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LONG RUN TRENDS IN UNEMPLOYMENT AND LABOR FORCE PARTICIPATION  
IN CHINA

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Working Paper 21460  
<http://www.nber.org/papers/w21460>

NATIONAL BUREAU OF ECONOMIC RESEARCH  
1050 Massachusetts Avenue  
Cambridge, MA 02138  
August 2015

We thank Albert Park, Xin Meng, Tony Fang and audiences at Southwest University of Finance and Economics, Peking University, Chinese University of Hong Kong, Hong Kong University of Science and Technology, and at the 2014 Fall NBER China conference for valuable comments. Jinwen Wang and Gaojie Tang provided excellent research assistance. All errors are our own. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

At least one co-author has disclosed a financial relationship of potential relevance for this research. Further information is available online at <http://www.nber.org/papers/w21460.ack>

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Shuaizhang Feng, Yingyao Hu, and Robert Moffitt  
NBER Working Paper No. 21460  
August 2015  
JEL No. J64,O15,O53

**ABSTRACT**

Unemployment rates in countries across the world are typically positively correlated with GDP. China is an unusual outlier from the pattern, with abnormally low, and suspiciously stable, unemployment rates according to its official statistics. This paper calculates, for the first time, China's unemployment rate from 1988 to 2009 using a more reliable, nationally representative household survey in China. The unemployment rates we calculate differ dramatically from those supplied in official data and are much more consistent with what is known about China's labor market and how it has changed over time in response to structural changes and other significant events. The rate averaged 3.9% 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- 2002, reaching an average of 10.9% in the subperiod from 2002 to 2009. 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 report results for different demographic groups, different regions, and different cohorts.

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# 1 Introduction

The unemployment rate is one of the major indicators of the state of a country's labor market. Market economies are normally thought of as having a natural rate of unemployment that is the lowest long-run unemployment rate that can be sustained with a stable rate of inflation. That rate differs from country to country and over time depending on the efficiency of the labor market, the availability of unemployment benefits and other sources of income while not working, taxes and the incentive to work, and the presence or absence of other types of labor market barriers and impediments. The unemployment rate is also a measure of the severity and phase of a business cycle, measuring the slackness in aggregate demand which is presumably temporary before the rate returns to its natural level. While the standard definition of unemployment as requiring search has many long-standing issues (e.g., the exclusion of discouraged workers who have stopped searching), it is nevertheless a key economic indicator.

How the unemployment rate changes over the course of economic development is an important question in development economics. The traditional stylized fact is that the unemployment rate tends to rise with development. The upper four lines in Figure 1, drawn from World Bank statistics which classify countries by their gross national income per capita into high income, upper middle income, lower middle income, and low income groups, supports this stylized fact. Although the ordering varies a bit over the 1988 to 2013 time period, it is always the case that high income countries have the highest unemployment rates and low income countries have the lowest ones, with middle income countries in between. The upper and lower middle income countries vary in their unemployment rate ordering depending on the time period.<sup>1</sup> This ordering may seem surprising given the common view that labor markets are less efficient at low levels of development than at high levels, but an old hypothesis for this pattern is known as the "luxury unemployment hypothesis" which

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<sup>1</sup>The unemployment series in Figure 1 is not based on official unemployment rates published by each country because those are often noncomparable in terms of coverage and consistency with standard definitions requiring search. Instead, the series is based on ILO models which adjust the official series to put them on a comparable basis.

suggests that, in lower income countries, the lack of unemployment benefits, savings, and other sources of income while unemployed means that reservation wages are necessarily very low and that the only individuals who can afford significant periods of job search are secondary workers from families with high incomes (Turnham and Jaeger, 1971, Udall and Sinclair, 1982). While there have been many objections to this hypothesis, both those which suggest that the positive correlation between unemployment and development is a result of other factors (e.g., more underemployment in low-GNI countries) and those which dispute the correlation itself (Turnham and Ercal, 1990), the data in Figure 1 do support the basic empirical pattern.

This paper is concerned with the unemployment rate in China. Figure 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 since 2002, including the 2008-2009 global financial crisis, it only fluctuated within a very narrow range between 4% and 4.3% since then and has stayed fixed at 4.1% since the third quarter of 2010.<sup>2</sup> 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 the Chinese labor market. As we discuss below, the Chinese economy has been gradually transformed from one governed by central planning to one that is mainly market-driven, including the restructuring of the State-owned-enterprises (SOEs), increases in rural-to-urban migration, World Trade Organization (WTO) entry, and an expansion of college enrollments. It is implausible that these major events have not affected the unemployment rate more than the official series indicates.

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<sup>2</sup>The ILO calculates a "modeled" unemployment rate series for China that is supposed to reduce non-comparabilities with other countries and to correct for definitional differences. However, that modeled series is also an outlier, fluctuating only between 4 and 5 percent over the 1991-2013 period.

Instead, the more probable explanation for the deviation of China in Figure 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>3</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 three reasons: (1) a large fraction of the population lacks local household registration (*Hukou*) status<sup>4</sup> and hence many unemployed people are not qualified to register with local employment service agencies, (2) even qualified unemployed people may lack the incentive to register because of very low levels of unemployment benefits, and (3) the total number of registered unemployed people are aggregated bottom-up within the bureaucratic system, thus subject to aggregation errors and potential data manipulations (Giles et al., 2005 and Liu, 2012). Also, the total labor force, which is the denominator in the calculation of 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>5</sup>

Despite the popular disbelief of official figures, it is not easy to find an alternative. Many researchers have attempted to estimate China's true unemployment rate and usually end up with numbers significantly higher than the official ones. The most common solution

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<sup>3</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>4</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>5</sup>In principal, one can infer the labor force participation rates using official statistics on total employment, registered unemployment and population, as Cai et al. (2008) did for 1996-2004.

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. 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 number of 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), making it difficult for any potential user to choose among them.

In this paper, we provide a new long series of estimates of nationally representative levels of unemployment rates and labor market participation rates in China over the period 1988-2009, using newly available microdata from a household survey that covers all of urban China. The Urban Household Survey (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> In addition, previous studies have typically only had access to a subsample of the UHS consisting of only several provinces, while we have the most complete access to UHS annual data from 1988 to 2009 covering all provinces.<sup>7</sup>

Our results completely change the picture of where China fits into the world picture portrayed in Figure 1. As shown in Figure 2, while we find that, while the Chinese un-

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<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 and 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) goes from 1992 to 2007.

employment 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 2002, the unemployment in China 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 life-time employment, mainly in the state sector—the unemployment rate averaged 3.9% in 1988-1995. But the dramatic rise in the rate in 1995-2002 coincided with a period of mass layoffs from state-owned enterprises (SOEs) and with a sharp increase in rural-to-urban migration. The rising trend stopped in approximately 2002, partly as a result of WTO entry that 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, different regions, and different cohorts and find them to be largely consistent with the features of labor market developments we have described. Our new calculations of labor force participation rates show that they were quite high, averaging 83.1% in 1988-1995, but fell thereafter.

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 - 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, different regions, and different cohorts. We also discuss the reliability of our estimates and conduct various robustness checks including correcting for possible misclassifications in labor force status using the method proposed by Feng and Hu (2013). 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 happened during the last several decades. Our main focus is on the development of China's urban labor market.

### 2.1 Prior to 1995

The Chinese economy has experienced tremendous changes since the open-door and reform policy 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).

### 2.2 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 and 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, 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 retain control of large enterprises. This triggered large-scale lay offs from SOEs and, indeed, 1995 was the first year with no absolute growth in state employment.<sup>8</sup> During the period from 1995 to 2001, there were an estimated 34 million workers laid off from the state sector (Giles

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<sup>8</sup>Based on National Bureau of Statistics and cited also by Giles et al. (2006).



et al., 2006).

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, employment certificates issued by the local labor bureau in cities, 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 argues 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.

## 2.3 Post-2002

On December 11, 2001, China officially became WTO’s 143rd member. China’s WTO entry has 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 has resulted a shortage of cheap labor in China’s affluent costal areas and a sharp rise in real wages. Zhang et al. (2011) identifies 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 urban *Hukou* population, especially for low skill workers.

## 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 US labor market statistics including unemployment rates and labor force participation rates. The UHS is also the only nationally representative 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 (we adjust for this possibility as described below). 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. In addition, household identifiers that are necessary to match the same households in different years are only available since 2002. 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.

Throughout the analysis, we restrict the sample to those aged between 16 to 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 people with local household registration (those with local urban *Hukou*) for several reasons. First, because of policy restrictions, there were very few non-local-*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 preferable to stick with people with local *Hukou* throughout the whole period. Second, while the UHS also covers non-local-*Hukou* people since 2002, the coverage is less than satisfactory because of the difficulties in interviewing non-local-*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 other existing data sets, to study the long run labor market outcomes of all urban residents. Last but not least, the *Hukou* population is also the more politically salient

group, as unemployed migrant workers without *Hukou* can return to their rural hometown or migrate to a different city. For the same reason, the labor market performance of people with local *Hukou* is probably a better indicator of China's overall labor market conditions than that of all urban residents, as the non-local *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 *Hukou* population, such as Giles et al. (2005).

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 36,529 in 2001 to 92,337 in 2002 because of a change in UHS sample design, and has increased further after that.

As we described above, prior to 2002 it is likely that the UHS oversampled certain strata of the population. In addition, the UHS appears to have 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 and Meng, 2012). However, the UHS provides no weights prior to 2002 and, since 2002, it provides weights that 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. To insure that the sample is representative, we calculate our own weights based on Census data for all periods, both before and after 2002. We use data from the three decennial censuses (1990, 2000, and 2010) and,<sup>9</sup> starting from the urban *Hukou* population in each age (5-yr categories)/province/sex/education cell, we interpolate/extrapolate linearly for all other years in our sample, then calculate weights as the ratio of population size and sample size for each cell. Thus two persons in the same cell, i.e., two sample individuals in the same province, with the same sex, the same age (5-yr category), the same education group(above college or below) will have the same weight in a given year. Figure A1 shows that

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<sup>9</sup>we use 1% census micro sample for 1990 and 2000. For 2010, since micro data are not available, we use summary statistics and impose the assumption that education distributions are the same for all provinces conditional on sex and age category.

the unweighted UHS sample has a much higher ratio of college educated and 40+ individuals than the weighted sample and the time trends are also quite different. For example, in 2009, the percentage of male sample individuals with college education is around 40%, but after the adjustment using the weights, it drops to only 20%.

### 3.2 Labor force status classifications in UHS

The annual UHS data have information regarding labor force status in December of that 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>10</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 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, (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 variables, 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 the Appendix. We assign categories (1) to (7) as employed; categories (11) and (12) as unemployed; and categories (8), (9), (10), (12), (14) and (15) as not-in-labor-force(NILF).<sup>11</sup> A careful perusal of the explanations of the 15 labor force categories suggests that our classification of employment, unemployment

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<sup>10</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.

<sup>11</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.

and NILF are largely consistent with the ILO definitions adopted in 1982 for internationally consistent unemployment rate comparisons.<sup>12</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**

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

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<sup>12</sup><http://laborsta.ilo.org/applv8/data/c3e.html>.

an average of 3.9%, which was higher than the official average of 2.5% but the discrepancies are relatively small and stable. Nevertheless, in 1995-2002, the UHS-based unemployment rate climbed rapidly, gaining one percentage point each year. The official rate only increased very mildly. In the last subperiod of 2002-2009, the UHS-based unemployment rate reached a peak and declined somewhat, with an average of 10.9%. The official rate lagged far behind at an average of only 4.2%, or less than half of the UHS-based rate.

Figure 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, even if 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 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 UHS-based unemployment rates are also plotted in Panel A of Figure 3 together with the official rates. Panel B of Figure 3 shows that the overall rate of labor force participation has dropped significantly from 1988 to 2009, with most of the declines happened in 1995-2002. Table 1 also reports the average participation level and annual rate of change by subperiod in Panel B. In 1988-1995, there were not much changes with labor force participation rates averaging 83.1%. During the second subperiod when mass-layoff in SOEs and rural-to-urban migration occurred, participation rates declined substantially, by 0.8 percentage points each year. In the last subperiod, labor force participation stabilized again at around 74%.

The overall trends of unemployment and labor force participation shown by 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 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 Figure 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 an recovery 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 Figure 3). The rebound 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.



## 4.2 Subgroup Results

### 4.2.1 Results by demographic group

Panel A of Table 1 also presents results for different demographic groups for the three subperiods, with more detailed information shown in Figure A2. The patterns displayed by all groups are similar: unemployment rates increased most during the 1995-2002 period, while experiencing considerably smaller changes in the first and last subperiods. Three groups have witnessed the highest growth rates in unemployment rate during 1995-2002: non-college younger females (1.8 percentage points increase p.a.), non-college younger males (1.2 percentage points p.a.) and non-college older females (1.1 percentage points p.a.). As a result, during the last subperiod of 2002-2009, these three groups also posted the highest unemployment rates. The average unemployment rates for the non-college younger females, non-college younger males, and non-college older females were 18.3%, 14.5% and 9.9%, respectively. On the other hand, older college males and females posted the lowest unemployment rates in all subperiods. Even in 2002-2009, both groups had unemployment rates of less than 2%. Overall, we see that people without college degrees, younger people, and females systematically face more slack labor markets than their more educated, older, and male counterparts. Figure A3 show that if we keep the 1988 demographic composition unchanged, unemployment rates would have increased much more significantly. This is understandable as levels of education have improved substantially, especially for younger people in the post-2002 period.

In terms of labor force participation, we see a sharp decline for young people in the 1995-2002 subperiod (see Figure A2 and Panel B of Table 1). For male non-college youths, the labor force participation rate was 83.9% in the first subperiod and declined steadily to around 72.1% in the last subperiod, representing almost a 12 percentage point decline. Similarly, male college educated youths and female non-college and college educated youths all have experienced more than a 10 percentage point decline, with the decreasing trend continuing in the last subperiod. The results suggest that cohort differences might be in play and that the younger generation may have faced higher cost and/or lower benefit in participating

labor market. Of course, for people below 25, the decline in labor force participation may be related to increased schooling. Note that for less educated youth, given the coinciding movements in both the unemployment rate and the labor force participation rate, rather than just selecting out of labor market voluntarily, they are likely to have faced increasingly tougher labor market conditions compared to other groups.

Figure A3 shows that, unlike unemployment, changes in overall labor force participation over time are not a result of demographic changes. If we fix the demographic composition in the population at the 1988 level, we would only have witnessed slightly lower participation rates in the last subperiod.

#### 4.2.2 Results by region

We also present results for different regions in China, including North, Northeast, East, South Central, Southwest, and Northwest.<sup>13</sup> Panel A of Table 1 gives results by subperiods, while the graphs are shown in Figure A4. Overall, different regions follow quite similar patterns: unemployment rates remained at low levels in the first subperiod, rose rapidly during the second subperiod, and then declined slightly during the last subperiod. Nevertheless, for regions with more SOE layoffs, the rise in unemployment rate in 1995-2002 was more significant. As shown in Table A2, the three regions with largest increases in unemployment rate during the 1995-2002 period are the Northeast (1.2 percentage point increase p.a), South Central (1.3 percentage point increase p.a.) and Southwest (1.1 percentage point increase p.a.). These regions happen to be the top three in terms of SOE layoff. For example, in the Northeast region, which was one of the hardest-hit areas during the SOE reform period, 7.3 million workers were laid off during the 1995-2002 period, or 42% of its total SOE employment in 1995.

Panel B of Table 1 show labor force participation results for different regions (see also Figure A4). The general patterns are quite similar, with all regions experiencing consistent

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<sup>13</sup>The provinces 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.

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 80.5% in the 1988-1995 period and the most significant decline in 1995-2002. As a result, its average participation level was only 69.8% in the last subperiod of 2002-2009. This was likely a result of cultural differences, as the Northwest provinces are populated by Muslim ethnic groups. The East region, which is the most economic developed, always had the highest participation rates.

### 4.2.3 Results by cohort

Finally, we examine patterns for different birth cohorts. Panel A of Figure A5 shows unemployment rates for males for four different cohorts: those who were born before 1960, those born in the 1960s, 1970s and 1980s, while panel B depicts results for females. The most striking pattern is that younger people had very high unemployment rates, especially for more recent cohorts. This is undoubtedly a result of timing when the different cohorts entered the labor market. Even at the age of around 30, the 1970s female cohorts had roughly a 10% unemployment rate, as compared to only 3% for females born in the 1960s. For males, the pre-1970 cohorts also had unemployment rates around 5 percentage points lower than that of those born after 1970 when they were 30. However, as workers age, the gap in unemployment rates gradually closes. At around 40, the 1960s cohort and 1970s cohort had roughly the same unemployment rate. It is important to note that the patterns shown are gross estimates for different cohorts at different ages. As we have not controlled for year effects and changes in demographic composition, the estimates cannot be simply understood as a cohort effect.

For different cohorts, as shown in Figure A5 (Panel C and Panel D), younger generations have significantly lower participation rates when they were young, which should be partly a result of increased schooling years, particularly the college enrollment expansion that affected the 1980s cohort. Nevertheless, for males (Panel C), at around age 30, different cohorts converged. For females, more recent cohorts had somewhat lower participation rates continuously, possibly due to changes in and out of labor market that makes women's

participation more difficult (or less rewarding). For example, Maurer-Fazio et al. (2011) and Du and Dong (2013) have discussed the role of child care on the decline of married women's labor market participation in China.

### **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 and 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, Shengyang, Wuhan and Xi'an) in 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 on two important points. 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 4.5 percentage points for the same period. It was 8.8% for year 2001, up from 4.3% 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 11.4% in that year. But CHIP only covers

around 10 Chinese provinces and 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 UHS-based estimates.<sup>14</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 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. These trends are similar to our estimates based on UHS. Studies of female labor force participation have also documented similar declining trends based on other data sets as ours, see e.g. Du and Dong (2013) and Maurer-Fazio et al. (2011).

#### 4.4 Measurement of search and unemployment

A serious concern for the UHS data is that the NBS does not specifically ask for labor search activities, which is necessary in order to use 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 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

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<sup>14</sup>The latest Chinese census suggests that unemployment rate was 4.9% for urban residents aged between 16-59 (including both with and without local *hukou*). 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 10.4% for the year of 2009, which is closer to the CHFS estimate.

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 (Table A3) show that doing this only increased unemployment rates slightly and hardly affected labor force participation rates. For example, in 2002-2009, the average unemployment rate was 11.2% as compared to our baseline result of 10.9%, and the average labor force participation rate was 74.2%, only slightly higher than the baseline rate of 73.9%.

Another concern regards laid-off workers, which is particularly an issue for middle-aged and old SOE workers in the SOE reform period. If the 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 be also 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 Table A3. As expected, this mostly affects the 1995-2002 mass-layoff period. The unemployment rate averaged 7.2%, which is 0.6 percentage points higher than our baseline estimate. The 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 achieved 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, as shown in Table A4. 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 (Table A3) using the estimated misclassification probabilities, we find that the corrected rates are very close to the baseline results.<sup>15</sup>

## 4.5 Additional robustness checks

In this subsection we perform some additional exercises to insure that the main trends that we report are robust. The main results in the paper are all weighted based on population Census. Previous studies based on UHS (see. e.g. Ge and Yang, 2014) have noted that the UHS samples overrepresent older people, especially those from the state sector. Therefore, it is important to weight the sample in order to derive correct statistics. To illustrate the effects of weighting, we also show the unweighted results (see series A4 in Figure A6 and row A4 in Table A3). In general, compared to our baseline results which are weighted, the unweighted unemployment rates are significantly lower and the unweighted labor force participation rates are higher. This is mainly because young people which have relatively high unemployment rates and low labor force participation rates are under represented in UHS. Figure A1 demonstrates how weighting changes the distributions in terms of age and education in the UHS sample.

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

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<sup>15</sup>The latent variable approach might not be able to identify measurement errors that are systematic over time. For example, if discouraged workers as 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.

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>16</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 A5 in Table A6 shows that attrition matters very little for our estimates. The unemployment rates stay virtually unchanged and the labor force participation rates are only slightly lower 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 to 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 Table A3, 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.

We also include the non-local-urban-*hukou* people in the sample for the post-2002 years. As we can see from Table A3 (row A7), 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*. The UHS may well under-sample temporary migrants for at least two main reasons. First, many migrants live in group living quarters such as construction sites not included in the sampling frame of UHS. Second, non-response rates are also much higher for more temporary migrants. The study of labor market conditions of migrants without local urban *hukou* is beyond the scope of this paper.

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<sup>16</sup>We divide the sample into 8 demographic groups using sex/age/education the same way as elsewhere in the paper.



## 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 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 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 people 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. Third, we compare different cohorts and show that recent cohorts experience significantly higher unemployment rates and lower participation rates than those of their predecessors, particularly when they were young.

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. Because of data limitations we have not studied labor market outcomes for people living in cities but without official registration status, a group that has become increasingly important since late 1990s. 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.

## References

- Fang Cai, Albert Park, and Yaohui Zhao. The Chinese labor market in the reform era. In Loren Brandt and Thomas G. Rawski, editors, *China's Great Economic Transformation*. Cambridge University Press, 2008.
- Fang Cai, Yang Du, and Meiyang Wang. Demystify the labor statistics in China. *China Economic Journal*, 6(2-3):123–133, 2013.
- Hongbin Cai, Yuyu Chen, and Li-An Zhou. Income and consumption inequality in urban China: 1992-2003. *Economic Development and Cultural Change*, 58(3):385–413, 2010.
- CFPS. China Family Panel Studies 2013. in Chinese, China Family Panel Studies, Peking University, 2013.
- Marcos D. Chamon and Eswar S. Prasad. Why are saving rates of urban households in China rising? *American Economic Journal: Macroeconomics*, 2(1):93–130, 2010.
- Kam Wing Chan and Will Buckingham. Is China abolishing the hukou system? *The China Quarterly*, 195(1):582–606, 2008.
- CHFS. China urban unemployment report. In Chinese, China Household Finance Survey, Southwest University of Finance and Economics, 2012.
- Gregory Chow. Are Chinese official statistics reliable? *CESifo Economic Studies*, 52(2):396–414, 2006.
- Xiao-Yuan Dong and Louis Putterman. Soft budget constraints, social burdens, and labor redundancy in China's state industry. *Journal of Comparative Economics*, 31(1):110–133, 2003.
- Fenglian Du and Xiao-yuan Dong. Women's employment and child care choices in urban China during the economic transition. *Economic Development and Cultural Change*, 62(1):131–155, 2013.

- Shuaizhang Feng and Yingyao Hu. Misclassification errors and the underestimation of the U.S. unemployment rate. *American Economic Review*, 103(2):1054–1070, 2013.
- John Fernald, Israel Malkin, and Mark Spiegel. On the reliability of Chinese output figures. *FRBSF Economic Letter*, 8:1–5, 2013.
- Suqin Ge and Tao Yang. Changes in China’s wage structure. *Journal of European Economic Association*, 12(2):300–336, 2014.
- John Giles, Albert Park, and Juwei Zhang. What is China’s true unemployment rate? *China Economic Review*, 16:149–170, 2005.
- John Giles, Albert Park, and Fang Cai. How has economic restructuring affected China’s urban workers? *China Quarterly*, 185:61–95, 2006.
- Carsten A. Holz. The quality of China’s GDP statistics. *MPRA Paper No. 51864*, 2014.
- Nicholas R. Lardy. *China’s unfinished economic revolution*. Brookings Institution Press, 1998.
- Hongbin Li, Lei Li, Binzhen Wu, and Yanyan Xiong. The end of cheap Chinese labor. *The Journal of Economic Perspectives*, 26(4):57–74, 2012.
- Justin Yifu Lin. Rural reforms and agricultural growth in China. *American Economic Review*, 82(1):34–51, 1992.
- Qian Liu. Unemployment and labor force participation in urban China. *China Economic Review*, 23:18–33, 2012.
- Margaret Maurer-Fazio, Rachel Connelly, Lan Chen, and Lixin Tang. Childcare, eldercare, and labor force participation of married women in urban China, 1982-2000. *Journal of Human Resources*, 46(2):261–294, 2011.
- Xin Meng. Labor market outcomes and reforms in China. *The Journal of Economic Perspectives*, 26(4):75–102, 2012.

- Xin Meng, Kailing Shen, and Sen Xue. Economic reform, education expansion, and earnings inequality for urban males in China, 1988-2009. *Journal of Comparative Economics*, 41(1):227–244, 2013.
- National Bureau of Statistics. China statistical yearbook. Various years.
- Martin Ravallion and Shaohua Chen. When economic reform is faster than statistical reform: measuring and explaining income inequality in rural China. *Oxford Bulletin of Economics and Statistics*, 61(1):33–56, 1999.
- Thomas G. Rawski. What’s happening to China’s GDP statistics? *China Economic Review*, 12(4):298–302, 2001.
- David Turnham and Denizhan Erocal. Unemployment in developing countries: New light on an old problem. 1990. Working Paper No. 22, OECD Development Centre.
- David Turnham and Ingelies Jaeger. The employment problem in less developed countries. *OECD Development Center Employment Series*, (1), 1971.
- Alan T. Udall and Stuart Sinclair. The ‘luxury unemployment’ hypothesis: A review of the recent evidence. *World Development*, 10(1):49–62, 1982.
- Alwyn Young. Gold into base metals: Productivity growth in the People’s Republic of China during the reform period. *Journal of Political Economy*, 111(6):1220–1261, 2003.
- Junsen Zhang, Yaohui Zhao, Albert Park, and Xiaoqing Song. Economic returns to schooling in urban China, 1988 to 2001. *Journal of Comparative Economics*, 33(4):730–752, 2005.
- Junsen Zhang, Jun Han, Pak-Wai Liu, and Yaohui Zhao. Trends in the gender earnings differential in urban China, 1988-2004. *Industrial and Labor Relations Review*, 61(2): 224–243, 2008.
- Xiaobo Zhang, Yang Jin, and Shenglin Wang. China has reached the Lewis turning point. *China Economic Review*, 22(4):542–554, 2011.

## Appendix: 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.

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 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.

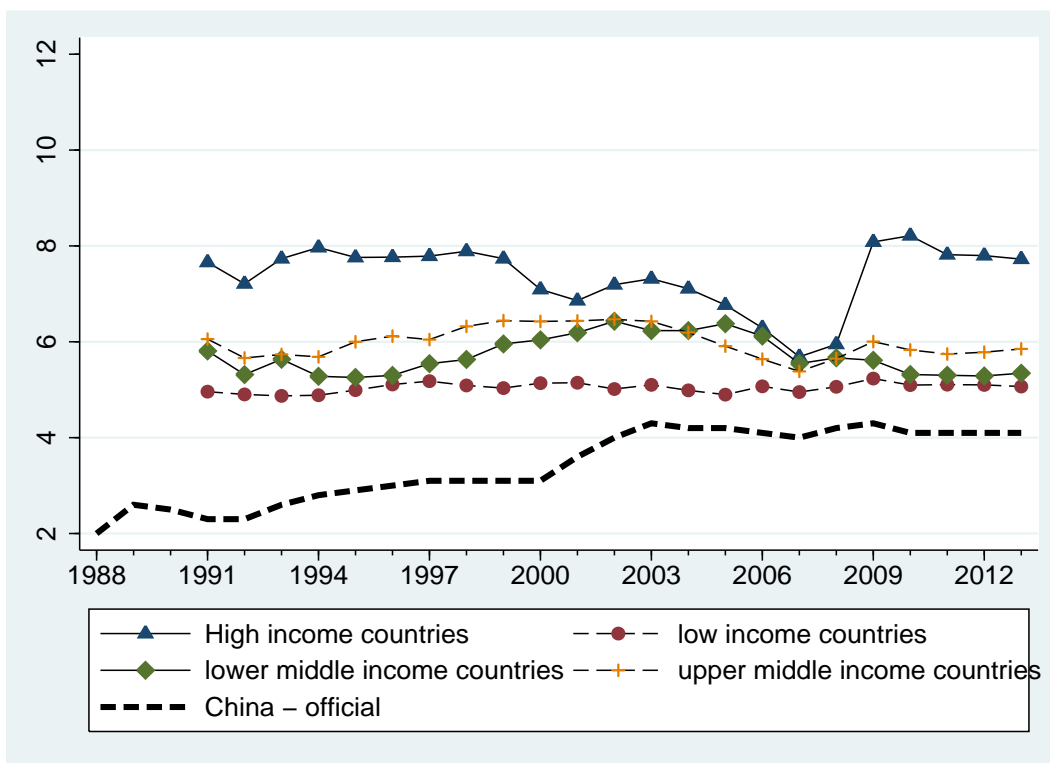
13: Students: refers to people who study in all types of schools.

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.

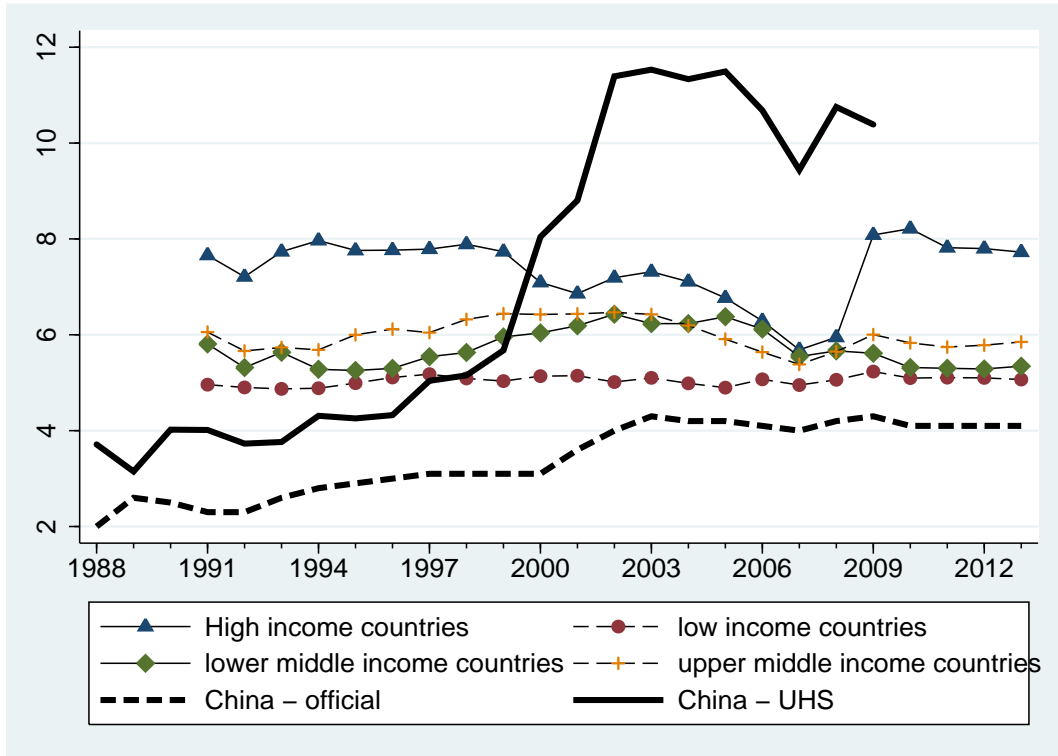


Figure 1: Unemployment rates by country: 1988-2013.



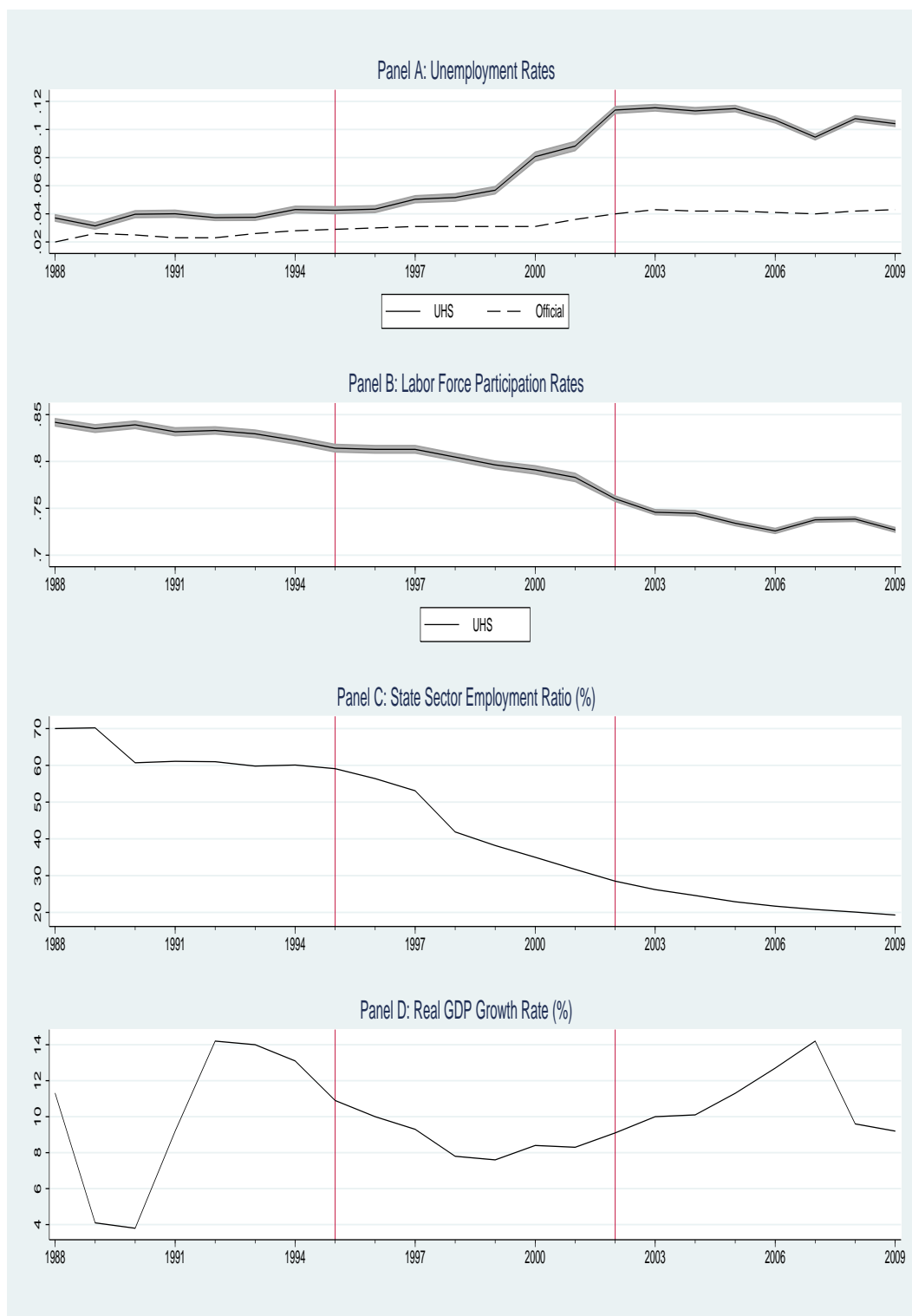
Source: China-official: National Bureau of Statistics of China. Other series: <http://data.worldbank.org/indicator/SL.UEM.TOTL.ZS> (accessed 5/21/15).

Figure 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 Figure 1.

Figure 3: National Unemployment Rates and Labor Force Participation Rates: 1988-2009.

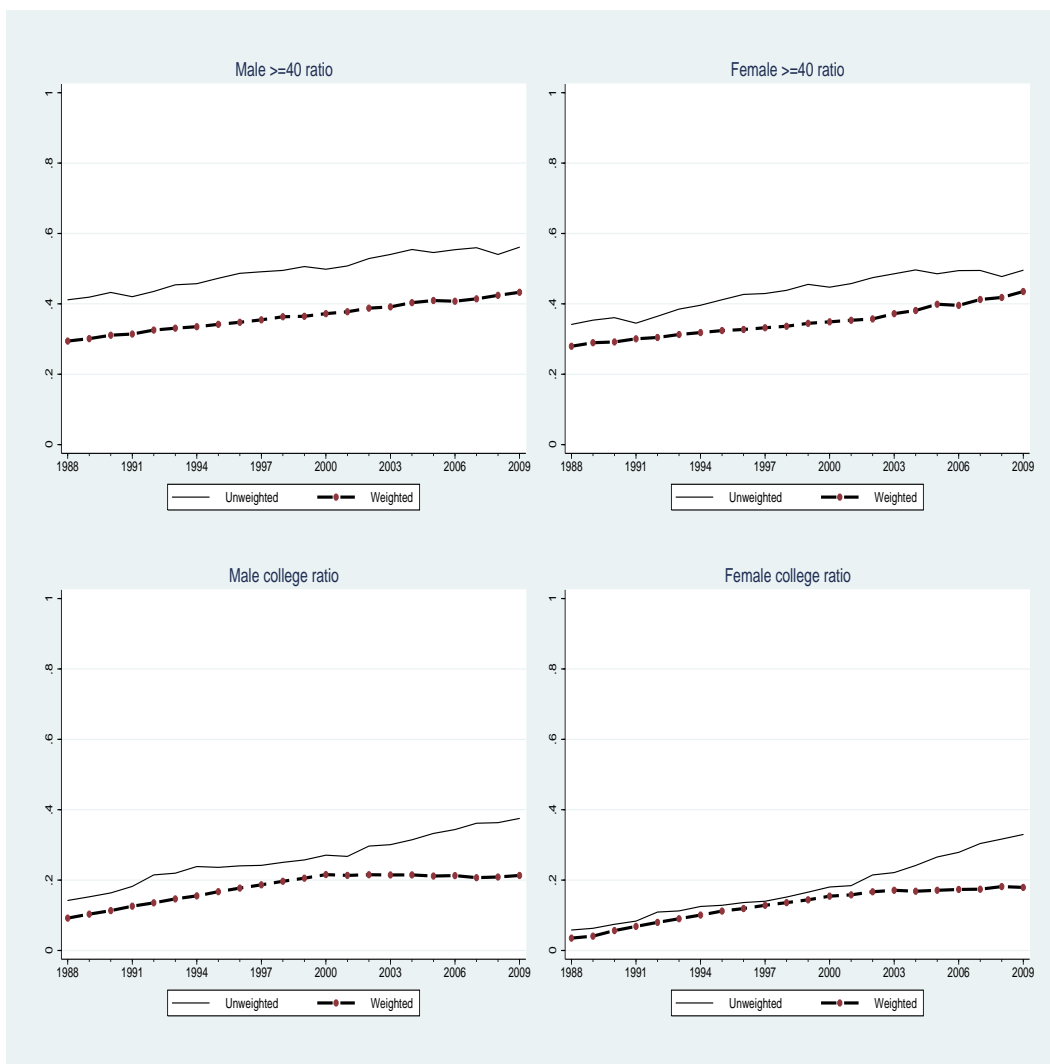


Note: Sample restricted to people with local urban *hukou* and aged 16-60 for males and 16-55 for females. In Panels A and B, the shaded areas represent 95% confidence bands based on 500 bootstrapped samples.  
 Source: Panels A & B, author's calculations based on UHS. Panels C & D: National Bureau of Statistics.

Table 1: Unemployment rates and Labor Force Participation rates by subperiod (%)

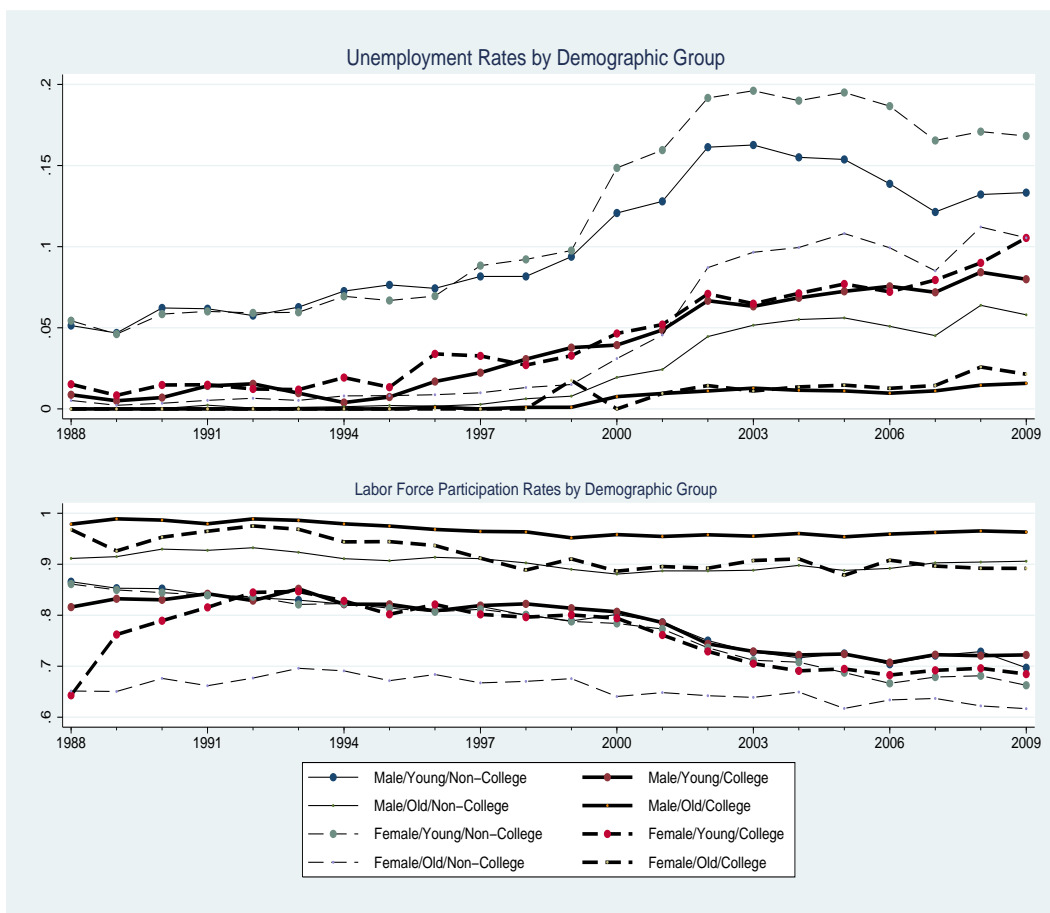
	subperiod 1 (1988-1995)		subperiod 2 (1995-2002)		subperiod 3 (2002-2009)	
	Average	Annual Chg.	Average	Annual Chg.	Average	Annual Chg.
Panel A: Unemployment Rate						
Nation	3.9	0.1	6.6	1.0	10.9	-0.1
-by demographics						
Male/Young/Non-col	6.1	0.4	10.2	1.2	14.5	-0.4
Male/Young/Col	0.9	-0.0	3.4	0.8	7.3	0.2
Male/Old/Non-col	0.1	0.0	1.3	0.6	5.3	0.2
Male/Old/Col	0.0	0.0	0.4	0.2	1.2	0.0
Female/Young/Non-col	5.9	0.2	11.4	1.8	18.3	-0.3
Female/Young/Col	1.4	0.0	3.8	0.8	7.9	0.5
Female/Old/Non-col	0.5	0.0	2.7	1.1	9.9	0.3
Female/Old/Col	0.0	0.0	0.5	0.2	1.7	0.0
-by region						
North	2.6	0.1	4.8	0.8	8.7	0.1
Northeast	3.6	0.2	7.9	1.2	12.5	-0.3
East	2.8	0.1	4.8	0.9	9.0	-0.1
South Central	4.6	0.0	7.7	1.3	12.3	-0.3
Southwest	5.6	0.1	8.3	1.1	13.4	-0.2
Northwest	6.9	-0.1	8.0	0.7	10.9	0.1
Panel B: Labor Force Participation Rate						
Nation	83.1	-0.4	79.7	-0.8	73.9	-0.5
-by demographics						
Male/Young/Non-col	83.9	-0.7	79.6	-1.0	72.1	-0.8
Male/Young/Col	83.1	0.1	80.3	-1.1	72.4	-0.3
Male/Old/Non-col	92.0	-0.1	89.7	-0.3	89.6	0.3
Male/Old/Col	98.1	0.0	96.2	-0.2	96.0	0.1
Female/Young/Non-col	83.6	-0.7	78.9	-1.1	69.2	-1.1
Female/Young/Col	79.1	2.2	78.8	-1.0	69.7	-0.6
Female/Old/Non-col	67.2	0.3	66.3	-0.4	63.2	-0.4
Female/Old/Col	95.7	-0.4	90.8	-0.7	89.7	0.0
-by region						
North	82.2	-0.4	78.1	-0.9	71.5	-0.5
Northeast	81.6	-0.2	79.1	-0.8	73.9	-0.7
East	85.1	-0.5	80.8	-0.7	76.3	-0.3
South Central	82.8	-0.5	80.3	-0.7	74.1	-0.6
Southwest	83.4	-0.5	79.9	-0.7	73.6	-0.3
Northwest	80.5	-0.3	77.3	-1.3	69.8	-0.4

Figure A1: Weighted and unweighted distributions on education and age



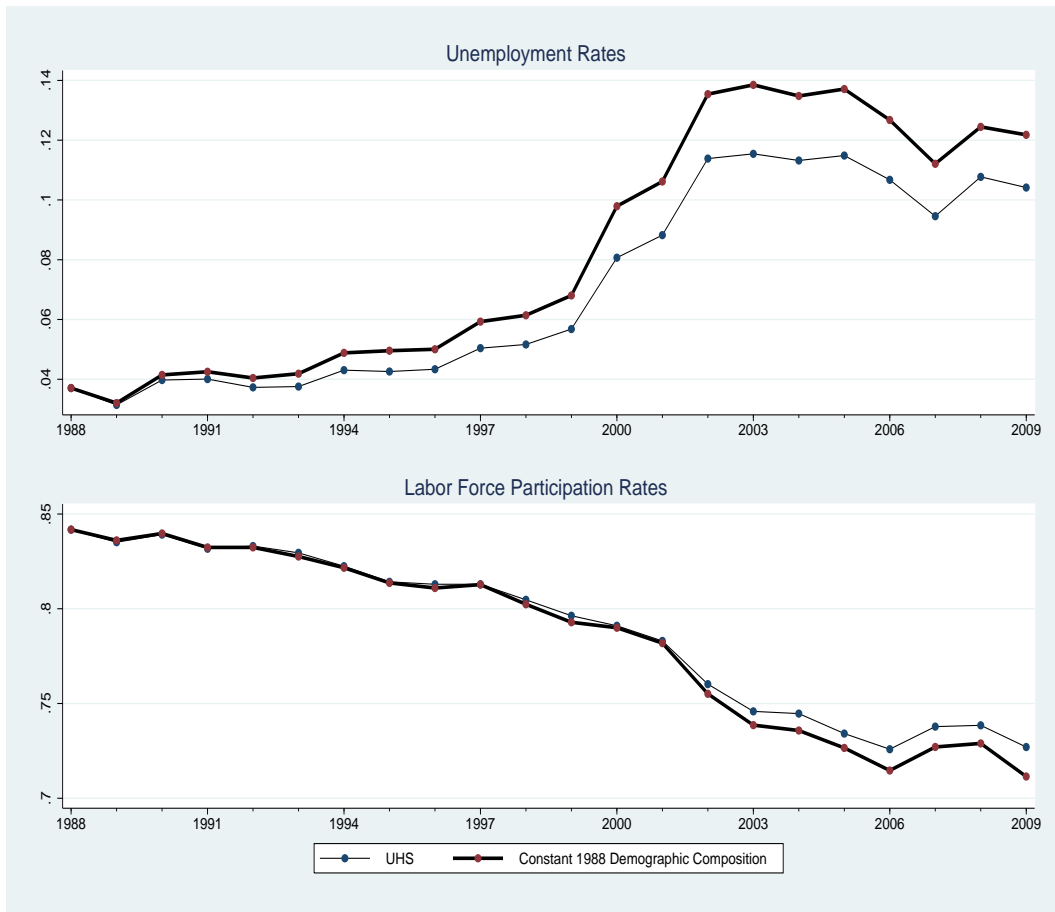
Note: Authors' calculations based on UHS.

Figure A2: Unemployment and Labor Force Participation by Demographic Group.



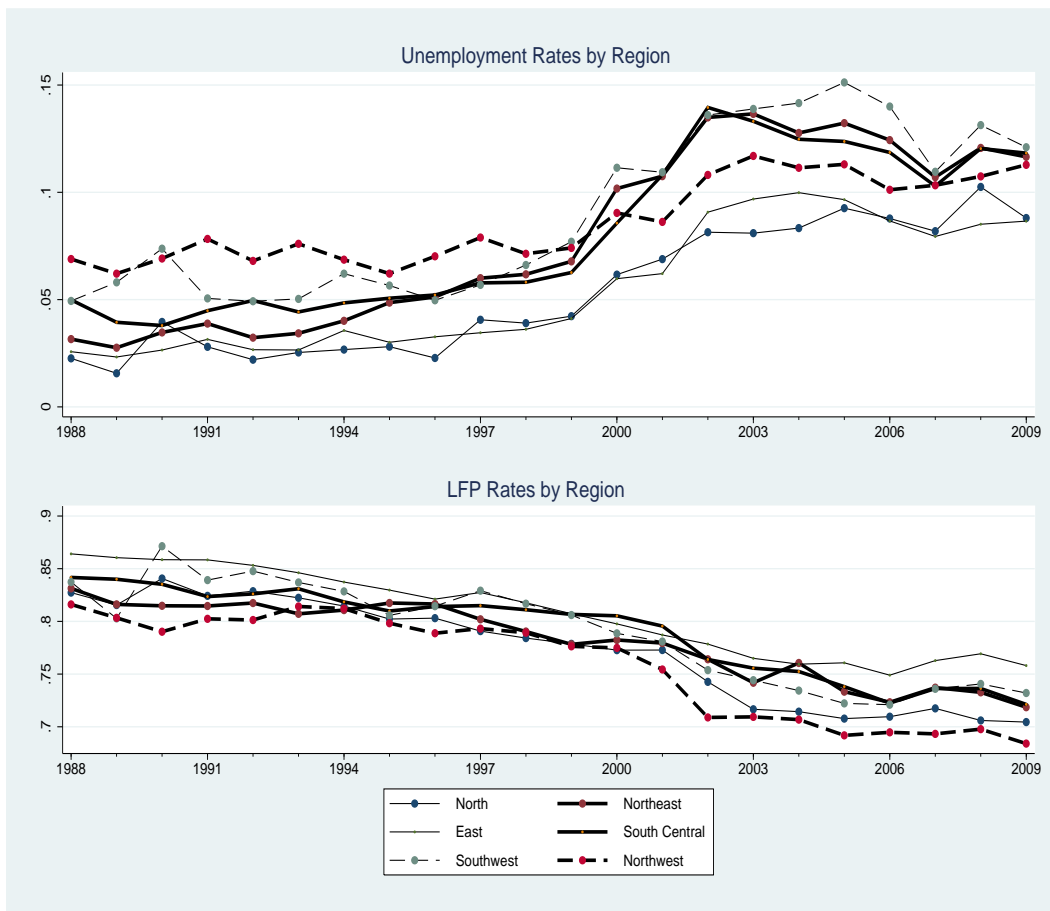
Note: Sample restricted to people with local urban *hukou* and aged 16-60 for males and 16-55 for females.

Figure 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.

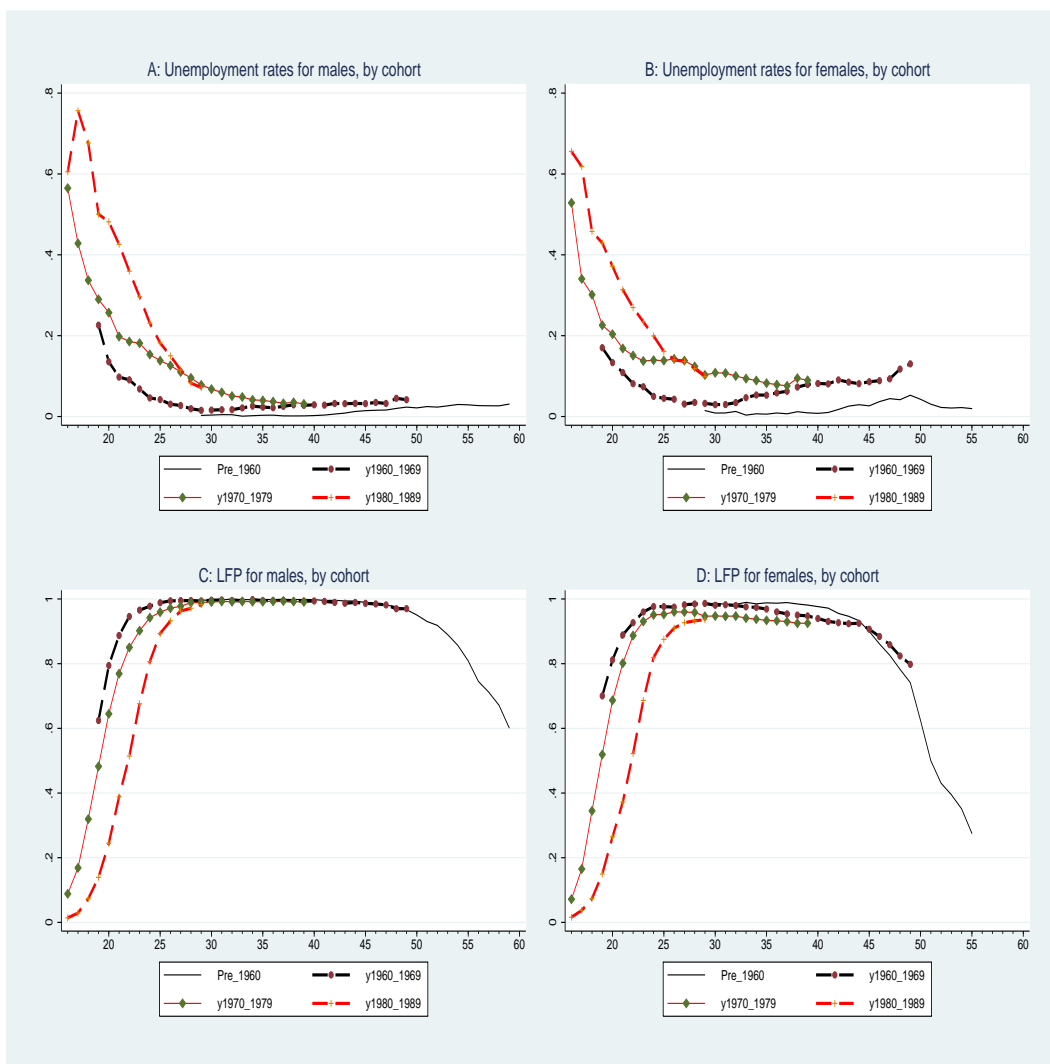
Figure A4: Unemployment and Labor Force Participation by Region.



Note: Sample restricted to people with local urban *hukou* and aged 16-60 for males and 16-55 for females.

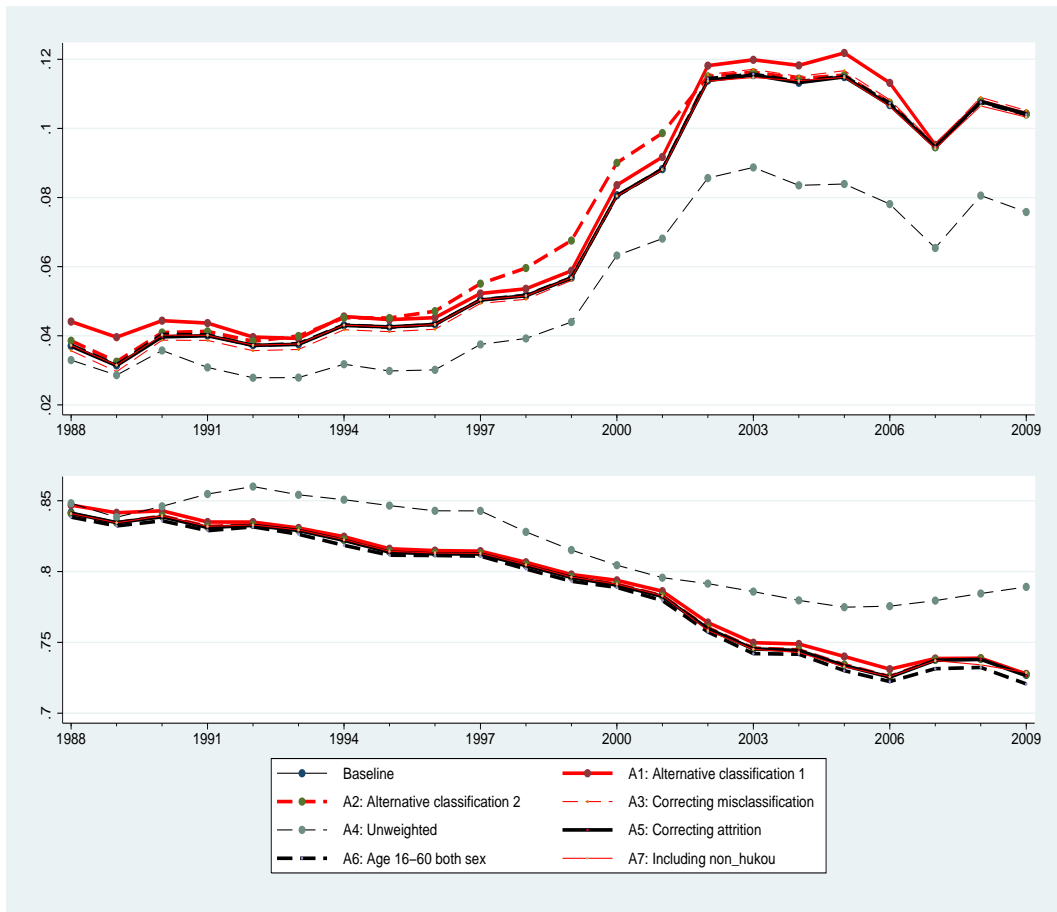


Figure A5: Unemployment and Labor Force Participation by Cohort.



Note: Sample restricted to people with local urban *hukou* and aged 16-60 for males and 16-55 for females.

Figure A6: Robustness Check Results.



Source: Authors' calculation from UHS.

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	10268	609	5291	352	33185
1989	8092	1172	5422	1260	9458	605	5129	377	31515
1990	8094	1255	5684	1441	9581	743	5370	459	32627
1991	7905	1495	5365	1450	9459	917	5064	403	32058
1992	8852	2131	6423	2048	10668	1364	6207	705	38398
1993	8313	2067	6524	2111	10008	1368	6414	712	37517
1994	7824	2358	6463	2117	9524	1532	6493	758	37069
1995	7549	2302	6721	2113	9137	1546	6691	787	36846
1996	7319	2365	7012	2173	8790	1641	6932	838	37070
1997	7060	2441	7099	2076	8617	1764	7028	781	36866
1998	6940	2574	7183	2147	8349	1956	7218	830	37197
1999	6751	2552	7239	2295	7885	2124	7449	923	37218
2000	6350	2852	7026	2121	7599	2368	7184	887	36387
2001	6285	2798	7230	2136	7392	2414	7357	917	36529
2002	14536	7530	18447	6395	16912	6930	18762	2825	92337
2003	15764	8125	20633	7539	18168	7678	20985	3459	102351
2004	15333	8553	21463	8346	17534	8426	21607	4049	105311
2005	16175	9924	22177	9199	18226	9867	21875	4639	112082
2006	15977	10209	22565	9970	17740	10331	22308	5160	114260
2007	15786	11508	23775	10901	17623	12021	23236	5829	120679
2008	17077	13588	25412	10656	18558	14032	24076	5719	129118
2009	15570	13058	25179	11423	16906	13664	23713	6317	125830

Source: Authors' calculation from UHS.

Table A2: Unemployment and SOE mass layoff

	Unemployment Rate		SOE Layoff	
	Average (1995-2002)	Annual Chg. (1995-2002)	Total number of laidoff workers (mn)	% of total State employment in 1995
North	4.8	0.8	3.965	22
Northeast	7.9	1.2	7.327	42
East	4.8	0.9	5.312	19
South Central	7.7	1.3	7.102	27
Southwest	8.3	1.1	2.856	23
Northwest	8.0	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.

Table A3: Alternative Estimates of Unemployment rates and Labor Force Participation rates (%)

	subperiod 1 (1988-1995)		subperiod 2 (1995-2002)		subperiod 3 (2002-2009)	
	Average	Annual Chg.	Average	Annual Chg.	Average	Annual Chg.
Panel A: Unemployment Rate						
Baseline	3.9	0.1	6.6	1.0	10.9	-0.1
A1	4.3	0.0	6.9	1.0	11.2	-0.2
A2	4.0	0.1	7.2	1.0	10.9	-0.2
A3	3.7	0.1	6.5	1.1	11.0	-0.1
A4	3.1	-0.0	5.0	0.8	8.0	-0.1
A5	3.9	0.1	6.6	1.0	10.9	-0.1
A6	3.9	0.1	6.6	1.0	10.9	-0.1
A7	3.9	0.1	6.6	1.0	10.8	-0.1
Panel B: Labor Force Participation Rate						
Baseline	83.1	-0.4	79.7	-0.8	73.9	-0.5
A1	83.4	-0.4	79.9	-0.7	74.2	-0.5
A2	83.1	-0.4	79.7	-0.8	73.9	-0.5
A3	83.1	-0.4	79.7	-0.8	74.0	-0.5
A4	85.0	-0.0	82.1	-0.8	78.3	-0.0
A5	83.0	-0.4	79.6	-0.8	73.9	-0.5
A6	82.8	-0.4	79.4	-0.8	73.5	-0.5
A7	83.1	-0.4	79.7	-0.8	73.8	-0.4

Note: A1: "Other nonemployed" classified as unemployed. A2: SOE workers older than 35 with no wage income classified as unemployed. A3: Corrected results using the approach by Feng and Hu (2013). A4: Unweighted results. A5: Results with attrition corrected. A6: Results using sample including all people aged 16-60. A7: Results using sample including all non-local-urban-*hukou* people.

Table A4: Misclassification Probabilities (%)

Group	$P_{21}$	$P_{31}$	$P_{12}$	$P_{32}$	$P_{13}$	$P_{23}$
Male/Young/Non-col	0.61	0.16	1.19	0.29	0.15	0.00
Male/Young/Col	0.06	0.02	8.03	2.69	0.00	0.00
Male/Old/Non-col	0.16	0.12	3.46	1.51	1.21	0.39
Male/Old/Col	0.08	0.06	7.44	0.00	0.99	0.79
Female/Young/Non-col	0.80	0.19	2.08	1.35	0.26	0.00
Female/Young/Col	0.37	0.04	5.95	0.00	0.00	0.00
Female/Old/Non-col	0.21	0.26	2.53	2.66	0.67	0.00
Female/Old/Col	0.06	0.05	4.42	0.00	2.48	0.04

Note:  $P_{ij}$  stands for  $P(u = i | u^* = j)$ .