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**Key Issues of Aging and Social Security in China**

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## **Abstract**

In China the problem of aging is only now emerging, however, when the population does start to age, it will do so faster than any population in history. In this largely descriptive paper, we look at the challenges faced in the areas of old-age pensions, health care and disability services. First, we identify the main institutions involved. Then we present ad hoc projections of pensions and health spending and the number of disabled persons. Our conclusion is that, unchecked, rising demand in these sectors has the potential to give China the social insurance spending profile of a developed country while it is still at the level of development of a poor one. Demography makes some increases in spending inevitable. However, the most important variables such as coverage of the pension system and the "underlying" rate of medical spending growth are responsive to policy. The paper concludes with an appeal to policy makers to adopt forward looking strategies now, while there is still time to develop appropriate policies and institutions.

## **About the Authors**

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# Key Issues of Aging and Social Security in China

*Su Liu and Landis MacKellar*

## Introduction

China will be the first country in history to experience demographic aging while still in the phase of rapid economic development and modernization. China is also in the process of enacting economic reforms, creating tension within the existing social security system. This paper is a survey of the main features and problems facing the old-age pension system, the health care system, and disability services in China. While mainly descriptive, it also uses simple projection methods to illustrate the challenges faced by the social security system. The intended audience is the policy community, and the purpose of the piece is to make a case for the importance of forward-looking, quantitative planning in the social sector reform process.

The first section of the paper describes the unique features of China. Among these are extreme demographic trends due to the “one-child family” policy and the impacts of ongoing economic reforms on the social security system. Current changes in the social security system are put in economic and social context. In the second section, the social security system in China is described at various administrative levels. Section three focuses on the sustainability of the system, identifying driving forces and the key issues. Assumptions on driving forces are made and illustrative projections are presented. The final section elicits a few conclusions.

## 1. Background

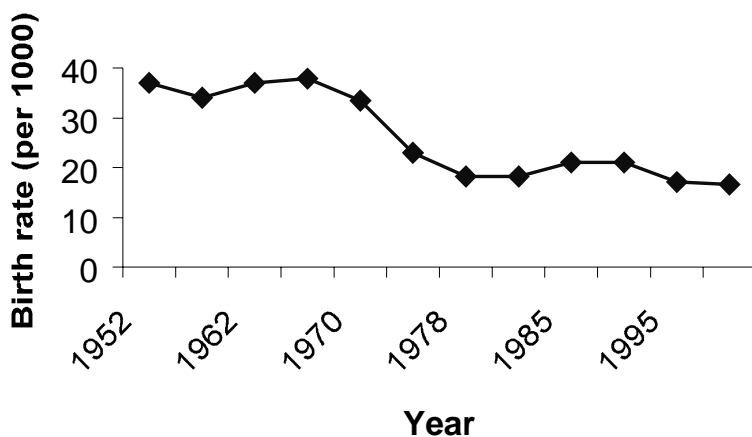
### 1.1 Demographic trends

Virtually all countries have experienced declining fertility coupled with increase in life expectancy. What distinguishes China is the speed and extent of fertility decline, which will translate into a similarly extreme population age distribution.

#### 1.1.1 “One-child family” policy

Figure 1 shows change in the crude birth rate (CBR, births divided by population) from 1952 to 1997 in China. We observe rapid decrease since the early 1970s, particularly from 1970 to 1975, a period over which the CBR decreased by almost 10 per thousand. This first phase of rapid fertility decline corresponded to wide implementation of the “one-child family” policy. The term “one-child policy” is an overstatement, since the rule of one child per family was never rigidly enforced in the countryside. “Planned birth policy” would be a more accurate description of the policy,

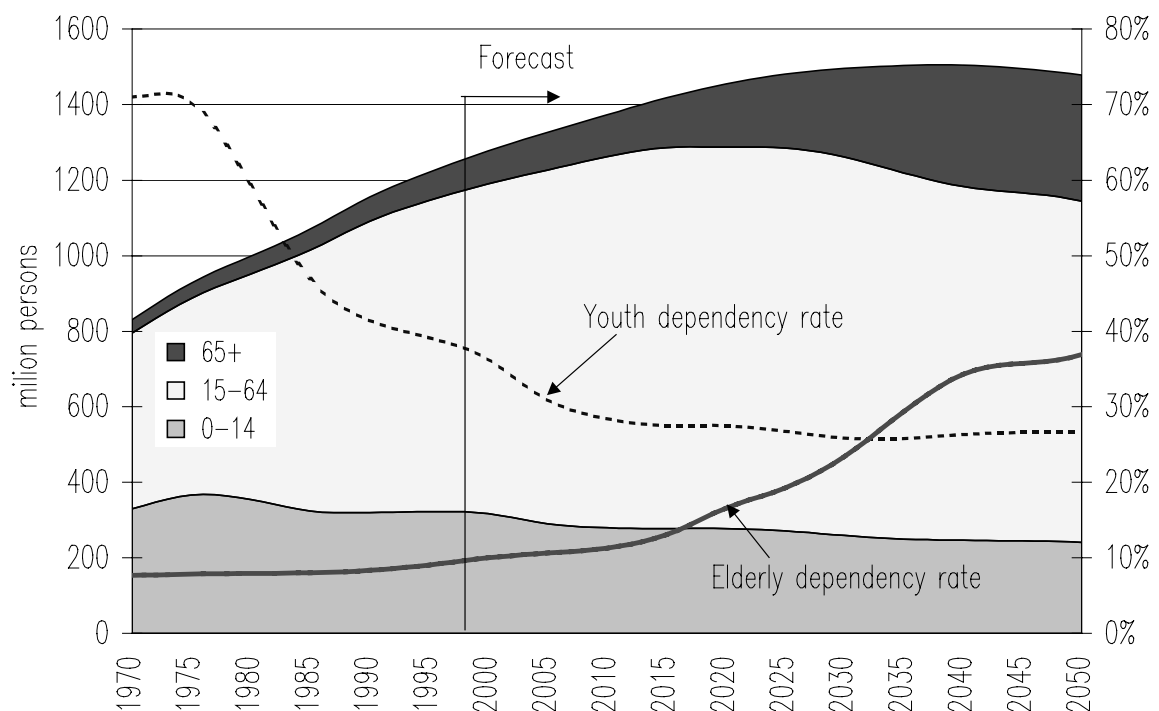
however, for convenience we will use the conventional term. There was a slight increase in the CBR in the 1980s, possibly reflecting rural resistance to the policy; however, fertility decline resumed in the 1990s. This second phase of decline reflected not only government policy, but also a combination of industrialization, urbanization, growing affluence and cultural change. Over only about 20 years, the total fertility rate (TFR, number of children a woman would have if she experienced the age-specific fertility rates observed in the population a given year) dropped from 6 to about 2. Even by the standards of other Asian countries which experienced accelerated fertility decline (Japan, Thailand, and others) this pace of decline is unprecedented.



**Figure 1: Birth rate change in China (1952-1997)**  
 Source: China Statistical Yearbook (1998)

### 1.1.2 *Rising old-age dependency ratio*

When the Chinese government introduced the one-child policy in the 1970s, it seems not to have anticipated its eventual age-distribution impacts. Yet, in roughly 2020, the absolute number of 15-64 year olds will start to decline while the number of elderly will grow (see Figure 2, based on UN population projections where absolute numbers are measured on the left-hand axis). The old-age dependency ratio (population over 65 relative to population aged 15-64, expressed as a percentage and measured on the right-hand axis), will rise from about 10% in recent years to almost 40% in 2050, with the phase of most rapid increase beginning between 2015 and 2020. These aggregate, rather abstract trends are perhaps best interpreted more concretely at the household level. Assuming, for simplicity, that members of the working-age population produce while the elderly and children only consume, each couple belonging to the "only child generation" will have to produce enough to meet, in addition to their own needs, the needs of 4 elderly parents and at least 1 child. Nor is this economic challenge far removed in the future: the leading edge of the "only child generation" is now (2000) in its twenties.



**Figure 2: Population trend and dependency ratio of China (1970-2050)**  
 Source: UN population projections (1998)

### 1.1.3 High absolute number of elderly population

According to the 1995 China 1% population census, there are approximately 80 million people in China above 65, accounting for 6.5% of the total Chinese population. Thus, China accounts for half of the elderly population in Asia, and for one-fifth of the entire elderly world population. Most strikingly, there are more elderly in China than in Western Europe, the region which usually comes to mind when global population aging is discussed. According to UN population projections, in 2050 the percentage of people above 65 in the total Chinese population will reach around 22.6%, i.e. nearly one in four.

### 1.1.4 Increase of the “oldest old”

The word “elderly” typically connotes someone who is no longer engaged in economic production and has a high level of need for health and long-term care services. Policy makers all over the world have taken comfort from the fact that, if health trends continue to be favorable, persons in age groups now conventionally labeled “elderly” may continue to lead economically productive, healthy lives. However, it seems likely that even given substantial health improvements over the next fifty years, there will still be some interval preceding death during which persons will be “elderly” in the conventional sense of the term. In this case, the focus should be put on the “oldest old,” say the population above 80 or 85. The nature of demographic aging in China (and around the world) is that the “oldest old” population is growing much more rapidly than the elderly population as a whole. In 1990 there were around 8



million persons above 80 in China, in 2000 about 28 million – a near tripling in only ten years.

### **1.1.5 Spatial imbalances in aging**

China has long been characterized by a pronounced rural-urban development gap. China's urban sector is leading the way in terms of demographic aging. The difference between urban and rural age distributions is, however, nothing new. For example, even as long ago as 1979, Shanghai was already “aged,” with 16.7% of the population over 65. At the end of 1994, the highest aged dependency ratio (65+ relative to 15-64) was 16.3% in Shanghai, while the lowest was 5.7% in Ningxia; the national average (see Figure 2) was 9.3%. The high degree of regional difference makes it especially difficult to create a nationally coherent social security policy. This will be discussed further in the next section.

## **1.2 Economic and institutional context of social security reform in China**

Economic reform, i.e. redefinition of public-private roles consistent with “market socialism,” has been going on in China since the late 1970s. Social security is a key reform issue because of its close connections with other reform areas. In this section, we list major areas of reform and draw attention to links with social security.

### **1.2.1 State-owned enterprise reform**

State-owned enterprises (SOEs) in China provide their workers with extensive cash and in-kind benefits such as pensions, health care, disability insurance, housing, and family allowances. Public subsidies to SOEs effectively decouple these benefits from the profitability (indeed, the solvency) of the enterprise, tending naturally to encourage the expansion and proliferation of benefits. In the new market environment, however, and with the number of pensioners rising rapidly, many SOEs find it difficult to compete with private-sector firms. Some have simply terminated, reduced or postponed promised benefit payments; thus, by May 1998, national pension arrears added up to 8700 million yuan and affected 3.56 million pensioners. Policy makers are in a dilemma: generous SOE social security benefits are unsustainable, but for many thousands of employees, there is no alternative source of basic social insurance. Shutting down an SOE is more than shutting down a firm, it means shutting down a mini-welfare state on which thousands of workers, pensioners, and their families depend.

### **1.2.2 Labor market reform**

The formal social security system covers only SOEs and collective enterprises. Therefore, there is a huge difference in benefits between different types of enterprises and different areas of the country. As a result, labor mobility across enterprises, industries or provinces is discouraged and efficiency gains in the labor market are impeded (Fan et al. 1998).

### **1.2.3 Reform of government institutions**

The challenge facing Chinese government institutions is not so much their large size as their inefficiency. For one task there are typically several decision-makers, often without a coherent policy, leading to a lengthy decision making process with sometimes less than satisfactory results. In the case of social security, at the national level, the Ministry of Labor, the Ministry of Civil Affairs, and the Ministry of Health have all historically been involved in social security policy making and social security system management. In the 1997, a new Ministry of Labor and Social Security Ministry was established to unify social security policy and give coherence to social security system management.

### **1.2.4 Rural and agricultural reform**

Rural China, comprising 70% of the total population, is virtually uncovered by the formal social security. Development of the Township and Village Enterprise (TVE) system, urbanization and industrialization, and rising levels of affluence are bound to affect the traditional Confucian religious culture and could weaken the informal family care system.

### **1.2.5 Public finance and financial sector reform**

Social security reform is connected with public finance reform through the operation of the pension system. Whatever the direction of social security reform, higher individual contributions are unquestionably on the horizon. The collection of these contributions will be closely connected to the levying of taxes, which is presently underdeveloped in China. Distribution of the pension benefits will also place new demands on the public finance system. Social security reform is also likely to be linked to structural changes in the financial system. The experience of other countries is that, with rising affluence, demand for social insurance rises faster than the public sector can keep pace with it and that the commercial pension and health insurance sector evolves to fill this gap.

## **2. The Current Social Security System**

The first social insurance regulations were issued in 1951 (Interim Labor Insurance Regulation). From that time until the 1980s, the system remained relatively unchanged. During the 1990s, however, changes have been so frequent that it is difficult for social insurance researchers to keep up to date.

There is a fairly sizeable English-language literature which can be dated back to Hussain and Ahmad's (1989) "Social Security in China: A Historical Perspective." Among the representative works are; from a historical point of view, Hussain 1993; from an economic and welfare point of view, Liu 1991, Hussain 1994, Lin 1996, Selden and You 1997, and Song and Chu 1997; from a policy point of view, Guo 1993 and Hou 1995; from a demographic point of view, Jiang 1994, and Zeng and Vaupel 1989; from a sociological point of view, Leung 1995, Jiang 1995, and Lee 1996; and from a statistical point of view, Shi 1994 and Tsui et al. 1995. The World Bank's 1997 "China 2020 Series" including 2 monographs dealing with social security -- "Old Age Security" and "Financing Health Care."

## **2.1 The old-age pension system**

### **2.1.1 History**

China's old-age pension system dates back to 1951, when the first labor insurance regulations created a social security system for state-sector employees. Under these regulations, employees of SOEs were tied to their work units and enjoyed cradle-to-grave benefits including generous retirement pensions, free health care, income support when sick or disabled, and housing (Song and Chu, 1997). Persons employed in the urban collective sectors also had some benefits, but at a lower level and varying according to the financial condition of the work unit. At that time, most of the employed labor force in urban China was in the state-owned and collective sectors (including government departments), and there were no social security programs for the then-negligible private sector. The retirement age for men was set at 60 for men and 55 for women.

The 1951 labor insurance regulations were amended in 1953, 1958, 1978, 1986 and several times in 1990s. The general effect of policy changes before the 1990s was a substantial increase in the number of retirees and pension costs. The number of retirees increased tenfold from 3.1 million in 1978 to 30.9 million in 1995, including 24.0 million from the state sectors (SOEs, collective enterprises, and government). Pension costs in the state sectors increased 80 times over roughly the same period, from 1.41 billion yuan in 1978 to 84.4 billion yuan in 1994 (see Annex, Table A1).

From the very beginning of Chinese social security policy, the government limited its concern to the urban sector. Although the Communist Party made an effort to change many aspects of the rural way of life, these did not include the Confucian tradition of elder care (Davis, 1994). The small number of elderly without family support in the rural area was taken care of either by government or rural collectives.

### **2.1.2 The old-age pension system and its problems ca. 2000**

Despite the amendments mentioned above, the social insurance system in 2000 broadly replicates the system put in place fifty years ago. A formal pension system only exists in the urban area; for most rural residents, family care is the predominant resource for old age (Leung, 1997; Shi, 1994). Within the urban sector, the formal social security system is mostly limited to employees of SOEs, comprising about 50% of the urban workforce.

Figure 3 attempts to summarize the most salient points of the pension system in roughly 2000. In theory, central government acts as policy maker in the area of social security. However, there was for many years no single authoritative institution to exercise overall leadership and management of social security activities (Hou, 1995). Rather, responsibility for the social security system was shared among the Ministry of Labor, the Ministry of Civil Affairs, the Ministry of Health, and others. However, the interests of various ministries did not always coincide, so in March 1998, a new department in the central government, called Ministry of Labor and Social Security, was established. This new ministry, charged with management of the whole social security system in China, comprises 5 departments: old-age pensions, health care, unemployment insurance, rural social insurance, and funds supervision. This marks the first time since 1949 that China has tried to have a unified management of social security affairs (Wang, 1998).

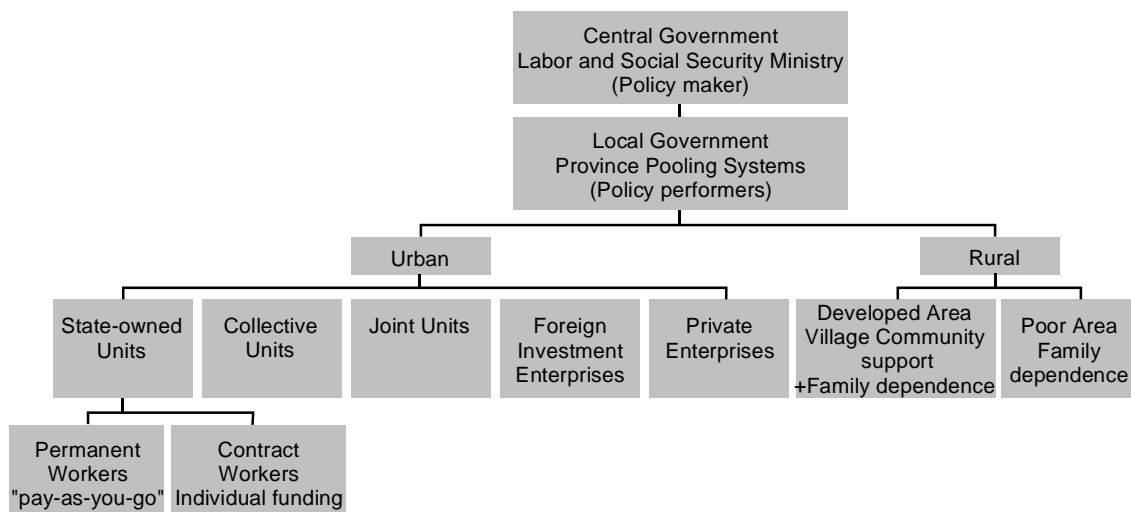
*Urban population.* Contribution rates at some SOEs run as high as 30%. In view of this and given pronounced differences of age structure across provinces, a provincial pooling arrangement has been put in place. As of October 1998, 21 provinces were involved in pooling systems and another 11 provinces were preparing to enter into such arrangements. These pooling systems relieve the heavy pension burden on some SOEs, however, at the expense of requiring poor, demographically young provinces to subsidize wealthy, demographically old provinces (see Annex, Figure A1).

An emerging area of concern is the labor contract system established in 1986 in an effort to reduce inefficiencies associated with lifetime employment contracts. Contract workers' pensions are fully funded whereas permanent workers' pensions are financed on a pay-as-you-go basis. As a group, contract workers are significantly younger than permanent workers. It has already been observed in some province pooling systems that contract workers' supposedly earmarked contributions are being used to finance the pensions of retired permanent workers (Lin, 1996).

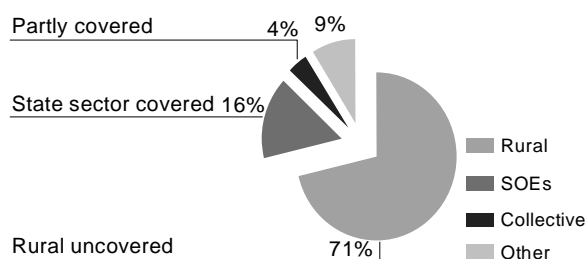
*Rural population.* The aged population in rural China has four options for old-age support. The first option is to remain in the labor force and, indeed, it is observed that many healthy elderly rural Chinese continue working long after the official retirement age. The second option is to depend on family care and financial help from kin. This, the main support resource in rural China, will be discussed in the paragraphs below. The third option, on which the 3-4% of the rural elderly with no available family support must rely, is support from government or collective enterprise funds. Finally, in a few relatively developed rural areas, mainly on the eastern coast of China, experimental rural pension schemes are being implemented.

According to a 1992 survey on the support system for the elderly, on average around 74% of rural children report that they provide financial support to aged parents. This number increases with parents' age and is higher in poor areas. Nor are family care ties limited to ties between children and parents, they also include ties to siblings, cousins etc. After the Chinese Communist Party (CCP) came to power in 1949, traditional family care values were not discarded like some other Confucian ideals; instead they were encouraged and even extolled. The CCP's fairly loose interpretation of the "one-child policy" in rural areas can be interpreted as a similar compromise. However, there are signs that the traditional rural family system is changing. Fertility is declining, successful TVEs are diversifying the economic base away from agriculture; young family members have become more mobile, and modernization, urbanization and opening to the external world have weakened traditional family institutions (McCarthy and Zheng, 1996).

Partly in response to these trends, since 1991 the Ministry of Civil Affairs has experimented with rural pension schemes in chosen localities. By the end of 1997, 2000 counties (most of them relatively developed rural areas) in almost every province were participating in this program at some level. Around 82 million peasants were participating and 13 billion yuan had been accumulated. The basic problem to be overcome, not surprisingly, is that participants' incomes are very low. In 1995, the average accumulation per participant was only 80 yuan, about 2% of a farmer's annual income. This amount is unlikely to generate a replacement rate (income after retirement relative to income prior to retirement, expressed as a percentage) over 5% (World Bank, 1997a). Other problems include the fact that inflation-indexed annuities are not available and funds are not well managed.



**Coverage of formal pension system (1997)**



**Main problems in the pension system**

Level	Main issues/problems
Central government	No coherent national policy
Regional	Huge disparity among regions
Urban	Narrow coverage
Rural	Almost no formal system
Enterprises/ Work units	- Discourage labor mobility - Impede enterprise and sector reform - PAYG and fully-funded schemes not segregated

**Figure 3: Current pension system coverage, structure and main problems**

## 2.2 Health care and disability services

### 2.2.1 History

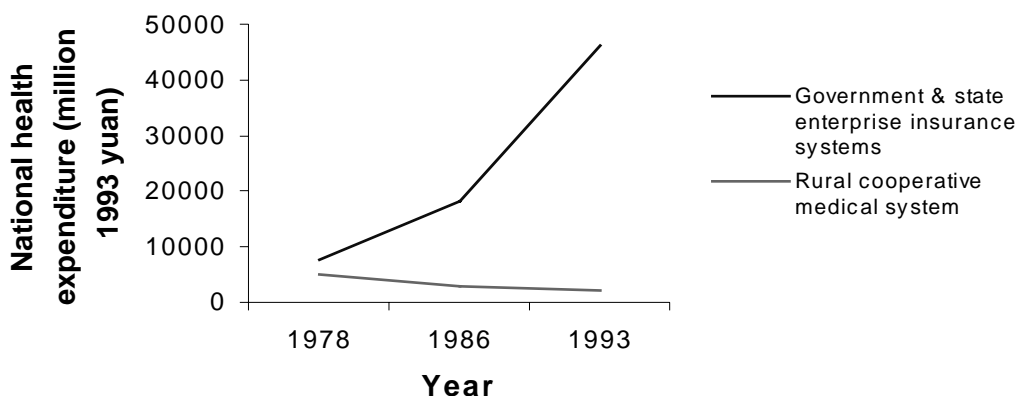
Health care and disability services in China are, broadly speaking, structured like the old-age pension system described above, and face similar problems. Like the pension system, the health system dates from the early 1950s. In the urban sector, SOE employees and government workers (as well as their dependents) receive health benefits and disability insurance as part of their compensation package, while the rest of the urban population is virtually without formal insurance.

The most significant difference between the health care and old-age pension systems is the strong emphasis on provision of health care in rural areas, a policy dating back to the Cultural Revolution (Hu, 1980). During that time, a cooperative medical system benefiting almost all of the rural population was established. Under this system, village collectives managed and financed the activities of "barefoot doctors" (peasants who received 3 to 6 months of medical training) to provide basic medical care to villagers. Patients suffering from more serious conditions were referred to a higher level, i.e. to hospitals at the village or township level and, subsequently, the county or city level. Medical expenditures at higher levels were reimbursed to the collective up to a certain percentage. In this way, universal health care coverage was provided to rural China before 1978. In urban areas, health services were provided by local clinics, street hospitals, production unit hospitals, city hospitals, and provincial hospitals. The basic rule was that patients progressed to higher levels via a referral system. Local authorities had extensive autonomy regarding the operation of health facilities within its jurisdiction.

### **2.2.2 Reforms and the current health care system**

Since 1978, the rural cooperative medical system has disintegrated and there has been a sharp reduction in the number of "barefoot doctors" (Shi, 1993a,b). In particular, replacement of the old commune work-point system by the new production responsibility system in agriculture transferred responsibility from the collective to the household. As a result, arrangements for paying village "barefoot doctors" no longer functioned and there was little money left for the collective to pay for higher-level health services. Less than 10% of the rural population today is still covered by the cooperative medical system, as opposed to 90% in 1978. The cooperative medical system has been replaced by a fee-for-service system. Combined with the lack of insurance, the result is that some 700 million rural Chinese pay for health services out of pocket. The Chinese government tried to reestablish the rural cooperative medical system in 1994 in some selected pilot counties, but the results have not been convincing.

By contrast to the rural health care system, the urban health care system is today little different than it was in 1978. As in the case of the pension system, there are two urban health insurance systems. The government insurance system, covering government workers and retirees, members of the military and university students, has a total of 30 million members, i.e. 2% of the total population. The SOE insurance system, covering SOE employees and retirees, has a 140 million members, i.e. 12% of the total population. Members of these two systems enjoy unlimited coverage with low co-payments and virtually zero premiums. Not surprisingly, from 1978 onwards, health expenditure for these two urban insurance systems has increased dramatically, while expenditure for the rural cooperative system has decreased continuously (see Figure 4 and Annex, Table A2).



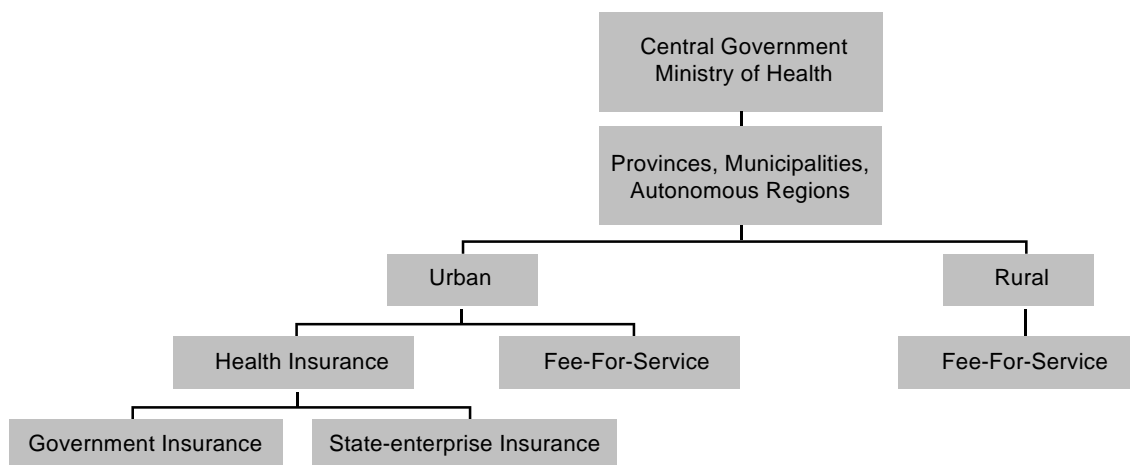
**Figure 4: Comparison of national health expenditure on urban insurance and rural insurance**

Source: China 2020 (World Bank, 1997b)

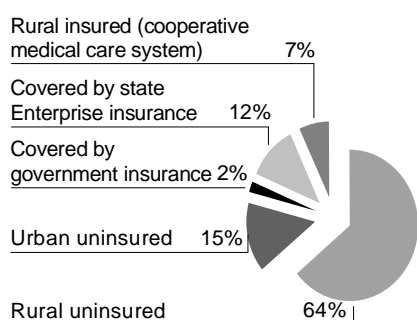
The lack of a coherent health insurance system leads to a number of problems. High expenditures to support the government and SOE systems put pressure on the government budget and impair the competitiveness of SOEs. Patients without insurance are discouraged from seeking needed care. In 1994 the Chinese government began some health care reform experiments at selected locations. The main ideas include broadening coverage, creating individual health saving accounts, reforming provider payment mechanisms, etc. However, results have been mixed. A summary of health care coverage, the structure and the remaining problems is given in Figure 5.

### **2.2.3 Disability and long-term care services**

Many studies have demonstrated that disability is positively correlated with age (Heikkinen, 1983). The great majority of less severely disabled elderly persons receive care from co-resident family members. The most severely disabled elderly who have formal medical insurance stay in hospitals and receive professional care. Those without formal insurance are dependent on family support or, lacking that, the community. Development of community services for the disabled is being actively encouraged by the Chinese government.



**Population by insurance status (1993)**



Source: *Financing health care* (World Bank 1997)

**Main problems of health care system**

Level	Main issues/problems
National	Budgetary pressures
Regional	Growing disparity in access
Urban	Narrow insurance coverage
Rural	- Shrinkage of Cooperative Medical System - No insurance coverage
Enterprises/ Work units	- Dependent on the efficiency and effectiveness of units - Lack efficient cost controls
Health care provider	- Rising cost - 3 <sup>rd</sup> party payment distortion - Irrational allocation & waste - Inefficient management

**Figure 5: Health care coverage, structure and problems**

### 3. Thinking about the future of social security in China

#### 3.1 Driving forces

The main directions of Chinese social security policy appear clear. In the area of pensions, the Chinese government will try to maintain the family support system in rural areas and at the same time reduce the heavy pension burden on enterprises by requiring increased individual contributions. In health care, China needs to return to a policy of vigorous financial support for public health, recognizing that many health care



services must be financed by the government if they are to be provided at optimal social levels (World Bank, 1997b).

In this section, we look at some of the forces driving social insurance trends and provide some ad hoc projections of the future.

### **3.1.1 Population age structure**

Pensions, health and disability are all tightly connected with population age structure, and are especially correlated with the trend and the situation of the elderly population. Under conditions corresponding to the UN population projection illustrated in Figure 2 above, the current “pay-as-you-go” pension scheme will not be sustainable without drastic increases in the contribution rate paid by workers. Large increases in the elderly population also emphasize the urgency of expanding health care and disability services.

How uncertain are these trends? Population size and age structure have a long memory, i.e. they are characterized by strong inertia. The population that will be aged 50 and higher in 2050 has already been born. The women whose children will be aged 15-49 in 2050 will, assuming that the average age of childbearing is 25, have been born between 1975 and 2010. Events of the next decade are unlikely to change this number much, nor are these women likely to experience fertility drastically different from that currently observed (even if the one-child policy is attenuated, modernization and other factors will act to reduce fertility). All in all, among the many uncertainties which make it difficult to project far into the future, demographic uncertainty is the least of our problems.

### **3.1.2 Economic development**

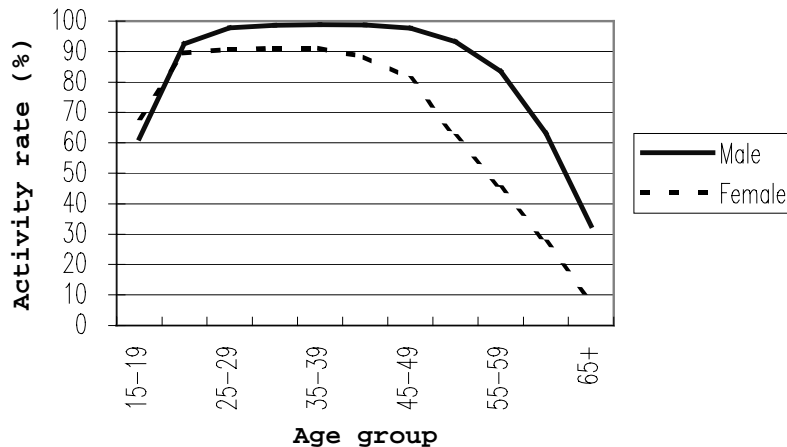
It is now broadly appreciated that, in the West, the problems faced by social security systems are not due to demographic aging per se, but rather to the fact that benefits expanded rapidly during the last fifty years. This expansion reflected, in large part, rising economic prosperity and the resulting demand for leisure (i.e., years of retirement) and health care.

Whereas Western countries experienced demographic aging after having attained a high level of economic development, China will experience population aging while it is still a developing country. The dilemma faced by social security policy makers is as follows. As a poor country, China cannot afford a comprehensive Western-style social security system. Yet, from the individual point of view, per capita income is too low (especially in rural areas) for households to meet their own needs for retirement income and health care. The challenge in social security is to design programs which meet legitimate needs while avoiding expensive, unsustainable solutions.

Economic development involves not only the level of output, but also its structure. Because China is still a developing country, structural changes are likely to have a greater impact on social security than they did in the West. The share of agriculture will decline, as will the importance of the state-owned sector. Inevitably, these structural changes will impose costs on older workers and retirees. Policy makers must ensure that these vulnerable groups are protected, albeit not coddled, during the reform process.

### 3.1.3 Labor force participation

Figure 6 gives the current labor force participation rate, by age, in China. Compared to other countries, the labor force participation rate in China is exceptionally high, peaking at virtually 100 % for males aged 35-39 and over 90% for females. Around three-quarters of people continue working for at least five years following the normal retirement age (male 60, female 55), and this percentage is much higher for the rural area.



**Figure 6: Labor force participation ratio by sex and age in China**

Source: ILO Yearbook of Labor Statistics (1998)

High economic activity rates after the normal retirement age are an important buffer minimizing the impact of demographic aging on the social security system. However, the experience of most countries has been that labor supply of the elderly participation declines rapidly with rising affluence. A partial exception to this trend is Japan, where despite declines, labor force participation of the elderly remains much higher than in Western countries at similar levels of economic development. Will China follow a similar path?

### 3.1.4 Urbanization, modernization, and cultural change

Because of universal marriage, reduced mortality, and flexible implementation of the one-child policy in rural areas, the number of elderly Chinese elderly with no surviving offspring will remain small. However, how likely are these children to take care of their aged parents? The related processes of urbanization and modernization are weakening traditional institutions and structures, including those related to elder care.

An example is the development of the Township and Village Enterprise (TVE) system in rural China. By 1996, 27.5% of rural inhabitants were engaged in such enterprises, and many villages had become prosperous on the basis of successful TVEs. Swift development of TVEs and rapid industrialization in some rural areas have brought tremendous changes to the internal structure of the rural economy and social relationships. The economic *raison d'être* of family solidarity has been weakened. As a result, many families will, at least partly, lose their traditional function of supporting

their elderly members. Already in some communities made prosperous by new TGVs, village-level support systems have been set up to substitute for family care for the elderly.

As agricultural ways of life give way to industrialization and urbanization, hierarchical family structures are weakening and the extended family is being replaced by the nuclear family. Modern means of communication and transportation now facilitate contacts between family members not living in the same house or area, thus weakening the necessity for co-residence. The new emphasis on efficiency in the labor market means breaking down old barriers to mobility, with consequences for out-migration of the young.

### 3.1.5 Government policy

Finally, government policy in the area of social security will be a driving force. Decisions made today regarding the extent of social insurance coverage, the means of financing (pay as you go versus funding), etc. will have long-lasting effects.

## 3.2 Quantitative prospects

In this section we apply simple projection techniques to make ad hoc forecasts of some major indicators of pensions, health, and disability. These projections are meant to serve as a basis for discussion and refinement; they by no means represent a definitive forecast of the future.

### 3.2.1 Pensions

In most OECD countries annual pension expenditure accounts for about 10% of GDP. With population aging, this proportion will likely rise in the future. In order to project the pensions to GDP ratio for China, we rely on the multiplicative identity

$$\frac{\text{Total Pension Expenditure}}{\text{GDP}} = \frac{\text{Average Pension}}{\text{Average Wage (A)}} \times \frac{\text{Number of Pension System Participants}}{\text{Labor Force (B)}} \\ \times \frac{\text{Number of Pension System Beneficiaries}}{\text{Number of Pension System Participants (C)}} \times \frac{\text{Total Wage Bill}}{\text{GDP (D)}}$$

In the above equation part (A) is conceptually similar to the replacement rate, which gives the benefit level of the pensioners when they retire as a proportion of their wage prior to retirement. In China this ratio is now very high, usually around 80% or even 90%. Part (B) gives the coverage of the formal pension system. This number, as mentioned in the previous section, is very low; the current old-age pension system only covers around 16% of the total labor force.

Part (C) is the system dependency ratio, closely related to population age structure. This number has doubled in the last 5 years, and is already close to 20%.

One reason for such dramatic increase is, of course, population aging. Moreover, the SOE and collective sector labor force is aging more rapidly than the labor force at large, since intake of young workers is minimal. Finally, early retirement has been heavily relied upon as a means of shedding workers and improving enterprise efficiency. Part (D) is usually a constant number in a mature economy, but could still be changing in current China. From 1990 to 1995 this number was steadily decreasing because enterprises were given more flexibility to retain profits, as a result of which the wage level did not increase as much as GDP.

Table 1 shows the data for these 4 elements in recent years and the corresponding results of their product, i.e. the proportion of pension expenditure in GDP. We can see that, although the proportion of pension expenditure is increasing continuously, it is still very low compared with most OECD countries or even with some of the other developing countries. In 1995 this proportion was still below 2%.

What are likely future trends in the components of the pensions-GDP ratio? Say that Part A, the replacement rate, trends downward towards the world average level of around 60%. Part B, coverage, will certainly be broadened, but the extent is a matter of government policy. Part C, the system dependency ratio, will be fairly close to the old-age dependency ratio of the population, around 40% in 2050. Finally, part D, the ratio of total wage bill over GDP, will approach a constant level. Among all four elements, the most variable element is B, coverage. Therefore, maintaining the same trend for the other three elements, we introduce three scenarios with low, medium and high coverage for the future, to see how different assumptions would affect pension expenditures (see Table 2 and Figure 7). These scenarios correspond to coverage rates of 30, 50, and 100% of the population in 2050.

**Table 1: Total pension expenditure/GDP (1990-1995)**

	A (replacement rate)	B (coverage)	C (system dependency ratio)	D	A*B*C*D
Year	Average pension/ Average wage	System participants/ labor force	System beneficiaries/ System participants	Wage bill/ GDP	Total pension expenditure/GDP
1990	87.29%	16.56%	12.40%	74.40%	1.33%
1991	89.57%	16.76%	13.40%	70.79%	1.42%
1992	90.30%	16.42%	14.60%	67.36%	1.46%
1993	88.37%	16.26%	16.20%	65.24%	1.52%
1994	86.45%	15.54%	18.10%	65.88%	1.60%
1995	84.00%	15.01%	21.70%	64.65%	1.77%

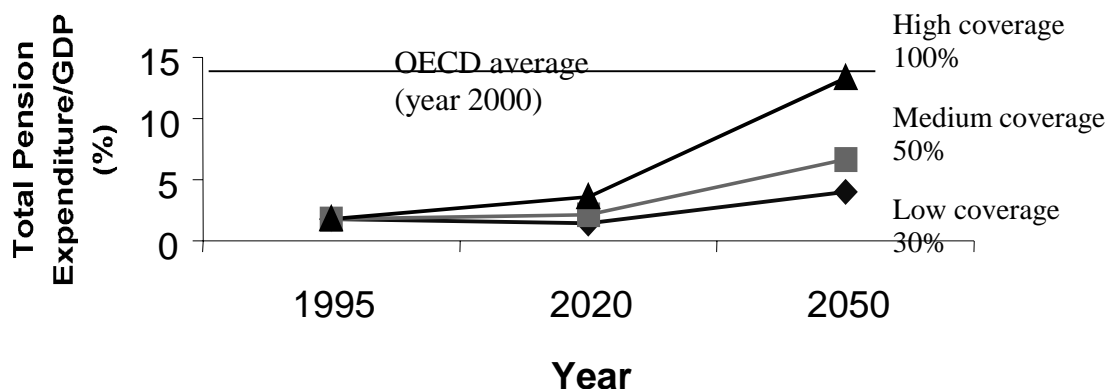
Data source: China statistical yearbook (1997); China 2020 (World Bank, 1997a)

From Table 2 it is obvious, first, that most of the increase in the pensions to GDP ratio will occur after 2020, which is sensible since this corresponds to the period of rapid demographic aging. Even under the low-coverage scenario, the ratio is projected to more than double by 2050; however, at 4%, the ratio would still be extremely low by OECD standards. By contrast, under the high-coverage scenario, China's pension obligations, relative to GDP, would be well within the OECD range by

2050. Note that the results of our ratio-based analysis are irrespective of the rate of growth of GDP.

**Table 2: Prospects for the future**

	A (replacement rate)	B (coverage)	C (system dependency ratio)	D	A*B*C*D
Year	Average pension/ Average wage	System participants/ labor force	System beneficiaries/ System participants	Wage bill/ GDP	Total pension expenditure/GDP
2020	70%	Low: 20% Medium: 30% High: 50%	17%	60%	1.43% 2.14% 3.57%
2050	60%	Low: 30% Medium: 50% High: 100%	37%	60%	4% 6.67% 13.32%



**Figure 7. Pension expenditure outlook under different assumptions for coverage**

### 3.2.2 Health

As can be seen from Table 3, during the 15 years from 1978 to 1993 both GDP and health spending in China increased dramatically. The annual growth rate of GDP was 7.7%, and health spending per capita increased even faster, with an annual growth rate of 9.5%. While the proportion of health care spending in GDP increased only by 1 percentage point over these 15 years, this is because it started from an extremely low base.

**Table 3: Increase of health spending & GDP (1978-1993)**

Year	GDP (billions yuan)	GDP per capita (yuan)	Total health spending (billions yuan)	Health spending per capita (yuan)	Total health spending as % of GDP
1978	880.9	915	25.8	27	2.93%
1979	948.2	972	28.7	29	3.03%
1980	1020.8	1034	31.6	32	3.10%
1981	1067.4	1067	34.2	34	3.20%
1982	1158.6	1141	39	38	3.37%
1983	1275.2	1238	43	42	3.37%
1984	1471.1	1410	47.9	46	3.26%
1985	1669.6	1577	49	46	2.93%
1986	1815.4	1689	54.6	51	3.01%
1987	2027.2	1855	62.5	57	3.08%
1988	2256.4	2032	71.1	64	3.15%
1989	2348	2083	77.8	69	3.31%
1990	2436.8	2131	84.8	74	3.48%
1991	2664.3	2300	94.2	81	3.54%
1992	3040.4	2595	103.3	88	3.40%
1993	3451.5	2912	132.1	111	3.83%

Source: China 2020 (World Bank, 1997b)

The approach employed here (from Mayhew, 2000) consists of decomposing growth in health care spending into two components, one reflecting changing demography and the second, a residual, reflecting all other sources of change. Let

$H(t)$  = health expenditure in year  $t$

$H(0)$  = health expenditure in the base year

We hypothesize that the rate of growth of total health spending can be decomposed into two rates, one a growth rate  $r_p$  reflecting demographic conditions (population size and age structure) and the second an "underlying" growth rate  $r_U$  reflecting change in technology, health system coverage, take-up rates, etc. If the demographic situation is summarized by an index  $I(t)$ , then

$$r_p = \frac{1}{t} \ln I(t)$$

and it is easy to confirm that

$$r_U = \frac{1}{t} \ln \frac{H(t)}{H(0)I(t)}$$

If we define  $I(0)=1$ , then the underlying rate can be written

$$r_U = \frac{1}{t} \ln \frac{H(t)/I(t)}{H(0)}$$

so  $r_U$  can be interpreted as the rate of growth of total health care expenditure normalized by an index of population size and structure.

The index of demographic conditions is defined as

$$I(t) = \frac{\sum_i P_i(t) c_i(t)}{\sum_i P_i(0) c_i(0)}$$

where

$P_i(t)$  = population in age group  $i$

$c_i(t)$  = an age-specific health per capita expenditure index with, say  $c_{5-9}(t) = 1$

$I(t)$  can be decomposed into components expressing total population change ("volume effect") and change in composition ("age distribution effect"). The first of these is

$$I_V(t) = \frac{\sum_i P_i(t)}{\sum_i P_i(0)}$$

and the second is

$$I_A(t) = \frac{\sum_i p_i(t) c_i(t)}{\sum_i p_i(0) c_i(0)}$$

where  $p_i(t)$  is the proportion of the population in age group  $i$  and

$$I(t) = I_V(t) I_A(t)$$

In industrial countries, it is possible to obtain explicit estimates for the age-specific health spending index  $c_i(t)$ . In China, however, such information is not readily available. Therefore, we make the simplifying assumption that

$$c_i(t) = m d_i(t)$$

where  $m$  is a time-invariant coefficient of proportionality and  $d_i(t)$  is the age-specific death rate. This assumption is based on the observation that most medical expenditure occurs in the months leading up to death.

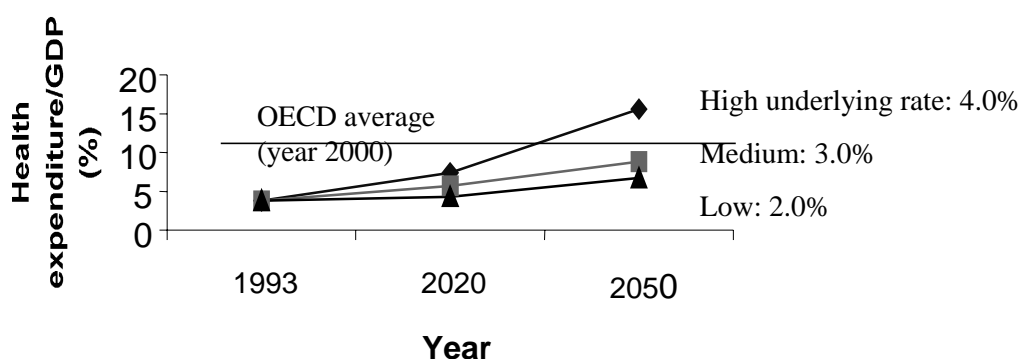
We assume three scenarios for the underlying rate  $r_U$ , one in which it is one percentage point higher than the annual GDP growth rate, one in which it is the same, and one in which it is one percentage point lower. These scenarios might correspond to varying rates of penetration of high-tech medical care imported from the West, varying degrees of success in avoiding moral hazard problems in health insurance, varying degrees of success in public health programs to address problems such as smoking, etc.

The other assumptions made relate to the demographic outlook (corresponding to the UN projection illustrated in Figure 2) and the rate of GDP growth (taken from the World Bank China 2020 reports).

**Table 4: The development of health care expenditure and GDP in China (1978-2050)**

	1978-1993	1993-2020			2020-2050		
GDP annual growth rate (%)	9.1	6.0			3.0		
Health care expenditure annual growth rate (%), of which due to	10.9	high	medium	low	high	medium	low
- underlying ( $r_U$ )	9.11	8.46	7.46	6.46	5.47	4.47	3.47
- population & age structure	1.79	7.0	6.0	5.0	4.0	3.0	2.0
- population change ( $I_V$ )	1.38	1.46	1.46	1.46	1.47	1.47	1.47
- aging ( $I_A$ )	0.41	0.72	0.72	0.72	0.053	0.053	0.053
Total health expenditure (billion yuan, end of period)	132.1	1297	990	756	6693	3785	2890
- As percentage of GDP	3.8%	7.4%	5.7%	4.3%	15.6%	8.8%	6.7%
GDP (billion yuan, end of period)	3451.5	17441	17441	17441	42897	42897	42897

Note: See text for explanation of assumptions regarding underlying rate of growth and GDP growth rate.



**Figure 8. Health expenditure under different assumptions for the underlying rate of growth**

If the underlying rate follows the path between the medium scenario and the high scenario, China will have a health expenditure profile similar to today's OECD countries by 2050. Under all scenarios, by far the most important component of increase in spending is the assumed underlying rate of growth. This underscores the urgency of putting in place a health care finance system which guarantees access to needed medical care while avoiding problems of moral hazard which have plagued OECD health systems. It also raises the question of whether burgeoning demand for high-tech medical care will "trickle down" from the urban middle classes to the large population of rural poor



### 3.2.3 Disability

Demand for disability services, like demand for health care, is highly age-dependent. Data on disability grouped by severity and age are very difficult to find from Chinese national sources. To arrive at an indicative picture of trends, therefore, in the following analysis we use statistics from an in-depth survey of disability carried out in the UK (Table 5) during the 1980s (OPCS, 1998).

**Table 5: Disability rates per thousand by age and severity**

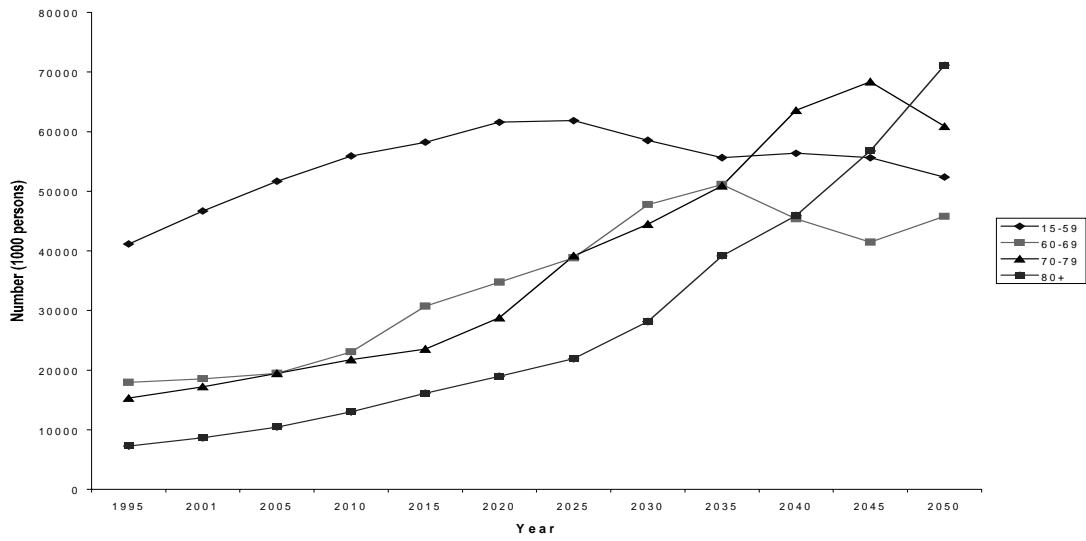
Severity	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	All
Most	5	5	5	7	14	27	57	200	22
Intermediate	7	10	13	23	34	57	112	238	40
Least	9	16	26	40	85	156	239	276	80
All	21	31	44	70	133	240	408	714	142

Source: adapted from OPCS, 1998

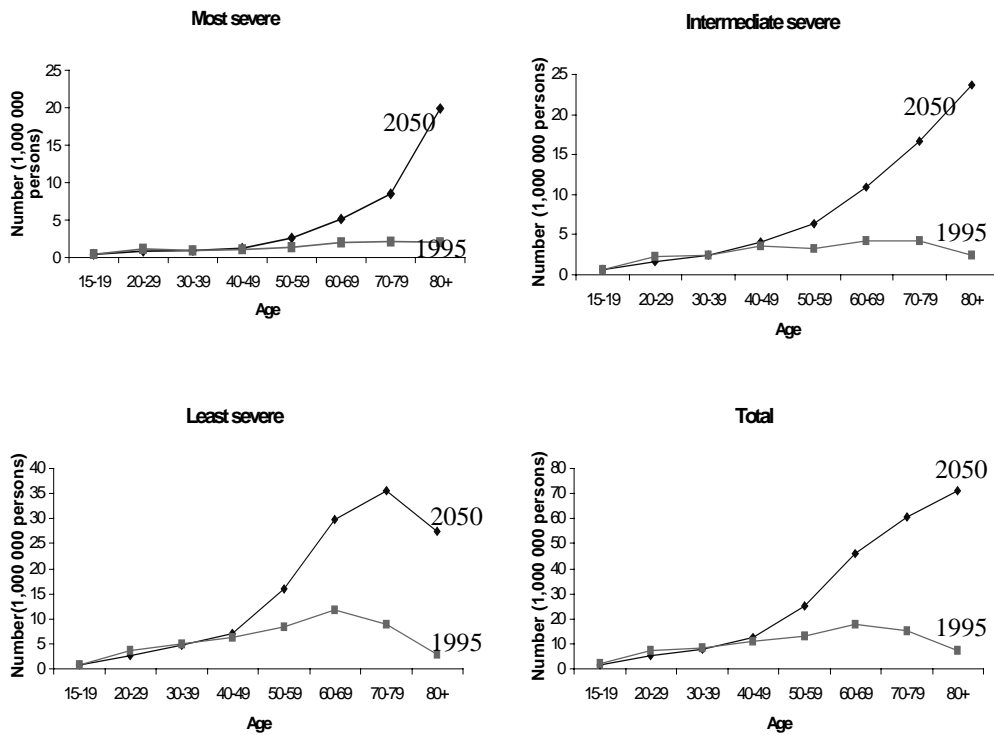
Can the statistics in the table be applied to the case of China? Compared to the data obtained from an elderly support survey taken in China, the proportion of most severe disability in the above table corresponds to the proportion of elderly in the Chinese survey who cannot live on their own, i.e., who need other persons' help. Similar proof showing the positive relationship between disability and age could also be found in the National Sampling Survey of Disability in 1987 China (Lee, 1997). We furthermore know that, although disability is more common among the young age group in China than in the developed countries, China is rapidly acquiring developed-country morbidity and mortality profiles. Based on these considerations, the data in Table 5 should be of at least some relevance to China.

In Figures 9 and 10, we display the results of applying the age- and severity specific disability rates in Table 5 to the UN population projections described earlier.

Figure 9 gives the projected number of people with disability by age group from 1995 to 2050 without stating different severity groups. It shows us that the number of disabled persons in young age groups (15-59) will not change much during the coming 50 years; in fact, if disability prevalence among the young declines with economic development, significant declines might be possible. On the other hand, the situation for the old age group, and especially for the older elderly (80+), is becoming increasingly serious over time. In 1995, the number of disabled persons in the 80+ age group was the smallest one among 4 age groups, but it is projected to increase continuously until 2050, ending with the largest number of disabled people compared to the other age groups. This trend is due in its entirety to population age-structure change. Growth in the severely disabled population, which places the greatest burden on long-term care services, will be especially pronounced because of population aging (see Figure 10 which "breaks out" the forecast by severity class).



**Figure 9: Projected number of people with disabilities by age group (1995-2050)**



**Figure 10: Number of disabled persons, 1995 and 2050 by age group and severity class**

With fewer young people to provide care, the burden of within-generation care giving (i.e., provision of care by a spouse or sibling) is likely to increase and, with the severity of disability increasing, the care-mix is likely to shift towards professional care

services. In 1997 there were 42,385 social welfare institutions in China, housing 785,199 persons, most of them elderly people without family care. But this only covered 2% of the total old disabled population in China, and was already behind the demand. To meet the higher demand in the future, China will have to start thinking about increasing the investment in the formal care-giving sector. Anticipating this need would help China avoid problems now faced in Japan, which must respond to a severe shortage of long-term care facilities. If proper facilities are not available, experience shows that the severely disabled are either cared for in hospitals (which should serve acute care needs) or receive insufficient care in a home setting.

#### **4. Concluding remarks**

Because of the speed of fertility decline, much of it associated with the "one-child policy," the population of China will age more rapidly than any population in history. At the same time, rapid economic growth has the potential to weaken traditional care-giving institutions and to increase demand for leisure (i.e., years of retirement) and high-tech health care. Also at the same time, social security institutions inherited from the past are being changed in the context of economy-wide reform.

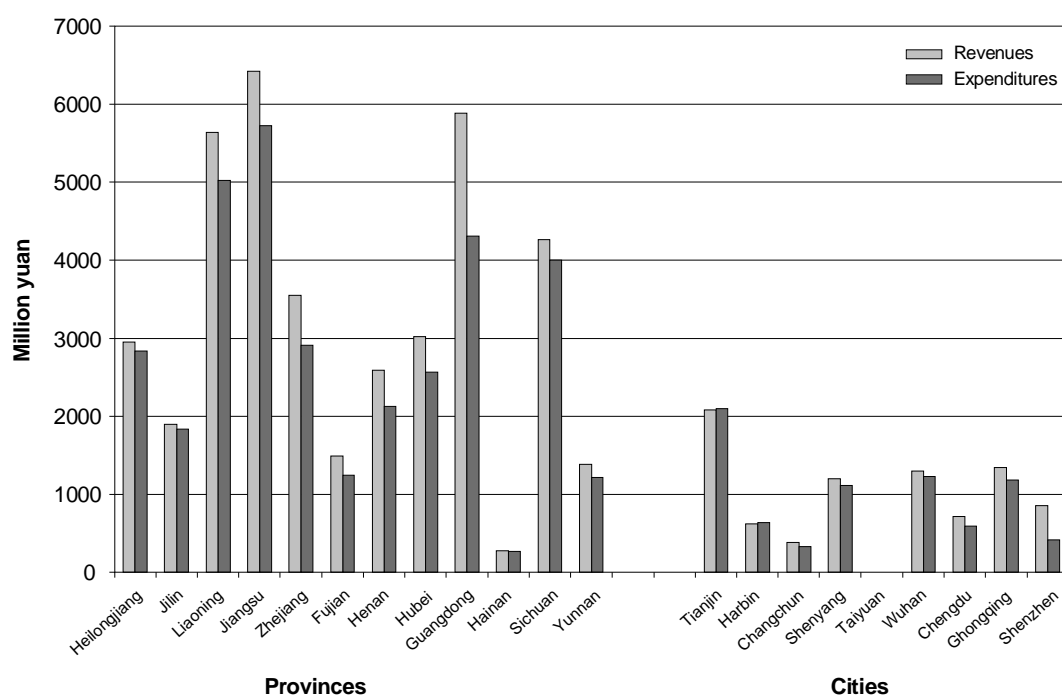
In this paper, we have described the main institutional structures dealing with pensions and health in China. We have also presented ad hoc projections for three important variables: pension spending, health care spending, and the number of disabled persons. Growth in pensions and health and disability spending has the potential to give China the social-insurance spending profile of a wealthy country while it still has the income profile of a poor one. However, while demography makes some increases in spending inevitable, the most important variables, such as pension system coverage and the "underlying" growth rate of medical spending, can be influenced by policy. Under these circumstances, it is important that Chinese policy makers look forward and put in place robust social insurance institutions. Assessment of alternative policies should be based not only on the types of ad hoc analysis presented in this paper, but on the elaboration of full-scale projection and simulation models in accordance with best international practice.

## Annex

**Table A1. Pension expenditures (1978-1997)**

Year	Pension Beneficiaries (10 000 Persons)		Ratio of Staff and Workers on Their Post to Beneficiaries				State sector pension expenditures  (billion yuan)
	Total	State- owned units	Total	State- owned units	Urban Collective ownership	Other Ownership	
1978	314	284	30.3	26.2	68.3		1.41
1980	816	638	12.8	12.6	13.6		4.01
1985	1637	1165	7.5	7.7	7.1	8.8	11.24
1986	1805	1303	7.1	7.2	6.9	9.2	13.42
1987	1968	1424	6.7	6.8	6.5	12	16.42
1988	2120	1544	6.4	6.5	6.2	12.1	20.9
1989	2201	1629	6.2	6.2	6.2	13.2	24.52
1990	2301	1742	6.1	6	6.3	14.9	30.61
1991	2433	1833	6	5.8	6.2	17.3	36.53
1992	2598	1972	5.7	5.5	5.9	16.6	45.65
1993	2780	2143	5.4	5.1	5.7	13.1	60.09
1994	2929	2249	5.1	4.8	5.2	12.5	84.4
1995	3094	2401	4.8	4.6	5	12.2	
1996	3212	2515	4.6	5.9	4.8	11.6	
1997	3351	2638	4.4	4.1	4.5	11.8	

Source: China Yearbook of Labor Statistics (1995), China Yearbook of Statistics (1995)



**Figure A1. Pension fund revenues and expenditures, 1995**

Source: China 2020 (World Bank, 1997a)

**Table A2. National health expenditure (1978, 1986, 1993)**  
Millions of 1993 yuan

Funding Source	1978	1986	1993
Government budget	7292 (28)	17288 (32)	18878 (14)
Government & state enterprise insurance systems	7689 (30)	18274 (33)	46108 (36)
Out-of-pocket payments	5268 (20)	14185 (26)	56106 (42)
Rural cooperative medical system	5109 (20)	2918 (5)	2243 (2)
Other	428 (2)	1956 (4)	8713 (6)
Total	25786 (100)	54621 (100)	132048 (100)
Memo item			
Total health expenditure as percentage of GDP	2.9	3.2	3.8

Note: Figures in parentheses are percentage shares of the total  
Source: China 2020 (World Bank, 1997b)

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