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Forecasting Labor Supply in Urban China: Integrating Demographic Dynamics and Socioeconomic Transition

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Contents

Abstract

China's urban labor market has been under growing pressure to meet the large job demands that are resulting from the Economic System Reform. For more than three decades during the Centrally Planned System, Chinese urban citizens have been guaranteed jobs by the government. Now, the crisis in the labor market might be a source of social unrest. Balancing the urban labor supply and demand has been considered not only an economic issue but also a political challenge. Therefore, a high quality forecast that aims at telling the labor supply dynamic is much needed. By integrating demographic and socioeconomic factors into one forecast model, this research examines the labor force development in urban China to the year 2020. The research shows that in the following 20 years, China's urban labor supply tends to grow at a rate of 2% per year. The development of the labor force tends to be most sensitive to the movement of three factors, namely, urbanization, expansion in higher education and the establishment of a National Social Security System. Fertility and mortality would only make a small impact on the future urban labor market. Urbanization is likely to be the major factor responsible for increasing the number in the urban labor force. The growth in higher education, which can delay the time that young people enter the labor market, could function as a buffer to reduce the tension in the labor market and, at the same time, improve labor quality. The forecast also shows that the income reform and the forthcoming National Social Security System appear to be crucial to the female labor supply dynamic. They make it possible to change the family labor division and thus alter female labor force participation from the plateau pattern to the M-pattern.

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Forecasting Labor Supply in Urban China: Integrating Demographic Dynamics and Socioeconomic Transition

Ya XU

China is the most populous country in the world and consequently has the largest stock of labor force. This situation will be true at least until the first half of the next century. As a result of the Economic System Reform, China's urban labor market has been under growing pressure. One of the causes of the pressure comes from the huge inflow of rural surplus labor into cities following the relaxation of restrictions on rural-to-urban migration in 1984. Another cause is from the massive lay-offs from the State-owned enterprises. Studies have shown limited job supply versus growing demand (see, among others, Mo 1999; Yang 1997). According to the Chinese Academy of Social Sciences, in 1999 China would have to create 23.8 million jobs in the cities to meet the demands of all the urban job seekers. However, estimates indicate that it may only be able to create as few as 5.5 million urban jobs (cited from Lawrence 1999), suggesting that more than four people will compete for one position. Some may doubt the accuracy of these estimations; it is hard, however, to deny the reality that China has to enter the twenty-first century with an over-crowded urban labor market.

Given the fact that for more than three decades during the Centrally Planned System, people in urban areas have been accustomed to having jobs guaranteed by the government, the crisis in the labor market might possibly cause social unrest. Therefore, the Chinese authorities view urban employment not only as an economic issue, but also as a political challenge.

Against this background, since 1990s, employment has gained an increasingly important position in China's policy making. For example, the target of economic growth rate for 1998 was based mainly on the consideration of assimilation of unemployment (Yang 1997:9-25).

As a precondition to balance labor supply and labor demand in the future, a set of reliable information both in economic development and in labor force is indispensable, in which a high quality labor forecast is the cornerstone. However, although the forecast on population has long been successful in China, a satisfied prediction on labor supply has hardly been seen. The problem lies in the fact that the labor supply involves not only demographic variables, but also socioeconomic variables, and the integration of both variables into one forecast model has been thought difficult.

As a pitiful result, some forecasts with the purpose of estimating labor supply could tell no more than the volume of the working age population (see Yang 1997:314), which is merely the *potential* labor force. For this reason, although there have been many population forecasts for China made either inside the country or abroad, and they all

show the great similarities in telling the number of the total population as well as the number of the working age population in future years, the question of how many people will be active in the labor market is still a number for speculation. The significant development in population modeling in recent years allows us to add other dimensions to the standard age and sex structure of population projection (see, among others, Goujon and Wils 1996; Lutz *et al*. 1999; Lutz and Scherbov 1989; Yousif *et al*. 1996; UN 1998; Zeng *et al*. 1999). That makes it possible for a population forecast to go down to the labor force stratum. The challenge left is how to make reliable scenarios. In comparison to demographic events, socioeconomic activities are more difficult to foresee because of their complicated causal structure and varied transition modes. This means that the success of a labor forecast depends not only on the sophistication of model technology but also on the discernment of the social, demographic as well as natural systems within which the labor force develops.

Furthermore, from the point of problem solving, China needs more than a labor forecast that tells how much labor force will be in the future labor market. The causal structure of labor dynamic, by which people are able to perceive how the labor supply will change if some socioeconomic policy is adjusted, is equally desired. For instance, at moment, China is undertaking a reform on the higher education system as well as establishing a National Social Security System in urban areas. Will these events influence the future labor market and, if so, how significantly?

By employing the multi-state PDE (population-development-environment) population projection model, which was developed by the IIASA Population Project (see Lutz 1994), this research attempts to integrate all the major influential factors into one projection model and provide a labor forecast for urban China to 2020. Besides the main forecasts grounded on the reality-based assumptions, we also make dummy forecasts according to dummy scenarios. By comparing these two kinds of forecasts, we hope to understand the causal structure of the labor dynamic.

The results show that in the 20 years to come, China's urban labor supply is expected to grow at the rate of about 2% per year, reaching some 330 million in 2020 compared to 202 million in 1995. The development of the labor force tends to be most sensitive to the movement of three factors, namely, urbanization, expansion in higher education and the establishment of a National Social Security System. Fertility and mortality would only have a small impact on the future urban labor market. Urbanization is likely to be the major factor responsible for increasing the number in the urban labor force. The expansion in higher education, which can delay the time that young people enter the labor market, could function as a buffer to reduce the tension in the labor market and, at the same time, improve labor quality. The forecast also shows that the income reform and the forthcoming National Social Security System appear to be crucial to the female labor supply dynamic. They make it possible to change the family labor division and thus alter female labor force participation from the plateau pattern to the M-pattern.

This paper is organized into four sections. In the first section we clarify the components of influential factors that lay behind the change of labor supply. Based on that, an analytical framework is established. In the second section, the feasible movements for each of the influential factors in urban China in the concerned period are discussed, and consequently the scenarios for both main forecasts and dummy forecasts are set out. Next, we will introduce the methodology applied and the model employed as

well as the data used. Finally, we present our prediction results and conclude with discussion.

Influential Factors and Analytical Framework

Population, Working Age Population, and Labor Force

If we assume a zero migration, a region's working age population is the trunk of the total population who is in the age span eligible to be in the labor market. In urban China, the working age population is set as follows: the age to enter the labor market is 15 for both men and women, whereas the retirement age is sex- and occupation-dependant. Most of the men retire at age 60 and women at age 55. For physical labor, women retire earlier, at age 50. But for senior professional staff, women retire at 60, the same age as men (Zhang and Liu 1996:77-78).

Not all working age population is considered as labor force. Only those who are *economically active*, i.e., either employed or actively seeking employment, are identified as labor force (Figure 1). Those who are not intending to, or not able to, offer their labor for wage or profit are *economically inactive* and are assumed to have no direct impact on the job market. The causes for their economic inactivity are various. Being engaged in education, occupied by family duty, dissatisfied with the salary or poor health can all keep them outside the competition in the labor market.

In an environment that is open to migration, the labor supply is also influenced by the size, structure as well as economic activity of the migrant population.

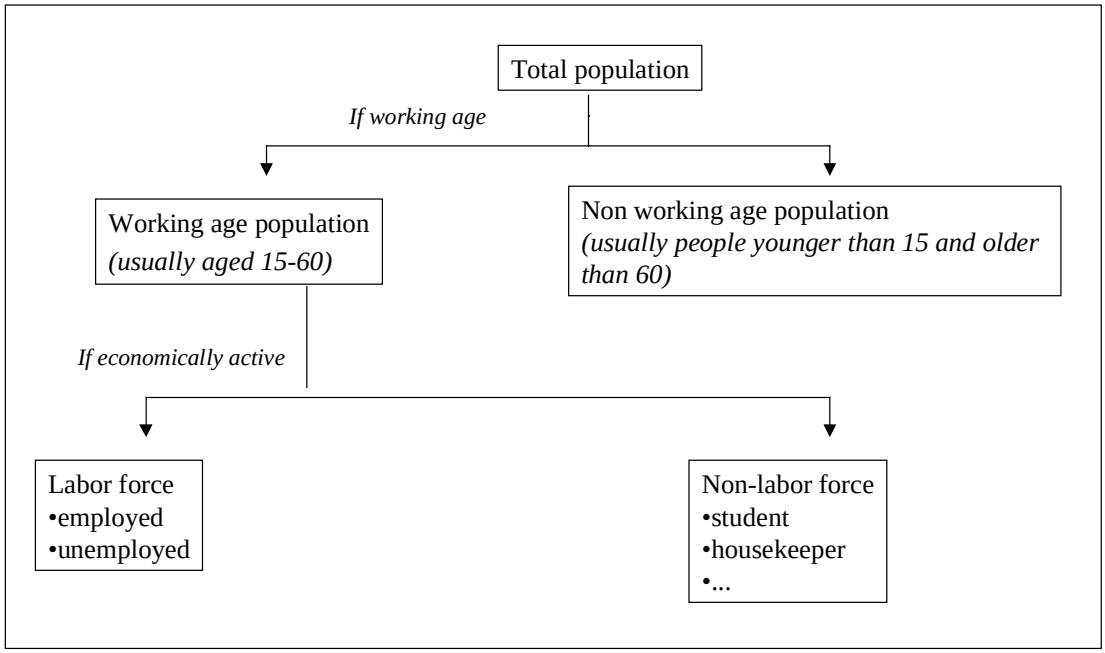

Figure 1. Concept of the labor force.

Demographic and Socioeconomic Factors

The dynamic of the labor force is a covariate of demographic behavior and socioeconomic behavior. As demographic behavior, its size, age- and sex- composition is shaped by demographic factors, whereas as socioeconomic behavior, it varies and fluctuates according to socioeconomic factors, which determine who is economically active or inactive in the labor market.

To predict the labor supply, we inescapably need to consider both factors. In order to get labor force, we must put the population through two sieves. The first is a demographic sieve made by the wire of fertility, mortality and migration, through which the working age population is sifted out. Then the working age population has to be put through the second sieve, the socioeconomic sieve, through which the labor force is identified (Figure 2). When comparing the composition of demographic factors, which are composed of fertility, mortality, and (sometimes) migration, the family of socioeconomic factors seems to consist of too many members, which may make the archetype too complicated. Moreover, the dynamics of demographic events, due to the nature of population inertia, are comparatively foreseeable[1] and thus easier to be modeled, while the effect of some socioeconomic factors on labor force participation seem to be unpredictable. The change in wage rates, the new regulation on working hours, can and sometimes is used purposely to change the labor supply in a short time. We think that these different attributes between demographic factors and socioeconomic factors are part of the main reasons why so few socioeconomic factors are introduced into population projection models. Nonetheless, after careful examination and with sufficient understanding of the socioeconomic context in which the population lives, we can grasp and model the key factors that determine the trend of labor mobility.

Two events are among the most powerful factors determining the economic activity of the working age population. The first is education, which determines the economic activity of young people. The second is the engagement in housework, which forms the strongest motivation for people in the middle age as well as in old age to withdraw from the labor market.

With the examinations above, we identify three demographic variables (fertility, mortality and net migration) and two socioeconomic variables (years spent in education and years engaged in housework) as the basic influential factors for our labor force forecast. Fertility, mortality and migration influence labor supply by shaping the working age population, while education and engaging in housework impact labor supply by directly controlling people's motivation to be active in the labor market. In the next section we will discuss the present situation as well as possible development for each of these influential factors in urban China.

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[1] As Lutz and Prinz (1994) put it, the effects of changes in fertility, mortality, and migration on population characteristics are not always immediate, but they follow the laws of population dynamic. That is why even a severe famine or certain epidemics do not directly diminish total population size but work through age- and sex-specific death rates that are applied to the given population structure. For the same reason, the population growth rate will not go down immediately when a rapid decline in fertility is applied to a very young structure of the population. It may take many years until it results in significantly declining growth rates (pp. 221-222).

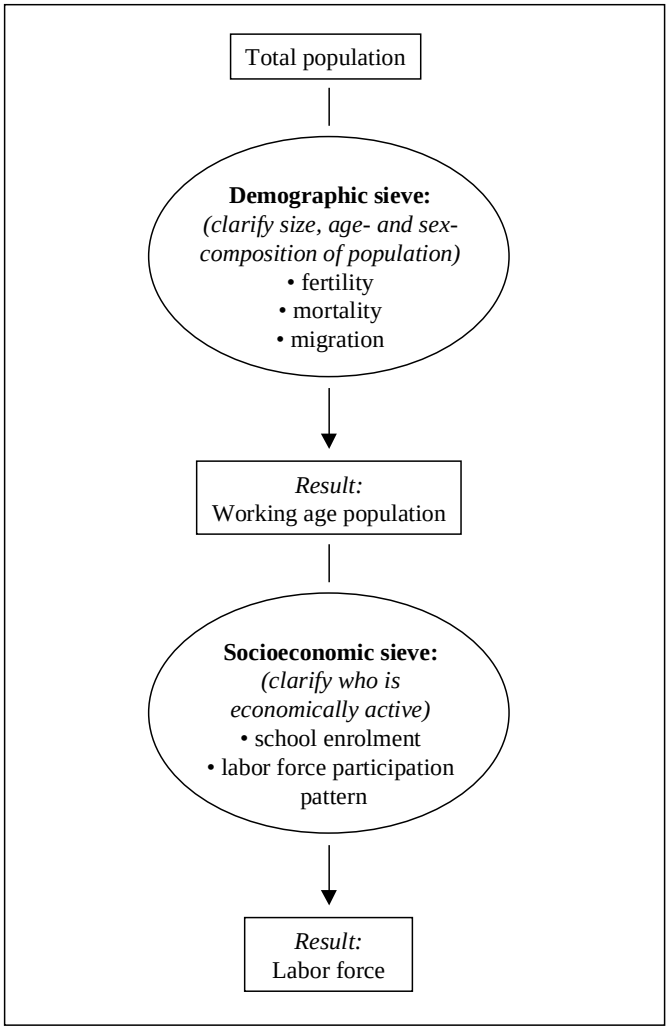


Figure 2. Population forms its labor force through two sieves.

Assumption Setting and Scenario Design

Influential Factors and their Prospective Changes: Assumption Setting

Fertility

Starting in the late 1970s, China's government has set up a well-structured administration system to reduce the fertility rate. Under the "one-child" policy that has been effectively implemented in the cities, the urban Total Fertility Rate (TFR) has been below replacement level for two decades, even though the desired number of children per couple has been stable around 2. In 1995, TFR for urban (city and town) areas was 1.19 (calculated from Office of National Population Sample Survey 1997).

As the new century approaches, discussions about future fertility policies have appeared mostly within the academic circles (see Liang *et al*. 1998). In consideration of the fast aging of the population, many scholars have suggested a slight rise in the

fertility level for China. Yang Shu-Zhang, a scholar from the Centre of China's Population Information and Research, proposes a policy of "gradually reducing the control of fertility, and then keeping on a moderate level" for the next century (Yang 1998:31-32). Zeng Yi (1998) favors an urban TFR of 1.7 to balance the needs of supporting an aging population and a mild population growth rate.

Despite these discussions, however, according to Zhang Wei-qing, Minister of the Family Planning Commission of China, China's family planning programs will be maintained for the foreseeable future (*China Daily*, March 15, 1999). Premier Zhu Rong-ji expressed the same idea in his letter written for the "World 6 Billion Population Day" (Zhu Rong-ji 1999). This decision is based on the fact that, in spite of a low fertility rate, the large population still brings 21 million births every year and an annual net increase of 13 million (State Family Planning Commission 1999a). It is projected that in dozens of years to come, an extra 300 million people will be added to China's heavy population load before its population becomes stable (*China Daily*, March 15, 1999). The situation of low fertility but high growth, coupled with the pressure from shortages of water, arable land, job opportunities, etc., makes the government hesitant to relax its fertility control.

Given the effectiveness of government administration, we assume that the change of fertility over the next twenty years will be mainly within the boundary drawn by the policy. However, it would be a mistake to think that following the fertility policy means "one child per couple" forever. The one-child policy has been designed for *one generation* only (*China Daily*, June 16, 1999). That means that if two people who were single children get married, they would be allowed to have two children.[2] Given that most of the children born after the one-child policy in the cities are single children, and that they shall enter parenthood in the first two decades of the next century, the urban TFR will inevitably increase because of this policy.

Therefore, along with the marriage among single children and the start of their parenthood, we assume that the urban TFR will gradually *increase* from the level of 1.19 in 1995. If all couples have two children by the year 2020, TFR will be 2. Yet considering that some couples may not be single children and some may voluntarily have only one child, the TFR may be around 1.5 in 2020. Therefore, we give three assumptions on future TFR:

Assumptions	TFR in 2020
Conservative	*1.5*
Moderate	*1.75*
Radical	*2.0*

Mortality

The mortality rate in China declined quickly after the establishment of the People's Republic of China in 1949. In 1980, the life expectancy at birth in China reached 66.4 for men and 69.4 for women. After that, however, the speed of increase in life

[2] "Two children for a couple made up of two single children" has been the policy since the beginning of the Family Planning Program in China. It was reconfirmed at the beginning of 2000 (see *China News Digest*, February 4, 2000).

expectancy has slowed down. In 1995 the life expectancy in China was 68 and 71 for men and women, respectively (Office of National Population Sample Survey 1997). In 1998 the figures only increased to 68.2 for men and 71.7 for women (UNFPA 1998).[3] Based on the past pattern of development, we assume a *limited progress* in life expectancy from the above mentioned levels and the assumptions set for the year 2020 are as below:

Assumptions	Life expectancy at birth, 2020	
	Men	Women
Conservative	*69*	*72*
Moderate	*70*	*73*
Radical	*71*	*74*

Migration

China has been a dual society with an overt socioeconomic line drawn between urban and rural people. Urban residents and farmers hold different *Hu-kou* or, booklet of resident registration, and urban *Hu-kou* links to privileges in employment, receiving government subsidies, and so on. Therefore, the direction of migration in China is mainly from rural to urban. The reverse is very rare. Before the Economic System Reform, change of rural *Hu-kou* into urban was extremely difficult. Without urban *Hu-kou*, a farmer was principally not allowed to work or stay long in the city. With such a strict control, migration from rural to urban was very limited. Consequently, till now, China's urban population only accounts for 30% of the total, which has accumulated large numbers of surplus labor force in the countryside. Official prediction indicates that the country's surplus labor force currently stands at more than 100 million people, and will surpass 200 million in 2000 (*China Daily*, June 16, 1998).

After the Economic System Reform, particularly after 1984, China started an ever-faster process of urbanization, which has taken two paths. The first is "guided urbanization," which recruits rural labor force in urban jobs and expands and rebuilds rural towns into small cities according to the government plan. Rural people who have followed this path into the cities are supposed to change their rural *Hu-Kou* into the urban one, and have been classified as urban dwellers in the official statistics. According to the statistics, from 1980 to the end of 1997, the number of cities has grown from 223 to 668, the number of towns from 2,874 to 17,900 and the urban population has grown from 191 million to 379 million (State Family Planning Commission 1999b; *China Daily*, March 15, 1999). Yet more farmers have entered the cities by another way, "spontaneous urbanization," if we may call it. Following the new policy by which farmers are allowed to look for jobs and work in the cities, millions of rural people have poured themselves into the urban areas, seeking chances to earn money. They still hold their rural *Hu-kou*, and their number is rather uncertain, fluctuating according to the urban labor market, farm-work intensity, and many other social, personal factors. For example, when there are opportunities in the urban job market, they come. And when the job is done, they leave. When there is not much work

[3] Yang Kuifu (in *China Daily*, March 15, 1999) estimated that China's life expectancy in 1998 was 68.8 for men and 73.2 for women. Here we take the UNFPA estimate.

in the crop fields, they go to the cities, and when the field demands intensive labor, they go back again. They become the main body of a city's "floating population." According to incomplete statistics, there is a floating population of 80 million, with 60% to 70% of them from the countryside (State Family Planning Commission 1999b; *China Daily*, March 15, 1999).

The new immigrants assure labor supply for the jobs that urban people usually do not want to take, and have contributed to a significant part in urban development. On the other side, however, the huge inflow of "floating population" causes tensions such as crowded public transportation, shortage of energy supply and housing, etc.

Despite the problems, economists claim a theorem that a 1% rise in the urban population will pull the gross domestic product up by 1.5% (*China Daily*, January 20, 1999). In view of a positive relationship between urbanization and domestic consumption growth, the government sees urbanization as the best way to expand the domestic market and to solve rural surplus labor force, and thus has decided to give urbanization a high priority in its 10th Five-Year Plan (2001-2005).

Since speeding up the urbanization is the preference of both farmers and the government, we can safely assume an increase in the numbers of net urban immigrants. When we set the numbers of net migration for urban areas in the future, we shall only consider the immigrants by the first way, i.e., by the way of "guided urbanization."

During the 9th Five-Year Plan period (1996-2000), 45.9 million rural people have turned into city residents (*China Daily*, June 16, 1998). The government plans to speed up the process by raising the growth rate of rural migration by one percent each year over the next 15 years (*China News Digest*, October 20, 1999; Yong zi 1998). Such an expansion will allow 85 million of the rural population to shift from rural to urban within the next five years (Zhao 1999), while academics predict an even faster process. According to Tian, a demographer from the Chinese Academy of Social Sciences, China's urban population will increase by 4% annually between 2001 and 2010, and by 3% between 2011 and 2025 (*China Daily*, June 20, 1998). Against this background, we set out three assumptions on urban net migration:

Year	Assumptions on net urban immigration (million people)		
	Conservative	Moderate	Radical
1996-2000	45.90*	45.90*	45.90*
2001-2005	47.29	49.51	51.72
2006-2010	49.70	56.31	62.92
2011-2015	52.24	63.28	74.32
2016-2020	54.90	70.53	86.15

* Figure cited from the report "Rapid Growth Poses Hurdles" in *China Daily* (June 1, 1998), along with the marriage among the single children and the start of their parenthood.

Higher education

Education is highly respected in the Chinese tradition. In Confucianism, a sound educational record is a prerequisite to becoming a qualified official (*Xue Er You Ze Shi)*. However, during the "Cultural Revolution" (1966-1976), education was badly damaged. Teachers, particularly the university teachers, were at the bottom of the social scale on the basis of the maxim: "the more knowledge you have, the more counter-revolutionary you are." No parents at that time wished their children to be "Intellectuals." Workers in state-owned factories and soldiers of the People's Liberation Army were the best future for young people. Higher education almost ground to a halt.

An active healing process on education started after 1978, the year when the Economic System Reform began. At present, the education profile is a 6+3+3+4 model. After six years of primary education, there is secondary education, which provides a three-year junior secondary education and a three-year senior secondary education, in comprehensive middle schools. Colleges and universities offer higher and postgraduate education. It usually takes at least four years to get a bachelor's degree. Besides formal education, there is also a system offering vocational education, adult education, television, and correspondence courses. The education law stipulates a nine-year compulsory education: six years in primary school and three years in junior secondary education. Almost all the educational institutions are funded and run by the state. From 1982 to 1997, the average length of education of Chinese people increased from 4.2 years to 5.8 years (Tian Xue-yuan in *People's Daily,* September 11, 1999). By now, primary and junior secondary education has been popularized in urban areas. But the healing of higher education is far from complete. In 1995, only 5% of urban youth aged 20-24 received higher education, i.e., education offered in college and universities or equivalent institutions (Office of National Population Sample Survey 1997).

Nonetheless, we can expect an acceleration in the development of higher education in China judging from its huge demand and good financial prospects. First of all, expanding higher education is the request of parents and students. The tradition has returned along with the end of the "Cultural Revolution." Nowadays a diploma not only means prestigious social status but also brings bigger chances in the labor market. According to All China Women's Federation and National Statistical Bureau (1993), about 49% of urban mothers and 30% of rural mothers expect their children to receive higher education, which means obtaining a diploma from a college or university. The survey conducted by MasterCard revealed that 71% of families in Beijing, Shanghai, and Guang zhou save for their children's education (*China Youth Daily,* October 15, 1999).

Yet higher education is not only a family or a young person's concern. It is of interest to the whole nation. Not only does economic development need a high quality in the labor force; university is also seen as one of the powerful engines driving domestic investment. According to an economist's estimate, total educational spending by China's urban residents reached 90 billion yuan (US$ 10.8 billion) in 1997, far exceeding the spending on housing (Hu 1999). A sample survey by the State Statistics Bureau and the China Economic Prediction Centre, showed that total domestic savings had exceeded 5,000 billion yuan (US$ 602.4 billion) so far, and 10% of these savings

would be used for educational purposes.[4] Hu (1999) calculates that, if half of the savings meant for education were invested in schooling, this investment would be 250 billion yuan (US$ 30 billion), equal to the country's total education budget. Therefore, economists are calling for an industrialization and marketization of higher education so as to not only meet the demand of parents and students, but also to enlarge educational consumption to help propel sustained economic growth.[5] In the eyes of Premier Zhu Rongji, accelerating development of education has yet another function and that is to help the country to ease the *employment* burden (Zhu Rongji, speech at the National Education Working Conference, June 1999, cited from *China Daily*, June 21, 1999).

Due to all these demands and importance, the central government has decided to raise the ratio of educational expenditure in the annual fiscal budget by 1 percentage point each year from 1998 to 2002. Provincial governments have been asked to increase their funding in accordance with their financial situations (*China Daily*, June 17, 1999). Nevertheless, this would not be the only way to fuel the growth in education. Marketing is believed to be another source. In the summer of 1999, Peking University got a loan from the Huaxia bank, opening a new era of non-governmental organization involvement in educational investment.

In fact, university admission has risen. In 1998, colleges and universities broke the record of 1 million enrolments. In 1999, China's higher education opened their doors to 1.5 million, a 42% increase in the number of new students in only one year (Man 1999).

Therefore, in spite of a comparatively low capacity of higher education in China at the moment, we have concrete reasons to predict a rapid increase in enrolments in colleges and universities in the future. In 1995, the probability for young *urban people* to remain students or to enter the labor market were:

	Observations*	
Age	Men	Women
Probability of entering higher level of education		
15-19	0.65	0.60
20-24	0.05	0.03
25-29	0.05	0.003
Probability of entering labor market		
15-19	0.35	0.40
20-24	0.95	0.95
35-29	0.97	0.997

* Calculation from Office of National Population Sample Survey (1997).

[4] Other sources give an even higher percentage of educational saving, for example, Tian Xue-yuan estimated that one-third of the household saving is for children's education (*China Daily*, September 11, 1999), and Yang Kuifu believes the percentage is about 44% (*China Daily*, June 21, 1999).

[5] But, in front of the calls for educational industrialisation and marketization, the State Education Committee (SEC) keeps a rational attitude. Insisting on the public nature of education, officials from SEC commented that it is unrealistic to treat higher education as a highly profitable industry in the long run (Man 1999).

With a slight gender gap[6] we assume the probabilities in the year 2020 for the same age groups:

Age	Assumptions for year 2020					
	Conservative		Moderate		Radical	
	men	*women*	*men*	*women*	*men*	*women*
Probability entering higher level education						
15-19	0.85	0.8	0.9	0.85	0.985	0.93
20-24	0.175	0.155	0.24	0.22	0.30	0.28
25-29	0.015	0.013	0.13	0.12	0.25	0.23
Probability entering labor market						
15-19	0.15	0.15	0.14	0.14	0.125	0.125
20-24	0.825	0.845	0.71	0.72	0.60	0.60
25-29	0.95	0.987	0.85	0.87	0.75	0.75

Engagement in housework

No other reasons can be stronger than family duty, particularly childcare, in pulling a female employee away from her job, which creates a worldwide gender difference in the patterns of age-specific employment rate. Except for the school years, men in almost every country show a consistently high labor force participation in all working ages. Labor force participation rates typically show an inverted "U"-shaped *plateau* pattern. Women's working career line, on the other hand, is characterized by the cut of "child-trough(s)" and thus forms a pattern of *peaks*. According to the time of childbearing and the number of children, the peaks can be further distinguished into *early peak*, *later peak* and *double peak* (or *M-pattern*). The *early peak* is a type where the female labor force mainly consists of single or young married women and where participation occurs dominantly before childbearing, dropping off steadily during and after it. The *later peak* is a type where women enter the labor force mainly after childbearing is completed, some perhaps forced into the work force by widowhood. The *M-pattern* is followed by labor force dropping during childbearing but then rising again after it (see Platenga 1995; Stichter and Parpart 1990).

Chinese urban women have kept a *male-styled* plateau pattern for four decades. Three main reasons have contributed to this. First, they go to work because the paid work can bring them a better status in society and in the family. After a long emancipation campaign and long labor force participation, many women in China have

[6] According to the survey conducted by the Institute of Population Studies of the Chinese Academy of Social Sciences (1994), 64% of urban people thought that boys should receive higher education, while the percentage for girls was 45%. Although the expectation for girls was some 19 percentage points lower than for boys, it was already unprecedentedly high in a tradition that does not consider intelligence an appreciated character for women. In spite of some male-centered legacy apparent in public opinion, we anticipate a narrowing down of the gender gap receiving higher education in the future. The "only child" situation gives parents no room to make gender differences in educational investment. Looking at the urban family, we find that parents of a single girl invest no less than those of single boys. Quite commonly, given the existence of gender discrimination in the job market and in other aspects of social life in China, single girls' parents tend to invest more in education for their daughters so as to make them more competitive in the society.

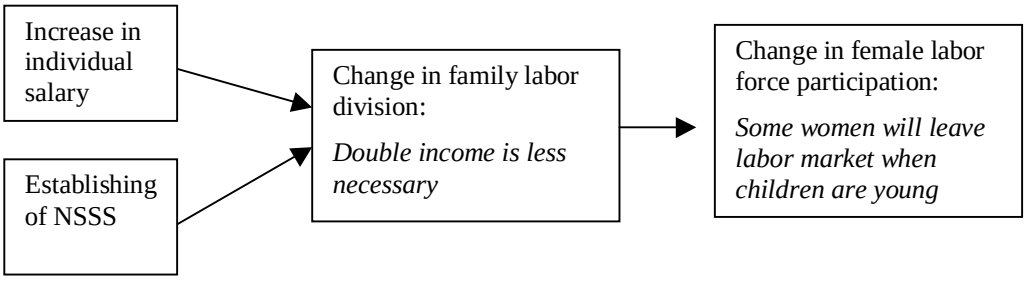
seen the engagement in paid work as part of their life. Second, women go to work because of the economic necessity. The salary system of the Centrally Planned Economy, which was low and equal among the employees, made the family income depend more on the number of people employed than on the quality of labor the household offered. Consequently, the family with one bread-earner found that their total income was just about half of their colleagues and neighbors, which was not only economically degrading, but also socially embarrassing. Thus the double-income was basic for a family to keep the urban standard of living. After the Economic System Reform, the income disparity has been enlarged. Some get higher salaries from their successful performance in the market, yet many more remain in state-owned enterprises and continue the legacy of the old salary system, or work in low-paid jobs in the market sector. As a result, many families still need double income to hold up their economic status and to deal with the allure of the growing consumption market. Third, women go to work to reduce uncertainty and to maximize family utility during the economic transition. As China continues on its way to a market system, the characteristics of jobs are converting from "low-paid yet with a life-long contract" to "paid according to the effort, with no long contract." During the period of transition, both types of jobs will co-exist until the transition process is completed. Given the fact that China lacks a national system that provides insurance for unemployment and for employees in both state and market sectors, from the family benefit point of view, each type has its short-comings and merits. The salary in the state sector is known to be low; the market salary is generally higher. But the state sector provides better benefits like health insurance, housing, pension, etc. For example, if one loses a job in the market, he/she would have nothing to rely on but savings. When a state-owned factory faces bankruptcy, arranging new jobs for the workers has always been at the top of the authority's agenda (see series of reports on laid-off state workers since 1997 in *People's Daily* and *China Daily*). It is natural for a family to want to use the division of labor to obtain the merits from both types of jobs. The gap between the two sectors is narrowing each day -- a result of reform on the state sector and improvement in working conditions on the market sector. Before the transition is done, each will hold some advantage over the other. Consequently, a division of family labor between the two sectors will remain as a way to maximize household utility for many families. All these reasons leave Chinese urban women little chance to be full housewives.

Although women's employment is necessary and women in urban China have engaged in a plateau pattern for long time, this does not mean that everyone is happy with it all the time. When housework is not shared by both spouses, which is still the case in many urban families, and when the children are young, many working mothers are suffering from the stress of a double burden.

Two national surveys on women have revealed that without economic necessity, about 20% of the women would have withdrawn from their jobs voluntarily (All China Women's Federation and National Statistical Bureau 1993; Institute of Population Studies, Chinese Academy of Social Sciences 1994).

Conditions that enable people to choose to leave employment (perhaps only for a special period) are on the horizon. First, along with marketization, payment is more and more dependent upon capability, which makes the quality, rather than quantity, of family labor decisive in family income. Families that are supported by a single high income are on the rise. Second, in 1999, the government began to establish a National

Social Security System (NSSS), including the guarantee of a minimum standard of living,[7] a pension system, unemployment and health insurance, which are to cover all urban employees both in the state and market sectors.[8] The success of this new policy will reduce the economic risk borne by the people who do not work and by those who work in the market sector. This may bring little change in men's labor force participation, but it will certainly enlarge the chances for women to concentrate on the family, particularly those women with heavy family duty but who have to work for the family's financial as well as security needs. The following causal relation is likely to happen:



We, therefore, assume a change in the plateau pattern of the female labor force participation in the future.

Who would like to leave the labor market for family duty? We expect that working mothers with young children will be most likely to fall into this group. Considering that Chinese urban women have fewer children and women's employment has been widely accepted by the society, we anticipate that women without financial pressure will have a high probability of leaving the labor market when they begin motherhood, and will re-join the labor force when their children reach a certain age, presumably school age.

We define a population's labor force participation as an *M-pattern* when the line is shaped like the letter M and the difference between the "gorge" and the highest "peak" is larger than *15 percentage points.* This means a change in female labor force participation from the present plateau pattern to the M-pattern in urban China. The age group of the highest fertility rate, i.e. 25-29, will fall into the "gorge." Three assumptions on the pattern of urban women's labor force participation are made based on the different expectations of the pace of the transition from plateau pattern to M-pattern.

Assumptions	**Urban women's labor force participation pattern**
Conservative	keep present plateau pattern till 2020
Moderate	change to M-pattern since 2010
Radical	change to M-pattern since 2005

[7] See Decree No. 271, the State Council of People's Republic of China, *Regulations on Minimum Living Standard Guarantee for Urban Residents,* issued by Premier Zhu Rong-ji on 28 September 1999.

[8] See Decree No. 259, the State Council of People's Republic of China, *Provisional Regulations on the Social Security Payment*, issued by Premier Zhu Rong-ji on 22 January 1999.

Scenario Design

Based on assumptions on the influential factors, we give three scenarios for our main labor forecast (Table 1):

Table 1. Three scenarios for urban labor force forecasts, 1995-2020.

	Conservative Scenario	Moderate Scenario	Radical Scenario
Demographic factors			
Total Fertility Rate (TFR)	**1.50**	**1.75**	**2.00**
Life expectancy at birth (in year)			
Male	**69.0**	**70.0**	**71.0 (2020)**
Female	**72.0**	**73.0**	**74.0 (2020)**
Urbanization (number of net urban migration) (million people in 5 years)	**(with an increase rate of 1% per year)**	**(with increase rates of 2.5% b/t 2001-2010 and 2% b/t 2011-2020)**	**(with increase rates of 4% b/t 2001-2010 and 3% b/t 2011-2020)**
1996 – 2000	**45.90**	**45.90**	**45.90**
2001 – 2005	**47.29**	**49.51**	**51.72**
2006 – 2010	**49.70**	**56.31**	**62.92**
2011 – 2015	**52.24**	**63.28**	**74.32**
2016 – 2020	**54.90**	**70.53**	**86.15**
Socioeconomic factors			
Education			
Probability to enter higher level education	**men** **women**	**men** **women**	**men** **women**
Age: 15-19	**0.85** **0.8**	**0.9** **0.85**	**0.985** **0.93**
20-24	**0.175** **0.155**	**0.24** **0.22**	**0.21** **0.18**
25-29	**0.015** **0.013**	**0.13** **0.12**	**0.03** **0.028**
Probability for students to enter the labor force	**men** **women**	**men** **women**	**men** **women**
Age: 15-19	**0.15** **0.15**	**0.14** **0.14**	**0.125** **0.125**
20-24	**0.825** **0.845**	**0.71** **0.72**	**0.60** **0.60**
25-29	**0.95** **0.987**	**0.85** **0.87**	**0.75** **0.75**
Women's labor force participation	**remain at present level of labor supply during 1995-2020**	**change the plateau pattern into M-pattern since 2010**	**change the plateau pattern into M-pattern since 2005**

Conservative Scenario. Combining all the conservative assumptions on development of influential factors, this scenario assumes that all the events will change at a slow pace. For fertility, it assumes that by 2020, each woman will have 1.5 children; life expectancy for both men and women only increases less than 2 years from the level of 1998; number of urban immigrants will only grow at the rate of 1% per year throughout 2000-2020. The development of higher education (represented by the probability that a student will remain a student over the next five years, and the probability that a student will enter the labor market within the next five years) is also going to proceed in a comparatively gradual manner. Female labor force participation will stay at the 1995 level for the projection period, and thus will remain a plateau pattern.

Moderate Scenario. This scenario blends all the moderate assumptions and takes the middle way between the conservative and the radical scenarios in estimating the changes in fertility, mortality, migration and higher education. For women's labor force participation, it assumes a gradual reduction in labor supply of women during child-bearing ages, thus the age-specific rate of female labor force participation will change into an M-pattern as of 2010.

Radical Scenario. All radical assumptions are joined together. It represents the estimation that all influential factors will change at a fast rate. According to this scenario, TFR in 2020 will be 2 for urban women and life expectancy will be about 3 years longer than in 1998. The number of urban immigrants will grow at a rate of 4% during 2000-2010 and 3% during 2011-2020. The increase in chances for people aged 15-29 in higher education will increase at a swift speed. Women in childbearing ages will reduce their labor supply overtly and thus the pattern of female labor force participation will present an M-pattern as early as 2005.

In order to observe the interactions among the influential factors during labor force development, and to analyze the causes of increases/decreases in labor supply, we make a set of dummy forecasts that include one "zero-change" forecast and five "partial-change" forecasts. The zero-change forecast assumes that all events will continue in the pace and pattern of 1995 until 2020. It gives an outline of the labor supply if there were no changes in transitions in all the influential factors.

The partial-change forecasts are made to observe the impact of each individual factor on future labor supply. In every partial-change forecast, one factor develops on the basis of the moderate scenario, while others are held at the 1995 level. For example, the partial-change forecast for fertility is made on the assumption that TFR will increase from 1.19 in 1995 to 1.75 in 2020 (moderate assumption), whereas the life expectancy, migration scale, higher education participation as well as female labor force participation patterns all continue as in 1995.

In sum, in estimating the labor supply in urban China and in analyzing its causal structure, we need to make the following forecasts:

Type of forecast	**Number of forecast**	**Scenario basis**
Main forecasts:		
Conservative	1	Conservative
Moderate	1	Moderate
Radical	1	Radical
Dummy forecasts:		
"zero-change"	1	All influential factors keep the level of 1995
"partial-change"	5	One of the influential factors develops according to the moderate assumption while the rest keep the level of 1995

Model and Data

Multi-State Population Projection and the PDE Model

Multi-state population projections (Rogers 1975; Keyfitz 1980; Land and Rogers 1982) have been employed in making the forecasts. This methodology has been developed into computer software named PDE (Population-Development-Environment) by the Population Project at IIASA. Compared to the traditional demographic event-based projection model, PDE enables us to integrate demographic and socioeconomic factors into population projection. Thus, we can see not only the change in the size of the population caused by demographic factors, but also the changes between labor and non-labor states of a population. Lutz (1994) gives a detailed introduction to the PDE model.

Data Required and 1% Population Sample Survey

To predict the age and sex structure of a future population, we need to start with a base population that is age and sex specific. To forecast the dynamics of labor supply influenced by demographic factors and educational development as well as transition in housework engagement, we must start with a base population that is not only age and sex specific, but also decomposed into four states, namely, labor force, student, housekeeper, and other non-labor. Only when the base population is recorded in such a way are we able to observe the interactions among all those determinants. The definitions of these four states are listed as follows:

1. Labor force (L): those who are of working age and are either employed or looking for jobs.
2. Student (S): those who study full time in schools or universities.
3. Housekeeper (H): those who are fully engaged in family duties, such as taking care of children and/or the elderly.
4. Other non-labor (O): those who are below the working age, or disabled, or retired.

Transitions between these four states (see Figure 3) have different meanings and involve different groups of people. For example,

1. O→S means people who are neither labor force, nor housekeeper, nor entering school to become a student. In the case of urban China, this event mainly concerns children between the ages of 5-9.
2. S→S stands for students in certain age groups who will continue their education when they enter the next age group. The expansion of higher education is reflected by the higher probability of this transition among students aged 15-29.
3. S→L refers to students entering the labor market between the ages of 15 to 29.
4. L→H indicates people exiting the labor market and becoming housekeepers. This transition concerns two groups of women: those who just start motherhood, and those who leave the labor market and become housekeepers after retirement.
5. H→L means housekeepers entering the labor market, and mainly concerns women who return to the labor market after their children reach a certain age.
6. L→O: mostly refers to people exiting the labor market due to retirement.

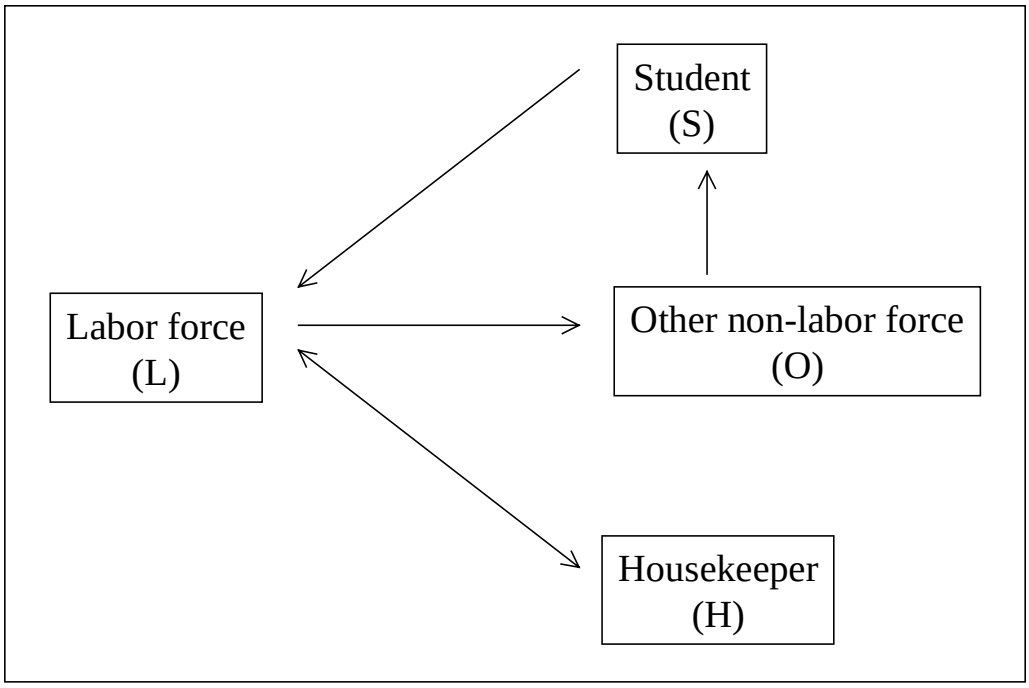


Figure 3. Four states and their main transitions.

Changes in the proportion of labor force and non-labor force due to education and labor force participation rates mean the changes in transition probabilities among the related states. With the purpose of observing age- and sex-specific transitions among these four states of China's urban population over the period from 1995 to 2020, we use the data from the National *1% Population Sample Survey* (conducted at 0 hour, 1 October 1995) as the basis data (Office of National Population Sample Survey 1997). This data provides us not only with age- and sex-specific records that accommodate demographic analysis, but also gives detailed classification of socioeconomic states of the population, which enables us to decompose the starting population into the four states. Moreover, the *1% Sample Survey* of 1995 is the latest demographic statistics available at present.

Projection Results and Discussion

Projection Results

Total population and working age population

In 1995, the total urban population in China was 353 million. The projection shows that, by 2020, the figure will double, with a minimum of 606 million (conservative scenario) and a maximum of 701 million (radical scenario). The urban sex ratio (male/female) will decrease slightly from 1.01 in 1995 to 0.99 in 2020 largely due to population aging and higher mortality rates for the male population in older age-groups.

The annual growth rate is estimated between 2.2% and 2.8% by conservative projections and radical projections, respectively. The growth of urban population will result in an expansion in the source of labor force at a rate of 2% per year (conservative scenario) or 2.6% per year (radical scenario). Till 2020, the number of working age population in cities and towns will range between 384 million (conservative scenario) to 434 million (radical scenario) (Table 2), compared to 231 million in 1995. The sex ratio of the working age population will rise from 1.07 in 1995 to around 1.14, as a result of the influence of gender structure from the immigrant population which is expected to consist of mainly working age population.

Table 2. Estimated working age population, urban China, 2000-2020. Three scenarios in main forecasts, in million people.

Year	Conservative Scenario			Moderate Scenario			Radical Scenario		
	total	male	female	total	male	female	total	male	female
1995*	232	120	112	232	120	112	232	120	112
2000	269	139	130	269	139	130	269	139	130
2005	311	162	149	311	162	149	313	163	150
2010	339	179	160	346	183	163	352	186	166
2015	364	193	171	378	200	178	391	207	184
2020	384	205	179	409	218	191	434	231	203

* data from Office of National Population Sample Survey 1997.

Labor force

In 1995, China's urban labor force was 202 million. By 2020 the number should be around 330 million, according to our projection, at an annual growth rate of 2%.

The conservative scenario shows a low population growth (low immigration level and low fertility) but a high economic activity rate (due to early labor force participation of young people and women) (Table 1). If the labor supply follows the conservative scenario, the total labor force would be 343 million, the highest among the results of the three scenarios. The radical scenario, on the other hand, shows a high population growth (large immigration number and higher fertility level) but a low economic activity rate (due to low labor supply of young people and women). It predicts a lower labor supply of 332 million. The moderate scenario, with its moderate assumptions in population growth as well as in economic activity rates, gives the lowest labor supply of 326 million.

From the gender perspective, we find that if the labor supply follows the conservative scenario, there would be the lowest male labor supply (185 million) but the highest female labor supply (158 million) among the three projections. On the contrary, the radical scenario estimates the highest male labor supply (204 million) but the lowest female labor supply (128 million). The moderate scenario provides values between the

two for both of the genders, with 195 million male labor force and 130 female labor force (Table 3).

Table 3. Comparison of labor force supply, urban China, 2000-2020. Three scenarios in main forecasts, in million people.

Year	Conservative Scenario			Moderate Scenario			Radical Scenario		
	total	male	female	total	male	female	total	male	female
1995*	202	111	91	202	111	91	202	111	91
2000	236	127	109	236	127	109	236	127	109
2005	271	145	126	266	145	121	259	145	114
2010	303	162	141	291	163	128	276	165	111
2015	326	175	151	312	179	130	302	184	118
2020	343	185	158	326	195	131	332	204	128

* data from Office of National Population Sample Survey 1997.

Labor force structure

Different scenarios present us with different structures of the future labor force. In the assumption of an increase in higher education and a decrease in mothers' labor force participation, the proportion of labor force among people aged 15-35 shows a trend of decline in the following 20 years. As shown in Figure 4, the proportions of labor force among people aged 15-35 drop from 83.17% in 1995 to 78.7% in the conservative scenario, 70.1% in the moderate scenario, and 67% in the radical scenario in 2020. Accordingly, we can expect a future labor force in urban China that is older in mean age yet better educated.

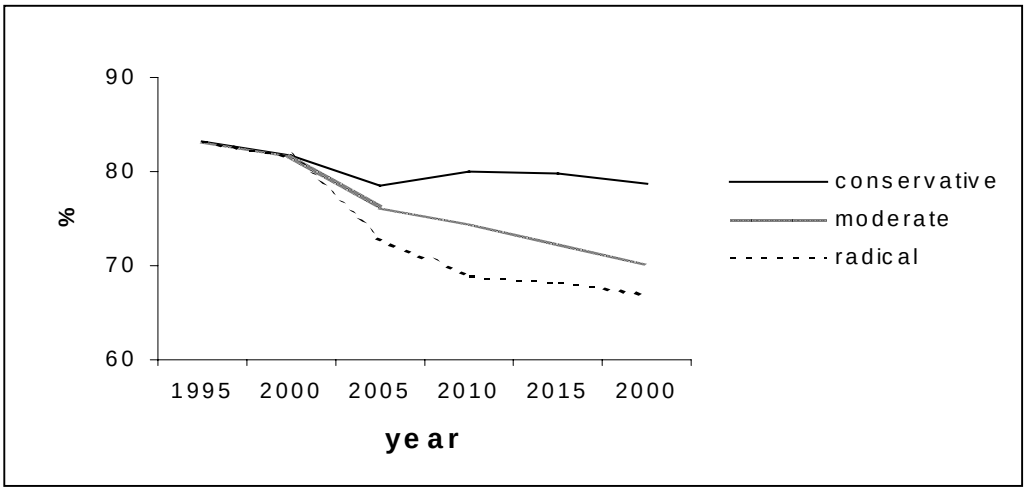


Figure 4. Proportion of labor force among people aged 15-35 (three scenarios in main forecasts).

A change in the sex composition of the labor force is also anticipated. As can be seen in Figure 5, the sex ratios of the labor force show a small decrease in all three scenarios from 1.23 in 1995 to 1.17 in 2000. Afterwards, the ratio holds steadily in the conservative scenario from 2005 to 2015, and finally ends at the same level of 1.17 in 2020, a result of the assumption of the constant plateau pattern in female labor force participation. With the assumption of a transition in female labor force participation from plateau pattern to M-pattern, however, both the radical scenario and the moderate scenario indicate a possible decline in the share of female labor force. In the radical scenario, the sex ratio of the labor force jumps from 1.17 in 2000 to 1.48 in 2010. From 2010, the increase in sex ratio slows down and ends at 1.6 in 2020. The moderate scenario exhibits a steady increase in sex ratio from 1.17 in 2000 to 1.49 in 2020.

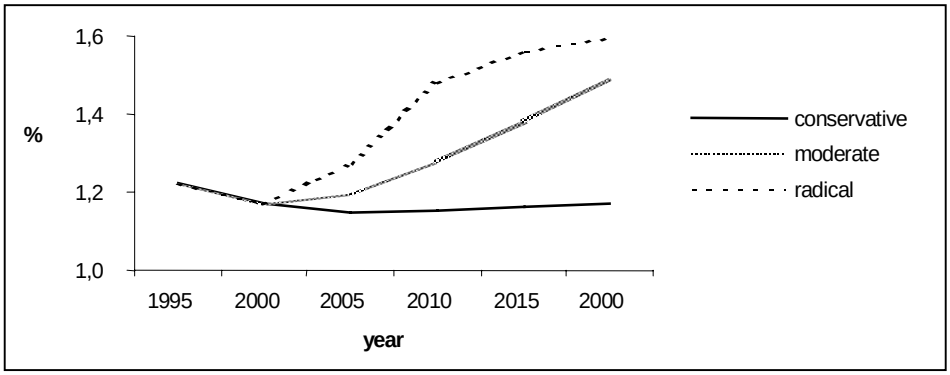


Figure 5. Labor force sex ratio (male/female) (three scenarios in main forecasts).

In terms of age-specific labor force participation, the projection indicates a stable pattern in male careers in the labor market and a dramatic variation for females. Although there is a minor postponement in time of entering the labor market due to the increase in participation in higher education, men are not expected to change the plateau pattern during the period 2000 to 2020 regardless of the scenario (Figure 6).

Female labor force participation, on the other hand, shows a different picture as of the year 2000 (Figure 7). As outlined in the main forecasts, in 2000, the plateau pattern dominates the three forecasts. As of 2010, the conservative scenario predicts an unchanged plateau pattern for female labor force participation, while the radical forecast gives a clear M-pattern for the same year. The moderate scenario, standing between the two, illustrates a transition from plateau pattern to M-pattern. By the year 2020, the conservative scenario still remains with the plateau pattern, whereas the radical scenario points to a further deep M-pattern and the moderate scenario steers closer to the radical scenarios.

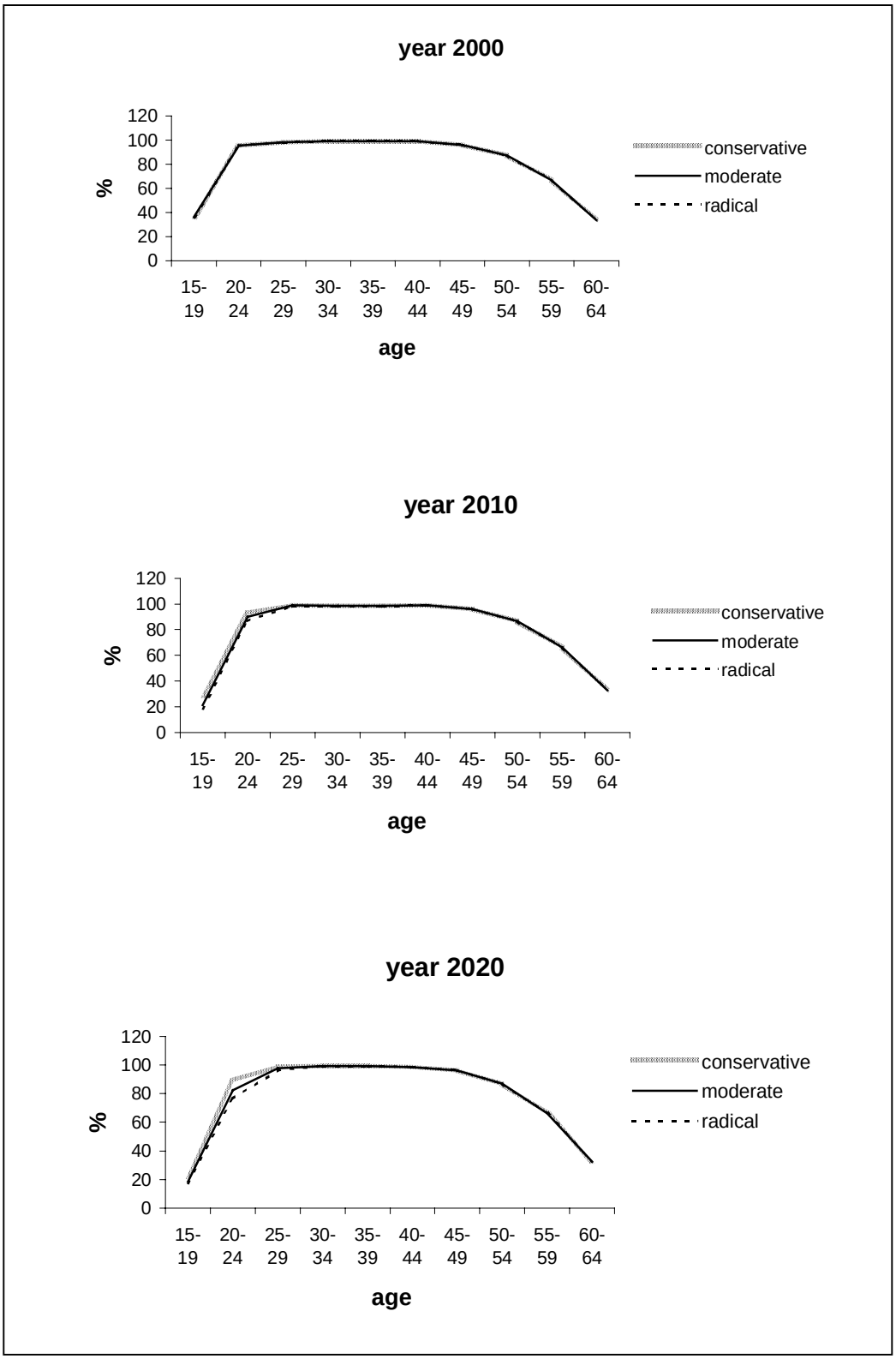


Figure 6. Male age-specific labor force participation rates in years 2000, 2010 and 2020 (three scenarios in main forecasts).

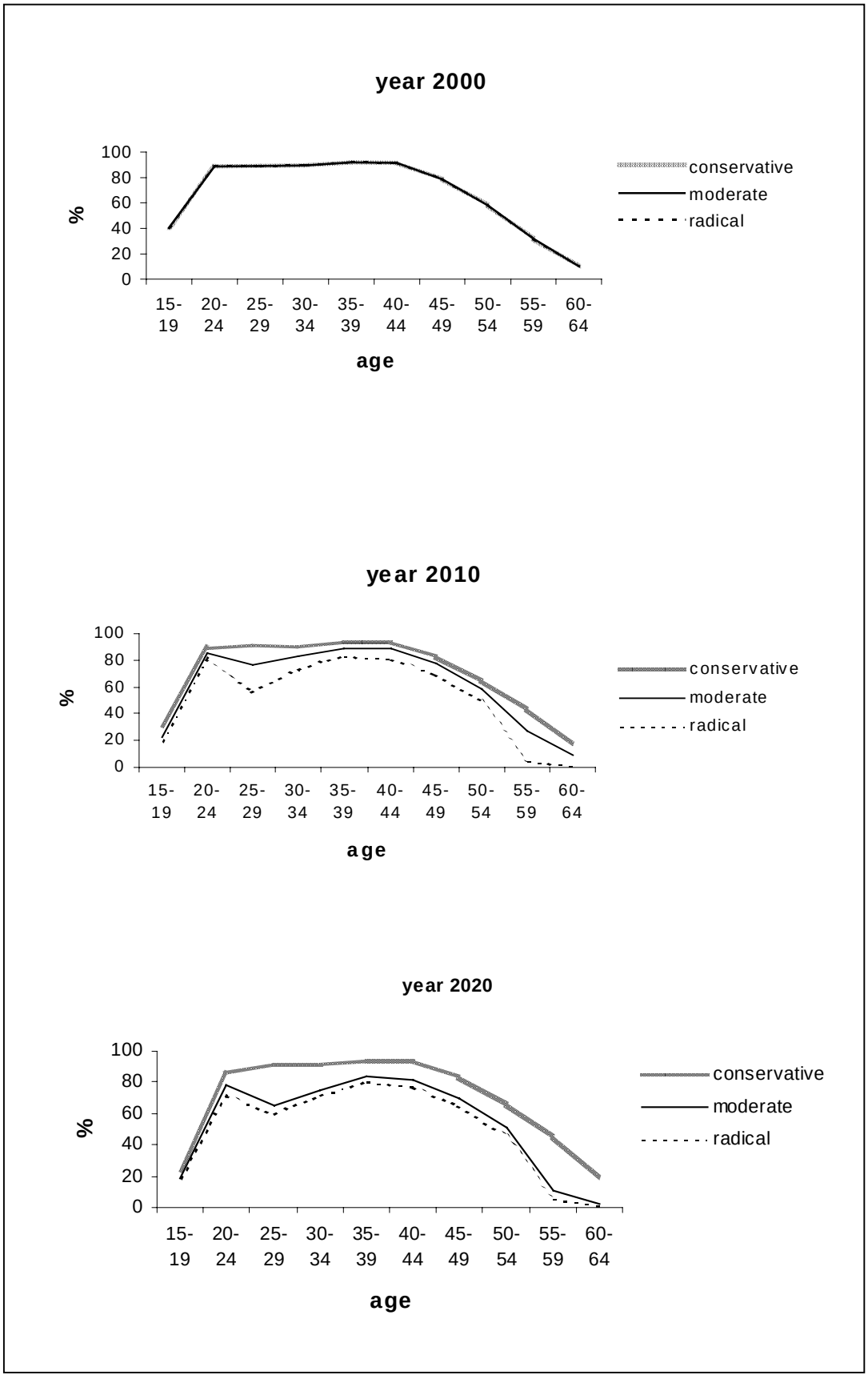


Figure 7. Female age-specific labor force participation rates in years 2000, 2010 and 2020 (three scenarios in main forecasts).

Causal structure of labor force dynamics

By running dummy projections, including one "zero-change" forecast and five "partial-change" forecasts, we can see how labor supply and its structure are affected by influential factors. First of all, dummy projections show that different influential factors impact on the labor development in different directions. Comparing the forecast results of the moderate scenario and the zero-change forecast, where all the influential factors are kept unchanged at the 1995 level, the increase in fertility, the decrease in mortality, and the increase in migration contribute to the augmentation of the number of labor supply to 0.7 million, 1.3 million and 33.4 million, respectively. In total, the change of these three factors from 1995 to 2020 would, in a moderate degree, add 35.4 million laborers in 2020 (Table 4 and Figure 8). Thus, they are expected to play a positive role in labor growth. Contrarily, expansion in higher education and an increase in engagement in housework would reduce labor supply to 11.3 million and 36.4 million, respectively. Their joint transitions in a moderate speed could cause a drop of 47.7 million in urban labor supply in 2020. Therefore, they are expected to play a negative function in labor force increase. As a result of interaction between the positive and negative factors, the total urban labor force in 2020 would be some 12.3 million less if their transitions follow the pace set in the moderate scenario than that in the zero-change forecast.

Table 4. Change in number of labor supply. Comparison of moderate, "zero-change" and "partial-change" forecasts (in million people).

Type of scenario	Compared to the zero-change forecast, the labor supply in 2020 would be		
	total	male	female
If all determinants follow moderate scenario (MS)	-12.3	13.1	-25.4
If other determinants remain at the 1995 level			
Only TFR follows MS	0.7	0.3	0.4
Only life expectancy follows MS	1.3	1.0	0.3
Only migration follows MS	33.4	17.4	16.0
Only higher education follows MS	-11.3	-5.6	-5.7
Only engagement in housework follows MS	-36.4	0.0	-36.4

From a gender perspective, our forecast shows that the development of the male labor force is free from the influence of some negative factors (i.e., change in labor force participation pattern) but a bit more influenced by some positive factors (decrease in mortality, increase in immigration) than the female counterpart. As the result, male labor supply displays 13.1 million more in the moderate forecast than in the zero-change forecast. Oppositely, female labor force is much more strongly influenced by some negative factors (change in labor force participation pattern) and thus ends in 25.4 million less in 2020 in the moderate forecast than in the zero-change forecast. Therefore, the total decline of 12.3 million laborers is the result of a 13.1 million increase in male labor supply and 25.4 million decrease in female labor supply (Table 4 and Figure 8).

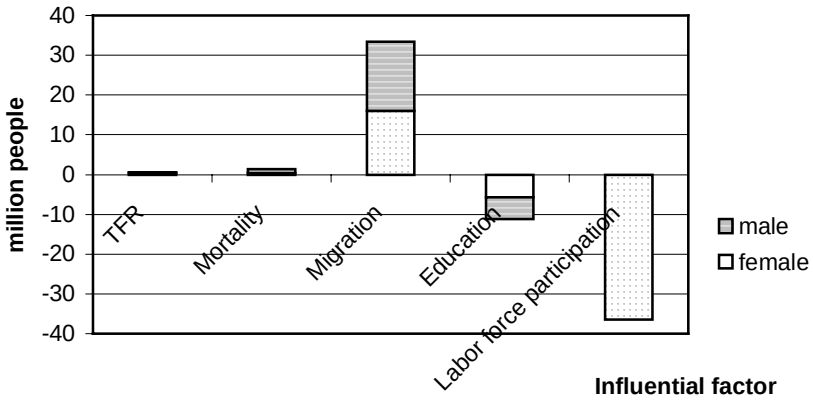


Figure 8. Change of labor supply caused by each influential factor (partial-change forecast).

Moreover, based on the partial-change forecasts, we find that each factor has a different power of influence. In our forecast, the change in the labor force participation pattern of women is the most powerful, and is responsible for 43.9% of the total change in labor supply. Migration follows, causing 40.2% of the changes in labor. Next comes higher education, with 13.6%. The increase in life expectancy and in fertility seems to have a very small effect on the future urban labor market, with each less than 2% of the labor dynamic (1.5% and 0.8% respectively) (Table 5).

Table 5. Percentage of changes in labor supply caused by each influential factor (one factor develops, based on the moderate scenario, while the others remain at the 1995 level).

Influential factors	Contributing percentage to the change of labor supply, 1995-2020 (%)		
	total	male	female
TFR	0.8	1.1	0.6
Mortality	1.5	4.0	0.6
Migration	40.2	71.9	27.2
Higher education	13.6	23.0	9.6
Engagement in housework	43.9	0.0	62.0
Total	100.0	100.0	100.0

Yet each factor works differently on the different genders of the labor force. The partial-change forecasts show that the male labor force is mostly impacted by the change in migration (responsible for 71.9% of the male labor change) and education (responsible for 23% of the male labor change). The rest of the factors play an insignificant role (4% contribution from a decrease in mortality, 1.1% from an increase in fertility and nearly zero from a change in labor force participation pattern). The female labor force is mostly influenced by the change in labor participation patterns (62% of the female labor dynamic). Migration (by contributing 27.2% of labor change) is the second powerful determinant. Education comes in the third place, responsible for

9.6% of female labor dynamic. The change in fertility and mortality only explain 1.2% of the future female labor supply.

The comprehensive expression of the projection results is shown by the population pyramids in the Appendix.

Discussion

About the increase in labor supply

Research shows that from 1995 to 2020, some 300 million people are expected to add to urban China's 350 million population. The proportion of urban population against the total could be raised from 30% to nearly 50% in the same time span. Consequently, the labor supply would grow at a rate of 2% per year, pulling the number of labor force from 202 million in 1995 up to between 326 million to 343 million in 2020 (Table 3). This means that on the one hand, China will continue to have abundant manpower to support any robust economic growth in the urban areas. But on the other hand, if the economy does not grow fast enough, or if it declines, China is likely to face a serious pressure in employment.

In 1997, China's urban labor market provided some 200 million jobs (State Statistical Bureau 1998). Can it provide 343 million in 2020 (the demand shown in the conservative scenario)? Based on the experience of 1989-1993, the employment elasticity, measured by the employment growth rate divided by the economic growth rate, was about 0.17 (Yang 1997:22). At the end of 1990s Mo (1999:236) believes that the coefficient has already declined to 0.1-0.11. Let's suppose that the employment elasticity will stay within the ranges of 0.1 to 0.17 for the following 20 years. By the end of 2020, China would then need to have an economic growth rate of *double digits* to accommodate total urban labor supply, which is obviously a difficult target. Of course the problem would disappear if the coefficient of employment elasticity could be increased. But given the trend that economic growth relies more and more on technology advancement than labor input, the rise of the coefficient of employment elasticity is less likely to happen. The most possible solution seems to be reducing the labor supply by adjusting its influential factors.

About the labor supply adjustment

The increase in urban labor supply in our forecast is the joint result of transition in speed, size, and pattern of the influential factors, namely, fertility, mortality, migration, higher education and engagement of housework. The in-depth analysis on the causes of labor dynamic indicates that, among the five influential factors, the last three are anticipated to be the most effective variables to adjust the future labor supply. To control the urban immigrants is to control the major source of urban labor increment. The expansion in higher education participation would reduce labor supply by delaying the entrance of young people into the labor market, while the change in female labor force participation patterns would modify female labor supply significantly. Due to the continuation of the Family Planning Programme and the limitation in further reducing the already low mortality level, fertility and mortality are not likely to play significant roles in the future labor change.

However, these three effective factors may be equally important in adjusting labor supply. They differ from each other in their influential power over labor demand. According to some economists, the growth of urban immigration creates labor opportunities (*China Daily*, January 20, 1999). Thus it becomes a debating question, if the tension in the urban labor market can be eased by controlling rural immigration. While the function of the two other factors -- the expansion in higher education participation and the change in female labor force participation from the plateau pattern to the M-pattern -- looks simpler, they will decrease labor supply without reducing labor demand. However, the difficulties in expanding higher education should not be underestimated. It is not just the economic factors such as tutoring fees and capital that matters. It involves an accumulation of human capital and system reforms as well. For example, the training of teachers, which is the precondition for education to expand, tends to take 5 to 10 years. If the salaries were attractive, China could solve the shortage of university teachers by employing international human resources. But given the low salary level in China, this is less likely to be an immediate solution. The radical expansion in 1999 in admission without enlarging the capacity of education has already received some inquiries and complaints (*China Youth Daily*, October14, 1999).

The transition of the labor participation pattern is expected to only influence the female labor force and is built on two conditions. The first is the salary system, in which not only the capable employee gets better pay, but also a payment high enough to support a family. The second is the establishment of a National Social Security System so that it is no longer necessary for a family to have double employment to deal with uncertainty during the social transition.

About the influence beyond the labor market

It must be noted that urbanization, transitions in higher education and engagement in housework will not only impact the labor market, but also China's socioeconomic life, including the change of women's lifestyles, a re-division of the family labor force, as well as the pattern of childcare in the future. An important task for social scientists and authorities is to foresee and to prepare for these changes.

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Appendix

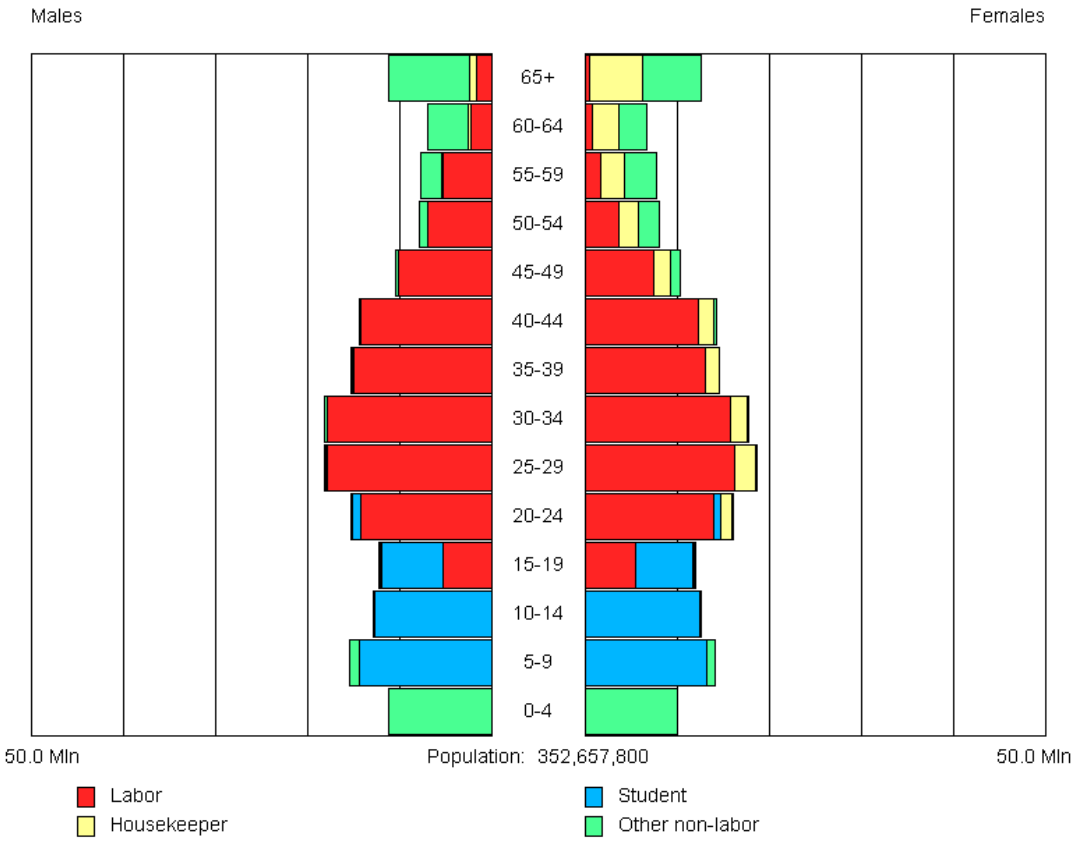

Figure A1. Population age pyramid of urban China, 1995, base year.

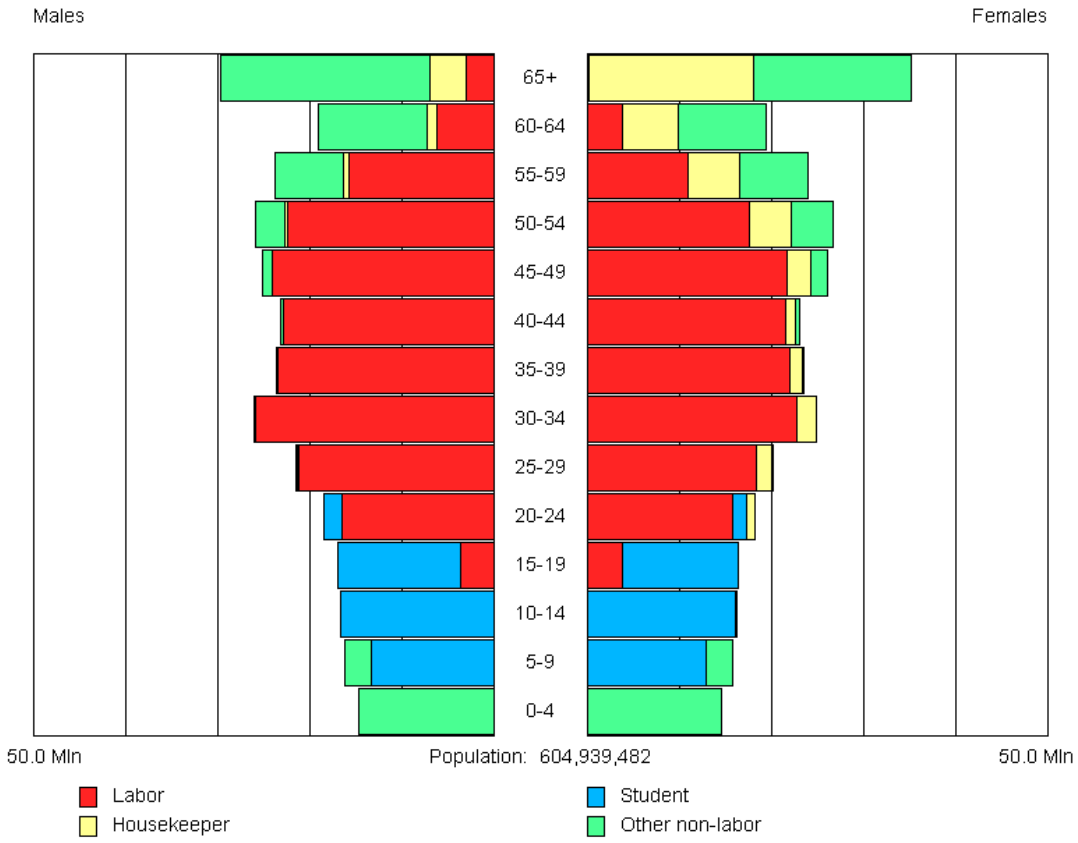

Figure A2. Population age pyramid of urban China, 2020, according to the conservative scenario.

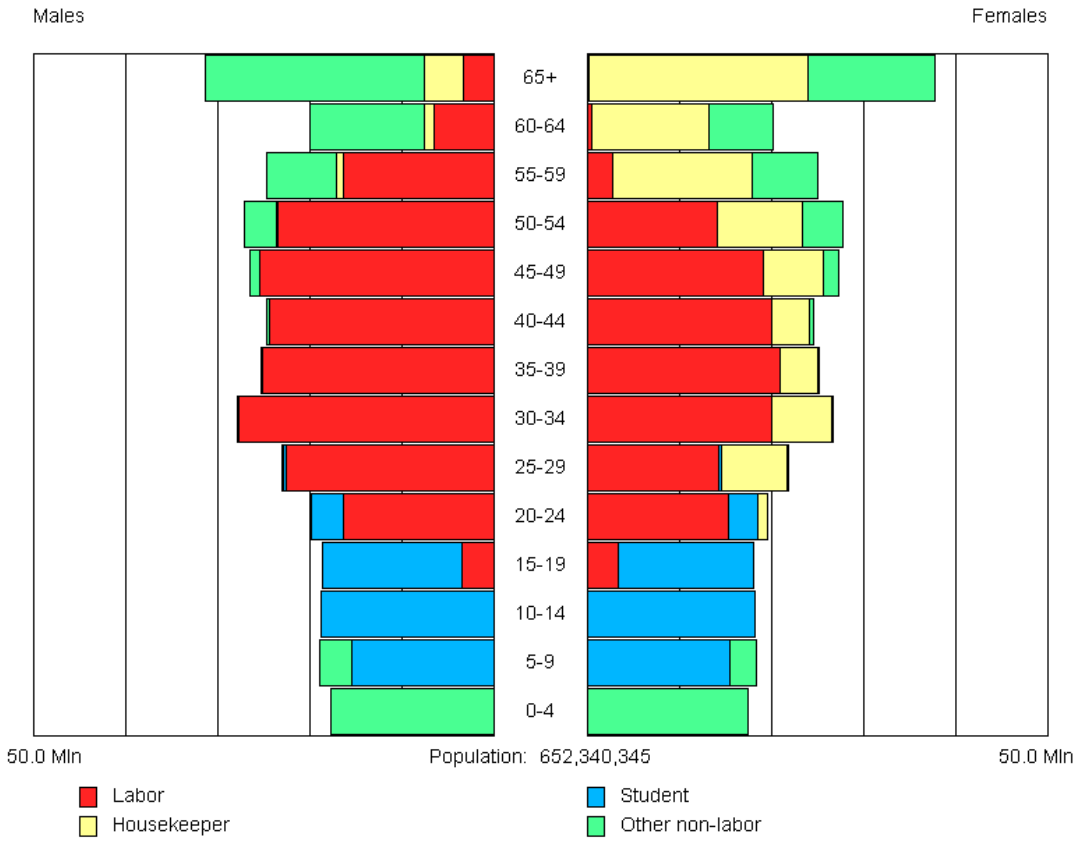

Figure A3. Population age pyramid of urban China, 2020, according to the moderate scenario.

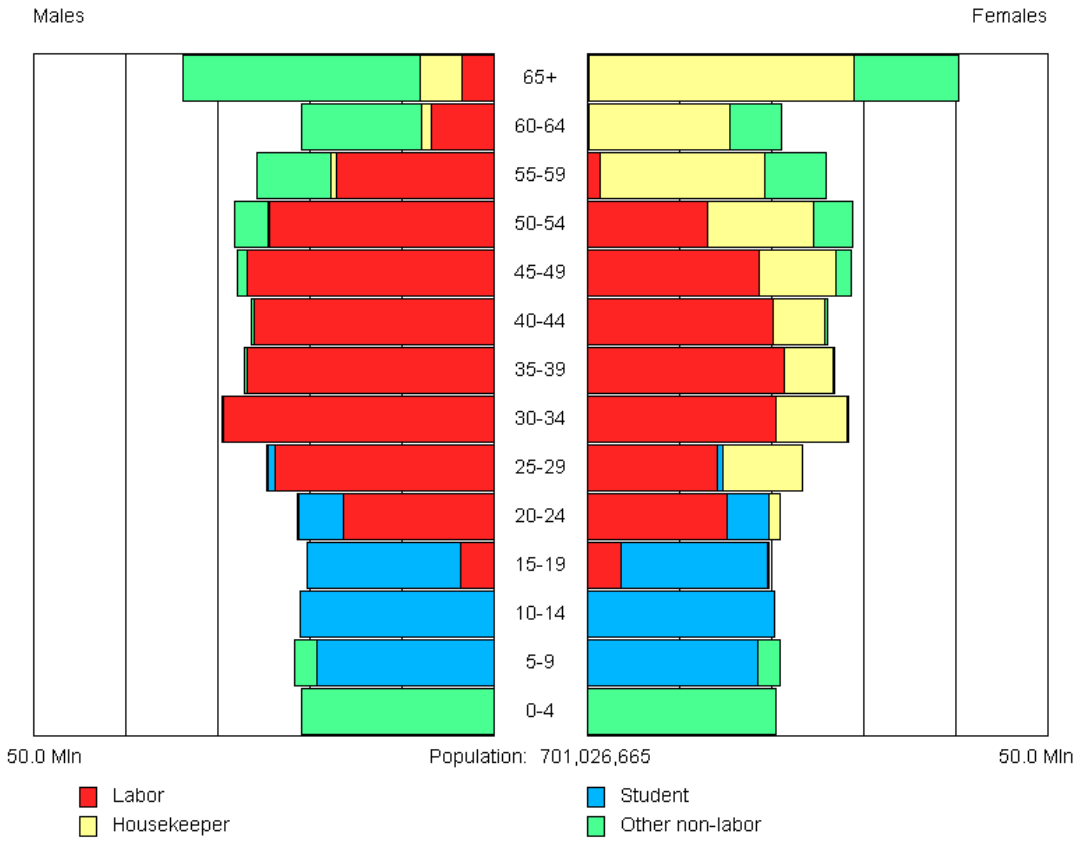

Figure A4. Population age pyramid of urban China, 2020, according to the radical scenario.

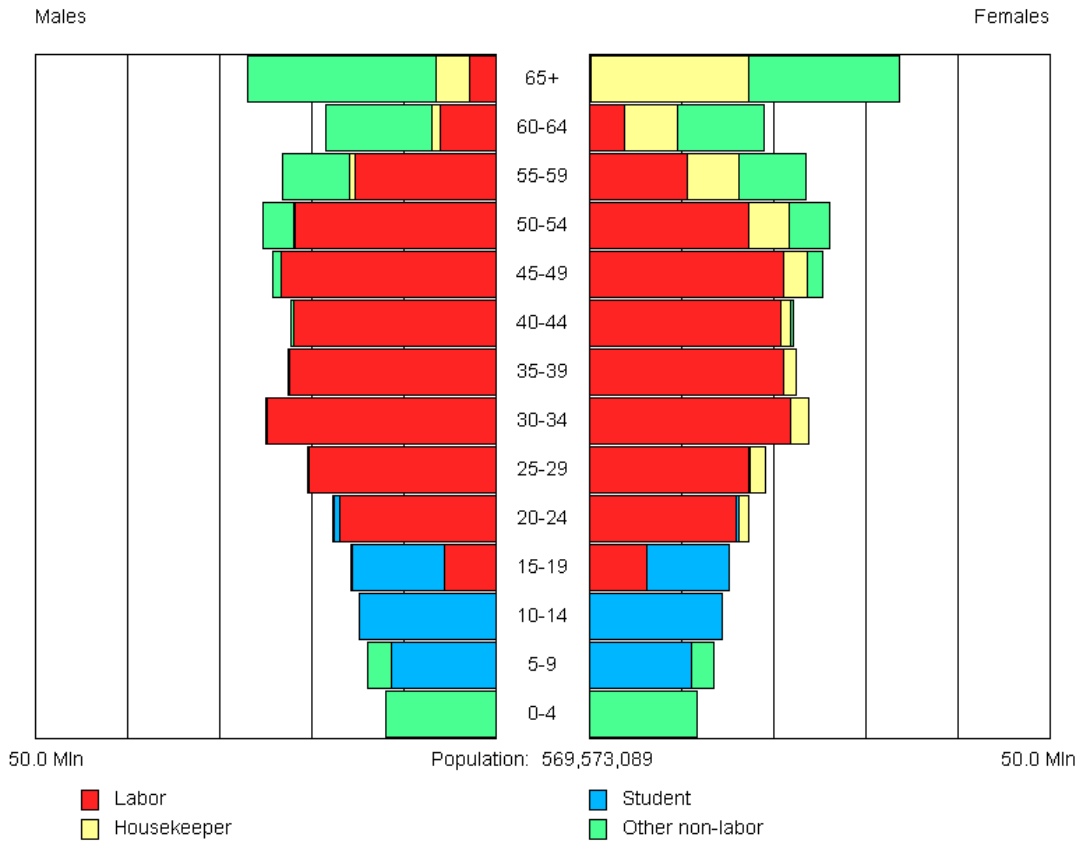

Figure A5. Population age pyramid of urban China, 2020, according to the “zero-change” scenario.