

Manufacturing employment in China

The scale of manufacturing employment in China dwarfs the numbers of manufacturing workers in other countries; China's manufacturing sector has shed surplus workers from inefficient state-owned factories, while increasing employment in the private sector

Judith Banister

In recent decades, China has become a manufacturing powerhouse. The country's official data showed 83 million manufacturing employees in 2002, but that figure is likely to be understated; the actual number was probably closer to 109 million. By contrast, in 2002, the Group of Seven (G7) major industrialized countries had a total of 53 million manufacturing workers. In the late 1990s through the year 2000, China saw declining numbers of manufacturing workers, caused by restructuring and the privatization of state-owned and urban collective-owned factories in the cities. Both massive layoffs of urban manufacturing workers and sharp increases in manufacturing labor productivity ensued. Since then, private-sector manufacturing has thrived in both urban and rural areas of China. The reorganized factories are more productive than state-owned and collective-owned factories and are competitive in the domestic and global economies. China's manufacturing employment began to rise again after 2000, regaining the upward trend of the period from 1980 to 1995.

This article begins with an overview of China's statistical system, including a description of the sources of data used in the analysis presented. Three main sources of statistics on China's manufacturing employment are compared and contrasted, and a hybrid data series is derived that helps evaluate Chinese manufacturing employment levels and trends from 1990 through 2002. The probable biases in China's statistics on the country's numbers of manufacturing workers are as-

essed, both at the national level and in the key export-manufacturing zones.

The analysis emphasizes issues of data quality and the remaining legacies of the command economy reflected in China's labor statistics. Among the factors included is the excessive focus of China's published statistics on city manufacturing employees, to the near exclusion of detailed data on the more numerous manufacturing employees working outside the administrative boundaries of cities. Even within the cities, data collection and reporting remain concentrated on the rapidly declining state-owned and urban collective-owned manufacturing enterprises, giving short shrift to the not yet adequately collected or published statistics on the thriving, growing, dynamic private manufacturing sector. A major reason for China's statistical neglect of the private sector is that the dominance of private and corporate businesses in today's economy does not fit easily into Marxist theory or Mao Zedong's ideology.

Because of the many data limitations, a great deal of uncertainty remains in the work presented here. A more exacting analysis awaits new and better data collection and more detailed metadata from China's statistical system.

This article is the first of a two-part series on China's manufacturing labor statistics. The second article, to be published in the next issue of the *Review*, will analyze manufacturing wages and labor compensation. A more detailed exposition

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of the analysis in the two articles is found on the Bureau of Labor Statistics (BLS) Web site.¹ The analysis in the current article refers to the People's Republic of China (mainland China; hereinafter, "China") and excludes statistics for Hong Kong, Macao, and Taiwan. Occasionally, Chinese terminology will be used, because the standard English translations of the terms are misleading or ambiguous and in some cases because there is no succinct, accurate English translation of the term.

Background

China's statistical system has been greatly strengthened during the most recent quarter century of economic reform.² Statisticians in China are steadily learning from international practice as promoted by the World Bank, the Asian Development Bank, the International Monetary Fund, and the United Nations system. China's statistical organizations endeavor to apply best practices from other countries—especially developed countries—to the Chinese economy. Their efforts have been particularly successful in China's population censuses and in some economic and demographic surveys—for example, the annual urban and rural household income and consumption surveys. Nevertheless, China's statistical system is still affected by categories and procedures that were established during the command economy period before 1978 and never revised. Those outdated categories hamper the analysis of levels and trends of economic growth, inflation or deflation, employment, wages, and economic change in the urban and rural economies. In addition, despite expanding its use of censuses and representative sample surveys, China continues to employ the method of regular (usually annual) statistical reporting by all production or administrative units as its primary data collection instrument.

Most statistics in China are recorded and collected under the central guidance of the National Bureau of Statistics (NBS). According to one source, "The NBS carries the responsibility for organizing, directing and coordinating the statistical work throughout the country."³ However, as will be shown later, other ministries have certain statistical turf that is their particular responsibility for historical or bureaucratic reasons, and there seems to be little coordination among the relevant ministries. For instance, with regard to manufacturing employment statistics, the Ministry of Labor and Social Security (hereinafter, Labor Ministry) gathers data on most components of the city economies, leaving a small, but rapidly growing, segment to the State Administration for Industry and Commerce. However, the collection of data and the reporting of statistics on manufacturing in rural areas and in towns are left to a part of the Ministry of Agriculture.⁴

The analysis that follows is based as much as possible on information in Chinese sources published by official statistical organizations. The most useful sources turn out to be statistical

yearbooks from various government ministries. Later sections of this article compile and compare data on China's manufacturing employment from the 1995 industrial census and the 2000 population census, as well as administrative data collected from manufacturing enterprises and reported annually. The article explains discrepancies among the data sets, to the extent possible, and discusses the effects of definitional changes on the available official series of manufacturing employment statistics. Strengths and weaknesses in the published statistics are highlighted.

Recent employment statistics

Employment figures for China are usually confusing and nonstandard. They reflect, in part, conventions from the Maoist command economy period from 1949 to 1978, as well as new conventions for the semimarket economy of the economic reform period since 1978. The available data also reflect China's attempts to make its economic statistics more internationally comparable. Recent employment statistics are pieced together primarily from annual enterprise data. Each enterprise, economic unit, small business, or self-employed individual or group is supposed to report employment data each year according to its "labor situation" in the previous year and at the previous year's end. The data are then compiled upward in a statistical reporting chain to the national government.

Enterprise data refer to who is working in what kind of work at the end of the relevant year (end of December). The urban enterprise statistical reporting form that is required to be submitted to authorities early in a calendar year and that refers to the previous calendar year asks enterprises for the "labor situation" (in particular, for the "actual situation that year")—and specifically for the numbers of each category of workers at the end of the previous year.⁵ Accountants or those who report employment and wage figures on behalf of their enterprises or other work units (at least those enterprises or other work units in urban areas) are given detailed instructions on how to report monthly, quarterly, yearend, and annual average figures on employment and wages. The instructions are based on regulations released by China's NBS, especially in 1990 and with further clarifications in 1998 and 2002, regarding how to report employment and wages.⁶

The annually reported figures on total manufacturing employment in China include all manufacturing employees: production workers, salaried workers, and supervisory workers. China does not show separate data for these groups of workers. Table 1 presents figures from China's annual enterprise reporting system on the numbers of employed manufacturing workers in the country from 1978 through 2002, broken down into the various categories reported (described in the next section).

Table 1. Official reported manufacturing employment in China, yearend 1978–2002

[In millions]

Year	Manufacturing employment			Manufacturing employment in urban units			Urban manufacturing staff and workers				Town and village enterprises (TVE's)	
	Total	Rural	Derived urban ¹	Total	Men	Women	Total	State-owned units	Urban collective-owned units	Other ownership units	Industry	Manufacturing ²
1978	53.32	17.34	35.98	—	—	—	35.95	24.49	11.46	—	17.34	—
1980	58.99	19.42	39.57	—	—	—	39.47	26.01	13.46	—	19.42	—
1985	74.12	27.41	46.71	—	—	—	46.20	29.75	16.08	.37	41.37	—
1986	80.19	31.39	48.80	—	—	—	48.20	30.96	16.80	.46	47.62	—
1987	83.59	32.97	50.62	—	—	—	49.88	32.09	17.24	.58	52.67	—
1988	86.52	34.13	52.39	—	—	—	51.49	33.27	17.45	.77	57.03	—
1989	85.47	32.56	52.91	—	—	—	52.06	33.44	17.54	1.08	56.24	—
1990	86.24	32.29	53.95	—	—	—	53.04	33.95	17.73	1.35	55.72	51.50
1991	88.39	32.68	55.71	—	—	—	54.43	34.82	17.82	1.80	58.14	53.73
1992	91.06	34.68	56.38	—	—	—	55.08	35.26	17.47	2.36	63.36	58.56
1993	92.95	36.59	56.36	—	—	—	54.69	34.44	15.95	4.30	72.60	67.10
1994	96.13	38.49	57.64	54.92	30.31	24.61	54.34	33.21	15.15	5.98	69.62	64.34
1995	98.03	39.71	58.32	54.93	30.11	24.82	54.39	33.26	14.17	6.96	75.65	69.92
1996	97.63	40.19	57.44	53.44	29.52	23.92	52.93	32.18	13.46	7.28	78.60	72.65
1997	96.12	40.32	55.80	51.30	28.44	22.86	50.83	30.11	12.44	8.27	³ 61.49	³ 56.84
1998	³ 83.19	³ 39.29	³ 43.90	³ 38.26	—	—	³ 37.69	³ 18.83	³ 7.42	³ 11.44	73.34	67.79
1999	81.09	39.53	41.56	35.54	20.12	15.42	34.96	16.48	6.22	12.25	73.95	68.35
2000	80.43	41.09	39.34	33.01	18.75	14.25	32.40	14.15	5.19	13.06	74.67	69.01
2001	80.83	42.96	37.87	30.70	17.52	13.18	30.10	11.94	4.25	13.91	76.15	70.38
2002	83.07	45.06	38.02	29.81	16.98	12.83	29.07	9.79	3.46	15.82	76.68	70.87

¹ Derived urban manufacturing employment is calculated as national manufacturing employment minus rural manufacturing employment.

² TVE manufacturing employment was reported officially only for 2002, when it constituted 92.4 percent of TVE industry employment; figures for other years are estimated, using the same percentage.

³ Break in series.

NOTES: Dash indicates data not available. All figures refer to the

mainland provinces of China, not including Hong Kong, Macao, or Taiwan. The data are from China's annual yearend reporting system, not from census data and not adjusted to agree with census data.

SOURCES: China National Bureau of Statistics and China Ministry of Labor, compilers, *China Labor Statistical Yearbook 2003* (Beijing, China Statistics Press, 2003), pp. 8, 10, 13, 16, 21, 23–26, 171, 473. China, Ministry of Agriculture, China TVE Yearbook Editorial Committee, editors, *China Village and Town Enterprise Yearbook 2003* [in Chinese] (Beijing, China Agriculture Publishing House, 2003), p. 130.

Structure of manufacturing employment

Chart 1 (based partly on table 1) displays the structure of China's manufacturing employment at the end of 2002, the latest date for which enough statistics are currently available. The country's NBS and Labor Ministry published a figure of 83 million manufacturing employees in China, of whom 45 million were called rural and 38 million were classified as urban. But these data do not take full account of the 71 million town and village enterprise (TVE) manufacturing workers reported by the Ministry of Agriculture. The TVE category includes large factories in industrial parks outside cities, as well as suburban, town, and rural factories.⁷ On the basis of the reasonable assumption that the 38 million urban and 71 million TVE manufacturing employment categories are mutually exclusive, the total manufacturing employment at yearend 2002 was about 109 million, as shown in Chart 1. (This contradiction and its implications are addressed more fully later in the article.)

Furthermore, there is evidence that the official figure of 83 million manufacturing workers excludes millions of migrant manufacturing workers. (See also later.)

Of the 38 million urban manufacturing employees at yearend 2002 indicated in Chart 1, 30 million were employed in so-called urban manufacturing units (*danwei*), and of these, 29 million were on-post (not laid-off or unemployed) staff and workers. Most of these urban manufacturing staff and workers (16 million) were employed by corporations, joint ventures, and other companies in China's growing private sector. By the end of 2002, manufacturing employment in urban state-owned enterprises had dropped steeply, to 10 million, and in urban collective units had declined to only 3 million. (See table 1.)

There is considerable overlap between the two categories making up the urban manufacturing classification: manufacturing employment in urban units and urban manufacturing staff and workers (*zhigong*). Urban manufacturing staff and workers (all of whom have been on-post workers since 1998) are

included by definition in the category of manufacturing employment in urban units.⁸ In every year for which both series are available, namely, 1994–2002, the category of manufacturing employment in urban units is slightly (0.5–0.7 million) larger than that of urban manufacturing staff and workers. (See table 1.) The residual half a million to three-quarters of a million workers in urban manufacturing units include urban reemployed former retirees and foreign employees of manufacturing units, as well as employees from Hong Kong, Macao, and Taiwan.⁹

For example, at yearend 2002, China recorded 29.807 million employed in urban manufacturing units and 29.069 million urban manufacturing staff and workers, the difference between the two categories being approximately 738,000. (See table 1 and chart 1.¹⁰) This residual is accounted for by the category of other urban manufacturing employment, with 738,885 reported for yearend 2002, of whom 150,470 were reemployed and continuing workers of retirement age.¹¹ Who, then, were the remaining 588,000 employees in urban manufacturing units? The Labor Ministry clearly has collected data on how many of them are foreign personnel, but *China Labor Statistical Yearbook 2003* does not report this information. (The volume does report that, in all sectors of the economy, only 50,045 out of all those in the category of other urban employment, totaling 4.28 million, were “Hong Kong, Macao, Taiwan & Foreign Personnel” at yearend 2002. This small number implies that the great majority of the hundreds of thousands of foreign experts, technical and administrative workers, teachers, managers, and entrepreneurs actually working in China have been classified—or misclassified—as working in rural areas or are not recorded as working at all.) Therefore, only a small proportion of the unexplained 0.59 million workers under the classification of “other” urban manufacturing employees at yearend 2002 could be recorded in the statistics as foreign personnel. The rest of the “other” urban manufacturing employees work for urban manufacturing enterprises, but are in statistical categories such as employees lent from another company, workers holding a second job, and those working without a contract because they have not completed employment formalities.¹²

The larger urban category of manufacturing employment in urban units included 29.8 million of the 38.0 million total for yearend-2002 urban manufacturing employment. (See table 1 and chart 1.) The other 8.2 million were in relatively small privately owned and privately operated enterprises (*siying qiye*) or were self-employed individual or family enterprises (*geti jiuye*) in urban manufacturing.¹³ China’s urban (*chengzhen*) manufacturing workforce in 2002 included 2.6 million workers in *getihu* (individual and household enterprises) and 5.6 million working in privately owned *siying qiye*. In the latter category, 0.8 million workers were categorized as “investors” in their own companies, and 4.8 million were called hired laborers or hired hands.¹⁴

On the basis of China’s urban manufacturing employment data (see table 1 and chart 1), 13 million urban manufacturing workers remain in public-sector (state-owned and urban

collective-owned) work units. Thus, the private sector now employs 25 million of China’s reported 38 million urban manufacturing workers.¹⁵ Private-sector manufacturing workers are counted, and their numbers are reported, but otherwise, far less information is published about the private sector than the public sector.

Because of the city bias of employment statistics in China, there are almost no further readily available details about the 45 million rural or 71 million TVE manufacturing employees. This information gap is the biggest weakness of China’s statistics on manufacturing employment. (The article returns to the problematic classifications of urban and rural statistics in a later section.)

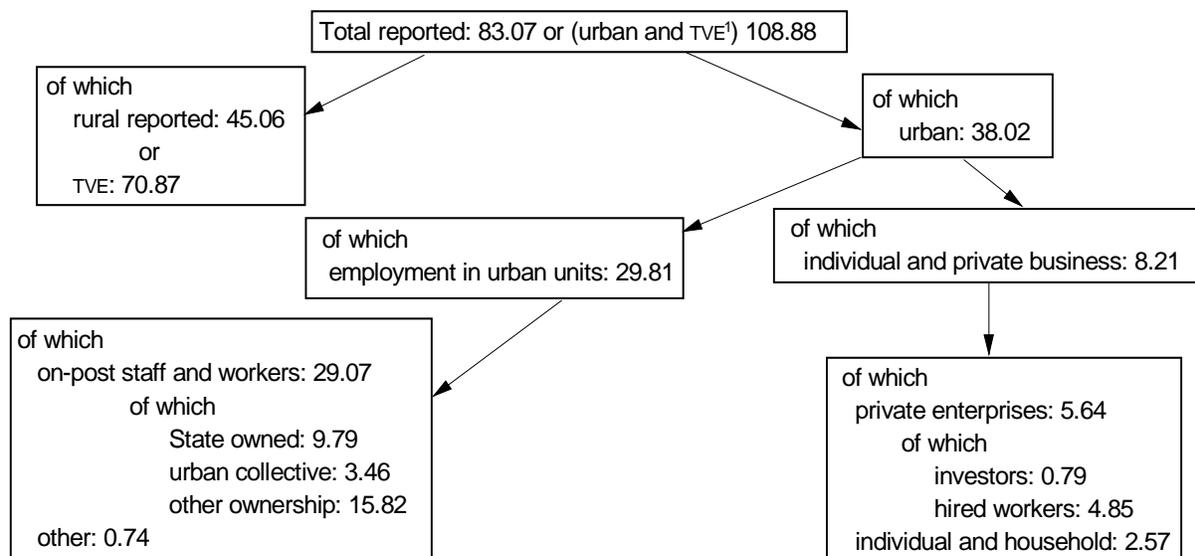
Reported trends in manufacturing employment

As shown in table 1, the officially reported number of employed manufacturing workers in China rose dramatically during the post-Mao economic reform period, from 53 million in 1978 to an all-time high of 98 million in 1995, declined sharply to 80 million in 2000, and then rose again to 83 million by yearend 2002. Rural manufacturing employment has risen with few setbacks throughout this 24-year period, peaking at a reported 45 million as of the end of 2002. The difference between China’s reported national and rural manufacturing employment should be urban manufacturing employment; but this number was not published for a number of years, and the column in table 1 is derived as a residual calculation. The figures so derived indicate that urban manufacturing employment in China rose from 36 million in 1978 to a high of 58 million in 1994–95 and then dropped to 38 million by yearend 2002. A figure of 38.018 million for urban manufacturing employment is directly reported in a published table.¹⁶ Therefore, the procedure used to derive urban manufacturing employment in table 1 appears to be defensible. Employment in urban manufacturing units reportedly dropped from 55 million in 1994–95 to 30 million by yearend 2002, and total urban manufacturing staff and workers increased from 36 million in 1978 to 55 million in 1992–93, thereafter declining to 29 million by the end of 2002, on the basis of the reported statistics in table 1. These employment trends based on the official data, however, are misleading. The next two sections discuss changes in definition and coverage that affect the available manufacturing employment statistics and the trends in manufacturing employment during 1990–2002 after adjusting for the changes to the extent possible.

Change in the definition of urban employed

What do the preceding numbers mean? In the first place, successive figures are sometimes not comparable due to changes in coverage or redefinition. In particular, the number

Chart 1. Structure of manufacturing employment in China, yearend 2002 (numbers in millions)



¹ Town and village enterprise.

NOTE: Official total yearend-2002 manufacturing employment in China was 83.07 million, of which 38.02 million was urban and 45.06 million was rural. But if nonurban manufacturing employment was best represented by TVE employment of 70.87 million, then the total yearend-2002 manufacturing employment in China was 108.88 million.

SOURCES: Table 1 and text.

for implied urban manufacturing employment dropped sharply, from 55.8 million at the end of 1997 to 43.9 million at yearend 1998, an apparent decline of 12 million in 1 year. A similar drop is shown for manufacturing employment in urban units, from 51.3 million at the end of 1997 to 38.3 million at the end of 1998, and thus down 13 million during 1998. Employment numbers for urban manufacturing staff and workers also declined, from 50.8 million to 37.7 million that year, a drop of 13 million as well. Figures for manufacturing staff and workers in state-owned units decreased by 11 million that year and went down by 5 million in urban collective-owned units, while increasing by 3 million in “other” ownership units.

What happened to these manufacturing employment statistics during 1998? One reported change was that there was an important shift in the employment statistics coverage in urban areas. Starting in 1998, workers who had been laid off from active employment, but were still connected with their former employment unit, were no longer deemed employed and were thus excluded from the employment figures.¹⁷ Therefore, these laid-off (“off-post” or “not-on-post” in the English translation of China’s statistical yearbooks) urban manufacturing workers are not included in the 1998–2002 numbers for urban manufacturing employment, manufacturing

employment in urban units, or urban on-post manufacturing staff and workers.¹⁸ By yearend 2002, the net result of the layoff and rehiring processes was that the number of laid-off urban manufacturing staff and workers totaled 9.13 million.

Adjusted trends in manufacturing employment

In order to gauge trends in manufacturing employment in China, the analyst must adjust for definitional changes and changes in coverage in the urban data. It is important to recognize that before, and even after, the definitional change in 1998, reported urban manufacturing employment figures for China included, and continue to include, millions of surplus workers.¹⁹ By the end of 2002, of those surplus manufacturing workers, 9.13 million were in the laid-off category, but through 1997 they were still nominally employed in their manufacturing work units.

One method for attempting to gauge true trends in manufacturing employment in China is to subtract the reported laid-off manufacturing workers from the pre-1998 total manufacturing employment figures (which still included laid-off employees), in order to get comparable figures for before 1998 and afterwards. There were reported to be 2 million laid-off manufacturing employees still nominally connected to their work units in 1995 and

3 million in 1996. Table 2 shows that, after adjustment of the 1995–96 totals for the reported definitional shift, there still was a steep drop in official total and official urban manufacturing employment between 1996 and 1998 that cannot be explained by the one definitional change that has been reported. This table would appear to indicate that on-post (not laid-off) manufacturing employment in China declined from 96 million in 1995, to 94 million in 1996, to 83 million in 1998, to 81 million in 1999. If on-post manufacturing employment were indeed dropping by 2 million manufacturing workers a year, then the total would have been 92 million in 1997, 90 million in 1998, and 88 million in 1999. So the official figures for total manufacturing employment from 1997 to 1998 had a loss of 7 million workers that is not accounted for by the one reported definitional change.

There is no discontinuity between 1997 and 1998 in the official rural manufacturing data series. The definitional shifts appear to be only in urban data, and these shifts come entirely from changed coverage of urban manufacturing staff and workers. The category of on-post urban manufacturing staff and workers was dropping by about 2½ million from 1995 to 1996 and again from 1998 to 1999. If we were to assume that the trend was continuous from 1995 to 1999, then we would see the following approximate numbers in the category of staff and workers: 52.3 million in 1995, 49.7 million in 1996, 47 million in 1997, 44.5 million in 1998, and 42 million in 1999. Instead, the reported 1998 figure was 37.7 million. Therefore, about 7 million workers were dropped from the category between 1997 and 1998, in addition to those workers dropped due to the known definitional shift from including laid-off workers in employment figures to excluding them.

Now consider again the trends in China's manufacturing employment based on official data, keeping in mind the unexplained loss of 7 million manufacturing workers from the

numbers up through 1997 to the figures for 1998 and thereafter. In 1995, on the basis of official data, China had 96 million on-post manufacturing workers, and the numbers were dropping through 1997. The reported 1998 official national total was 83 million. If the inexplicably missing 7 million are added back in, then perhaps the total was really 90 million, although that figure still signifies a significant drop in manufacturing employment from 1995 to 1998. By yearend 2000, the reported total was 80.4 million (but the true number could have been more than 87 million if the missing workers were included). No matter how the official data are adjusted, China's total manufacturing employment dropped by around 8.5 million or more from 1995 to 2000. The official total then rose by 2.6 million from yearend 2000 to 2002. So the net loss of manufacturing jobs in China during 1995–2002 was about 6 million. Nevertheless, it is important to note that the trend of declining manufacturing employment in China was apparently reversed after the year 2000.

Below the national level, official figures for rural manufacturing employment rose until 1995–96 and stabilized from 1995 through 1999, thereafter rising every year since 1999. Therefore, on the basis of the official series, all the declines in China's manufacturing employment in the late 1990s happened in urban areas. Many who lost their jobs were laid off while still receiving basic living subsidies from their enterprises, and many others were subjected to mandatory early retirement. Some manufacturing workers in urban China also have become fully recognized as unemployed.²⁰ Of the yearend-2002 registered unemployed urban workers who were previously employed (2.17 million), 41 percent had lost manufacturing jobs.²¹ This reduction in the workforce implies that 0.89 million former urban manufacturing workers were classified as unemployed as of the end of 2002.

Table 2. Manufacturing employment excluding surplus laid-off manufacturing workers in China, yearend 1995–2002

[In millions]

Year	Total manufacturing employment ¹	Surplus laid-off manufacturing workers	Rural manufacturing employment	Derived urban manufacturing employment ¹	Manufacturing employment in urban units ¹	Manufacturing urban staff and workers ¹
1995	95.90	2.13	39.71	56.19	52.80	52.26
1996	94.40	3.23	40.19	54.21	50.21	49.70
1997	—	—	—	—	—	—
1998 ²	83.19	(³)	39.29	43.90	38.26	37.69
1999	81.09	(³)	39.53	41.56	35.54	34.96
2000	80.43	(³)	41.09	39.34	33.01	32.40
2001	80.83	(³)	42.96	37.87	30.70	30.10
2002	83.07	(³)	45.06	38.02	29.81	29.07

¹ Excludes surplus laid-off manufacturing workers. Data for 1995–96 are calculated from the reported figures, shown in table 1, minus surplus laid-off manufacturing workers. Data for 1998–2002 are the reported figures.

² Break in series.

³ Data not shown because surplus laid-off manufacturing workers are not included in total manufacturing employment after 1997. Only 1995 and

1996 data are used to calculate estimates presented in this table.

NOTE: Dash indicates data not available.

SOURCES: Table 1; China National Bureau of Statistics and China Ministry of Labor, compilers, *China Labor Statistical Yearbook 1996* (Beijing, China Statistics Press, 1996), p. 409, and *China Labor Statistical Yearbook 1997* (Beijing, China Statistics Press, 1997), p. 405.

Apparently, then, manufacturing employment in China increased vigorously until 1995, declined from that year to 2000, and has risen again since then, regardless of whether the reported data come from the Labor Ministry and the NBS or whether the data are adjusted for changes in coverage or definition. Urban state-owned and collective-owned manufacturing enterprises have lost most of their employed workers since the early 1990s, as shown in table 1. Most of their former workers have been laid off, fired, subjected to early retirement, or retained by their enterprise after it was sold, was privatized, or became a joint Chinese-foreign company in the decade from 1992 to 2002. Meanwhile, rural manufacturing employment reportedly has continued to increase, and in urban areas manufacturing employment in the category of other ownership units grew rapidly during that decade. This category includes manufacturing enterprises with joint (Chinese-foreign) ownership, shareholding stock ownership, limited-liability corporations, and foreign-owned enterprises.²² What these numbers appear to mean is the following:

- China's manufacturing is becoming less bloated with surplus workers over time;
- The number of manufacturing workers (however defined or adjusted) in China has declined somewhat since 1995;
- Urban state-owned and urban collective-owned enterprises have shown steep declines in numbers of manufacturing workers since the mid-1990s;
- So-called rural manufacturing is still growing; and
- Urban private-sector manufacturing employment is expanding.

Research by Thomas Rawski helps us understand what is going on in some parts of China's manufacturing sector. Rawski documented the decline in urban staff and worker manufacturing employment in China from 1993 to 2002. Utilizing detailed data from several engineering sectors producing widely used industrial components, he showed a 52-percent increase in labor productivity (value added per worker) in the short period from 1996 to 2000, while employment in these sectors dropped steeply by the year 2000, to 63 percent of the 1996 numbers, and output was nearly stagnant. According to Rawski, "These data reveal industries in the throes of restructuring rather than dynamic growth."²³ China's manufacturing sector is shedding surplus workers and becoming more productive and competitive. Meanwhile, Rawski pointed out, laid-off manufacturing workers in China and in developed countries such as the United States and Japan are experiencing similar dislocations in their personal and family lives.

The U.S. Conference Board has emphasized that China is losing many more manufacturing jobs than the developed world

(including the United States) is—and in many of the same industries in which the developed world has seen the greatest declines.²⁴ Manufacturing industries in China with the greatest job losses during 1995–2002 were textiles, steel processing, machinery, and nonmetal mineral products.²⁵ China's manufacturing job losses can be traced to the restructuring of extraordinarily inefficient state-owned and urban collective-owned factories and to rapidly advancing labor productivity.²⁶

The next five sections of this study delve more deeply into some of the topics raised in the foregoing analysis. Enterprise employment data are contrasted with data from the 2000 population census, supporting the conclusion that the enterprise reports undercount millions of manufacturing workers. Then the problematic categories of urban and rural manufacturing workers are explored in more detail, leading to a statistical anomaly that goes further into the data on the TVE's. Finally, key export regions are examined and migrant manufacturing workers are discussed, because many of China's manufacturing workers have migrated into the export zones in search of jobs and there is some evidence that they are not well enumerated in China's labor statistics.

Data discrepancies

This section presents a comparison of manufacturing employment data from the 2000 census of China with the annual enterprise data for the same year and attempts to explain the discrepancies between the two sources. The comparisons here show that the regular administrative reporting system misses many millions of workers, not only in the manufacturing sector, but also in many other sectors of the economy. In addition, a discussion of the census results highlights an apparent tendency on the part of rural households to report household members as agricultural workers, even if they work in manufacturing part time or for part of the year. Therefore, although the census achieved more complete reporting than did the official annual compilations from enterprises, the census, too, appears to have undercounted manufacturing employment, especially outside the cities and towns.

The 2000 census of China discovered more manufacturing workers than were reported from annual administrative data. Both the 1990 and 2000 censuses asked respondents information about the employment of all persons aged 15 years and older. In the 2000 census, the data were gathered in a long form filled out by about 10 percent of civilian households in every locality and chosen to be representative of the population as a whole. Figures cited in the rest of this article are extrapolated to the entire counted civilian population aged 15 years and older.²⁷

Employment data from annual enterprise reporting and from China's 2000 census do not agree with each other. For example, table 3 shows the estimated numbers of employees in each major sector of China's economy at or near the end of the year 2000

Table 3. Employment in China: comparison of census and enterprise data, 2000

[In millions]

Sector	Census data	Enterprise data	Difference ¹
Total employment	709.71	629.78	79.93
Farming, forestry, animal husbandry, and fisheries	456.89	333.55	123.34
Mining and quarrying	7.41	5.97	1.44
Manufacturing	88.43	80.43	8.00
Production and supply of electricity, gas, and water	4.44	2.84	1.60
Construction	19.05	35.52	-16.47
Geological prospecting and water conservancy90	1.10	-.20
Transport, storage, post, and telecommunications	18.30	20.29	-1.99
Wholesale and retail trade and catering services	47.48	46.86	.62
Finance and insurance	4.19	3.27	.92
Real estate trade	1.64	1.00	.64
Social services	15.27	9.21	6.06
Health care, sports, and social welfare	7.53	4.88	2.65
Education, culture and arts, radio, film, and television	18.16	15.65	2.51
Scientific research and polytechnical services	1.59	1.74	-.15
Government and party agencies and social organizations	16.69	11.04	5.65
Others	1.74	56.43	-54.69

¹ Difference is census figure minus enterprise figure.

NOTES: Enterprise data are for yearend 2000; census data are from November 1, 2000, which was 2 months earlier. Therefore, the numbers from the two sources are not expected to be exactly the same. Census figures are derived by the author from the census long-form sample and refer to population aged 15 and older.

SOURCES: Census data are from China National Bureau of Statistics, *Tabulation on the 2000 Population Census of the People's Republic of China, vol. 2* [in Chinese] (Beijing, China Statistics Press, 2002), pp. 1569–70. Enterprise data are from China National Bureau of Statistics and China Ministry of Labor, compilers, *China Labor Statistical Yearbook 2003* (Beijing, China Statistics Press, 2003), pp. 8–9.

from the two major data sources. On November 1, 2000, the census recorded a total employed population of approximately 709.7 million workers. Two months later, administrative compilations of data from enterprises, economic units, and self-employed individuals recorded a total of 629.8 million workers, 80 million fewer than the census. (See table 3.)

What are the sources of the discrepancies between these two sets of data? We can see from table 3 that the census recorded 123 million more workers in agriculture than did annual administrative data. One reason for this large difference is that the census asked about employment only in the last week of October 2000, the week just prior to the date the census was taken. The census surely detected individuals who work in agriculture during peak planting and harvest seasons, but not the rest of the time, and these workers were counted as employed in agriculture during the peak autumn harvest season.

The way employment questions are asked in China's censuses and the instructions for filling out the census forms apparently bias rural household respondents in favor of reporting all household members as agricultural workers, even if some adults in the family actually work in nonagricultural sectors of the economy most of the time.²⁸ Therefore, the decennial censuses may overreport employment in agriculture and underreport employment in many industrial and service sectors of the economy. In particular, the censuses of 1990 and 2000 probably underreported the total number of manufacturing employees in China.

In most other employment categories outside of agriculture, the census also estimated a larger employed population for the latter months of the year 2000 than did enterprise data compiled by the Labor Ministry and the NBS. This may mean that the census detected millions of workers that the administrative reporting system is regularly missing. (See table 3.) For example, in services, the annual reporting system seems to be leaving out millions of workers, perhaps because many service workers are in the informal economy. By contrast, the regular administrative reporting system recorded more workers than the census did in construction, in transport, in the small categories of geological prospecting and water conservancy, and in research and technical services. The annual system also reported 56 million people at yearend 2000 in the category of other unclassified workers, while the census was able to classify most workers into one of its standard employment categories. (See table 3.) Some of these "other" workers may in fact work in two parts of the economy, such as agriculture during peak seasons and manufacturing during another, or even the same, part of the year.

The discrepancy between census and enterprise data on the number of manufacturing workers in China was not large in the year 2000, at least if census data are compared with the total employment figures by sector compiled by China's Labor Ministry and the NBS and reported in table 3. The two data sets are as close together as they are because the census also likely undercounted rural manufacturing workers. (See

later.) The census estimated 88.43 million persons employed in manufacturing the last week of October 2000. On the basis of the national employment totals published by the NBS and the Labor Ministry, economic units reported that employment in manufacturing totaled 80.43 million at yearend 2000.²⁹

What can account for this discrepancy of 8 million manufacturing workers between census data and the officially compiled enterprise data? First, the census counted each part-time worker as an employed worker. Anyone who worked more than 1 hour for pay in the week before the census was counted as one employed worker. Of manufacturing workers counted in the census, 3 percent worked fewer than 4 days in the previous week, and 97 percent worked full time or overtime. More specifically, 39 percent of manufacturing employees worked for income 4 or 5 days in the previous week, and 58 percent worked 6 or 7 days during the 7 days before the census.³⁰ It is possible that annually reported employment figures tend to neglect those who work less than full time. Therefore, part-time manufacturing workers might explain some of the discrepancy—no more than 2 to 3 million—between the census-based estimate of manufacturing workers in late 2000 and the official NBS-Labor Ministry compilation of yearend-2000 enterprise data on manufacturing employees.

Temporary workers in manufacturing who happened to be at work during the last week of October 2000 would have, or at least should have, been reported by the census as employed in manufacturing. Annual enterprise data also capture some temporary workers. For example, it was reported that, within the category of on-post urban manufacturing staff and workers in state-owned enterprises in 2002, 9.31 million (95 percent) of 9.79 million were in long-term manufacturing employment, while 0.47 million (5 percent) were in temporary manufacturing employment.³¹ However, long-term or temporary status is reported only for this 10 million of China's reported total of 83 million on-post manufacturing workers in 2002. The annual enterprise reporting system classifies all urban on-post employees as either "long term," defined as having been working for 1 or more years, or "temporary, provisional," defined as having worked for less than 1 year.³² Many of the latter employees may simply be workers who have not yet been on the job long enough to qualify as long-term workers, even though that is the intent of both employer and employee. It is possible that the census included more of China's actual temporary manufacturing workers than are included in the annual enterprise reports, although there does not appear to be any proof that such a bias or shortfall exists in enterprise data.

A minor cause of differences in manufacturing employment between census data and annual data is that the censuses of 1990 and 2000 recorded employment of the population aged 15 years and older, whereas compiled annual data are supposed to refer to the population aged 16 years and older.³³ According to 2000 census data, China had a total of 334,000 manufacturing

workers who were exactly age 15 in the last week of October 2000.³⁴ Therefore, 0.33 million of the 8.00 million differential between census and annual enterprise numbers of manufacturing workers in China in 2000 could have been caused by the inclusion of workers aged 15 years in census data and their apparent exclusion from annual employment data.

At the older end of the working ages, the census was supposed to include as employed everyone aged 15 years and older in the long-form sample population who had worked for income either part time or full time in the week before the census, no matter what their age. China's regular employment statistics define working ages as 16–59 years for men, 16–54 years for women working in white-collar jobs, and 16–49 years for women in blue-collar jobs. In theory, with regard to urban workers, only those in these age groups are included in the category of staff and workers. Employed people who are still working beyond the statutory working ages or who have been rehired after retiring from a job are supposed to be included in the category of "other" urban employment, in a subcategory of retirement-age workers who have been rehired or who have continued working. The aforementioned working ages do not apply to agricultural employment, and it is not clear whether they have any relevance to rural or town manufacturing employment. In theory, annual employment statistics, as well as census employment statistics, should include all those people in their fifties, sixties, and older who are working to earn income. Therefore, at the older working ages, there should be no age cutoff in employment statistics and no definitional difference between census figures and annual enterprise data on manufacturing or other employment.

Urban and rural manufacturing workers

In China's annual statistics on employment in manufacturing, the categories "rural" (*xiangcun*) and "urban" (*chengzhen*) are profoundly problematic.³⁵ If these employment statistics followed China's official statistical definition of urban and rural places and populations, then *urban* would include manufacturing employment in cities (*chengshi* or *cheng*) and in towns incorporated as urban places (*zhen*). The urban manufacturing figures should include actual workers in manufacturing in cities and towns, regardless of whether the workers have or do not have their permanent residence or registration there. If rural villagers are employed full time in manufacturing in an urban town (*zhen*) or in a city, then, on the basis of the NBS statistical definition of *urban*, these manufacturing employees should be classified in the data as urban manufacturing workers.

Indeed, China's census of November 1, 2000, reported that the nation had 41.96 million manufacturing workers in cities and 18.41 million in urban towns (*zhen*), for a total of 60.36 million urban manufacturing workers, constituting 68 percent of all the manufacturing workers in China. The census also counted 28.07 million rural (*xiangcun*) manufacturing workers, 32 percent of

the enumerated manufacturing workers.³⁶ As it is, the 2000 census may have underestimated the urban proportion of manufacturing employment because rural workers who had moved to towns or cities within the previous 6 months and who were working in manufacturing there would be counted for the census back in their villages and therefore might be called rural manufacturing workers or even rural agricultural workers.

Table 1 shows, however, that the annual statistics for yearend 2000 recorded urban manufacturing employment at only 39 million (fewer than the 2000 census counted in the cities alone), just 49 percent of the reported national total, while rural manufacturing employment, at 41 million, constituted more than half of China's manufacturing employment. The category of manufacturing employment in urban units was reported at only 33 million that year, and that of urban manufacturing staff and workers was reported at 32 million. China's 2000 census used a comparatively careful definition of urban population and employment that has been refined by the NBS during the last two decades. The NBS official statistical definition of urban and rural populations and employment is arguably the best standard for other Chinese statistics. Interestingly, the breakdown of China's annual manufacturing employment statistics into the rural classification and the various urban categories is inconsistent with China's own statistical definitions of *urban* and *rural*.

The inconsistencies between census data and annually reported data on urban and rural manufacturing employment arise in part because annual data are "administrative." The regular statistics are based on administrative geographical boundaries, rather than on statistical distinctions between rural and urban employment. In the administrative data, *urban* encompasses only cities and perhaps also the political county seat (called the "county town") of each county in China, while *rural* denotes everywhere else, including all other towns that are officially established as urban.³⁷ In the annual manufacturing employment statistics, however, the word *urban* appears to be a misnomer. The data ostensibly refer to manufacturing employment only in China's cities and perhaps some of their immediate suburbs and the county towns. Apparently, almost all of China's manufacturing employment in urban towns (*zhen*) and rural areas is lumped together as rural manufacturing employment.

In truth, the discrepancy between the annual administrative data and the census data is even greater than the preceding paragraph asserts. According to the NBS, some "urban" data on manufacturing employment include data from units that are not in fact located in any urban area.³⁸ Specifically, if a state-owned factory is located in a remote rural area, its data might still be included in urban data on employment and wages in manufacturing. This categorization is a legacy of the planned-economy practice of reporting data by administrative subordination rather than geographic locality. In addition, according to the NBS, there is at least one case of a rural county in Guangdong province that was reclassified and established as a city, after

which all the factories in the new "city" continued to be classified and reported as TVE's; indeed, it may still be that no manufacturing employment or wage data from this new "city" are reported as urban.

Fortunately, of late China has been making a gradual transition to compiling statistical data on the basis of geographic locality rather than administrative subordination.³⁹ Still, there appears to be no concrete information that can help quantify what proportion of the reported data on "urban" manufacturing employment and wages is actually from rural locations or what proportion of "rural" or "TVE" manufacturing employment or wages actually refers to manufacturing units located in cities.

A major statistical anomaly

China's statistics on manufacturing employment suffer from an important inconsistency. The Labor Ministry concerns itself primarily with city employment, while the Ministry of Agriculture is responsible for data on rural and town (*zhen*) employment. This division of responsibility is a legacy of the Maoist command-economy era, and it has not yet been corrected. Therefore, the Labor Ministry publication *China Labor Statistical Yearbook* concerns itself almost entirely with city employment and wage statistics; even within cities, the Labor Ministry focuses its data collection and reporting on the rapidly declining urban state-owned and collective enterprises. The Labor Ministry calls these data "urban" statistics. Meanwhile, the Agriculture Ministry collects employment and wage data from the TVE's, including those engaged in manufacturing, and publishes the data in its own publications. It appears that there is no coordination between the two ministries. For example, in calculating total manufacturing employment in China, NBS and the Labor Ministry seem to ignore the Agriculture Ministry data from the TVE's.

This problem is illustrated in table 1 and chart 1. The rightmost two columns of the table report Ministry of Agriculture data on employment in industry (*gongye*) TVE's since 1978. This category is almost all employment in manufacturing. (The rest of "industry" employment comprises the two relatively small categories of mining and the production and supply of electricity, gas, and water.) In 2003, a Ministry of Agriculture publication reported for the first time the number of TVE manufacturing employees (for yearend 2002), and that number constituted 92.4 percent of TVE industry employment. Arbitrarily using that same percentage for the years starting in 1990, the far right column of the table presents estimated TVE manufacturing employment during 1990–2001.

It is important to note that TVE industry employment data had an abrupt definitional shift in 1997 in which the total reported dropped sharply, only to rise again the following year. Part of the jump in the number of TVE manufacturing employees in 1998 may be associated with the unexplained statistical loss of 7 million urban manufacturing staff and workers that year, as

discussed earlier. In 1998, the NBS reclassified the group of directly reporting enterprises to those with annual sales revenue above a certain amount and exempted smaller enterprises.⁴⁰ As reporting requirements were reduced for small and medium-sized enterprises in urban areas, 7 million manufacturing workers inexplicably dropped out of the urban numbers entirely and were not picked up anywhere in the official rural or in the official total manufacturing employment series. However, they may have been added to the TVE employment category, boosting its manufacturing employment numbers in 1998.

It is unclear just what the TVE industry employment numbers actually mean and do not mean or how part-time or part-year employees are treated in the data. Therefore, it is unclear whether TVE industry employee numbers are overstated, understated, or about right. Nevertheless, the TVE data must be considered in evaluating China's manufacturing employment levels and trends, and evidence discussed in the remainder of this article argues for using those data, rather than the official series on rural manufacturing employment, to estimate noncity manufacturing employment in China. In addition, the TVE data provide the only figures on rural earnings, and those earnings must be used in constructing earnings and compensation estimates for all of China.⁴¹

The column giving data on total manufacturing employment in table 1 does not include all the reported TVE manufacturing employees. How do we know this? The reason is that all or almost all of the reported "urban" manufacturing employees in China are not in TVE's. The category of urban "staff and workers" explicitly excludes all TVE employees.⁴² The rules about how to report the "other" urban enterprise employees who, together with staff and workers, constitute "employment in urban units" have nothing to do with TVE's.⁴³

It may be that some of the residual 8.21 million "urban" manufacturing employees who were self-employed or who worked in private enterprises in 2002 also were called TVE employees, but this overlapping of categories appears unlikely, given the way urban and rural employment data for China are reported.⁴⁴ These workers are in cities, whereas TVE manufacturing employees generally work outside the cities, in rural areas and in towns. In fact, instructions for filling out China's labor force survey specifically state, "TVE employees are only those who work in enterprises located in rural townships and villages."⁴⁵ Among manufacturing workers in 2002, there were 21.35 million employees in private enterprises (*siying qiye*) or in individual or family enterprises (*geti duzi qiye*). Of these, 8.21 million were in the cities, while 13.14 million were classified as "rural," meaning noncity; it is likely that the latter group was included in 2002 TVE manufacturing employment and wage statistics.⁴⁶

If the 29.81 million manufacturing employees working in urban units at yearend 2002 are subtracted from the total manufacturing employment figure for the same year (table 1), the result is 53 million manufacturing employees who could be

working in TVE's. Yet the Agriculture Ministry reported 70.87 million TVE employees in manufacturing that year. (See table 1.)

Chart 2 graphs two different estimates of total manufacturing employment in China. The "reported" series is that constructed by the NBS and the Labor Ministry and titled "Total manufacturing employment" in table 1. The series titled "Urban and TVE" in the chart assumes that the columns for derived urban manufacturing employment (referring to cities) and TVE manufacturing employment (referring primarily to towns and villages—the rightmost column in the table) are mutually exclusive and do not overlap; the chart series is the sum of those two sets of data. (Data from the two series in Chart 2 are given in table 4.) Both series indicate that (1) total manufacturing employment in China peaked in the mid-1990s; (2) there was a slow decline in Chinese manufacturing employment in the late 1990s; and (3) beginning in 2001 or 2002, there was a slight increase in national manufacturing employment. (Note that there were definitional shifts in TVE industry employment data, and then in urban manufacturing employment data, from 1996 to 1998.)

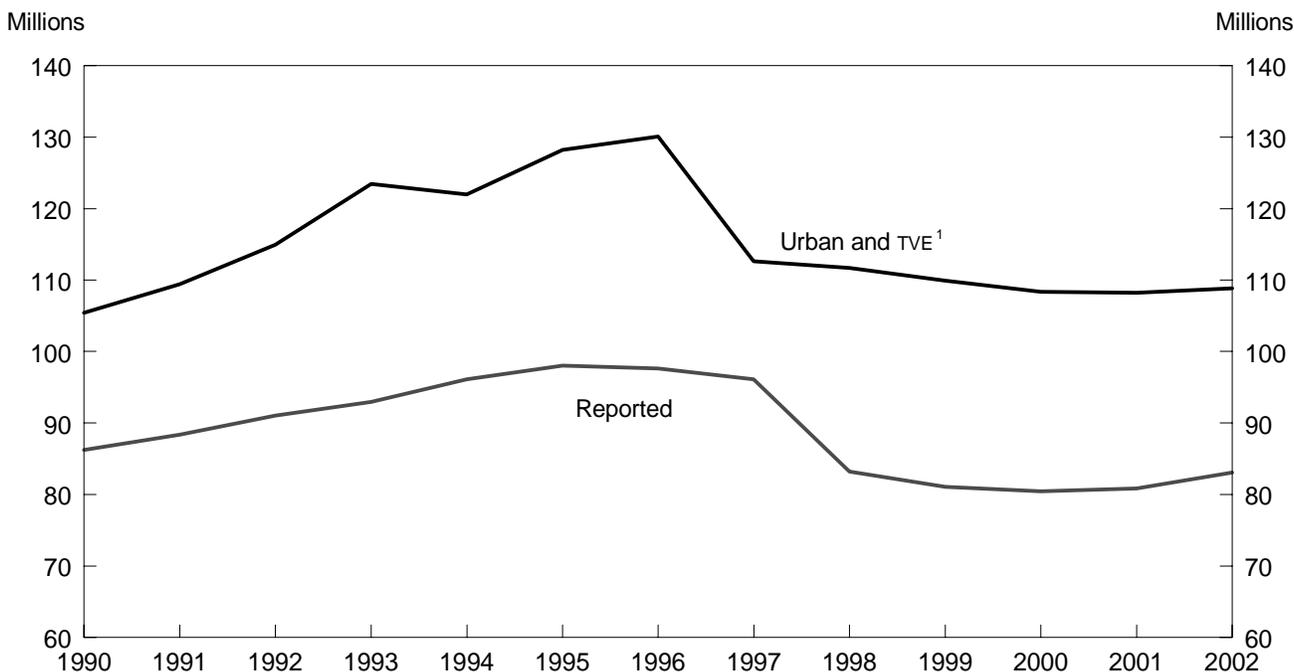
The "urban and TVE" series in chart 2 and table 4 suggests that China had 109 million manufacturing employees by yearend 2002, whereas the officially compiled series reported 83 million, a difference of 26 million. Which series is correct or, at least, more nearly correct?

On the one hand, if the yearend-2000 totals from the two series in the chart and the table are compared with 2000 census-based estimates of manufacturing employment, it becomes evident that the census found about 8 million more manufacturing workers in China than did the NBS-Labor Ministry compilation that year (see table 3), but 20 million fewer than the TVE and urban manufacturing employment total for that date. The census number is closer to the official series, which would argue in favor of that series.

On the other hand, the urban and TVE series agrees with the results of the 1995 industrial census, which counted 147 million workers in industry (*gongye*) nationwide. China's official administrative data series for the whole country (not only for TVE's) reported that, in 1995, 89 percent of all of China's "industry" employees were in manufacturing. Applying this percentage to the industry employment data from the 1995 industrial census would translate into 131 million manufacturing workers nationwide that year.⁴⁷ The total of urban and TVE manufacturing employment for yearend 1995 was 128 million. Therefore, evidence from the 1995 industrial census of China argues for using the urban and TVE series to estimate total manufacturing employment in China.⁴⁸

More information is needed to determine which series is more nearly correct for total manufacturing employment in China during 1990–2002. Tentatively, it would appear that the urban and TVE series on manufacturing employment would be more useful than the official series. One reason is that the NBS and the Labor Ministry have little usable information associated with their figure of 45 million "rural" manufacturing workers.

Chart 2. Manufacturing employment in China, yearend 1990–2002



¹Town and village enterprises; manufacturing employment in this sector is derived from reported TVE industry employment.

SOURCE: Calculated from Table 1.

Nothing is published except that one number, and no information is available on how this number was derived or estimated. By contrast, a branch of the Agriculture Ministry has gathered and published some information on the TVE manufacturing employees and on the earnings paid to them. The only regular reporting system that collects detailed data for rural enterprises, including manufacturing enterprises, is the data collection system run by the Township Enterprise Bureau of the Ministry of Agriculture:

The Township Enterprise Bureau of the Agriculture Ministry collects detailed data on township-run and village-run collective enterprises, and basic statistics on co-operative enterprises, private enterprises and individual-owned enterprises. The NBS assists the Township Enterprise Bureau in the design of the statistical reporting forms. The Township Enterprise Bureau collects the data and makes some of them regularly available to the NBS. The NBS relies on the Township Enterprise Bureau's data and has no independent regular reporting system for rural enterprises.⁴⁹

If the urban and TVE series is the more nearly correct one, then the 2000 census long form may have underestimated the

true number of manufacturing workers in China on November 1, 2000, by about 20 million (108,000,000–88,000,000). (See tables 3 and 4.) One study has pointed out that the census questionnaire and the instructions for enumerators may tend to bias the responses of rural households in favor of reporting all members as engaged in agricultural employment, even if a family member is working in manufacturing.⁵⁰ Another problem is that when the 2000 census enumerators located migrants, they probably handed them a short census form to fill out, whereas households were sampled to decide which would receive the long form. The result of these procedures might be that employment in industry or service sectors favored by migrants is underestimated by the census long form.⁵¹ Also, in some parts of China, the last week of October is still a heavy harvest season, and the census might have counted as agricultural workers millions of manufacturing employees who were only temporarily diverted into agriculture.

If the urban and TVE manufacturing series is the preferred one, then China reported about 105 million manufacturing employees at yearend 1990, a figure that rose to 128 million at yearend 1995 and 130 million at yearend 1996. (See table 4.) In 1997 and 1998, statistical changes and corrections, as well as redefinitions, in both TVE data and urban employment data resulted in a drop in China's total manufacturing (urban and

Table 4. Manufacturing employment in China: two alternative series, yearend 1990–2002

[In millions]

Year	Urban and TVE ¹ manufacturing employment	Official reported manufacturing employment
1990	105.45	86.24
1991	109.44	88.39
1992	114.94	91.06
1993	123.46	92.95
1994	121.98	96.13
1995	128.24	98.03
1996	130.09	97.63
1997	112.64	96.12
1998	111.69	83.19
1999	109.91	81.09
2000	108.35	80.43
2001	108.25	80.83
2002	108.88	83.07

¹ Town and village enterprises. SOURCE: Calculated from table 1.

TVE) employment figure, to approximately 112 million by yearend 1998, of which 44 million were called “urban” and about 68 million “TVE.” (See table 1.) Since then, TVE manufacturing employment apparently rose slowly each year, to 71 million at yearend 2002, while on-post (not laid-off) urban manufacturing employment dropped from 44 million to 38 million. Total urban and TVE manufacturing employment in China declined by 4 million, from 112 million in 1998 to 108 million in 2000–01, and then rose slightly to 109 million by yearend 2002, as shown in table 4 and chart 2.

Manufacturing in key export regions

Many establishments in China engage in manufacturing that is part of global trade. These manufacturing enterprises import large quantities of components, inputs, raw materials, and machinery, primarily from other Asian countries, and they employ large numbers of nonnative managers and professionals. They export some of their final product to the global market, chiefly the United States, Europe, and developed countries in Asia.⁵² The two leading manufacturing regions producing for the global market today are the Pearl River (*Zhujiang*) Delta (near Hong Kong and Macao) of Guangdong Province, which includes 9 cities, and the Yangtze River (*Changjiang*) Delta, which includes 15 cities in Shanghai Municipality, Zhejiang Province, and the southern half of Jiangsu Province.⁵³ Both areas include many noncity manufacturing centers.

At yearend 2002, on the basis of the NBS and Labor Ministry compilation, these four provinces reported a total manufacturing employment of 2.69 million in Shanghai Municipality, 7.81 million in Zhejiang Province, 7.45 million in Jiangsu Province, and 7.81 million in Guangdong Province.⁵⁴ Except in Shanghai Municipality, the majority of the manufacturing employees were classified as rural in these export-oriented provinces. Rural manufacturing employees totaled 1.09 million in Shanghai

Municipality, 5.82 million in Zhejiang Province, 4.61 million in Jiangsu Province, and 4.25 million in Guangdong Province.⁵⁵ If the Agriculture Ministry were to report the numbers of TVE manufacturing workers by province, the numbers for those four provinces would undoubtedly be much higher than the reported numbers of rural manufacturing employees there. If their TVE manufacturing workers constitute about 92.4 percent of their TVE industry workers, then the four provinces have approximately the following numbers of manufacturing workers outside their cities: Shanghai, 1.50 million; Zhejiang, 8.00 million; Jiangsu, 6.96 million; and Guangdong, 7.61 million, for a total of about 24 million.⁵⁶ These numbers are far greater than the numbers of rural manufacturing workers reported by the NBS and the Labor Ministry for those provinces.

Of China’s reported 70.9 million TVE manufacturing employees in 2002, only 13.4 million were reported to be producing for export, while 57.5 million were apparently producing only for the domestic market. Most of the TVE employees producing for the export market probably were located in the Pearl River and Yangtze River Deltas.

Migrant manufacturing workers

Where are the migrant manufacturing workers in China’s statistics? Most published data on manufacturing employment do not single out migrants. Therefore, it is difficult to discover how many migrant manufacturing workers there are and where they are.

Many of China’s urban manufacturing workers, especially in the export-manufacturing zones, have migrated into cities and their suburbs from rural areas. These rural-to-urban in-migrants are supposed to be included in 2000 census figures on urban manufacturing employees if they have been in the city for 6 months or longer. Also, annual enterprise data for urban manufacturing units are, in theory, required to include workers from rural areas in the category of urban manufacturing “staff and workers.” Specifically, the urban employment classification “on-post staff and workers” includes the category “workers whose population registration is in rural areas”; all these figures are to be reported monthly, quarterly, and annually.⁵⁷ According to the NBS, the official series on manufacturing employment in urban units (see table 1) included a total of 4.59 million migrant manufacturing workers (whose household registration was still in rural areas) at yearend 2002. The 4.59 million figure constituted 15 percent of the 29.81 million manufacturing employment in urban units; the number of in-migrant manufacturing workers with rural population registration increased to 5.46 million at yearend 2003, or 18 percent of manufacturing employment in urban units at the end of that year.⁵⁸

Many millions of young rural workers have migrated to China’s export-manufacturing zones in the most recent decade and a half to work in factories. Sometimes these factories are

within city administrative boundaries, but often they are located in industrial parks, suburban areas, built-up periurban industrial zones, towns, or rural regions where agricultural land is being taken over for manufacturing zones. Both foreign and domestic employers who are eager to keep down their labor costs and statistical reporting requirements may prefer that their export-processing factories be classified as rural or TVE.⁵⁹ Under such a classification, they need meet few, if any, requirements to pay social insurance and other welfare obligations for their hundreds or thousands of production and hand-assembly workers, and, at the same time, data-reporting requirements for their enterprises are minimal. Many of the migrant manufacturing workers in these factories may be counted in China “rural” manufacturing employment figures or in the TVE manufacturing industry employment numbers. (See table 1.)

There is, however circumstantial evidence that not all migrant workers are included in China’s official annual employment data. China’s November 1, 2000, census estimated that there were already 14.60 million migrant rural-to-urban manufacturing workers, constituting 25 percent of all manufacturing workers in cities and urban towns.⁶⁰ Worker migration has been increasing since then, especially for manufacturing, so the number likely was larger by the end of 2002.

Other indirect evidence from one province points to the same conclusion. Shanghai Municipality carried out a detailed survey of its “floating population” (*liudong renkou*) as of August 1, 2003.⁶¹ The survey estimated that in-migrants from other provinces who had been in Shanghai Municipality for a day or more totaled 4.99 million. Of these individuals, 3.75 million were employed, yet the *Shanghai Statistical*

Yearbooks exclude even long-term in-migrants from their figures on the total population of the municipality and, therefore, probably from the total employment figures (7.43 million at yearend 2002; 8.13 million at yearend 2003) and the manufacturing employment figures as well.⁶² Data on manufacturing employment in Shanghai Municipality in the *China Labor Statistics Yearbooks* are based on the data in the *Shanghai Statistical Yearbooks*. Shanghai Municipality reportedly had 2.69 million manufacturing workers at yearend 2002 and about 2.61 million at yearend 2003.⁶³ As of August 1, 2003, there were 1.27 million floating in-migrant manufacturing workers in Shanghai Municipality. It appears that these migrant manufacturing workers were largely excluded from the official data series on Shanghai. Unless they were counted in China’s official data series as manufacturing workers back in their home provinces, they also were missing from the official national manufacturing employment series that is compiled from provincial data.

A global perspective

Table 5 gives BLS compilations of levels and trends of manufacturing employment in the Group of Seven (G7) developed countries; in 2002, these countries had a total of 53 million manufacturing workers. China’s official data showed 83 million manufacturing employees that year, but, as mentioned earlier, that figure was likely an understatement, and the true number was probably closer to 109 million. (See table 4.) Most of the countries listed in table 5 have had declining numbers of manufacturing workers, as did China in the late 1990s, because

Table 5. Manufacturing employment in G7 countries, 1995–2002

[In thousands]

Year	G7 total	United States	Canada	Japan	France	Germany	Italy	United Kingdom
1995	59,825	20,493	1,907	14,520	4,115	9,017	4,831	4,942
1996	59,437	20,518	1,926	14,420	4,073	8,643	4,781	5,076
1997	² 59,567	² 20,835	2,016	14,390	4,035	8,521	4,746	5,024
1998	² 59,204	² 20,733	2,102	13,790	4,047	8,688	4,820	5,024
1999	² 58,024	² 20,070	2,202	13,410	4,031	² 8,591	4,820	4,900
2000	² 57,353	² 19,644	2,254	13,180	4,081	8,646	4,796	4,752
2001	55,606	18,434	2,230	12,800	4,127	8,626	4,774	4,615
2002	53,321	17,233	2,291	11,990	4,059	8,491	4,814	4,443

¹ The G7 countries are the United States, Canada, Japan, France, Germany, Italy, and the United Kingdom.

² Break in series. For the United States, all breaks are due to updated population controls. Furthermore, data for 2000 forward for the United States are based on the 2002 North American Industry Classification System; data for earlier years are based on the 1987 Standard Industrial Classification. The 1999 break for Germany reflects the incorporation of an improved method of data calculation and a change in coverage to persons living in private households only.

NOTE: The data in this table are obtained mainly from household surveys, such as the Current Population Survey for the United States. Household surveys are more comparable across countries than are establishment surveys.

SOURCE: *Comparative Civilian Labor Force Statistics, Ten Countries, 1960–2004* (Bureau of Labor Statistics, May 13, 2005); on the Internet at <http://www.bls.gov/fls/fls1forc.pdf>.

of both rising productivity and increasing global competition in manufacturing.⁶⁴

In addition, the share of manufacturing in total employment has been declining in most of the G7 countries.⁶⁵ In 1990, manufacturing employment ranged from 15 percent to 32 percent of total employment in these developed countries, but by 2002, the share was down to 12 percent to 24 percent of total employment. In China, meanwhile, official data showed that manufacturing constituted only 14 percent of total employment in 1990, after which it declined to 12 percent in 2002. The difference between China and the developed countries, of course, is that agriculture still employs a large proportion of the working population in China. Chart 3 shows that, even though manufacturing employs a similar proportion of workers in the United States and China, most other workers in the United States are in services, whereas in China the service sector is comparatively underdeveloped and agriculture continues to employ more workers than services.

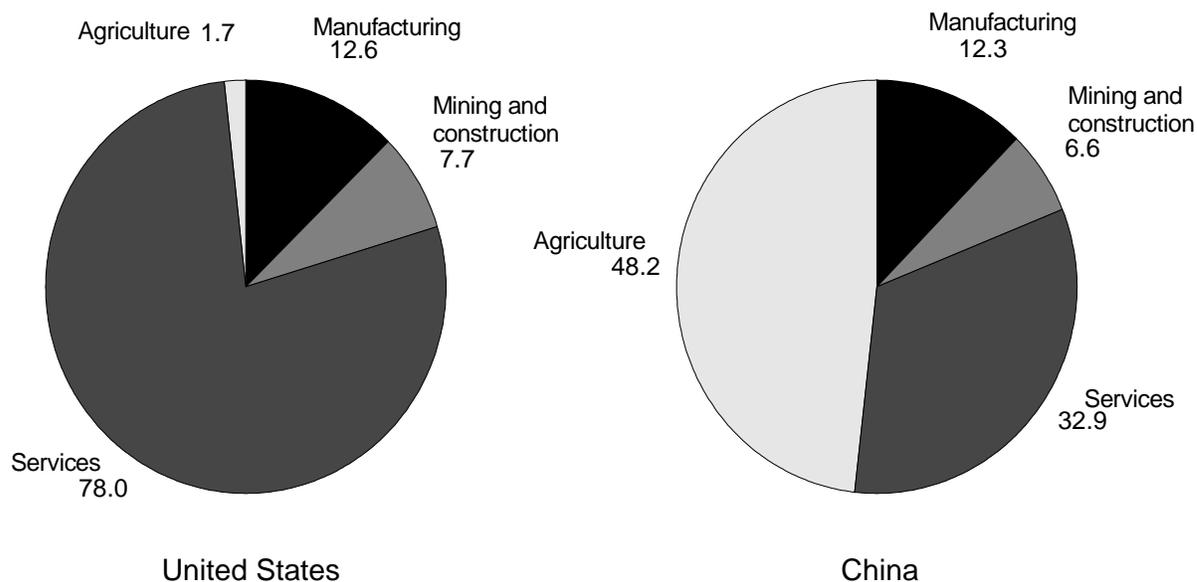
Why does China have so many more manufacturing workers than other countries? First, much of China's manufacturing production is still labor intensive rather than capital intensive, so more workers are required in China to produce the same output. Second, China is extremely competitive in the global market for manufactured products and is able to sell its

manufactures around the world, not only because it pays low wages, but for many other good reasons as well. Third, the manufacturing sector in China serves the country's own huge domestic market as well as the international market.⁶⁶

Summary and conclusions

This article has collected and assessed the available statistics on manufacturing employment in China. Official data from the China National Bureau of Statistics and the Labor Ministry show a steep drop in urban manufacturing employment in China from 1995 to 2001 and in total manufacturing employment from 1995 to 2000, after which the numbers stabilized or began to rise. The declines in Chinese manufacturing employment in the late 1990s were caused by (1) massive layoffs and early retirements of redundant workers in China's urban state-owned and urban collective-owned manufacturing enterprises, (2) a change in coverage starting in 1998 that has included only on-post (not laid-off) manufacturing workers in the urban employment numbers from 1998 to the present, and (3) another definitional shift from 1997 to 1998 that has not been explained. The analysis presented here has shown that, even after adjustment for the definitional shifts, China has lost millions of manufacturing workers since the mid-1990s.

Chart 3. Employment by sector in the United States and China, 2002, in percent



SOURCES: U.S. data are from *Comparative Civilian Labor Force Statistics, Ten Countries, 1960–2004* (Bureau of Labor Statistics, May 13, 2005); on the Internet at <http://www.bls.gov/fls/flsforc.pdf>. Chinese data are from official yearend enterprise reports as published in *China Statistical Yearbook 2003* (Beijing, China Statistics Press, 2003), pp. 128–29.

Published labor statistics for China continue to emphasize data for the declining urban state-owned and collective-owned enterprises, while neglecting the healthiest and most dynamic parts of the economy. This approach means that the employment numbers put out by the Labor Ministry and by the National Bureau of Statistics are becoming ever more irrelevant. In manufacturing, the action has moved to the private sector. In urban statistics, the booming private domestic, foreign-owned, and multinational manufacturing enterprises and corporations are lumped under the umbrella term “other ownership units.” Privately owned and family-owned urban *siying qiye* manufacturing businesses are ignored in the employment data from the Labor Ministry and the NBS, and the same is true of self-employed manufacturing workers in the cities. Yet it is the urban private sector that has seen ever-increasing manufacturing employment. “Other” urban manufacturing ownership units had only 1.35 million employees in 1990, but the number has grown every year since then and reached 15.82 million by yearend 2002. Meanwhile, the residual category of urban manufacturing workers employed in the privately owned *siying qiye* and *getihu* rose from less than 1 million in 1990 to 8.21 million by yearend 2002. It appears that government statistical and labor agencies do not pay adequate attention to the private-sector manufacturing corporations and the small manufacturing businesses in China’s cities.

China’s employment statistics focus on the cities, while the expanding “rural,” town, suburban, and industrial park manufacturing enterprises all over the country are almost entirely left out of the statistics. Apparently, virtually all of China’s manufacturing enterprises and factories located outside strict city limits are lumped together under the category “town and village enterprises” (TVE’s). This term is a misnomer for all the employers, both private and collective, both domestic and foreign, of the 71 million noncity manufacturing employees in China who are referred to as TVE manufacturing employees. Most TVE’s were privatized by the late 1990s; therefore, the private sector has become important in employing TVE workers as well as urban workers.⁶⁷

In a holdover from the Maoist decades, the Ministry of Agriculture is responsible for supervising and collecting statistics on all the industrial enterprises located outside city limits in China. In 2003, for the first time, one of the agency’s publications, the *China Village and Town Enterprise Yearbook*, published the number of TVE manufacturing employees in China.⁶⁸

Adding together official manufacturing employment numbers for the cities and estimates for the TVE’s suggests that China had about 105 million manufacturing employees in 1990, and the total increased in the early 1990s to a peak of 130 million in 1996. This large number may have included some overreporting of TVE manufacturing employees, along with the surplus urban

manufacturing employees not yet deleted from the total urban manufacturing employment figures. After statistical corrections in both urban and TVE data, China was estimated to have approximately 112 million manufacturing employees at yearend 1998. The number declined to about 108 million in 2000–01 and rose slightly to 109 million by yearend 2002. All of these estimates are based on the supposition that there is no overlap between TVE and official urban manufacturing employee figures.

This article has demonstrated that manufacturing employment in China increased during the 1980s and early 1990s, peaked in about 1995–96, declined during the late 1990s until 2000–01, and increased again in 2002.

Future research priorities

The following areas should have high priority for future data collection in China and future research on Chinese manufacturing:

1. *Migrant manufacturing workers.* Publicly available data on China’s manufacturing employees do not provide enough information about how many migrant manufacturing workers there are in China and where they are working. Yet migrants from the rural areas are fueling the country’s manufacturing boom, and there are tens or hundreds of millions more surplus workers in agriculture, some of whom could migrate to join factories in the future. Migrant workers help keep China globally competitive in manufacturing. Further collection and dissemination of information on China’s migrant manufacturing workers are needed.
2. *Rural manufacturing employment.* Much better data collection and reporting, and much more research, are needed to try to fill in some of the missing information on rural and town manufacturing employment. Reporting is routinely more thorough for city manufacturing units in China.
3. *Conflicting data.* More work is needed by China’s statistical leaders and by analysts of labor force data to reconcile and make sense of the conflicting sets of manufacturing employment data so far released. Communication, coordination, and better statistical oversight are needed among the NBS, the Labor Ministry, the Ministry of Agriculture, and the State Administration for Industry and Commerce and with scholars who utilize China’s official labor force statistics.
4. *Labor force surveys.* China needs to design, carry out, and publish results of labor force surveys using international standards and definitions. The surveys should cover the rural as well as the urban labor force. China has been conducting experimental labor force surveys,

but most of the results have not yet been released. Reportedly, China will conduct a regular labor force survey in 2006 and begin publishing data from that survey.

5. *National economic census.* During 2005, with reference year 2004, China is conducting its first national census of the economy. This census is expect-

ed to refine, correct, and update data on who works where in manufacturing. The census “is sure to find that private-sector employment is much higher than is currently reported.”⁶⁹ When results of the economic census become available at the end of 2005, the new information should be used to update research on China’s manufacturing sector. □

Notes

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¹ Judith Banister, “Manufacturing Employment and Compensation in China,” on the Internet at <http://www.bls.gov/fls/#publications>.

² See Jeffrey R. Taylor and Judith Banister, *Statistical Reliability in China* (U.S. Census Bureau, 1989).

³ Carsten A. Holz, *The Institutional Arrangements for the Production of Statistics*, Statistics Directorate, OECD-China Governance Project, OECD Statistics Working Paper STD/DOC (2005), 1 (Paris, Organization for Economic Cooperation and Development, 2005), p. 5.

⁴ Banister, “Manufacturing Employment and Compensation in China.” (See “Ministries” in the “Glossary and Definitions” section of that paper for a list of the ministries involved in the collection and reporting of manufacturing employment in China.)

⁵ For relevant Chinese language terms, see Banister, “Manufacturing Employment and Compensation in China.” “Actual situation,” “labor situation,” and “yearend number of workers” are defined in the “Glossary and Definitions” section of that paper.

⁶ Copies of the enterprise statistical reporting form (*laodong qingkuang biao*, or “labor situation form”) for 2004 were submitted to urban authorities by the end of February 2004 and reported 2003 data for urban companies and work units; wage-reporting instructions (*laodong gongzi—tongji taizhang*, or “labor wages—statistical accounts”) for 2004 were from the Beijing Municipality Statistical Bureau. (See especially p. 2-1 of the latter.)

⁷ The TVE’s were originally established as collective economic units run by local governments in rural areas and towns. The purpose of TVE’s was, and still is, to employ small farmers and rural laborers in industrial or service occupations in locations not far from their family homes. This practice allows the modernization of China’s vast countryside without necessitating massive migration from villages to cities. In the 1980s, and especially from the 1990s to today, TVE’s shifted from public toward private ownership, and many foreign-funded enterprises

became classified as TVE’s. Now the TVE category, in addition to encompassing small local enterprises, can include very large factories in industrial parks outside cities, as well as suburban, town, and rural factories. Indeed, companies have incentives to have their factories classified as TVE’s because mandatory social insurance payments are very low, statistical reporting requirements are minimal, and many legal and taxation benefits accrue to TVE’s.

⁸ See Banister, “Manufacturing Employment and Compensation in China.” Some of the terms are defined in the “Glossary and Definitions” section of this paper.

⁹ China National Bureau of Statistics and China Ministry of Labor, compilers, *China Labor Statistical Yearbook 2003* (Beijing, China Statistics Press, 2003), p. 638.

¹⁰ See also *China Labor Statistical Yearbook 2003*, pp. 13, 230.

¹¹ *Ibid.*, p. 249.

¹² Enterprise statistical reporting forms, 2004; wage-reporting instructions, 2004.

¹³ *China Labor Statistical Yearbook 2003*, p. 169.

¹⁴ China State Administration for Industry and Commerce, *Zhongguo gongshang xingzheng guanli nianjian 2003 (Yearbook of the Industry and Commerce Administration of China 2003)* (Beijing, China Industry and Commerce Press, 2003), pp. 583, 587.

¹⁵ See also Ming Lu, Jianyoung Fan, Shejian Liu, and Yan Yan, “Employment restructuring during China’s economic transition,” *Monthly Labor Review*, August 2002, pp. 25–31; on the Internet at <http://www.bls.gov/opub/mlr/2002/08/art3full.pdf>.

¹⁶ *China Labor Statistical Yearbook 2003*, p. 10.

¹⁷ *Ibid.*, p. 20.

¹⁸ *Ibid.*, p. 243. See also Banister, “Manufacturing Employment and Compensation in China.” The terms *laid-off staff and workers*, *non-on-post staff and workers*, *off-post staff and workers*, and *on-post staff and workers* are defined in the “Glossary and Definitions” section of that paper.

¹⁹ Ray Brooks and Ran Tao, “China’s Labor Market Performance and Challenges,” IMF Working Paper WP/03/210 (Beijing, International Monetary Fund, November 2003); on the Internet at <http://www.imf.org/external/pubs/ft/wp/2003/wp03210.pdf>; see also Robert H. McGuckin and Matthew Spiegelman, *China’s Experience with Productivity and Jobs* (New York, The Conference Board, 2004), p. 12.

²⁰ See Banister, “Manufacturing Employment and Compensation in China.” The term *unemployment rate* is defined in the “Glossary and Definitions” section of that paper.

²¹ *China Labor Statistical Yearbook 2003*, pp. 96, 126.

²² *Ibid.*, p. 637.

²³ Thomas G. Rawski, *Recent Developments in China's Labor Economy* (Geneva, International Labor Office, November 2003) (revised from a report prepared in January 2002).

²⁴ McGuckin and Spiegelman, *China's Experience*, p. 5.

²⁵ See Changming Li, *China Industrial Development Report 1997* (Beijing, Economic Management Press, 1997), especially Chapter 11, "China's textile industry: From size to strength"; also in Christopher Howe, Y. Y. Kueh, and Robert Ash (eds.), *China's Economic Reform: A Study with Documents* (London, RoutledgeCurzon, 2003), pp. 165–75.

²⁶ McGuckin and Spiegelman, *China's Experience*, pp. 4–5, 11–13, 17.

²⁷ The calculation procedure for estimating the nationwide employed population from the long-form sample sidesteps the problem that there was a severe undercount of children below age 10 or so in the 2000 census. The count of the population aged 15 years and older in the 2000 census was quite complete, in that it matched the expected adult population as projected from the 1990 census and taking into account all available demographic information for the interim period, even though there is controversy about whether some young and middle-aged adults were counted in the wrong places. (See Weimin Zhang and Hongyan Cui, "Dui Zhongguo 2000 nian renkou pucha zhunque xing de guji" ("Estimates of the accuracy of China's 2000 population census"), *Renkou yanjiu (Population Research)*, vol. 27, no. 4, 2003, pp. 25–35; Kam Wing Chan, "Chinese census 2000: New opportunities and challenges," *The China Review*, Fall 2003, pp. 1–12; Daniel Goodkind and Gregory Robinson, "Intercensal evaluations of year 2000 censuses: Issues and surprises in the United States and China," paper presented at the International Seminar on China's 2000 Population and Housing Census, Beijing, April 2004.

²⁸ Alwyn Young, *Gold into base metals: Productivity growth in the People's Republic of China during the reform period*, NBER Working Paper Series no. 7856 (Cambridge, MA, National Bureau of Economic Research, 2000), pp. 22–23.

²⁹ *China Labor Statistical Yearbook 2003*, pp. 8–9.

³⁰ China National Bureau of Statistics, *Tabulation on the 2000 Population Census of the People's Republic of China*, vol. 2 [in Chinese] (Beijing, China Statistics Press, 2002), pp. 1578–79.

³¹ *China Labor Statistical Yearbook 2003*, pp. 23, 362.

³² Wage-reporting instructions, 2004, p. 1-2.

³³ Compare "Di wu ci quanguo renkou pucha biao chang biao" ("The fifth national population census form, long form") (Beijing, China National Bureau of Statistics, 2000), columns R17–R22, with China National Bureau of Statistics, *China Statistical Yearbook 2003* (Beijing, China Statistics Press, 2003), p. 181.

³⁴ China National Bureau of Statistics, *Tabulation on the 2000 Population Census of the People's Republic of China*, vol. 1, p. 570; vol. 2, pp. 800, 1269.

³⁵ See Banister, "Manufacturing Employment and Compensation in China." The terms *urban* and *rural* are defined in the "Glossary and Definitions" sections of that paper.

³⁶ *Tabulation on the 2000 Population Census of the People's Republic of China*, vol. 2, pp. 888, 942, 996, 1050.

³⁷ Louise Fox and Yaohui Zhao, "China's labor market reform: Performance and prospects," background paper for the *China 2002 Country Economic Memorandum* (Washington, DC, World Bank, 2002), p. 27.

³⁸ Most of the information that follows is from an interview with NBS statistics officials in Beijing Jan. 10, 2005.

³⁹ Holz, *The Institutional Arrangements*, p. 12.

⁴⁰ *Ibid.*, p. 17.

⁴¹ See Judith Banister, "Manufacturing earnings and compensation in China," *Monthly Labor Review*, forthcoming, August 2005.

⁴² *China Statistical Yearbook 2003*, p. 181.

⁴³ Enterprise statistical reporting forms, 2004; wage-reporting instructions, 2004, pp. 1-1 to 1-2.

⁴⁴ *China Statistical Yearbook 2003*, p. 123; Loraine A. West, discussant, BLS seminar, Washington, DC, Nov. 8, 2004.

⁴⁵ "2004 nian chengzhen laodongli diaocha zhidu" ["The 2004 Urban Labor Force Survey System"] (China National Bureau of Statistics, Nov. 17, 2004), p. 20.

⁴⁶ *China Statistical Yearbook 2003*, pp. 146–47.

⁴⁷ *China Labor Statistical Yearbook 2003*, p. 8.

⁴⁸ Young also showed that the official NBS and Labor Ministry compilation of national manufacturing employment in 1995 was highly inconsistent with the 1995 industrial census results. (See Young, *Gold into base metals*, 2000, p. 22 and table XI.)

⁴⁹ Holz, *The Institutional Arrangements*, pp. 15–16.

⁵⁰ Young, *Gold into base metals*, 2000, pp. 22–23.

⁵¹ Daniel Goodkind, personal communication, Nov. 8, 2004.

⁵² Nicholas R. Lardy, "United States-China ties: reassessing the economic relationship," testimony presented before the House Committee on International Relations, U.S. House of Representatives, Oct. 21, 2003; on the Internet at <http://www.iie.com/publications/papers/lardy1003.htm>.

⁵³ Zhong Wu, "Guangdong keeps foreign trade lead," *The Standard, Greater China's Business Newspaper*, May 18, 2004.

⁵⁴ *China labor Statistical yearbook 2003*, p. 8.

⁵⁵ *Ibid.*, p. 26.

⁵⁶ Ministry of Agriculture, China TVE Yearbook Editorial Committee, eds., *China Village and Town Enterprise Yearbook 2003* [in Chinese] (Beijing, China Agriculture Publishing House, 2003), pp. 156, 174.

⁵⁷ Wage-reporting instructions, 2004; enterprise statistical reporting forms, 2004.

⁵⁸ Personal communication with NBS officials, Jan. 10, 2005; table 1, this article; China National Bureau of Statistics and China Ministry of Labor, compilers, *China Labor Statistical Yearbook 2004* (Beijing, China Statistics Press, 2004), p. 9.

⁵⁹ Fox and Zhao, "China's labor market reform," pp. 13–14.

⁶⁰ "Chengzhen jiuye yu shiye wenti yanjiu—2000 nian di wu ci quanguo renkou pucha shuju fenxi" ["Research on Urban Employment and Unemployment Problems—Analysis of Year 2000 5th National Census Data"] (Beijing, Chinese Academy of Social Sciences, CASS Population and Labor Economics Research Institute, 2003), p. 47.

⁶¹ "Shanghai Shi 2003 nian wailai liudong renkou diaocha—shuju shouce" ["Survey of the Floating Population of Shanghai in 2003—Data Handbook"] (Shanghai, Shanghai Municipal Statistics Bureau, 2004).

⁶² *Shanghai tongji nianjian 2003* [*Shanghai Statistical Yearbook 2003*] (Beijing, Shanghai Municipal Statistics Bureau, China Statistics Press, 2003), pp. 62, 98; *Shanghai Statistical Yearbook 2004* database.

⁶³ *China Labor Statistical Yearbook 2003*, p. 8; *Shanghai Statistical Yearbook 2003*, pp. 78–81; *Shanghai Statistical Yearbook 2004* database.

⁶⁴ For manufacturing productivity trends in the advanced industrial countries, see *International Comparisons of Manufacturing Produc-*

tivity and Unit Labor Cost Trends, Revised Data for 2003 (Bureau of Labor Statistics, Feb. 25, 2005), on the Internet at <http://www.bls.gov/news.release/pdf/prod4.pdf>; and *International Comparisons of Manufacturing Productivity and Unit Labor Cost Trends, Supplementary Tables* (Bureau of Labor Statistics, Feb. 25, 2005), on the Internet at <http://www.bls.gov/fls/prodsupptabletoc.htm>.

⁶⁵ *Comparative Civilian Labor Force Statistics, Ten Countries, 1960–2004* (Bureau of Labor Statistics, May 13, 2005), Table 6; on the Internet at <http://www.bls.gov/fls/flsforc.pdf>.

⁶⁶ See Banister, “Manufacturing Employment and Compensation in China,” for a discussion of China’s domestic market, of factors

enhancing and factors inhibiting China’s competitiveness, and of the question whether China has an “inexhaustible” supply of labor.

⁶⁷ Fang Cai, Albert Park, and Yaohui Zhao, “The Chinese labor market,” paper presented at the Conference on China’s Economic Transition: Origins, Mechanisms, and Consequences, Pittsburgh, Pennsylvania, November 2004, p. 17.

⁶⁸ *China Village and Town Enterprise Yearbook 2003*; data were for 2002.

⁶⁹ “China, no right to work,” *The Economist*, Sept. 11, 2004, pp. 27–28.