in *Remin ribao* (People's Daily), 31 July 2003, p. 2.

Appendix 1

Major Points in Defining Urban Population in Census 2000

i) The resident population of a place is the population in that locality with local *hukou*, and those without local *hukou* (migrants) who have been in that locality for at least six months, or who have been in that locality for less than six months, but have been away from the *hukou* registration place for more than six months.

ii) The urban population of China is composed of the "City Population" and the "Town Population."

iii) A population density criterion is introduced for classifying city Districts (including all the lower-level units within them) as urban. Precisely, Districts with an average population density of at least 1,500 persons per sq.km. are automatically counted as urban. All the population in such a district is counted as city population.

iv) A "contiguous built-up area" criterion is also used to cover localities other than the above:
   a. For city districts with a density of below 1,500 per sq.km., and county-level cities, only the following is defined as urban (and hence only population in the following is the City Population):
      i. A township-level unit (Street, Town and Township) where the District or City government is located;
      ii. A township-level unit of which the built-up area is contiguous to i) above.
      iii. All other Streets.
   b. For designated Towns, the following is counted as urban (and hence only population in the following is the Town Population):
      i. A village-level unit (Residents' Committee or Village) where the Town government is located;
      ii. A village-level unit of which the built-up area is contiguous to i) above;
      iii. All other Residents' Committees.

Sources: Based on "Guanyu tongji shang huafen chengxiang de guiding (shixing)" (Stipulations on Rural-urban Statistical Classification [Trial]), in *Diwuci diwuci quanguo renkou pucha zonghe peixun shouce* (Comprehensive Training Handbook for the Fifth National Population Census), published by Wuhan Population Census Office (2000).

Appendix 2

Derivation of the Annual Adjustment Ratios in Estimation 2

Year end	% of non-agricultural population	% of Non-agricultural population generated by UN method	Adjustment ratio	% of urban population generated by UN method (Estimation 2)	Adjusted urban percentage
	A	B	C = A/B	D	E = D × C
1990	20.864	20.864	1.000	26.41	26.41
1991	21.103	21.349	0.988	27.31	27.00
1992	21.674	21.842	0.992	28.23	28.01
1993	22.419	22.343	1.003	29.17	29.27
1994	23.278	22.852	1.019	30.13	30.69
1995	23.833	23.370	1.020	31.10	31.72
1996	24.375	23.895	1.020	32.10	32.74
1997	24.789	24.428	1.015	33.10	33.59
1998	25.074	24.970	1.004	34.13	34.27
1999	25.506	25.519	0.999	35.17	35.15
2000	26.076	26.076	1.000	36.22	36.22

Sources and Notes:

Col. A: Calculated from the statistics released by the Ministry of Public Security in NBS, *Zhongguo renkou tongji nianjian* (*RKTJNJ*, Chinese Population Statistical Yearbook) (Beijing: Zhongguo tongji chubanshe), various years. (Recent yearly figures are found, for example, in *RKTJNJ 1999*, p. 383; *RKTJNJ 2000*, p. 477; *RKTJNJ 2001*, p. 231).

Cols. B and D: Numbers are generated by the "UN Method," see the formulae explained in Note 21.