



## Long run trends in unemployment and labor force participation in urban China<sup>☆</sup>



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### ABSTRACT

**Feng, Shuaizhang, Hu, Yingyao, and Moffitt, Robert**—Long run trends in unemployment and labor force participation in urban China

Unemployment rates in countries across the world are strongly correlated with GDP. China is an unusual outlier from the pattern, whose official government statistics show abnormally low, and suspiciously stable, unemployment rates relative to its GDP. This paper reports estimates of China's unemployment rate for its local urban *Hukou* population using a more reliable, nationally representative dataset for that population than in prior work, and which spans a longer period of history than in the past literature. The unemployment rates we calculate differ dramatically from those supplied in official data and are much more consistent with what is known about key historical developments in China's labor market. The rate averaged 3.7% in 1988–1995, when the labor market was highly regulated and dominated by state-owned enterprises, but rose sharply during the period of mass layoff from 1995 to 2002, reaching an average of 9.5% in the subperiod from 2002 to 2009. The rates were even higher when demographic composition is held fixed. We can also calculate labor force participation rates, which are not available in official statistics at all. We find that they declined throughout the whole period, particularly in 1995–2002 when the unemployment rate increased most significantly. We also find that the impacts of these changes fell most heavily on the unskilled (women, those with less education, and younger individuals). Finally, estimates of unemployment and labor force participation rates are also provided for all urban residents, including migrants without local urban *Hukou*, and show the same patterns of change over time.

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## 1. Introduction

The unemployment rate is one of the major indicators of the state of a country's labor market and is intended to measure labor market tightness as well as demographic factors. Development economists are well aware that the rate is strongly correlated with GDP, as shown by the upper four lines in Fig. 1. Unemployment rates are negatively correlated with GDP, with high income countries having the highest rates and low income countries having the lowest ones, with middle income countries in between.

This paper is concerned with the unemployment rate in urban China. China is one of the major economies in the world with one of the fastest growing GDPs of all countries, and the level of its unemployment rate should therefore be of intrinsic interest. Fig. 1 shows the official Chinese government unemployment rate series and makes clear that it is an extreme outlier. The World Bank classifies China as an upper middle income country in terms of its GNI per capita, yet the series shows the rate to be below not only that of other middle income countries but even that of low income countries. While it has risen somewhat over time and therefore the gap between it and other countries has narrowed, it has never risen to reach even the average level of low income countries. In addition, despite economic ups and downs in all economies in the world, and in China's economy in particular since 2002, including the 2008–2009 global financial crisis, the official rate only fluctuated within a very narrow range between 4% and 4.3% and has stayed fixed at 4.1% since the third quarter of 2010.

While it is in principle possible that China's labor market was simply more efficient and unchanging over time than that of other countries over this period, that view conflicts with everything that is known about historical developments in the Chinese labor market. As we discuss below, the Chinese economy has experienced a number of major transformations over the last 30 years, transforming from one governed by central planning to one that is mainly market-driven, including the restructuring of the State-owned-enterprises (SOEs). China has also experienced dramatic increases in rural-to-urban migration, has entered the World Trade Organization (WTO), and has experienced a major expansion of college enrollments. It is implausible that these major events have not affected the unemployment rate more than the official series indicates.

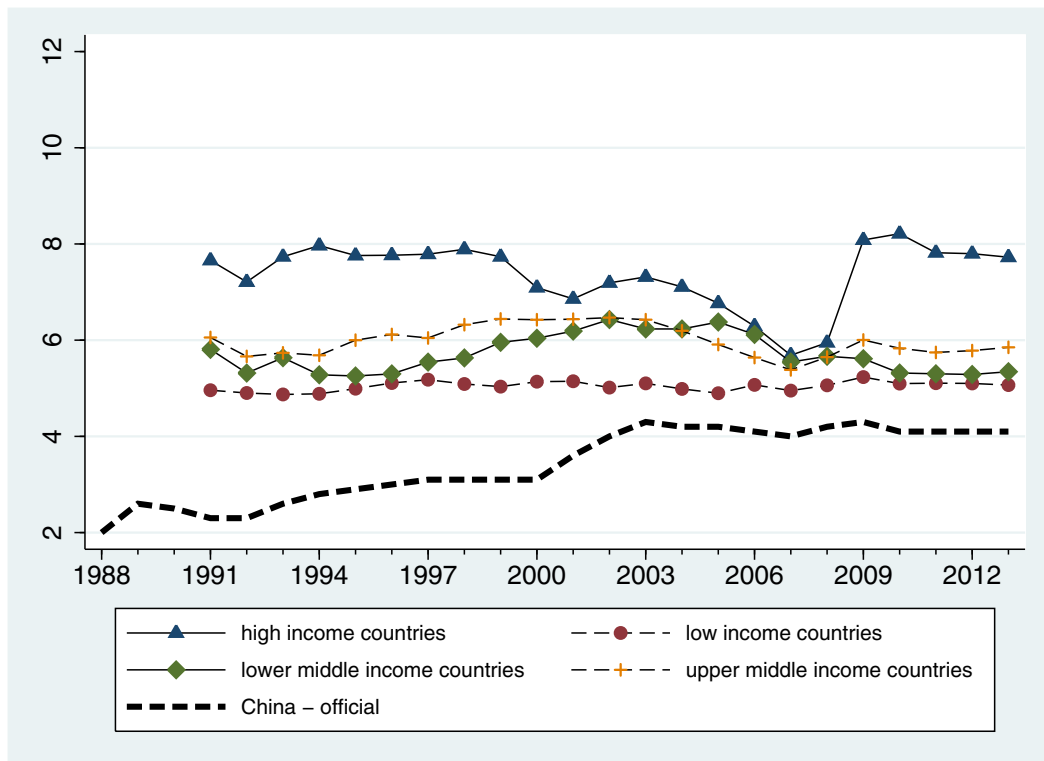
Instead, the more probable explanation for the deviation of China in Fig. 1 is that it is a result of deficiencies in the measured official series, deficiencies which have been discussed extensively in the literature. Although many of China's official statistics have been viewed with considerable suspicion (see e.g. Ravallion and Chen, 1999; Rawski, 2001; Young, 2003), the official Chinese unemployment rate is thought to be probably the least informative among all key economic indicators.<sup>1</sup> The primary deficiency is that the official Chinese unemployment rate is calculated as the share of total registered unemployed people over the total labor force, which is known to underestimate total unemployment. That underestimation is likely to be particularly severe in China for four reasons: (1) a large fraction of the population lacks local household registration (*Hukou*) status<sup>2</sup> and hence many unemployed people are not qualified to register with local employment service agencies; (2) some unemployed people who do not meet the employment history qualifications for unemployment insurance, or who have worked on non-qualified jobs, are not eligible to register;<sup>3</sup> (3) even qualified unemployed people lack the incentive to register because of very low levels of unemployment benefits and because of the social stigma associated with being identified as unemployed; and (4) the total number of registered unemployed people are aggregated bottom-up within the bureaucratic system, and are thus subject to aggregation errors and potential data manipulations (Giles et al., 2005; Liu, 2012). The total labor force, which is the denominator in the calculation of the unemployment rate, is also subject to error for many reasons. One recent article that reviewed the quality of Chinese labor statistics claimed that the official unemployment rate is “almost useless” (Cai et al., 2013). Another important and related labor market indicator - the labor force participation rate - is not even reported in official statistics.<sup>4</sup>

<sup>1</sup> Many studies have examined the validity of China's GDP figures and, in general, most researchers have found the statistics to be at least usable and informative in understanding the Chinese economy, see e.g. Chow (2006); Fernald et al. (2013); Holz (2014).

<sup>2</sup> China's *Hukou* system has both a “rural/urban” dimension and a geographic dimension. Since the reform and open-up policy in late 1970s, the *Hukou* system has gradually evolved towards a weakening of the rural/urban divide, but a strengthening of the geographic element. Currently, *Hukou* is in some sense a local “citizenship”, see e.g. Chan and Buckingham (2008).

<sup>3</sup> This is similar to many high income countries such as the U.S., where the “insured” unemployment rate does not include those who are searching for work but do not qualify for unemployment insurance benefits.

<sup>4</sup> In principal, one can infer the labor force participation rate by dividing the officially reported “economically active population” by the total population, as Cai et al. (2008) did for 1996–2004. However, the reported economically active population is the sum of total employment and total registered unemployment, both of which are subject to the problems we have noted. In addition, the official statistics are usually not clear about what age range they refer to and whether the numbers include only hukou individuals or all urban residents.



**Fig. 1.** Unemployment rates by country: 1988–2013. Source: China-official: National Bureau of Statistics of China. Other series: <http://data.worldbank.org/indicator/SL.UEM.TOTL.ZS> (accessed 5/21/15).

These problems have been recognized in the literature and many researchers have attempted to estimate China's true unemployment rate, usually ending up, indeed, with numbers significantly higher than the official ones. The most common solution is to rely on published government aggregate data and simply add laid-off (or “*Xiagang*” in Chinese) workers to the registered unemployed in order to derive a total unemployment figure. But, as pointed out by Giles et al. (2005), many officially laid-off or registered unemployed workers may actually be working part- or full-time or may be out of the labor force.<sup>5</sup> In addition, administrative labor statistics are also unreliable, as discussed in Cai et al. (2013). A few studies have employed micro-level data but typically such data were only available for selected regions and for a few years. For example, Giles et al. (2005) used self-collected data in five big cities in 2002 and retrospective information for the 1996–2001 period to estimate the national level of unemployment. Liu (2012) used China Household Income Project (CHIP) data in 1988, 1995 and 2002 which covered around 10 provinces in China. Owing to different data and methodologies, the existing alternative estimates also vary greatly (see e.g. Table 2 of Giles et al., 2005).

In this paper, we provide a new long series of estimates of unemployment rates and labor market participation rates in urban China over the period 1988–2009, using the Urban Household Survey (UHS) that covers all of urban China. The UHS has been administered by China's National Bureau of Statistics (NBS) since the 1980s. Although the data have been widely used to study various aspects of China's labor market and the urban economy, no previous study has focused on the issue of unemployment and labor force participation.<sup>6</sup> Whereas previous studies using the UHS have typically had access only to a subsample of the UHS consisting of only several provinces or a few years, we have access to the UHS data covering all provinces and for all years from 1988 to 2009.<sup>7</sup> The data set is therefore the most nationally representative of urban China over a long period of time, allowing us greater coverage of important historical developments in the Chinese labor market than most past work.

Our results completely change the view of where China fits into the world picture portrayed in Fig. 1. As shown in Fig. 2, we find that, while the Chinese unemployment rate was only somewhat above the official series from 1988 to the mid-1990s, it rose dramatically shortly thereafter. In fact, we find that by approximately 2000, the unemployment in China

<sup>5</sup> See also Solinger (2001; 2002) for more detailed discussions of, and interviews with, “*Xiagang*” workers.

<sup>6</sup> Topics that have been examined based on UHS include wage structures (Ge and Yang, 2014), gender wage gap (Zhang et al., 2008), return to education (Zhang et al., 2005), income and consumption inequalities (Meng et al., 2013; Cai et al., 2010), household savings (Chamon and Prasad, 2010), among others.

<sup>7</sup> For example, Zhang et al. (2008) use samples from 6 provinces, Meng et al. (2013) only use samples from 16 provinces, Cai et al. (2010) use data from 1992 to 2003, while Ge and Yang (2014) cover the 1992–2007 period.

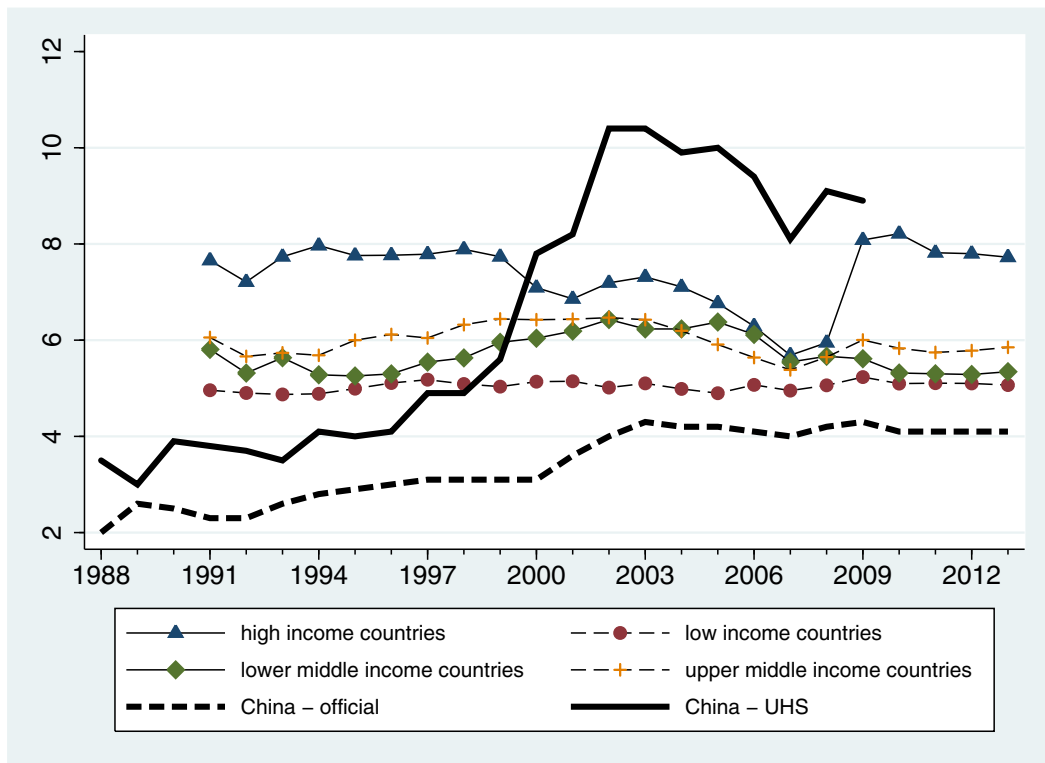


Fig. 2. Unemployment rates by country: 1988–2013, with China-UHS. Source: China-UHS: Author's calculations based on UHS. Other series are the same as in Fig. 1.

was actually *higher* than that of high income countries, exactly the opposite of what is implied by the official series. Our explanation for the time series pattern is that when unemployment rates were low in the early period, the urban labor market was still characterized by the so called “iron rice bowl”, with state-assigned jobs and lifetime employment, mainly in the state sector. The unemployment rate averaged only 3.7% in the 1988–1995 period. But the dramatic rise in the rate in 1995–2002 coincided with a period of mass layoffs from state-owned enterprises (SOEs) and an acceleration in rural-to-urban migration. The rising trend stopped in approximately 2002, partly as a result of WTO entry, which increased the demand for labor, and partly as a result of a major expansion of college enrollment which improved the overall quality of labor. We also analyze patterns by different demographic groups and find that demographic shifts over the period actually dampened the increase in the unemployment rate. When demographic composition is held fixed, the unemployment rate was even higher, reaching levels over 12% in the early 2000s, for example. We also find that the increases in aggregate unemployment fell most heavily on the less educated, younger, and female portion of the population. Our new calculations of labor force participation rates show that they were quite high, averaging 82.2% in 1988–1995, but fell thereafter, especially during the subperiod of 1995–2002 when the unemployment rate rose most significantly.

A disadvantage of the UHS relative to some other data sets such as the population Census is that coverage of the non-local-*Hukou* urban population is inadequate in most years. Our main results just described are based on the *Hukou* population only.<sup>8</sup> This is an important issue because migrants generally do not have local urban *Hukou* status and both rural-to-urban and urban-to-urban migrations have risen over the time period we study. We conduct sensitivity tests to the likely effects on our estimates of the exclusion of non-local-urban *Hukou* individuals. We find that unemployment rates of all urban residents are much lower than those of the subgroup with local urban *Hukou* while the rates of labor force participation are higher. This is because, overall, migrants are much more likely to participate in the labor market and much less likely to be unemployed. But despite the growing share of migrants in urban areas, the trends we noted above are unchanged.

The remainder of the paper proceeds as follows. The next section briefly discusses key events and policy changes related to the development of China's urban labor market since 1988. Section three introduces the data set - the Urban Household Survey (UHS). This is followed by section four, which reports a long run (1988–2009) time series of estimates for Chinese urban unemployment rates and labor force participation rates, as well as results for different demographic groups and different regions. We also discuss the reliability of our estimates and conduct various robustness checks including correcting for

<sup>8</sup> Note that the official unemployment rate also only applies to local urban *Hukou* population.

possible misclassifications in labor force status using the method proposed by [Feng and Hu \(2013\)](#). Estimates for the whole urban population including migrants are also included here. The last section summarizes our main findings and discusses possible future research areas.

## 2. Historical background

In this section, we provide a narrative of major events and institutional changes that have occurred over the last several decades in China. Our main focus is on the development of China's urban labor market.

**Prior to 1995** . The Chinese economy has experienced tremendous changes since the open-door and reform policies initiated in the late 1970s. However, changes in urban labor markets came much later. In the first half of the 1980s, reform was primarily in rural areas characterized by decollectivization (see e.g. [Lin, 1992](#)). Throughout the 1980s and the early 1990s, state-owned firms were gradually given some autonomies in making production decisions, and private and foreign firms started to emerge. Nevertheless, until the mid-1990s, the urban labor market was essentially still under the central planning regime. The majority of workers in cities were still employed in State-owned-enterprises. By 1995, around 60% of all urban workers were still hired by the state sector ([National Bureau of Statistics](#)). It was very difficult, if possible at all, for firms to dismiss redundant workers ([Dong and Putterman, 2003](#)).

**1995–2002** . Since the mid-1990s, China's urban labor market has experienced significant transformations and structural changes (see e.g. [Li et al., 2012](#); [Meng, 2012](#)). Along with the product market reforms and the emergence of the non-state-owned sector, the state-owned firms began to experience substantial financial difficulties in the 1990s ([Lardy, 1998](#)). Starting from 1995, and especially since the 1997 Fifteenth Communist Party Congress, the government began a policy of “seizing the large and letting go of the small” (in Chinese, *Zhua da fang xiao*), to privatize small and medium-sized SOEs while retaining control of large enterprises. This triggered large-scale layoffs from SOEs and, indeed, 1995 was the first year with no absolute growth in state employment.<sup>9</sup> According to [Giles et al. \(2006\)](#), from 1995 to 2001, there were an estimated 34 million workers laid off from the state sector. Although different sources give somewhat different estimates, there is no doubt that a significant share of SOE workers were removed from their posts in the late 1990s and early 2000s.<sup>10</sup>

In line with the transformation of China's labor market, the first labor law of the People's Republic of China became effective on January 1st, 1995 ([Cai et al., 2008](#)). The law formally enacted the regulations of the labor contract system and made labor contracts mandatory in all industrial enterprises. The labor contract system allowed firms to select and hire suitable individuals. The law also permitted no-fault dismissal of workers by employers. On the other hand, employees were given the right to negotiate the duration, terms, and conditions of their employment, as well as the right to resign.

During roughly the same period of time, rural-to-urban migration picked up. Historically, migration of peasants to cities was highly regulated with the *Hukou* system. Essentially all migrants living in cities without local *Hukou* were officially illegal and subject to forced deportation. But since the mid-1990s, along with the changes in product market and labor market in the urban sectors, the demand for cheap labor increased and the government gradually relaxed restrictions on population movements. In 1995, the central government started to allow migrants to stay in cities if they possessed four documents: a national identification card, a temporary resident permit in cities, an employment certificate issued by the local labor bureau, and an employment card issued by the labor bureau in their origin location ([Cai et al., 2008](#)). According to [Meng et al. \(2013\)](#), in 1997 there were around 39 million migrant workers in cities and, by 2009, this increased to 145 million, with the most significant inflow occurring during the early 2000s. [Meng et al. \(2013\)](#) also argue that the main effect of migrant inflows on the urban market was a “quantity” effect rather than a “price” effect. The urban *Hukou* population enjoys various forms of protections in the labor market and benefits, such as subsidized housing, health insurance, unemployment insurance, minimum living standard subsidies, and thus have significantly higher reservation wages than rural migrants. When rural migrants came to the cities, many urban workers dropped out of the labor force or became unemployed instead of staying employed with a much lower wage.

**Post-2002** . On December 11, 2001, China officially became WTO's 143rd member. China's WTO entry triggered profound changes. Total exports increased from \$266 billion USD in 2001 to \$2.2 trillion in 2013 ([National Bureau of Statistics](#)). The domestic manufacturing sector thrived and the demand for labor increased, which generated employment opportunities for both rural migrants and urban residents. In addition, in 1999, China implemented a major college enrollment expansion, resulting in a dramatic increase in enrollment from about 1.1 million in 1998 to about 5.5 million in 2006, and to 6.3 million in 2009 ([National Bureau of Statistics](#)). College expansion has drastically increased the number of workers with college degrees since 2002, the first year that three-year college students enrolled in 1999 graduated.

During this period of time, the flow of rural migrant labor to the cities also slowed considerably. This resulted in a shortage of cheap labor in China's affluent coastal areas and a sharp rise in real wages. [Zhang et al. \(2011\)](#) identify the year 2003 as the time when China crossed the so called “Lewis turning point,” when the excess supply of cheap rural labor to the urban sector came to an end. This of course would have beneficial impacts on the labor market prospects of the urban *Hukou* population, especially for low skill workers.

<sup>9</sup> Based on [National Bureau of Statistics](#) and cited also by [Giles et al. \(2006\)](#).

<sup>10</sup> See also [Solinger \(2001; 2002\)](#).

### 3. Data

#### 3.1. The urban household survey data

The primary data source for this study is the 22 consecutive years of Urban Household Surveys (UHS) conducted by the National Bureau of Statistics (NBS) of China for the 1988–2009 period. The survey design of the UHS is similar to that of the Current Population Surveys (CPS) in the U.S., which is the source of official U.S. labor market statistics including unemployment rates and labor force participation rates. The UHS is also the only nationally representative urban household dataset in China that encompasses all provinces and contains yearly information dating back to the 1980s.

Every three years, the NBS draws a first-stage sample of households from selected cities and towns in each province probabilistically in a multistage fashion, starting from cities and towns, then districts, residential communities, and finally housing units. A final sample is then randomly selected from the first-stage sample for detailed interviews and diary-keeping every month. Each year, one third of the households in the final sample is replaced by other households from the first-stage sample. Nevertheless, the design has not been always strictly enforced in all years. In the years prior to 2002, for example, it is likely that those households with workers in state-owned enterprises were oversampled. In addition, in a couple of cases, some provinces may have delayed withdrawing and replacing the first-stage sample at the end of the three-year period for funding reasons. Past work with the UHS on other topics also appears to have shown some evidence of non-random nonresponse, with older and more educated people more likely to respond and hence to be over-represented in the sample (see e.g. [Ge and Yang, 2014](#); [Meng, 2012](#)). The survey questionnaires have also been updated several times along the way, with two major changes in 1992 and 2002, and minor changes in 1997 and 2007. We investigate whether the representativeness of the data may have changed over time as a result of these changes in design, as described below.

Throughout the analysis, we restrict the sample to those aged between 16 and 60 for males and for those aged between 16 and 55 for females. This is because that the official retirement age is 60 for males and either 50 (for blue collar jobs) or 55 (for white collar jobs or so called “cadres”) for females. We conduct some robustness checks to these sample restrictions later.

The main analyses of this paper focus on individuals with local urban household registration (those with local urban *Hukou*) for several reasons. First, because of policy restrictions, there were very few non-local-urban- *Hukou* people in cities in the 1980s and early 1990s. Thus, in order to examine the long run trend of a homogenous group, it would be desirable to maintain a sample of individuals with local urban *Hukou* throughout the whole period. Second, while the UHS also covers non-local-urban-*Hukou* people since 2002, the coverage is less than satisfactory because of the difficulties in interviewing non-local-urban- *Hukou* individuals, as discussed in [Ge and Yang \(2014\)](#) and many other studies that use UHS data. Therefore, it is not possible to use UHS data, or any alternative existing data sets, to study the long run labor market outcomes of all urban residents directly. Last but not least, the *Hukou* population is also the more politically salient group, as unemployed migrant workers without local *Hukou* can return to their rural hometown or migrate to a different city. Therefore, the labor market performance of people with local urban *Hukou* is probably a better indicator of China’s overall labor market conditions than that of all urban residents, as the non-local-urban-*Hukou* population is a highly self-selected sample of all potential migrants. Most previous studies on long run labor market employment conditions also focus only on the local-urban-*Hukou* population, such as [Giles et al. \(2005\)](#). Nevertheless, the unemployment rate of all urban residents, including migrants, is of clear interest as well. Consequently, we provide estimates of the unemployment rate for that total population later in the paper.

Sample summary statistics are given in [Table A1](#). We divide the sample into 8 different demographic groups by sex (male or female), age (less than 40 or 40+) and education (college education or high school and below). The total sample size was more or less stable before 2002, but jumped from 36,527 in 2001 to 92,461 in 2002 because of a change in the UHS sample design, and has increased further after that.

For our investigation of the representativeness of the UHS, we compare its composition by age, region of residence, gender, and education for *Hukou* individuals to that in three decennial Censuses. The details are given in [Data Appendix A](#). We find that the distributions of the UHS along several dimensions are slightly off from those in the Censuses and that the deviation changes slightly over time. We therefore reweight the UHS sample to match its composition to that in the Censuses. However, the reweighting has little effect on the estimated trends in the unemployment and labor force participation rates described below, although it does change the levels of estimates somewhat.

#### 3.2. Labor force status classifications in UHS

The annual UHS data have information regarding labor force status in December of each year, which allows us to calculate unemployment rates and labor force participation rates. During the 1992–2009 period, fifteen categories for “employment status” are consistently reported for all sampled individuals:<sup>11</sup> including (1) staff and workers in state-owned economic units, (2) staff and workers in urban collectively-owned economic units, (3) staff and workers in other types of economic

<sup>11</sup> The order of the 15 categories listed here applies to 1992–2001. The 2002–2009 period contains exactly the same categories but the order is slightly different.

units, such as foreign owned enterprises, (4) self-employed workers or owners of enterprises, (5) persons employed by private firms, (6) retired staff and veteran cadre who are reemployed, (7) other employees, (8) retired people, (9) people who are unable to work because of disabilities or in chronic conditions, (10) people who are mainly responsible for housekeeping (housewives), (11) people waiting to be employed (unemployed), (12) people waiting for assignment, (13) students at school, (14) people waiting to enter higher levels of schools, and (15) other non-working-age nonemployed people. For the 1988–1991 period, we are also able to reconstruct these same 15 categories based on two variable, one for employment status and one for occupation.

The exact meanings of the 15 labor force status categories are translated from the original Chinese interviewer manual and included in Data [Appendix B](#). We assign categories (1)–(7) as employed; categories (11) and (12) as unemployed; and categories (8), (9), (10), (13), (14) and (15) as not-in-labor-force (NILF).<sup>12</sup> A careful perusal of the explanations of the 15 labor force categories suggests that our classification of employment, unemployment and NILF are largely consistent with the ILO definitions adopted in 1982 for internationally consistent unemployment rate comparisons.<sup>13</sup> For example, to be qualified as “unemployed” (category 11 in UHS), one has to be “capable of working, has performed paid work before, but do not have a job at the time of the survey, and are actively looking for job, and are currently available for work”. UHS is also careful in assigning people as “mainly responsible for housekeeping” (category 10) only if they “have no intention to seek paid employment outside home”.

Nevertheless, readers should still be cautious when comparing our results with labor statistics from other countries, particularly those in the OECD, for there are at least three differences between the UHS-based and many developed-country definitions of labor force status. First, there was no clear reference week for the labor force status in UHS in a given month. Second, the exact definitions of employment are slightly different. If a full-time student on summer break works for even one hour for pay during the reference week, then he is defined as “employed” according to many surveys (such as the U.S. Current Population Survey), while he would be classified as NILF in the UHS. Third, in terms of job search, which is an important criterion for unemployment, some surveys (e.g., the CPS) have a four week reference period and lists specific activities to be qualified as active searching, while no such details are given in UHS (we discuss this measurement issue further below).

## 4. Trends in unemployment and labor force participation

### 4.1. National results

The first row of [Table 1](#) reports our main results from 1988 to 2009. Consistent with the developments of the labor market in China over the past several decades as described in [Section 2](#), we divide the whole time period into three equal subperiods: 1988–1995, 1995–2002, and 2002–2009. In the first subperiod, unemployment rates were relatively stable at a low level, with an average of 3.7%, which was higher than the official average of 2.5% but the discrepancies are relatively small and stable, and with an annual rate of change of only 0.1%. However, in 1995–2002, the UHS-based unemployment rate jumped to an average 6.2%, far above the official estimate, and climbed rapidly during the period, gaining almost one percentage point each year. In the last subperiod, 2002–2009, the UHS-based unemployment rate reached a peak average of 9.5% and declined slowly during the period. The official rate lagged far behind at an average of only 4.2%, or less than half of the UHS-based rate. The UHS-based unemployment rate is plotted year-by-year in Panel A of [Fig. 3](#) together with the official rate.

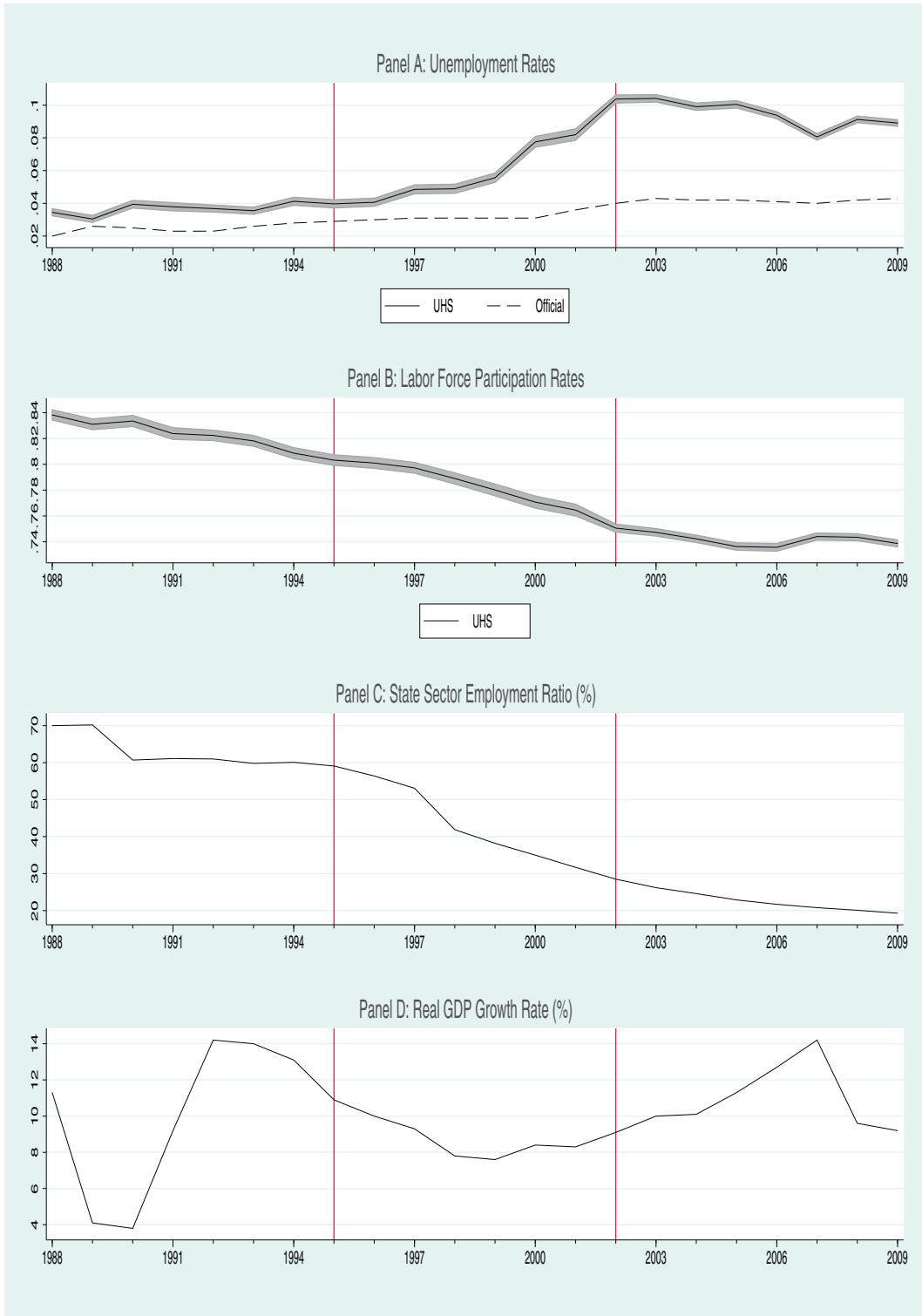
[Fig. 2](#), referenced in the Introduction, shows that our results completely change the comparison of China with other countries. From 1988 through 1995, the unemployment rate in China was indeed lower than that of other countries, even low income countries, although somewhat higher than the official series. This was, as we have noted, the SOE period. However, the post-SOE period led the unemployment rate to jump to a level even higher than that of high income countries, although it has drifted down slowly since its 2002–2003 peak. Still, the labor market in China has not yet recovered from the SOE period and unemployment remains high relative to its stage of development as represented by GNI per capita. This is a major conclusion of our paper.

The first row of Panel B of [Table 1](#) reports our main results for the labor force participation rate. We find that it dropped from an average of 82.2% in the first period to 78.2% in the second period, and again dropped, down to 74.2% in the third period. The year-by-year figures are plotted in Panel B of [Fig. 3](#). Declines in labor force participation often accompany increases in the unemployment rate as individuals become discouraged and withdraw from the labor force because of the difficulty in finding a job. We also show below that neither the changes in the labor force participation rate nor those in the unemployment rate are driven by demographic factors; these were structural, not demographic, shifts.

The overall trends of unemployment and labor force participation shown by the UHS data correspond very well with China’s economic transformations and institutional changes in different development stages. As reviewed in the section on historical background, no major labor market reforms occurred in 1988–1995. The state sector remained predominant in

<sup>12</sup> There is some ambiguity on whether category (15) should fall into the unemployed or NILF group. However, most people in this category have passed the official retirement age and are thus not included in our sample, so this should not significantly affect our results. We also provide a robustness check on this issue below.

<sup>13</sup> <http://laborsta.ilo.org/applv8/data/c3e.html>.



**Fig. 3.** National Unemployment Rates and Labor Force Participation Rates: 1988–2009. Note: sample restricted to people with local urban *hukou* and aged 16–60 for males and 16–55 for females. In Panels A and B, the shaded areas represent 95% confidence bands based on 500 bootstrapped samples. Source: Panels A & B, author's calculations based on UHS. Panels C & D: National Bureau of Statistics.



**Table 1**  
Unemployment rates and labor force participation rates by subperiod (%).

	subperiod 1 (1988–1995)		subperiod 2 (1995–2002)			subperiod 3 (2002–2009)		
	Average	Annual Change	Average	Annual Change	Chg over subperiod1	Average	Annual Change	Chg over subperiod2
<b>Panel A: Unemployment Rate</b>								
Nation	3.7	0.1	6.2	0.9	2.5	9.5	−0.2	3.3
-by demographics								
Male/Young/Non-col	5.9	0.3	9.7	1.1	3.8	13.2	−0.5	3.5
Male/Young/Col	1.0	0.0	3.3	0.8	2.3	6.5	0.1	3.1
Male/Old/Non-col	0.1	0.0	1.3	0.6	1.2	5.4	0.3	4.1
Male/Old/Col	0.0	0.0	0.3	0.1	0.3	1.1	0.0	0.8
Female/Young/Non-col	5.8	0.2	11.2	1.7	5.4	17.8	−0.3	6.6
Female/Young/Col	1.8	−0.0	3.9	0.8	2.1	7.1	0.3	3.2
Female/Old/Non-col	0.6	0.0	2.7	1.1	2.1	9.9	0.3	7.1
Female/Old/Col	0.0	0.0	0.4	0.3	0.4	1.5	−0.0	1.1
-by region								
North	2.4	0.1	4.5	0.7	2.1	6.7	−0.1	2.3
Northeast	3.6	0.2	7.7	1.2	4.1	11.6	−0.3	3.9
East	2.6	0.1	4.6	0.8	1.9	7.8	−0.1	3.3
SouthCentral	4.5	0.0	7.3	1.1	2.8	10.8	−0.3	3.5
Southwest	5.3	0.1	7.5	1.0	2.3	11.9	−0.3	4.4
Northwest	6.3	−0.3	7.4	0.7	1.1	9.1	−0.1	1.8
<b>Panel B: Labor Force Participation Rate</b>								
Nation	82.2	−0.5	78.2	−0.8	−4.0	74.2	−0.2	−4.0
-by demographics								
Male/Young/Non-col	84.7	−0.7	79.4	−1.2	−5.3	73.4	−0.2	−6.0
Male/Young/Col	82.6	−0.4	79.6	−0.7	−3.0	75.7	0.0	−3.9
Male/Old/Non-col	84.8	−0.4	82.0	−0.0	−2.8	82.7	0.1	0.7
Male/Old/Col	94.3	−0.2	89.8	−0.4	−4.4	92.5	0.3	2.6
Female/Young/Non-col	84.0	−0.7	78.7	−1.3	−5.3	69.4	−0.6	−9.3
Female/Young/Col	80.2	0.8	78.3	−0.7	−1.9	73.6	0.0	−4.7
Female/Old/Non-col	66.6	0.5	66.7	−0.2	0.1	62.2	−0.9	−4.5
Female/Old/Col	93.4	−0.6	89.0	−0.5	−4.3	89.6	0.2	0.5
-by region								
North	81.5	−0.6	76.6	−0.8	−4.9	72.3	−0.0	−4.3
Northeast	80.5	−0.3	77.6	−0.6	−2.8	74.6	−0.5	−3.1
East	84.5	−0.6	79.6	−0.9	−4.9	75.7	−0.1	−3.9
SouthCentral	82.2	−0.5	78.8	−0.5	−3.3	74.3	−0.4	−4.5
Southwest	82.8	−0.4	78.0	−0.8	−4.8	74.0	0.1	−4.0
Northwest	79.0	−0.2	75.6	−1.2	−3.4	71.7	0.3	−3.9

Source: Authors' calculation from UHS. Sample restricted to those with local urban *Hukou* and aged between 16 and 60(males) or 55(females). Young: aged less than 40; Old: aged 40 and above; Col: some college and above; Non-col: high school and below.

the economy despite the emergence of non-state firms. For state employers, it was still very difficult, if not completely impossible, to dismiss redundant workers. Most jobs were still “iron rice bowls”. Therefore, unemployment rates were very low and stable during this period of time, and labor force participation rates were high. With the kickoff of massive SOE layoffs, things changed dramatically during the second subperiod. Together with the development of the non-state sector, the state employment share declined by half, from 60% to 30% in 1995–2002, as shown in Panel C of Fig. 3. Rural-to-urban migration also gained momentum, which severely worsened labor market conditions of low-skilled urban residents. These events underlay the massive rise in unemployment rates that we observe during this period. The enactment of the labor law also signalled the structural change in China's labor market from centrally-controlled to market-oriented. Some groups, such as older less educated females, suffered especially from the mass-layoffs. Regions that had more SOEs and layoffs also had witnessed a more severe worsening of labor market conditions, characterized by both rising unemployment and declining labor force participation.

In the last subperiod from 2002 to 2009, WTO entry helped to improve labor demand. The college enrollment expansion, which increased quality of labor force, also served to halt the rising trend in unemployment. Meanwhile, unemployment rates became substantially more volatile, suggesting that the labor market was more sensitive to changes in macro economic conditions as a result of the structural changes. After the unemployment rate peaked in 2002–2005, it started to decline slightly, and sharply dipped in 2007, with a rebound in 2008. The decline in unemployment rate during the 2005–2007 period can be considered as a recovery from the end of SOE mass layoffs. The 2007 dip in unemployment rate coincided with an exceptionally high real GDP growth rate of 14.2%, as compared to only 9.6% in 2008 (see Panel D of Fig. 3). The increase in unemployment after 2007 can be linked to the global financial crisis. Overall, it seems that the most recent

natural rate of unemployment rate are very different from the 1980s and early 1990s because of fundamental changes in the labor market and the overall economic structure.

While a detailed investigation into the various underlying drivers of the trends is beyond the scope of this paper, we provide some preliminary correlation analyses here using provincial level panel data. We consider the following macro indicators: trade/GDP ratio, where trade is the sum of export and import; FDI/GDP ratio; SOE layoffs (data only exist from 1998 to 2005); tertiary industry/GDP ratio; and GDP per capita. In each of the regressions, we regress provincial level unemployment rates or labor force participation rates on a macro variable, a linear time trend and provincial dummies.<sup>14</sup>

The results are shown in Table A2. Overall, after controlling for provincial fixed effects and a linear time trend, the correlations are consistent with our layoff and labor demand explanations, although they are not always statistically significant. Panel A shows that trade and FDI reduce unemployment, while more SOE layoffs are related to a higher rate of unemployment in a province. In addition, both a higher proportion of service industries and higher GDP per capita in a province are associated with a lower level of unemployment. Panel B shows the results for labor force participation. As expected, trade and FDI increases are associated with higher participation rates, as do higher service industry proportion and GDP per capita. On the other hand, SOE layoffs are related to lower levels of participation.

#### 4.2. Subgroup results

**Demographic Group.** Investigating subgroup results by demographic characteristics is of interest both because they are of interest in their own right and because they are needed to determine whether the changes in the aggregates just discussed are partly a function of shifts in the shares of different groups in the population. We examine unemployment and labor force participation rates by age, education, and gender. In high income countries with mature and free labor markets, ordinarily instability in the labor market affects less skilled workers more than more skilled, so we might expect young, less educated, and female workers to be more affected by the increase in the Chinese unemployment rate. However, the SOE layoffs are somewhat different, representing a structural shift that could have fallen more heavily on more skilled and older workers. WTO entry also could have affected skilled workers more heavily.

Panel A of Table 1 presents results for different demographic groups for the three subperiods, with more detailed information shown in Fig. A2. The patterns show that it was the less skilled groups that most heavily experienced the increases in unemployment and declines in labor force participation. From the first subperiod to the second, younger less educated women saw an increase in their unemployment rate of 5.4 percentage points and a further increase of 6.6 percentage points from the second to the third subperiod (with 1.7 percentage point per year increase in the 1995–2002 subperiod). Younger less educated men also experienced high rates of period-on-period increases, at 3.8 and 3.5 percentage points, respectively. Some indication of a large impact on older less skilled people also appears, especially for older less skilled women, who witnessed a 7.1 percentage points increase in average unemployment rate from subperiod 2 to subperiod 3. This is likely a direct result of SOE layoffs. The increases were much smaller for more educated older men and women.

Panel B of Table 1 shows that the declines in labor force participation followed the same relative patterns, with younger, less educated women experiencing the greatest declines (the largest decline was 9.3 percentage points for younger, less educated women from the second to the third periods). But the gradient with respect to demographic factors was lower, and non-trivial declines were also experienced for some of the more educated, and older individuals as well. Older college-educated men and women sometimes experienced declines of over four percentage points, for example.

In addition, we perform some individual level regression results to show the effects of demographics on the probabilities of unemployment and labor force participation and how these effects change over time. In panel A of Table A3, we restrict the sample to those in the labor force. The dependent variable is a dummy that equals 1 if the person is unemployed, 0 otherwise. The explanatory variables include age dummies (less than 30, between 30 and 40, more than 40), gender, education dummies (college, high school, less than high school), as well as provincial dummies and year dummies. The regressions are performed for the three subperiods separately. The results are largely consistent with what was observed in Table 1 showing that young people, females, and those with less education are more likely to be unemployed over time. Conditional on being in the labor force, young people (meaning those less than 40 but especially those less than 30) are significantly more likely to be unemployed. In addition, the age differences have become much larger since the second subperiod when SOE reform started. Males are more likely to be unemployed in the first subperiod, but became less likely to be unemployed since the second subperiod, and increasingly more so in the third subperiod. Regarding education, although better educated people are less likely to be unemployed even in the first subperiod, the effects became much stronger in the second, and even more so in the third subperiod.

Similarly, panel B of Table A3 displays results for labor force participation. We see the usual hump shaped age profile, which became more pronounced for those aged less than 30 in the last two subperiods. Not surprisingly, males are consistently more likely than females to participate in the labor market, but the effects also became stronger over time.

<sup>14</sup> We did not do multivariate regressions for several reasons: (1) we are only interested in the simple correlations between these macro variables and unemployment rate or labor force participation rate; (2) the macro variables are highly correlated, thus subject potentially to multicollinearity problems in a multivariate setting; and (3) one of the most important variables, layoffs from SOEs, only have data from 1998 to 2005, which would force us to drop most of the years of data if we include all macro variables in the same regression.

Similarly, compared to those who have less than high school education, college and high school graduates are more likely to participate, with the effects increasing in the second and especially the third subperiod.

Given these large differences in changes in labor force activity by demographic group, any changes in the share of the population in the different groups could have an impact on our aggregate figures. Fig. A3 shows the effect of demographic share shifts on the unemployment rate by showing how the unemployment rate would have changed if population shares by age, education, and gender had remained at their values in the first year of our data, 1988. The figure shows that, in fact, the unemployment rate would have been higher and increased even more than our previous figures indicated. The main reason is the major upward shift in the percent of the population that is college educated, and college-educated workers have lower unemployment rates. The lower panel of the Figure shows that demographic shifts affect the trend in the aggregate labor force participation rate much less. This is because, as already noted, the differences in changes in labor force participation across the different demographic groups were much less than for the unemployment rate.

**Region.** China is a large country with marked heterogeneities across different regions. Economically, the coastal region has benefitted more from the economic reform and open door policy. Regional differences in the labor market should also be heavily affected by the concentration of SOEs, given the massive layoffs happened in the 1995–2002 period. For example, the traditionally heavy-industry dominated Northeast region was also the hardest-hit area during the SOE reform period. During the 1995–2002 period, 7.3 million workers were laid off in the Northeast region, or 42% of its total SOE employment in 1995.

Results for different regions in China are shown in the lower portions of Panels A and B in Table 1 and are plotted in Fig. A4.<sup>15</sup> While the different regions follow quite similar patterns overall, the increases in unemployment rates were highest in the three regions with the largest SOE layoffs. These include the Northeast (4.1 percentage point increase from the first period to the second and 3.9 percentage point increase from the second period to the first, and with a 1.2 percentage point annual increase in the second period), the South Central (2.8 percentage point increase from the first period to the second and 3.5 percentage point increase from the second period to the first, and with a 1.1 percentage point annual increase in the second period), and the Southwest (2.3 percentage point increase from the first period to the second and 4.4 percentage point increase from the second period to the first, and with a 1.0 percentage point annual increase in the second period). Results are also shown in Table A4.

Panel B of Table 1 show labor force participation results for different regions (see also Fig. A4). The general patterns are quite similar, with all regions experiencing consistent declines throughout the study period, but especially in 1995–2002. The Northwest region seems a bit different from other regions, with a relatively low participation rate of 79% in the 1988–1995 period and the most significant decline in 1995–2002 (with annual rate of decline of 1.2 percentage points). As a result, its average participation level was only 71.7% in the last subperiod of 2002–2009. This was likely a result of cultural differences, as the Northwestern provinces are populated by Muslim ethnic groups, and slower economic growths. The East region, which is the most economically developed, always had the highest participation rates.

#### 4.3. Comparison with other estimates

Although many researchers have tried to estimate China's true unemployment rates and labor force participation rates, the studies vary in methodology and most of them also suffer from serious data limitations (see reviews by Giles et al., 2005). The study of John Giles, Albert Park and their coauthors (see. e.g. Giles et al., 2005; 2006) was exceptional in two senses. First, they used self-collected individual-level data. Second, their questions regarding labor force statuses were based on ILO standards. The main limitation of their study is that their data were collected in only five large cities (Fuzhou, Shanghai, Shenyang, Wuhan and Xi'an) in one single year (2002), although respondents were also asked to recall information for the 1996–2001 period. National statistics were then estimated using information from the five cities. Nevertheless, it is still informative to compare our results with Giles et al. (2005) and other studies.

Regarding the unemployment rate, our results are fairly consistent with most other existing estimates in two important aspects. First, the actual levels of China's unemployment rates are significantly higher than the official ones, especially since the mid-1990s with the kickoff of labor market reforms. Second, there were significant increases in unemployment from the mid-1990s to the early 2000s. Based on estimates from Giles et al. (2005), the urban unemployment rate rose from 6.1% in 1995 to 10.8% in 2001, or an increase of 4.7 percentage points. As a comparison, our estimated unemployment rate increased 4.2 percentage points for the same period. It was 8.2% for year 2001, up from 4% in 1995. Therefore, although the Giles et al. (2005) estimates are higher than ours in levels, the change during this time period was strikingly similar. Both sets of results are much higher than the official unemployment rate, which was only 3.6% in the year 2001. In another study also based on micro level data, Liu (2012) reported that the 2002 unemployment rate was 9.5% using China Household Income Project (CHIP) compared to our rate of 10.4% in that year. But CHIP only covers around 10 Chinese provinces and

<sup>15</sup> The provinces (including provincial-level administrative divisions) included in different regions are as follows. North (5 provinces): Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia. Northeast (3): Liaoning, Jilin, Heilongjiang. East (7): Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong. South Central (6): Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan. Southwest (5): Chongqing, Sichuan, Guizhou, Yunnan, Tibet. Northwest (5): Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang.

has a much smaller sample size than the UHS. Still, the rise in the unemployment rate between CHIP1995 and CHIP2002 was significant and similar to our UHS-based estimates.<sup>16</sup>

Although the Chinese government does not release official labor force participation rates, two alternative estimates are available from existing studies for the years roughly corresponding to our second subperiod of 1995–2002. Both series show a significant decline in labor force participation similar to what we observed based on the UHS data. [Cai et al. \(2008\)](#) use official aggregate labor statistics and report that labor force participation rates for the working age population declined from 73% in 1996 to 64% in 2004. Using the Chinese Urban Labor Survey (CULS) that was conducted in five large Chinese cities by the authors, [Giles et al. \(2006\)](#) find that the labor force participation rate in these cities declined from 83.3% in 1996 to 74.4% in 2001. Our estimates based on the UHS are in between these two alternative estimates in levels, but the trends are all very similar. Other existing studies have also documented declining female participation based on other data sets, see e.g. [Du and Dong \(2013\)](#) and [Maurer-Fazio et al. \(2011\)](#).

#### 4.4. Measurement of search and unemployment: robustness checks

A serious concern for the UHS data is that the NBS does not specifically ask for labor search activities, which is necessary to strictly follow the definitions given by the ILO. Rather, the labor force statuses fall into 15 different categories based on the information provided by the respondent and using the interviewer's judgement. Despite that, the study of [Giles et al. \(2005\)](#) has shown that the NBS-based classification may be quite close to the ILO-based measures. The authors surveyed labor force status in five Chinese cities in 2002 using questionnaires consistent with ILO standards and then compared the generated unemployment rates with the predicted ones based on historical NBS-based unemployment rates. They found the difference to be quite small. The actual ILO-based unemployment rates are only 1.064 times the predicted rates based on historical NBS-based rates. To show the magnitude of the difference, if the ILO-based unemployment rate is 9%, the predicted rate would be 8.5%. The actual difference between ILO-based and NBS-based unemployment rates could be even smaller if prediction errors are taken into account.

After a careful examination of all the 15 labor force statuses categories, we find that the most ambiguous category is "other non-working-age nonemployed people". Because no further information is provided, it is difficult to be certain whether this belongs to unemployment or not-in-labor-force. Fortunately, this group mostly applies to those who have passed the official working age upper limit. Thus, it should not affect our results much regardless. As a robustness check, we classified those "other non-working-age nonemployed people" as unemployed. The results are reported as Alt1 in [Table A5](#) and show that doing this only increases unemployment rates slightly and hardly affect labor force participation rates. For example, in 2002–2009, the average unemployment rate was 9.9% as compared to our baseline result of 9.5%, and the average labor force participation rate was 74.5%, only slightly higher than the baseline rate of 74.2%.

Another concern regards laid-off workers, which is particularly an issue for middle-aged and old SOE workers in the SOE reform period. If a laid-off worker has no hope of returning to her previous job despite a nominal relationship with her previous employer, it seems not appropriate to classify her as "employed". On the other hand, as discussed by [Giles et al. \(2005\)](#), it may also be too simplistic to classify laid-off workers as "unemployed". Nevertheless, to shed light on the possible magnitude of this problem, we conduct a test by assigning all SOE workers aged 35 and above who have no wage income as unemployed rather than employed. The results are shown in row Alt2 in [Table A5](#). As expected, this mostly affects the 1995–2002 mass-layoff period. The unemployment rate averaged 6.9%, which is 0.7 percentage points higher than our baseline estimate. The differences in results for the 1988–1995 and 2002–2009 periods are negligible. Of course, without further information on search activities, we can never be completely sure about the labor force status of these workers, but this does not seem to affect the trends in different subperiods.

A more general approach to measurement errors in the unemployment rate can be pursued by following [Feng and Hu \(2013\)](#) by modeling the underlying true labor force status as a latent process potentially subject to measurement error. Using matched annual UHS data, we estimate the misclassification probabilities for different demographic groups.<sup>17</sup> Overall, there were many fewer measurement errors compared to the US (see [Table 1](#) in [Feng and Hu, 2013](#)). Once we correct the unemployment rates and labor force participation rates, as shown in row Alt3 in [Table A5](#), using the estimated misclassification probabilities, we find that the corrected rates are very close to the baseline results.<sup>18</sup>

<sup>16</sup> There are two new nationally representative surveys launched after 2010, China Household Finance Survey (CHFS) by Southwest University of Finance and Economics, and China Family Panel Studies (CFPS) by Peking University. While CHFS reports that unemployment rate for the urban *hukou* 16–55 population in 2011 was 11.2% ([CHFS, 2012](#)), CFPS reports a much lower unemployment rate of 4.6% for 2012 for those urban *hukou* people aged 16–59 ([CFPS, 2013](#)). Our latest number was 8.9% for the year of 2009, which lies somewhat in between. Note that these new estimates are not directly comparable to ours as the study years and age restrictions are different.

<sup>17</sup> Results available upon request.

<sup>18</sup> The latent variable approach might not be able to identify measurement errors that are systematic over time. For example, if discouraged workers are always classified as unemployed rather than not-in-labor-force, then the approach used by [Feng and Hu \(2013\)](#) would not be able to identify such measurement errors. In this example, Assumption 5 in [Feng and Hu \(2013\)](#) that requires each individual to be more likely to report the true labor force status than to report any other possible values are violated.

#### 4.5. Additional robustness checks

In this subsection we report robustness checks for our weight calculations, attrition in the UHS, our selection rules for our sample, and the inclusion of the non-local-urban-*hukou* individuals who appear in the UHS. For the first of these, we reported in Data Appendix A our procedures for reweighting of the data to match the UHS to the Census along age, gender, region of residence, and education composition. Row Alt4 of Table A5 shows unemployment rates using the unweighted data, which shows rates that are between a half and one-and-a-half percentage points below our Baseline results. The unweighted labor force participation rates are higher. This is partly because younger individuals, who have relatively high unemployment rates and low labor force participation rates, are slightly underrepresented in UHS (see Panel A of Fig. A1). However, the time patterns of the unemployment and labor force participation rates are unchanged.

A related issue that has been overlooked in the literature is attrition. By design, sample households may stay in UHS for up to three years, but they always enter the UHS in January and, when they exit, it should always be December. However, the annual file of UHS only includes labor force status of December of that year. Thus even if the sample was representative initially (in January), it may no longer be so in the data we actually use (in December) if there is non-random attrition. To address this issue, we have used the internal UHS monthly sample from January 2004 to December 2006, which allow us to observe the detailed monthly attrition patterns for these years. Based on the attrition rates for each demographic groups,<sup>19</sup> we calculate attrition weights and then apply them to adjust the unemployment rates and labor force participation rates for all years. Under the assumptions that attrition is random conditional on demographics and that the attrition process stays the same during the whole study period, our procedure adequately addresses the issue. Series Alt5 in Table A5 shows that attrition matters very little for our estimates. Both the unemployment rates and the labor force participation rates stay virtually unchanged after we correct for attrition.

We also consider different sample selection rules. First, we restrict the sample differently to include both males and females aged between 16 and 60. This makes the sample more comparable to international practice despite the fact that the official working age upper limit is 55 for females in China. As shown in row Alt6 of Table A5, doing so reduces labor force participation rates somewhat. This is hardly surprising as women aged between 55 and 60 are much less likely to participate in the labor market.

Lastly, we also include the non-local-urban-*hukou* people who appear in the UHS sample for the post-2002 years. As we can see from Table A5 (Alt7), the unemployment rates and labor force participation rates are basically unchanged. Thus, the migrant sample in the UHS are very similar to the *hukou* population in terms of labor market activities. This does not imply that migrants as a whole are similar to local people with *hukou*. Rather, the UHS may well under-sample temporary migrants for various reasons. To gain some understanding of the labor market conditions of migrants without local urban *hukou*, one has to look beyond UHS. We address this issue in the next subsection.

#### 4.6. Inclusion of migrants

As we have discussed, the UHS provides reliable coverage only of urban residents with local urban *hukou*. Using the decennial Census data and extrapolating to other off-Census years, panel A of Fig. A5 shows trends in the local urban *hukou* population and the migrant population.<sup>20</sup> The estimates clearly show that the migrant population has been the main source of increase for all urban residents, and has surpassed the local-urban-*hukou* population in number since around 2004.

Because no reliable labor force data consistently exist for migrants over the years that we are interested in, we make estimates based on information from the three decennial Censuses: 1990, 2000 and 2010, which contain both local urban *hukou* population and migrants in cities. We first calculate unemployment rates from the three Censuses for both local urban *hukou* population and migrants, and then compute the ratio between unemployment rates of these two groups of people for 1990, 2010 and 2010. We then quadratically extrapolate these ratios to all off-census years. Finally, we apply these ratios to estimate migrants' unemployment rates based on local urban *hukou* people's unemployment rates for all years between 1988 and 2009 using UHS data. We do exactly the same thing to impute labor force participation rates for migrants.

The results are graphically illustrated in the last two panels of Fig. A5. The net effect of including migrants in the sample is to lower the unemployment rate and to raise the labor force participation rate. This is not surprising given that the majority of migrants come to cities for work, and they would return to their rural home if there are no job opportunities in cities. As for the time pattern, although the migrant share has gradually increased over time, the general trend is very similar to our baseline results with only local-urban-*hukou* people. For the post-2000 period, where estimates peak, our estimate for the unemployment rate for all urban population lies between 5% and 7%, which is in line with the range for upper middle income countries that China belongs to (see Fig. 2). The labor force participation rate ranges between 78% and 80% in that same period. As expected, the gap between the rates for the total urban population and the rates for those with local urban *hukou* grows over time, given the increasing share of migrants in the population. We suggest further research on this important topic in the future.

<sup>19</sup> We divide the sample into 8 demographic groups using sex/age/education the same way as elsewhere in the paper.

<sup>20</sup> Details are given in Data Appendix A.

## 5. Summary

The official unemployment rate series for China is implausible and is an outlier in the distribution of unemployment rates across countries ranked by their stage of development. There is strong evidence that this is the result of mismeasurement of the official rate. We provide the most comprehensive evidence to date that this mismeasurement is the source of the outlier status of China in the world distribution of unemployment rates. We show that, when properly measured, the unemployment rate in China is consistent with its economic and labor market history and its unemployment rate can be reconciled with those of other countries.

This paper bases its new findings on a nationally representative household survey in China. The survey is administered by the National Bureau of Statistics and is the only source of information regarding the Chinese labor market during the last two decades. Our specific contributions are three. First, we report, for the first time, a nationally representative time series on the urban unemployment rate and labor force participation rate dating back to the late 1980s. Second, we identify several demographic groups that post high unemployment and low participation rates, including younger less educated individuals and older, less educated females. We also show that regions with more SOE layoffs experienced a greater increase in unemployment. These particular demographic groups and regions deserve policy priority to achieve maximum employment. Last, we combine the UHS sample and the population Census information to report tentative estimates of unemployment rates and labor force participation rates of all urban residents since 1988.

The regularities that this paper reveals are largely consistent with the economic transformations and macroeconomic developments in China during the past several decades. However, we view this paper only a first step toward a full understanding of the Chinese labor market over that period. The exact labor market consequences of many important events, such as rural-to-urban migration, WTO entry, and mass layoff from SOEs, as well as secular social and cultural changes that may have affected participation patterns, are left for further investigation in the future.

## Appendix A. Weighting of UHS using population from Chinese population Censuses

To investigate the representativeness of the UHS, we compare UHS distributions to those in the 1990, 2000 and 2010 Census long forms, which have basic demographic information including individuals' *Hukou* status.<sup>21</sup> We first exclude all people living in rural areas and only include those who reside in towns and cities. For these urban residents, we further divide them into two groups, one with local urban *Hukou*, and the other migrants broadly defined, including those either

<sup>21</sup> we use publicly available 1% census micro sample for 1990 and 2000 (10% random subsample of the long form sample, which are 10% of the population). For 2010, since micro data are not publicly available, we requested the NBS to conduct the analysis for us using a 0.1% micro sample (10% random subsample of the long form sample).

**Table A1**  
Sample size.

Year	Male Young Non-col	Male Young Col	Male Old Non-col	Male Old Col	Female Young Non-col	Female Young Col	Female Old Non-col	Female Old Col	Total
1988	8727	1079	5569	1290	10,268	609	5291	352	33,185
1989	8092	1172	5422	1260	9458	605	5129	377	31,515
1990	8094	1255	5684	1441	9581	743	5370	459	32,627
1991	7868	1493	5342	1449	9423	915	5047	403	31,940
1992	8852	2131	6423	2048	10,668	1364	6207	705	38,398
1993	8313	2067	6524	2111	10,008	1368	6414	712	37,517
1994	7824	2358	6463	2117	9524	1532	6493	758	37,069
1995	7549	2302	6721	2113	9137	1546	6691	787	36,846
1996	7319	2365	7012	2173	8790	1641	6932	838	37,070
1997	7059	2441	7098	2076	8613	1764	7028	781	36,860
1998	6940	2573	7183	2147	8348	1956	7218	830	37,195
1999	6751	2552	7239	2295	7885	2124	7449	923	37,218
2000	6350	2852	7026	2118	7599	2368	7184	887	36,384
2001	6285	2797	7230	2136	7391	2414	7357	917	36,527
2002	14,588	7542	18,447	6395	16,964	6938	18,762	2825	92,461
2003	15,819	8138	20,633	7539	18,219	7687	20,985	3459	102,479
2004	15,386	8565	21,463	8346	17,584	8434	21,607	4049	105,434
2005	16,180	9925	22,177	9199	18,229	9870	21,875	4639	112,094
2006	15,979	10,209	22,565	9970	17,741	10,332	22,308	5160	114,264
2007	15,789	11,509	23,775	10,901	17,634	12,023	23,236	5829	120,696
2008	17,077	13,588	25,412	10,656	18,558	14,032	24,076	5719	129,118
2009	15,570	13,058	25,179	11,423	16,906	13,664	23,713	6317	125,830

Source: Authors' calculation from UHS. Sample restricted to those with local urban *Hukou* and aged between 16 and 60 (males) or 55 (females). Young: aged less than 40; Old: aged 40 and above; Col: some college and above; Non-col: high school and below.

**Table A2**  
Provincial level panel regressions.

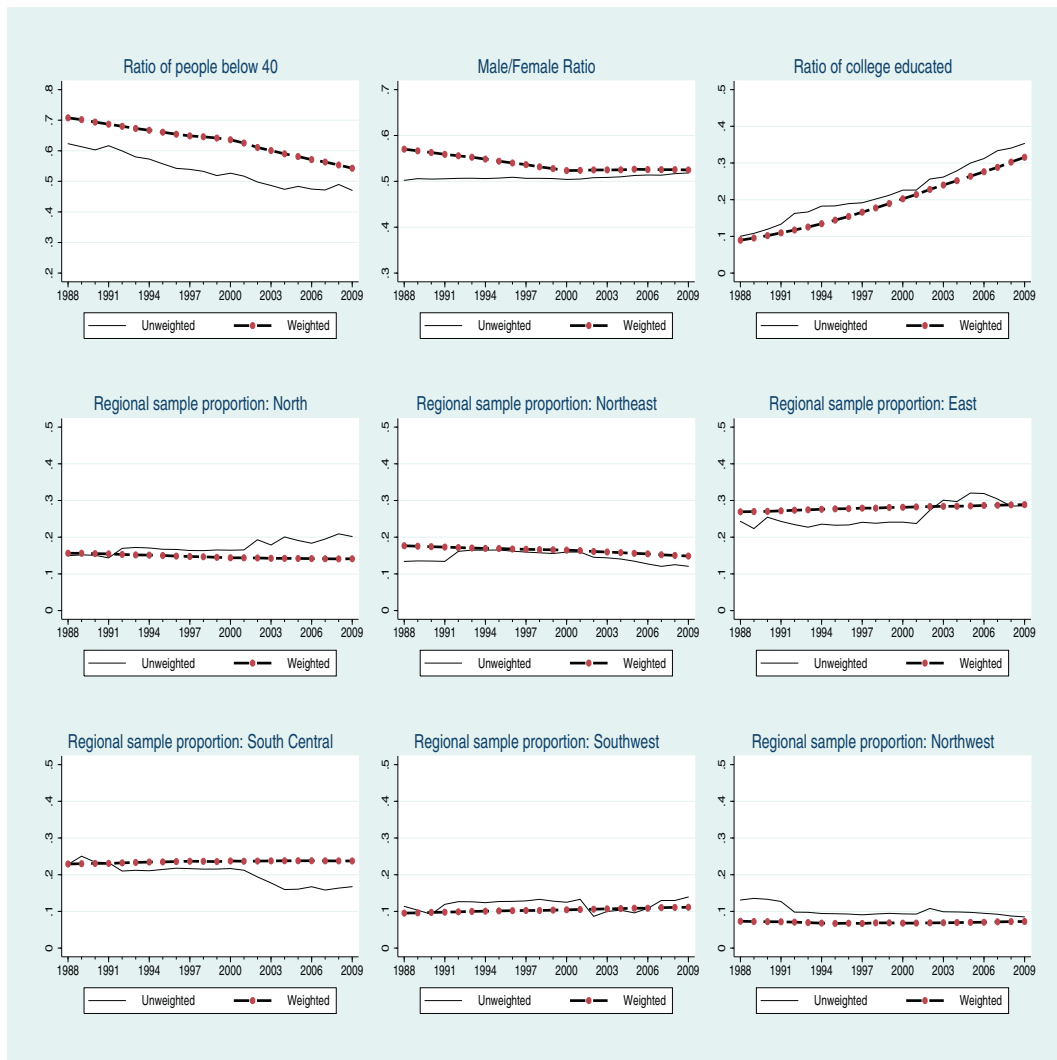
	(1)	(2)	(3)	(4)	(5)
	Panel A: Unemployment Rate				
Trade/GDP		-0.001 (0.003)			
FDI/GDP		-0.078* (0.041)			
SOE Layoff			0.012** (0.006)		
Tertiary Industry/GDP				-0.021*** (0.005)	
GDP per capita					-0.045*** (0.006)
Number of Observations	647	643	237	647	647
Adjusted R-squared	0.423	0.459	0.459	0.438	0.469
	Panel B: Labor Force Participation Rate				
Trade/GDP		0.004 (0.003)			
FDI/GDP		0.013 (0.047)			
SOE Layoff			-0.022*** (0.005)		
Tertiary Industry/GDP				0.022*** (0.006)	
GDP per capita					0.046*** (0.007)
Number of Observations	647	643	237	647	647
Adjusted R-squared	0.567	0.574	0.569	0.575	0.594

Note: All regressions also include provincial dummies and a linear time trend. Robust standard errors are reported in parentheses. The time period is from 1988 to 2009 except for the regression on SOE layoff, which spans only 1998–2005. All explanatory variables are in natural log. \*, \*\*, \*\*\* stands for statistical significance at the 10%, 5% and 1%, respectively.

**Table A3**  
Regression results on probability of unemployment/labor force participation.

	Subperiod 1 (1988–1995)	Subperiod 2 (1995–2002)	Subperiod 3 (2002–2009)
	Panel A: Unemployment		
Age less than 30	0.098*** (0.009)	0.135*** (0.008)	0.134*** (0.009)
Age greater than 40	-0.002*** (0.001)	-0.018*** (0.001)	-0.017*** (0.002)
Male	0.004** (0.002)	-0.009*** (0.003)	-0.028*** (0.004)
College	-0.039*** (0.004)	-0.071*** (0.004)	-0.106*** (0.005)
High School	-0.021*** (0.003)	-0.034*** (0.003)	-0.048*** (0.003)
Number of Observations	237,278	286,168	706,095
Adjusted R-squared	0.077	0.089	0.063
	Panel B: Labor Force Participation		
Age less than 30	-0.264*** (0.007)	-0.337*** (0.010)	-0.426*** (0.007)
Age greater than 40	-0.218*** (0.007)	-0.222*** (0.007)	-0.202*** (0.006)
Male	0.048*** (0.004)	0.066*** (0.004)	0.100*** (0.005)
College	0.106*** (0.006)	0.120*** (0.006)	0.188*** (0.007)
High School	0.040*** (0.005)	0.057*** (0.005)	0.096*** (0.006)
Number of Observations	279,097	350,561	902,376
Adjusted R-squared	0.133	0.168	0.216

Note: All regressions also include provincial dummies and year dummies. Robust standard errors are reported in parentheses. In Panel A, the samples are restricted to those in the labor force. \*, \*\*, \*\*\* stands for statistical significance at the 10%, 5% and 1%, respectively.



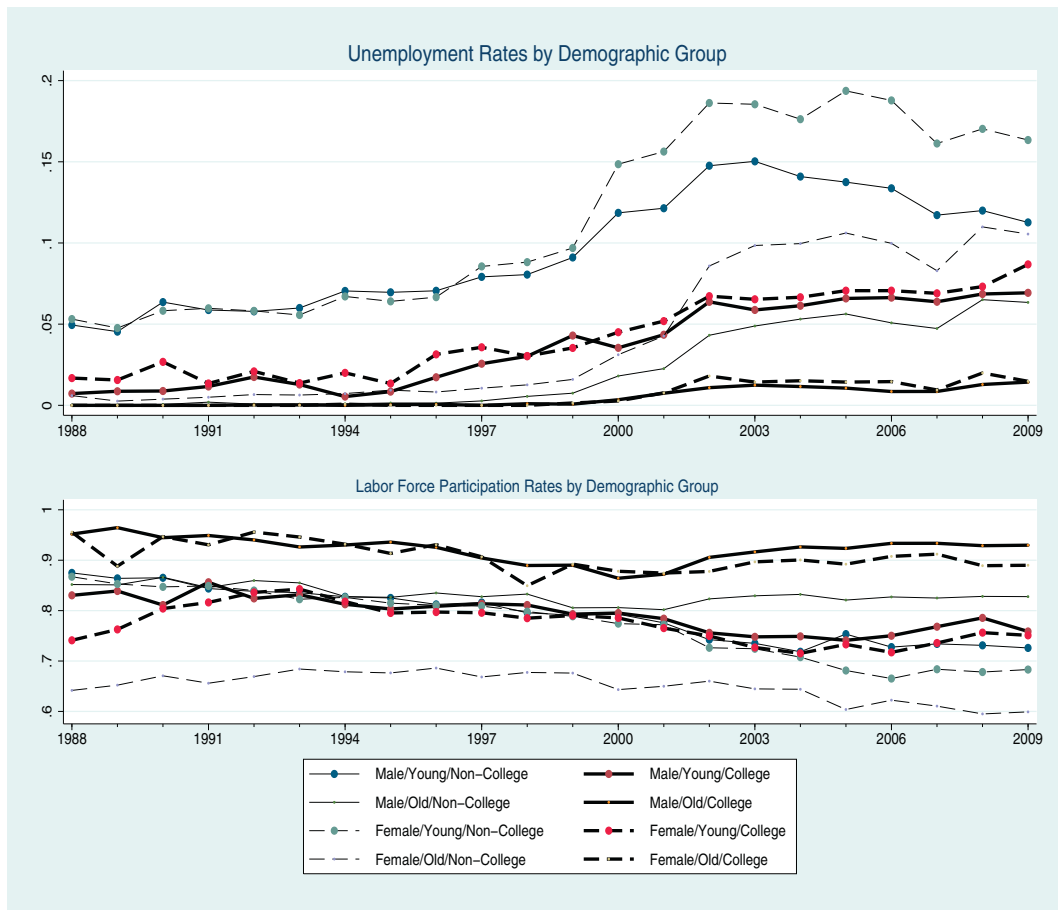
**Fig. A1.** Weighted and unweighted distributions on UHS sample Note: Authors' calculations based on UHS.Sample restricted to people with local urban *hukou* and aged 16–60 for males and 16–55 for females.

have local rural *Hukou* or do not have local *Hukou*. For the local urban *Hukou* population, we further divide each group into different cells defined by the multiplication of the following: (1) 5-yr age categories, (2) region of residence (North, Northeast, East, South Central, Southwest, West), (3) male or female, and (4) whether they have a college education. For each cell, we fit a quadratic relationship between log population and year based on the log population in the three census years, and then interpolate from the fitted relationships for the other years.

For the local urban *Hukou* population group, which we use in our main analysis, we then calculate weights to apply to the UHS for each of the cells just described, which bring the UHS sample into alignment with the Census data. Fig. A1 compares the unweighted and weighted levels and trends in the UHS data by age, gender, and region. The unweighted UHS sample has a higher ratio of more educated and older people than the weighted sample. The unweighted sample also includes more females in the 1980s and 1990s. There are also some differences in some regions after 2002. The gaps between the weighted and unweighted data change slightly over time for some variables as well. Given these differences, we use the weighted UHS data in all our calculations of unemployment rates and labor force participation rates in the paper.<sup>22</sup> But despite the differences shown in the Figure, using the weights has no appreciable effect on the levels or trends in our

<sup>22</sup> We were forced to derive our own Census-based weights as UHS does not provide reliable weights. Prior to 2002, UHS does not provide weights. Since 2002, UHS weights only adjust for probabilities of selecting a city of given size (large, medium or small) into the sample within a province, i.e., all the individuals in the large(medium/small)-sized cities in a province would receive the same weight.





**Fig. A2.** Unemployment and Labor Force Participation by Demographic Group. Note: sample restricted to people with local urban *hukou* and aged 16–60 for males and 16–55 for females.

**Table A4**  
Unemployment and SOE mass layoff.

	Unemployment Rate		SOE Layoff	
	Average (1995–2002)	Annual Change (1995–2002)	Total number of laidoff workers (mn)	% of total State employment in 1995
North	4.5	0.7	3.965	22
Northeast	7.7	1.2	7.327	42
East	4.6	0.8	5.312	19
South Central	7.3	1.1	7.102	27
Southwest	7.5	1.0	2.856	23
Northwest	7.4	0.7	2.066	21

Source: The first two columns are the same as in Table 1. The last two columns are from National Bureau of Statistics.

calculated rates, as shown in the rows labeled Baseline and Alt4 in Table A5, which we also discuss in the main text of the paper. There is virtually no difference in terms of long run trends in the two estimates.

## Appendix B. Detailed explanation of employment status from the UHS interviewer manual

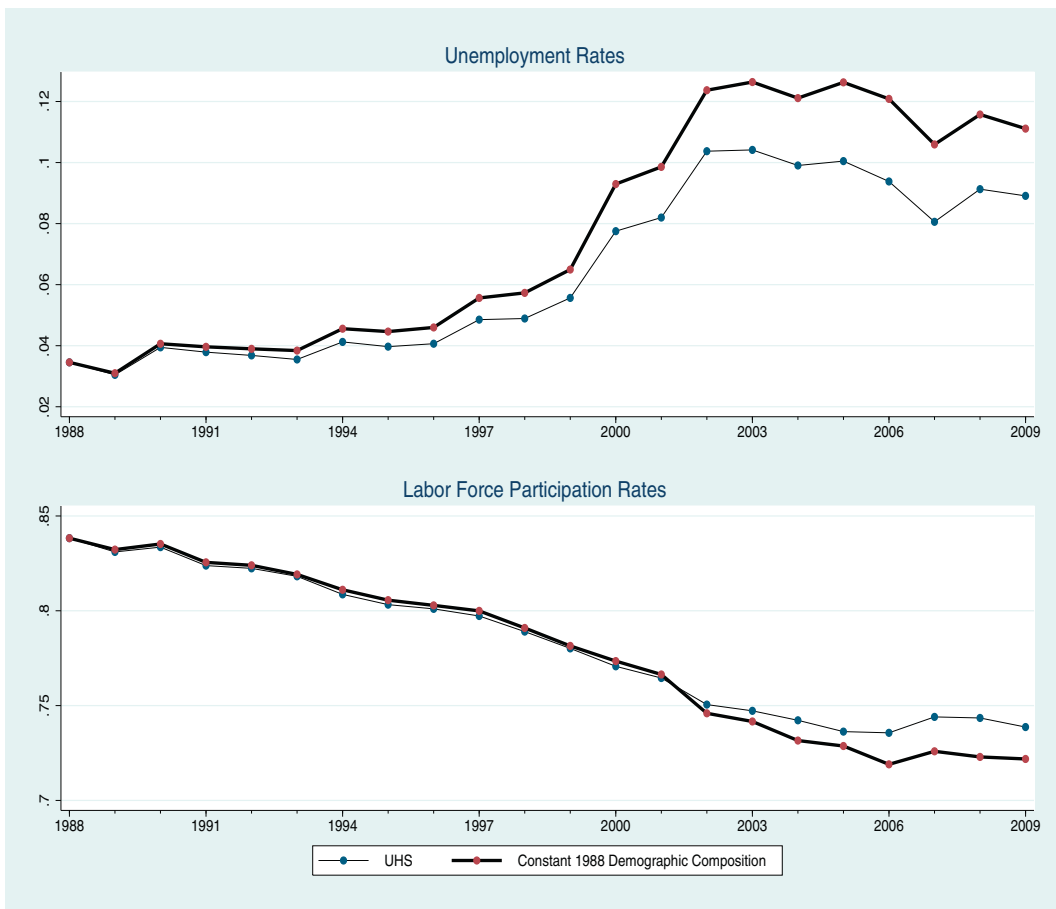
Employment status refers to the current employment situation of the respondent, including those who are not employed. All respondents are required to fill in the employment status according to the following list of categories.

1: Employees of state-owned economic units: refers to people working in and paid by the following units: public institutions owned by the party or the government, state-owned enterprises and their affiliated units. Workers in stock companies where the state has the majority share are also included in this category. However, people reemployed after official retirement are not included.

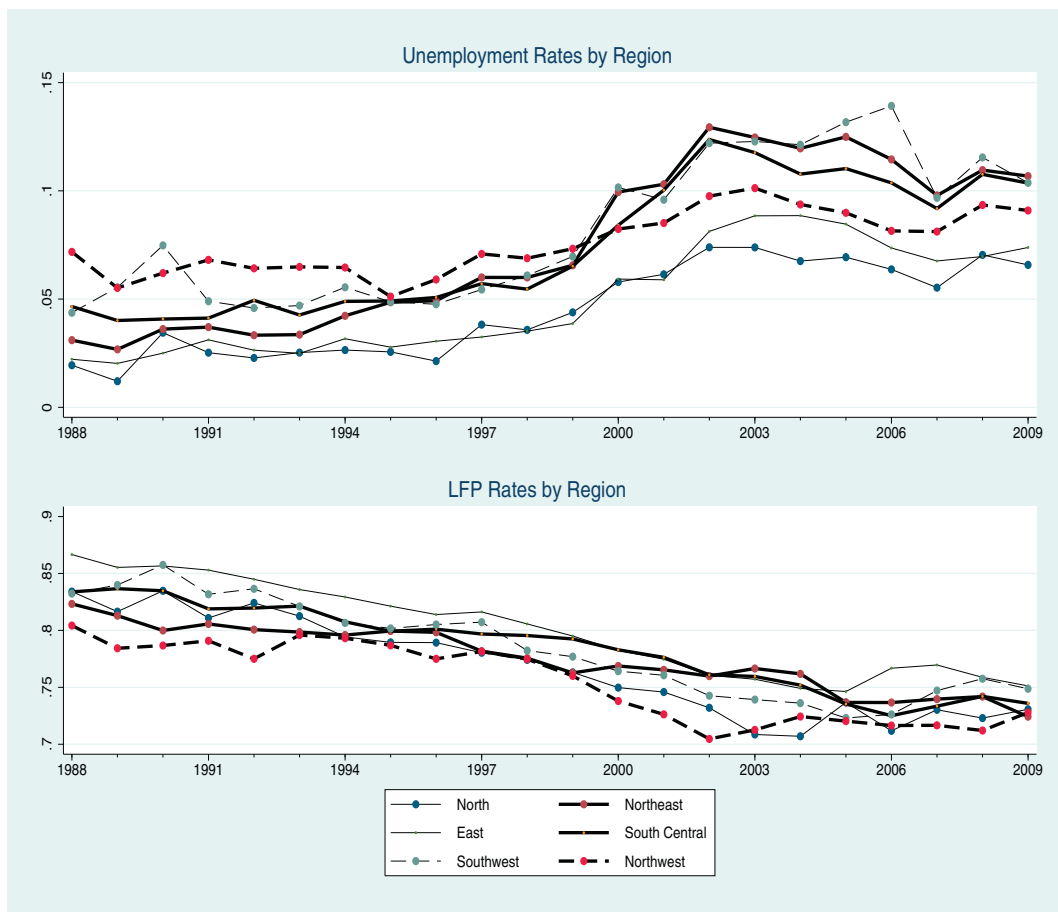
**Table A5**  
Alternative estimates of unemployment rates and labor force participation rates (%).

	subperiod 1 (1988–1995)		subperiod 2 (1995–2002)			subperiod 3 (2002–2009)		
	Average	Annual Change	Average	Annual Change	Chg over subperiod 1	Average	Annual Change	Chg over subperiod 2
<b>Panel A: Unemployment Rate</b>								
Baseline	3.7	0.1	6.2	0.9	2.5	9.5	−0.2	3.3
Alt1	4.1	0.0	6.5	1.0	2.4	9.9	−0.3	3.4
Alt2	3.8	0.1	6.9	0.9	3.0	9.6	−0.2	2.8
Alt3	3.6	0.1	6.2	1.0	2.6	9.7	−0.2	3.5
Alt4	3.1	−0.0	5.0	0.8	1.9	8.0	−0.1	3.1
Alt5	3.7	0.1	6.2	0.9	2.5	9.5	−0.2	3.3
Alt6	3.7	0.1	6.2	0.9	2.5	9.5	−0.2	3.3
Alt7	3.7	0.1	6.2	0.9	2.5	9.5	−0.2	3.3
<b>Panel B: Labor Force Participation Rate</b>								
Baseline	82.2	−0.5	78.2	−0.8	−4.0	74.2	−0.2	−4.0
Alt1	82.6	−0.6	78.5	−0.7	−4.1	74.5	−0.2	−3.9
Alt2	82.2	−0.5	78.2	−0.8	−4.0	74.2	−0.2	−4.0
Alt3	82.3	−0.5	78.3	−0.7	−4.0	74.3	−0.2	−4.0
Alt4	85.0	−0.0	82.1	−0.8	−2.9	78.3	−0.0	−3.8
Alt5	82.2	−0.5	78.2	−0.8	−4.0	74.2	−0.2	−4.0
Alt6	80.6	−0.6	76.3	−0.8	−4.3	71.7	−0.3	−4.5
Alt7	82.2	−0.5	78.2	−0.8	−4.1	73.9	−0.1	−4.3

Note: Alt1: “Other nonemployed” classified as unemployed. Alt2: SOE workers older than 35 with no wage income classified as unemployed. Alt3: Corrected results using the approach by Feng and Hu (2013). Alt4: Unweighted results. Alt5: Results with attrition corrected. Alt6: Results using sample including all people aged 16–60. Alt7: Results using sample including all non-local-urban-*hukou* people.



**Fig. A3.** Effects of demographic changes Note: sample restricted to people with local urban *hukou* and aged 16–60 for males and 16–55 for females.



**Fig. A4.** Unemployment and Labor Force Participation by Region. Note: sample restricted to people with local urban *hukou* and aged 16–60 for males and 16–55 for females.

2: Workers in urban collective economic units: refers to people working in and paid by urban collectively-owned enterprises, collectively-owned public institutions and their affiliated economics units. Those who are reemployed after retirement are not included.

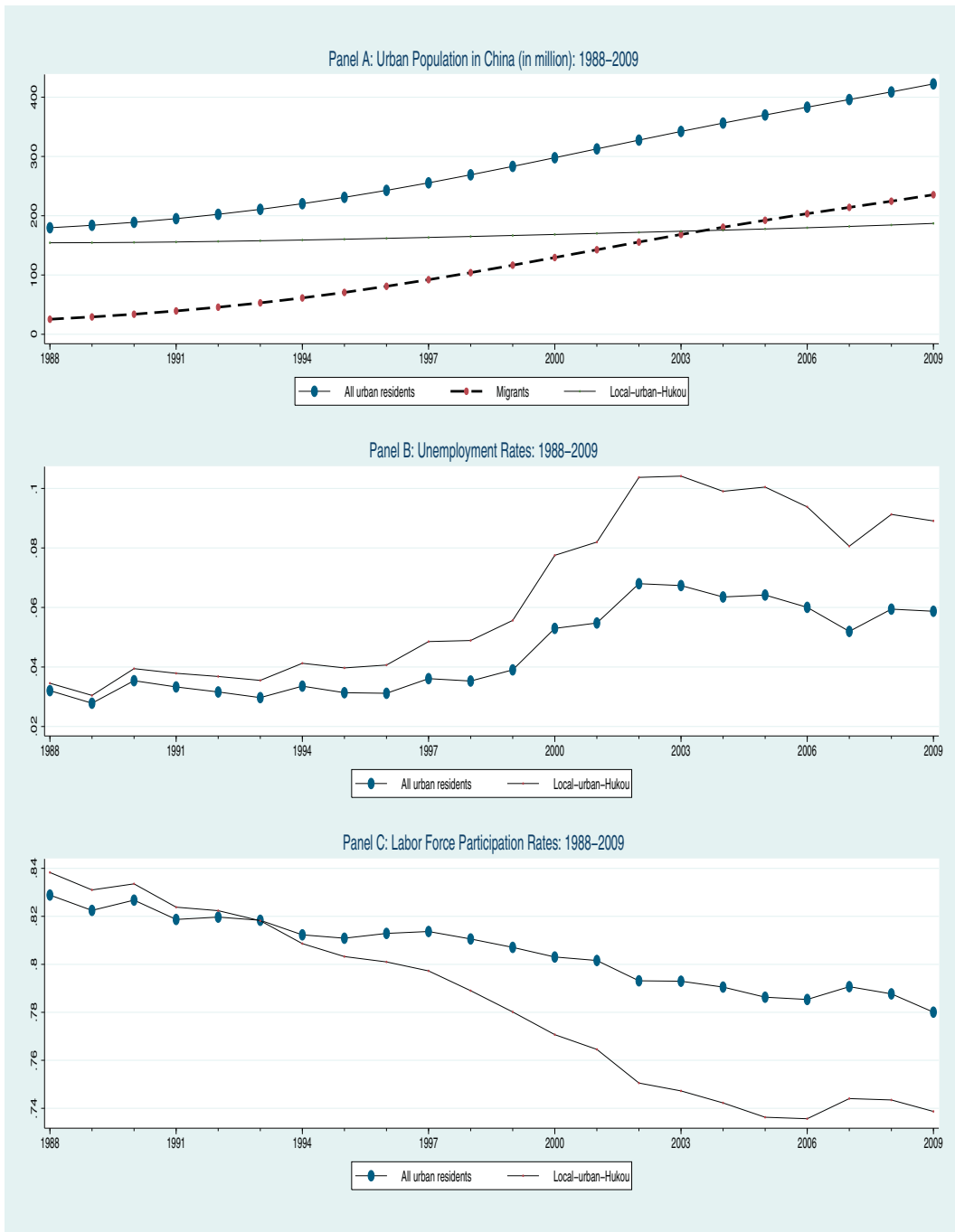
3: Workers in economic units of other types: refers to people working in and paid by economic units of mixed ownerships, joint-stock firms, foreign and Hong Kong, Macau, Taiwan invested firms, and other types of economic units. People reemployed after official retirement are not included.

4: Urban self-employed and private entrepreneurs: also known as self-employed persons (individual employers and self-employed persons), refers to an individual or a couple or several partners work together, and own the production assets and the final product (and income generated). They should have obtained the approval and receive the license for “individual or private business operations”. Those who have not obtained a license yet but has normal operations at a fixed place should also be included in this category, including: Employer: refers to people who have the appropriate license and hire at least one employee (not a household member) in their businesses. Self-employed persons: refers to people who have a proper license but have not hired any other individuals (except for the family members).

5: Employees in private enterprises: refers to people who are hired and paid by self-employed people and private entrepreneurs.

6: Re-employed retirees: refers to people who are hired by their original employers or other employers after official retirement, and receive payment other than their pension. Those self-employed with a proper business license after retirement are also included. Retirees who have performed some social activities during the survey month with remunerations enough to cover basic living cost should also be included.

7: Other employed people: refers to people who are employed but not included in the above six categories, including: those without a stable job but has performed social activities for more than half of the month during the survey month and earned remunerations enough to cover basic living cost. Some examples are: people who take raw materials from a firm and process in their own home, washing and mending from home, childcare, nanny, freelance writers and painters, and people who provide service in information as intermediaries, stocks and other investments in securities, and other self-employed



**Fig. A5.** Results including migrants Source: Authors' calculation from UHS and Census. Sample restricted to those aged 16–60 for males and 16–55 for females.

without proper license or fixed work place. Middle school, high school, college students who participate in work during the holidays are not counted as employed people, although they may receive remunerations. The payments they receive should be counted as “other labor income”.

The following are the categories for non-employed people:

8: Retirees: refer to people who are officially retired and rely only on pension for living. Those who are reemployed after retirement should be considered as employed and not included here.

9: Incapacitated: refer to working-age people (16–60 years old for men and 16–55 years old for women) who are unable to work due to psychological, physical disabilities, illnesses or other reasons.

10: People responsible for housekeeping: refer to working-age people who stay at home to perform household duties and receive no remunerations, and have no intention to seek paid employment outside home.

11: Unemployed: refer to working-age people who are capable of working, has performed paid work before, but do not have a job at the time of the survey, and are actively looking for job, and are currently available for work. Note those who are performing some kind of paid work and seeking new jobs at the same time should be considered employed and not included in this category.

12: People waiting to be assigned to jobs: refer to people who are waiting to be assigned to jobs by the government after they graduate from colleges, technical high schools and other technical schools. Demobilized soldiers who have waited for less than a year to be assigned to jobs by the government should also be included here.

13: Students: refers to people who study in all types of schools.

14: People waiting to enter the next level of schools: refers to middle school and high school graduates who are waiting to enter the next level of schools, and high school graduates studying at home to prepare for college entrance exams.

15: Other non-employed people: refer to other non-employed people not included in the above categories.

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