SCHOOL-AGE POPULATION AND EDUCATIONAL PLANNING IN CHINA

BY

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DECLARATION

Except where otherewise indicated

this thesis is my own work.

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ABSTRACT

This study has projected, compared and analysed the trends in size of the total population, school-going population (aged 6-14) and level of school enrollment under various fertility assumptions for China during the period 1982-2012, as well as associated demands. The focus of this study is on the future school enrollment and its implications. Based on population projections by residence (rural and urban), under different mortality and fertility assumptions, this study has found that in general the size of the projected school-age population aged 6-14 and school enrollment for primary and junior high school show a falling trend broken by a substantial period of increase during the period 1982-2012, but the dimension of changes is varied under different fertility variants. With the passage of time, the differences among the projected results under different fertility variants become larger as a result of the intensified influence of fertility assumptions.

Taking the projection results under the medium variant as an example, it is found that the school-going population decreases by 23 per cent during the period 1982-1992 for rural areas and by 32 per cent during the period 1982-1999 for urban areas; and increases by 35 per cent during 1992-2005 for rural areas and increase by less than 0.01 during the period 1999-2001 for urban areas; then decreases again starting from 2006 and 2002 to the end of the projection period for rural and urban

areas respectively. It is further assumed that the enrollment rate will increase from 87.6 per cent in 1982 to about 99.8 per cent in 2002 for urban areas and from 73.1 per cent in 1982 to about 99.5 per cent in 2012 for rural areas, indicating the realization of a universal period of nine years of compulsory education. Correspondingly, a similar fluctuation occurs to the associated demands for teachers and funds.

This study has also examined and evaluated some of the implications of the fluctuation of the projected trends of school-going population. Although the policy of population growth control will benefit the people's well-being and the national development, including the development of education, this kind of fluctuation in the population trends that will result from the implementation of the inconsistent population policy in the past must be taken into serious consideration by the policy-makers and education-planners. Flexible and appropriate strategies should be implemented in advance, for such aspects as the training of qualified teaching staff and available funds, in order to accommodate the future fluctuations in the demand for educational services.

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CHAPTER 1

INTRODUCTION

1.1. The importance of education in China

It is argued that education is the primary component of human resources development which both raises productivity and lowers reproductivity and plays a significant role in economic growth and population control (Corner, 1986:1). Therefore the Chinese government has recently paid special attention to education in its national planning and has decided to introduce nine years of compulsory education within the next ten years. China, the most populous country in the world with a population of more than 1 billion, is facing the great challenge of realizing its ambitious goals of population control and modernization of industry, agriculture, technology and defence. Education is not only the key to the quality of the country's human resources and the formation of the qualified, highly-productive labour force needed for the national economic development, but also the key to fertility reduction and control of population growth under the present conditions in China.

1.1.1. Education, human resources and national development

As education is a critical factor primarily affecting "human capital formation" -- the process of changing the "quality" or productive power of human

labour (Corner, 1986:3) -- "education occupies a highly important place in most plans for economic and social development" (Jones, 1975:69). First-cycle education, that is primary and junior high school education, equips the whole population with basic literacy and numeracy, and is the foundation of the whole education system and the starting point for improving the scientific and educational level for the whole nation (He, 1984:515). As a result, first-cycle education merits the government's special attention and constitutes an important integrated component of the national development plan.

It is estimated that in the early 1980s, 60-70 per cent of national economic growth of developed countries in the world was due to technical development which mainly relies on knowledge and skills of the labour force (Xue, 1987:3-5). In contrast, the national economic growth in China has mainly depended on new capital construction and extension of the existing enterprises but has largely ignored the development of human resources and improvement of the quality of the labour force. The fact that during the period 1952-1980, only about 16 per cent of the growth of total output value of state-owned enterprises came from technological progress (Xue, 1987:3-5), is at least partly due to that neglect.

The educational attainment of the labour force is an indicator of its productive power. For example, it is estimated that, compared with a worker without education, primary education can help a worker increase productivity

by 43 per cent, senior high school education by 108 per cent, and university or college education by 300 per cent (Xue, 1987:3-5). However, the educational attainment of the employed population in China is so low that it is impossible to meet the requirements of economic development in the next decades. According to the 1982 population census (CASS, 1986:653; Cheng, 1985:15), for the total employed population, the highest levels of education are as follows: only 1 per cent have college or university education, 11 per cent senior high school education, 26 per cent junior high school education, 34 per cent primary education, and 28 per cent are illiterate and semi-literate. This adverse situation has become a major obstacle for China to realize its national goal of four modernizations and has posed a difficult problem for the government to deal with.

1.1.2. Education and population control

Education also makes another important contribution to development by means of fertility reduction. According to the UN Secretariat (1984:89-90), there is a significant negative relationship between fertility and educational level in those developing countries which have a high literacy level. The negative effect of education on fertility is more often true for female education, "which may have an effect about three times that of male education" (Bulatao and Lee, 1983:782).

As far as Chinese women are concerned, the 1982 One-Per-Thousand Fertility Survey in China and several empirical studies by Chinese scholars have proved that there is a strong inverse correlation between educational attainment of women and fertility in China. Education of females has a substantial impact on Chinese women's fertility through various ways, such as increased labour force participation, higher status occupations, the acceptance of family planning policy and adoption of birth control methods (Li, 1986:374).

Table 1.1. clearly indicates the strong inverse relation between birth order and mother's educational attainment. These data indicate that more than 90 per cent of births to women who had higher levels of education (junior high and above) were first or second births, but this figure was much lower for those with only primary education (73 per cent) and lower still for the uneducated (less than 40 per cent). Under the column of first and second birth and the column of third birth or more, the largest difference (17.7 per cent) appears between mothers with junior high school education and those with primary education in both groups; this shows junior high school education is a threshold of fertility reduction in China. It is clear that with the increase in mothers' educational attainment, there is a large increase in the percentage of those having first and second births and a striking decrease in percentage of those having third births or higher. Here it should be mentioned that age may be a factor; this means that those

Table 1.1.

Birth Order of Births in the Year Preceding Census According to Educational Attainment of Mother Aged 15-49, China, 1981

EDUCATIONAL ATTAINMENT	% OF ALL BIRTHS OCCURRING TO WOMEN AGED 15-49	% 1ST & 2ND BIRTH OF BIRTHS TO WOMEN IN THIS EDUCATION CATEGORY	% 3RD BIRTH OR MORE TO WOMEN IN THIS EDU. CATEGORY	TOTAL ROW % (NO)
UNIVERSITY	0.5	98.4	1.6	100.0 (59,252)
SENIOR HIGH	9.6	96.6	3.4	100.0 (1,602,404)
JUNIOR HIGH	22.3	90.8	9.2	100.0 (13,828,483)
PRIMARY	30.4	73.1	26.9	100.0 (6,601,988)
ILLITERATE & SEMI-LITERATE	37.2	59.4	40.3	100.0 (8,337,036)
TOTAL COLUMN %	100.0			

Source: 1982 Population Census of China (CASS, 1986:682)

with more education are probably younger and have not yet had a "chance" to have higher order births. In addition, the women with higher eductional levels are more likely to come from urban areas and therefore be subject to the stronger family planning policies in the cities. But these explanations still could not account for the great differences shown between education groups. This indicates better educated mothers have greater preference for smaller family size and more acceptance of the government's antinatalist policy. As the success of China's family planning program, to a great extent, depends on the elimination of third or higher births, it can be concluded that the improvement of women's educational attainment will greatly benefit fertility reduction and population growth control.

1.2 The Implications of population growth for education planning

It is clear that population growth greatly increases the magnitude of the task of expanding and upgrading educational systems and that a decline in fertility leads to important savings in the costs of meeting educational goals (Jones, 1975:101). The educational planners and policy-makers in China are showing special concern for population growth based on the understanding of the significant impacts of population growth on the development of education.

1.2.1. Demographic profiles and the Chinese government's antinatalist policy

China's population is characterized by its huge size, large proportion of rural population (80 per cent), and young age structure. Although the percentage of population aged 0-14, which is the main target of first-cycle education, decreased from about 40 per cent in the 1964 census to 34 per cent in the 1982 census, it is still high compared with developed countries. This means a considerable momentum for population growth in the next 20-30 years considering that there are 337 million children now in this age group (CASS, 1986:597). Besides, the age structure pyramid in the 1982 census shows an irregular shape, which is the result of inconsistencies in the government's population policies and the family planning campaigns in the past decades and reflects the previous large fluctuations in population growth. As far as the planning for first-cycle education is concerned, in the age structure of the 1982 census, the 10-14 age group (born during the 1963 to 1968 baby-boom) expanded significantly; the 0-4 and 5-9 age groups were successively smaller, reflecting the fact that population growth has been under strict and planned control since 1970. In addition, the large rural population creates an obstacle to the implementation of universal nine years of compulsory education, due largely to the economic and cultural constraints in rural China. In summary, all the above-mentioned characteristics bring about uncertainty and difficulties

for educational planning and exert great pressure upon the development of education.

1.2.2. The implications of rapid population growth for education

Rapid population growth has a strong, direct effect on future expenditures on education. Among several factors which may increase educational outlays, such as rising wages of teachers and increasing enrollment rates, an absolute increase in the number of students has been shown to be the single most important factor in increasing educational expenditure (Birdsall, 1977:69). This can be illustrated from the following aspects according to the situation in China. First, a large population of children eligible for nine years of compulsory education results in difficulties in accomplishment of such universal compulsory education. Second, the size of the school-going population directly limits the promotion rate from one level to another, as a large gap exists between the demand resulting from a large school-going population and the supply which can be provided by the existing educational system in secondary and higher education institutions. Third, the large population to be covered by general education implies the requirement of considerable expenditure, and therefore the development of higher education facilities for training of specialized personnel is impaired by shortage of funds. Fourth, current population growth in China is too rapid for educational allocation from the state

revenue to follow at corresponding speed due to the limited financial resources, and this has resulted in declining conditions of facilities and deteriorating quality of education.

1.3 Objectives of the thesis

It is evident that educational demands are very closely related to population growth (Jones, 1975:70). Therefore educational planning must be based on possible future demographic trends and thus requires population projections. By reviewing the current situation of education in China, especially highlighting the enrollment differentials by sex and by residence, this thesis intends:

(1) to project the school-going population and school enrollments for the first-cycle of education (six-year primary education plus three-year junior high school education) in China, during the period 1982-2012, as well as relevant associated demands, such as schools, teachers, facilities and funds required;

(2) to compare and analyse the school-going population and enrollment trends under various fertility assumptions which depend on the degree of implementation of the family planning program and the acceptance of the government's anti-natalist policy;

(3) to examine and evaluate some of the implications of the projected school-going population trends both for planning and policy aspects in order to indicate the importance of population control policy in China's

present situation, and to make suggestions relevant to education planners and policy-makers in China.

The difficulties of population projection are due to uncertainty about future fertility, which may not respond to government policy as readily as in the past. In China's situation, at this stage, a small variation in the government policy may produce great effects on the future trends in the school-age population. It is imperative for the educational planners to be prepared for the uncertainty of the future demand which is the basis of the educational planning. It is hoped that this study can provide some assistances to the planners in this regard.

1.4 Data sources

Only published data are used in this study to project future school-age population, enrollment and relevant demands. The data come mainly from five sources:

(1) The Ten Per Cent Sample Tabulation of the 1982 Population Census of China (referred to as the Census Ten Per Cent Sample Tabulation), which provides base year population by single year of age, sex and residence (SC and SSB, 1983);

(2) The 1982 National Sample Survey on Women's First Marriage and Fertility (referred to as the National Sample Survey on Women), which provides total fertility rates by residence (Zhao, 1985).

(3) The 1983 Third National Sample Survey on Children (referred to as National Sample Survey on

Children), which provides basic data to calculate school participation rates by age, sex and residence (CPIC, 1985).

(4) Achievements of Education in China, Statistics, 1949-1983, which provide data to estimate relevant demand, for example, for teachers and expenditure (MOE, 1984).

(5) Life tables derived from data collected in the 1982 Population Census of China, which provide life expectancy at birth by sex and residence (Liu, 1986:13).

1.5. Data limitations

Data limitations will be discussed from three aspects: coverage and timing, quality of data, and availability of data.

1.5.1. Coverage and timing

As data from different sources are to be used in making the population projections, consistency of coverage and timing is an important concern.

(1) Completeness of data

The Census Ten Per Cent Sample Tabulation is a preliminary tabulation for the purpose of obtaining some of the most important results earlier than through complete tabulations. It provides the base year population for the projections, that is, single-year age distribution by sex and residence (urban/rural). However, these data do not include 4.238 million active servicemen, accounting for about 0.4 per cent of the total population (Li, 1985:12). The exclusion of active

servicemen means the total population is not truly represented, but in fact it makes no difference to the projection results. As the projected school-going population are those aged 6-14, the group of servicemen is not really directly relevant. It may have some impact on future births, but servicemen are predominantly men aged 18 to 21, and thus the impact is probably small.

(2) Geographical coverage

As all the data used in this study exclude Taiwan, Hong Kong and Macao, the consistency of geographical coverage refers to inclusion or exclusion of Tibet in the above-mentioned surveys. Tibet is a minority autonomous region with a sparse population and is located in the southwest border area of China. The Census Ten Per Cent Sample Tabulation and the National Sample Survey on Children both include Tibet while the National Sample Survey on Women excludes Tibet. As the population in Tibet is about 1.9 million and thus accounts for only about 0.2 per cent of the total population, the exclusion of Tibet has very little effect on the overall values of these measures, such as the total fertility rate used for the projection.

(3) Timing

The simultaneity of data from independent sources is another point under consideration to ensure the validity of this study. The 1982 National Census was conducted on 1 July 1982; the National Sample Survey on Women on 31 December 1982; and the National Sample Survey on Children in 1983. As the timing of these surveys was

very close to each other, the influence of timing difference can be considered to be negligible.

1.5.2. Quality of data

(1) Age-reporting

With the help of the Chinese lunar calendar with an animal sign for each year, the age reporting in the 1982 Census is quite accurate and reliable. The quality of data can be further evaluated according to international standards and comparisons with the 1964 National Census.

According to international standards, the indices of age misstatement calculated from the Census Ten Per Cent Sample Tabulation are as follows. Whipple's index, with a reference value of 100, is 102.3, indicating no preference for ages ending in 0 and 5; Myer's index, with a reference value of 0, is 3.005 (male 3.025; female 2.85), thus there appears to be no digit preference in age reporting; the UN index (reference value 20-40) is 28.43, which also shows no obvious errors in reporting of age and sex (Jiang and Zhu, 1986:229). Obviously, all of these indices indicate a high degree of accuracy compared with the reference values. The values of Myer's index and the UN index are a little higher than the corresponding reference value and this phenomenon is not caused mainly by age misstatement but by some other reasons. In the past two decades, there have been large population fluctuations in China. The age structure anomalies caused by these fluctuations are the likely

cause of most variation from the standard values of the indices (Li, 1985:5; Ma, 1984:260).

In comparisons with the 1964 census, by using survival ratios to check the 1982 census data compared with the 1964 census data which has been proven to be reliable and accurate (Myer's index is 0.42 for male, and 0.47 for female) (Jiang and Zhu, 1986:29), several questionable age groups can be identified. These are females aged 20 (survival ratio 1.0508) and 22 (survival ratio 1.0167), and males aged 41, the survival ratio of each of these being larger than one, although the latter has no effect on this study. The relevant data for females are shown in Table 1.2.

Table 1.2

Survival Ratios to 1982 for Females Aged 2 and 4 in 1964, China, 1982

NUMBER OF POPULATION				SURVIVAL RATIO
1964		1982		
AGE 2	7,544,061	**AGE** 20	7,927,363	1.0508
4	6,955,196	22	6,969,977	1.0167

Source: 1964 and 1982 Population Census of China (CASS, 1986:602-604)

The distortion in female ages may be due to the new marriage law of 1980. According to that law, the legal marriage age for females is 20. In order to be eligible for marriage, age over-reporting might have occurred among those women who were under 20 in 1980 when

the new law was announced and those who were under 20 when the census was conducted (Li, 1985:5; Ma, 1984:260). This can be justified by the fact that survival ratios from 1964 for those aged 18 and 19 in 1982 are 0.8877 and 0.9306, respectively, which are lower than the usual value of 0.96 for neighbouring age groups. As the fertility distribution of the TFR is different for age groups 15-19 and 20-24, misreporting from 15-19 to 20-24 may lead to slightly higher results in projecting future births.

(2) Undercount of deaths

It is known that life expectancy at birth is closely related to the infant mortality rate (IMR). According to the post-enumeration check of the 1982 census, the net death omission rate (that is the number of deaths omitted in the enumeration divided by the total number of deaths actually occurring) is 0.44 per cent. If this percentage is added to the group aged 0 in the calculations, it only decreases the value of life expectancy at birth by 0.1 year (Ma, 1984:267; Jiang, 1984:635).

In general, the data from the 1982 National Census and the Census Ten Per Cent Sample Tabulation are fairly good and can serve as the basis of population analysis and projections.

1.5.3. Availability of the data

(1) International migration

Data on international migration of China are not available. However, international migration is very small compared with the total population, and hence the population may be considered a closed population for projection purposes.

(2) Rural/urban migration

It is known that urban and rural migration is very important to a reasonable population projection by residence. However, as the relevant data are not available, rural/urban migration will be ignored in this study. For the consideration of educational planning, the projected urban school-age population can be regarded as a minimum figure and the projected rural one as a maximum figure since the migration process from rural to urban areas may continue during the projection period depending on government policy and the economic situation.

(3) School participation rate

In the 1982 census, the question asked about education is about educational attainment, not school attendance. This is an important omission of a generally recommended topic (Kannisto, 1984:40). Therefore data on school attendance by single years of age, sex, and residence are not available from the census. However, the National Sample Survey on Children conducted in 1983 provides figures on school attendance by single years of age for children aged 6-14 by sex but not residence, and

for all children (both boys and girls) by age and residence. Age-specific participation rates for 6-14 by age, sex and residence can be estimated indirectly from these tabulations, on the assumption that there is no bias in urban areas against sending girls to school.

(4) Proportion of over-aged children in school

A high proportion of over-aged children at schools is not an unusual phenomenon in China, especially in primary school and in rural areas. In order to get more accurate school enrollment, this proportion should be taken into consideration. Only an overall figure of 19 per cent of over-aged children at school (not by residence) is available (MOE, 1984:226). This figure is used in the calculation of school enrollment, under the assumption of the same proportion of over-aged children in both primary and junior high schools. It is further assumed that the proportion of over-aged children will be reduced gradually with the realization of nine years of compulsory education in the whole country. As shown in Tables 4.7 and 4.8, the proportion is 0.19 in 1982, 0.15 in 1992, 0.05 in 2002 and 0.01 in 2012.

(5) Pupil/teacher (P/T) ratio

As the P/T ratio is available only by level of school (primary and junior high school), and not by residence, the projected number of teachers by level of school is obtained by using total enrollment of urban and rural areas and the P/T ratio by level of school.

(6) Percentage of teachers' salary and other recurrent costs increase

Based on the government's statements and recent trends (SSB, 1987:117, 164; Wang, 1988a:1), it is assumed that the average teacher's salary will be increased by 93 per cent and the other recurrent costs per student will be increased by 179 per cent every 10 years.

(7) Drop-Out Rate and Repeater Rate

The age-specific drop-out rate and repeater rate are important to evaluate the efficiency of the school system and to estimate future demand for schooling and expenditure. Unfortunately, these rates are not available, and thus a detailed study of the efficiency of the educational system is not possible at this stage.

CHAPTER 2

EDUCATION IN CHINA

2.1 Introduction

This chapter illustrates the general situation of education in China as a background to understanding the topic of this thesis. This background covers the government's policy concerning education; introduction of the nine years of compulsory education system; literacy, illiteracy and semi-literacy rates as obtained in the census; school enrollment rates and their differentials; the teaching staff; and the efficiency of the school system (drop-out rates and promotion rates).

2.2. The government's policy and the introduction of nine years of compulsory education

Since the founding of the People's Republic of China in 1949, China's elementary education has made considerable progress. According to the data released by the China Population Information Centre (1985:381), 81.4 per cent of children aged 7-14 were enrolled in the whole country in 1983, compared with 20 per cent before 1949. However, primary education has not been universal, with many school-aged children, particularly girls, dropping out of the required elementary courses. This, in turn, leaves many young people and middle-aged adults illiterate or semi-literate, and about 10 per cent of population reaching the age for entering the labour force annually are illiterate.

In China, a country with a centralized economy, government policy and strategy play a vital role in every aspect of national development, including education. At present, the Chinese government has put education as one of its priorities in the national plan and has started to formulate relevant laws and regulations to ensure the development of education.

Experience suggests that the period of compulsory learning should be lengthened gradually in relation to a country's economic growth (Zsigmond and Devereaux, 1980:137). The duration and requirement of compulsory education are associated not only with the level of economic development but also with the speed of economic growth and the economic targets.

In 1986, the Chinese government adopted the Law on Compulsory Education, implementing six years of primary education and three years of junior high school education (Dai, 1986:5). This indicates the government's strong commitment and marks the beginning of a new stage in China's elementary education. Although China will not be able to enter the ranks of countries with medium per capita income until the beginning of next century, the stipulation of nine years of compulsory education is higher than the average duration of 7.1 years of countries with medium and low income levels (Zhou, 1986:II-29). Achieving this target is indispensable for the realization of the ambitious national goal of building a country with rapid economic growth and a high standard of civilization.

According to this law, by the end of this century, school-aged children in most areas will be educated under the nine-year education system. Nevertheless, this goal will have to be attained through realistic measures step by step, according to the actual economic and cultural conditions in different areas. It will first be implemented, by 1990, in the cities and other economically developed areas which comprise one-fourth of the total population. In the less economically developed areas, with nearly half of China's population, it will be introduced by around 1995. In a few under-developed areas, primary education may not be widespread until the end of this century (Dai, 1986:5).

As shortage of funds is one of the most serious difficulties in the development of education, the law provides that the growth rate of the total outlay for education should be higher than that of regular state revenues, and the average educational funds per student should also be increased progressively. This stipulation provides the financial guarantee for education from the government (Dai,1986:5).

Some other major laws on education will be formulated in the next three to five years, such as the Basic Law on Education; the Law of Universal and Compulsory Primary Education; the Law on Education Funds; the Teachers' Law; the Law on Protecting Schools (YPRC, 1985:517). In particular, the formulation of the Teachers' Law should be mentioned. This law (YPRC, 1985:483) stipulates the qualifications, training,

examination, employment, treatment and awards to teachers. It aims at speeding up the training of the teaching staff and developing various teacher training institutions. Finally it aims at improving teachers' social status and living conditions, and building a stable and sufficient contingent of qualified teachers.

2.3 Literacy, illiteracy and semi-literacy rates

The 1982 census attempted to enumerate the number of people aged 12 and over who were illiterate and semi-literate (CASS, 1986:137). According to the 1982 census, the illiteracy and semi-literacy rate among the population aged 12 and over was just under 32 per cent. Compared with the figure of 57 per cent in 1964, the rates decreased by 25 per cent, an average annual reduction of 1.4 per cent during the time span of 18 years (CASS, 1986: 597,602,618). This shows great effort and progress by the government in eliminating illiteracy. Even so, the total population illiterate and semi-literate reached an astonishing figure of 237.7 million.

If the illiteracy and semi-literacy rate for the population aged 12 and over is examined from different aspects, the striking contrasts between urban and rural residence and between the sexes are clearer. In Table 2.1, in regard to the illiteracy and semi-literacy rate by residence (urban/rural), the approximate figure for rural areas (35 per cent) is more than twice the one for

Table 2.1

Illiteracy and Semi-literacy Rate Among Population Aged 12 and Over in China, 1982

	URBAN	RURAL	TOTAL
MALE	8.9	21.1	19.2
FEMALE	24.6	49.0	45.2
TOTAL	16.4	34.7	31.9

Source: 1982 Population Census (Liu, 1987:12)

urban areas (16 per cent). In regard to illiteracy and semi-literacy rate by sex, the figure for males is about 19 per cent, in contrast to 45 per cent for females, with the percentage point difference of 26 per cent. Furthermore, there is an even sharper contrast if the illiteracy and semi-literacy rate for the population age 12 and over is examined by residence and sex. In urban areas, the figures are about 9 per cent for males and 25 per cent for females, with a percentage point difference of 15 per cent; in rural areas, the figures are about 21 per cent for males and 49 per cent for females, with a percentage point difference of 28 (Liu, 1987:12). The large differentials by residence or sex, or by residence and sex, reflect the uneven development of education, the different extent of achievement of universality of primary education in urban and rural areas, and the inequality of access to education between males and females, especially in rural areas. It is clear that the focus of achieving universality of education must be on

rural areas and the emphasis on the enrollment and schooling of girls.

2.4. School enrollment and its differentials

According to the National Sample Survey on Children conducted in 1983 (CPIC, 1985:379-383), as shown in Table 2.2, of children aged 6-14 covered in the survey, urban children account for 18.1 per cent and rural children account for 81.9 per cent of the total; when they are classified by sex, females account for 48.3 per cent and males account for 51.7 per cent of the total. The total enrollment for children aged 6-14 is 75.7 per cent; the enrollment ratio is 87.6 per cent for urban children and 73.1 per cent for rural children; and 80.5 per cent for males and 70.6 per cent for females. If examining the enrollment ratio by residence and sex, the enrollment ratio for males in rural areas is 79.3 per cent and the corresponding figure for females is 66.6 per cent. In some rural areas, the situation is even worse. According to the sample survey conducted by State Statistical Bureau (Jiao, 1988), for example, in Guizhou province, the enrollment ratio for children aged 6-11 is 80 per cent for boys but only 44 per cent for girls.

Table 2.2

School Enrollment by Residence and Sex, for Children Aged 6-14 in China, 1983

	PERCENTAGE OF CHILDREN AT SCHOOL		
	URBAN	RURAL	TOTAL
MALE	--	79.3	80.5
FEMALE	--	66.6	70.6
TOTAL	87.6	73.1	75.7

Source: 1983 National Sample Survey on Children (CPIC, 1985:381-383)

According to recent information (Zhao, 1988), there are 2.73 million school-age children not at school, of whom 2.25 million are girls, accounting for 83 per cent of the total. Among the difficulties preventing girls from entering school or continuing studies are the traditional feudal ideas of son preference, the backward economic situation, and financial difficulties prevailing in most rural areas. In rural areas, it is often held that girls will get married and leave the family sooner or later, so it is not worthwhile sending them to school at the family's financial expense.

In brief, it is obvious that the realization of nine years of compulsory education in the whole country mainly depends on the achievements of universal education in the rural areas and the most difficult task is the enrollment of girl students and the reduction of their drop-out rate.

2.5. Teaching staff and facilities

2.5.1.Teaching staff

There are nearly eight million primary and senior high school teachers in China, 2.35 million junior high school teachers and 5.58 million primary school teachers (CEY, 1984:198). Although the number appears large, the quantity and quality of teachers fall short of the needs of achieving the universality of compulsory education. The government has decided to accelerate the training of teachers so that those teaching in primary schools will have senior high school teacher education and those in junior high school are at least graduates of three-year teachers' colleges (Dai, 1988:5). Correspondingly, teachers' schools and colleges will be developed while teachers in positions at present will advance their education through correspondence courses and televised teaching programmes.

The general situation of teaching staff in primary schools and high schools is deteriorating currently; this is indicated by the following points according to recent newspapers (Cheng, 1988).

(a) Shortage in numbers of qualified teachers. For example, during the period of the Seventh Five-year Plan (1986-90), an extra 200,000 teachers are needed;

(b) Poor qualifications of the current teaching staff. In terms of qualifications, according to the records for formal schooling, unqualified teachers account for 37 per cent of the total teachers in primary

schools, 74 per cent in junior high schools, and 61 per cent in senior high school;

(c) Lack of successors for the current teaching staff, as excellent senior high school graduates do not want to be enrolled into teachers' college and most graduates from teachers' college are reluctant to become teachers in high schools but prefer to work in government offices and enterprises;

(d) Instability of the team of qualified teaching staff. At present, considerable numbers of competent teachers with high qualifications intend to transfer to other occupations to improve their salary and position;

(e) Difficulties in the implementation of the core curriculum: due to a great shortage of teachers in some subjects, such as music, physical education, arts and foreign languages, many schools cannot start all compulsory courses.

In particular, the surplus of unqualified teachers and the poor qualifications of the teaching staff should be mentioned. In previous years, especially during the Cultural Revolution, being a teacher was regarded as a better and lighter job both in urban and rural areas compared with manual work in factories and fields. Therefore many people with special backgrounds and contacts were recruited as teachers in primary and junior high schools without consideration of their academic record and qualifications. This practice has unavoidably led to the current situation in the educational system characterised by a surplus of

unqualified teachers and poor qualifications of the teaching staff.

2.5.2. Facilities

Expansion of facilities to meet the needs of a growing school-age population should be planned carefully to make optimal use of human and financial resources. In China, due to insufficient finances, a shortage of necessary teaching facilities (including classrooms, desks and chairs, reference books and other teaching equipment) is the general situation. The conditions are much better in urban areas than in rural areas but crowding in the classroom is quite a serious problem even in the large cities. In rural areas, the situation is worse because of financial difficulties. According to a recent report (Wang, 1988 b), there is a shortage of about 750 million square meters of school buildings for primary and high schools in the whole country and there are 450 million square meters of school buildings which need urgent repair. In addition, less than 10 per cent of primary and high schools are equipped with necessary teaching equipment according to the standard set by the State Education Commission.

2.6. Finance

As education is the basis for the existence and development of contemporary society, with economic development, especially with the increase of national income per capita, the proportion of state revenue

allocated for education and the average educational funds per student should be increased. Although this idea has been reflected in the Chinese government's recent public statement mentioned earlier (see section 2.2), history witnesses that what occurred to education in China was contrary to this principle on most occasions (Zhou, 1986:II-28). Thus, the government's insufficient appropriation, which was far behind the requirements, has seriously hindered the development of education.

2.6.1 Percentage of educational outlay in state revenue

During the period 1957-1985, the percentage of educational outlays in the state revenue was 2.15, 2.10, 2.18 and 2.72 per cent for the years 1957, 1965, 1978 and 1985, respectively (Zhou, 1986:II-28). It is clear that during the period 1957-1978, this proportion remained almost unchanged while the number of students in primary schools increased by 30 per cent and students in high schools increased nearly 10 times (Zhou, 1986:II-26-28).

The problem of shortage of educational funds in China can be illustrated more clearly by making comparisons of the proportion of educational outlay in the state revenue with some other countries. In the period 1980-1984, for the developed countries, such as the United States of America, Britain, West Germany, the USSR, France and Japan, the average annual percentage of educational outlay in the state revenue ranged between 6 per cent and 9 per cent; while for some developing countries in Asia, such as Malaysia and Singapore, the

corresponding figures were 5 per cent and 4 per cent, respectively. But for China, the corresponding figure during the same period was only 2.56 per cent, lower than in Indonesia (2.7 per cent) and India (2.6 per cent) (Chang, 1988).

2.6.2 Average educational funds per student

The outlays on education consist of two parts, one for teachers and another for students. In general, the teachers' salaries account for the principal part of educational expenditure and increase with the growth of national per capita income. In China, the teachers' salaries account for 68.4 per cent and 80.9 per cent of the total recurrent costs in high schools and primary schools, respectively (Zhou, 1986,II-28).

In order to improve the general situation of schools and teaching staff, except for the increase in teachers' salary, the recurrent costs per student should also increase with the growth of national income per capita. However, the recurrent costs per student for high school did not increase with the national growth of per capita income; on the contrary, the absolute figures (including inflation) decreased from RMB yuan 110 in 1952 to RMB yuan 84 in 1957 and RMB yuan 40 in 1978. The recurrent cost per student for primary schools has increased a little, but has not caught up with the speed of inflation. Moreover, the ratio of recurrent costs per student to the national per capita income has decreased substantially for primary students: for example, the

ratio was 0.108 in 1957 but only 0.052 in 1978. Recently, the recurrent costs for students have increased a great deal but the ratio between the recurrent cost per student and per capita income has not reached the level of 1957 (Zhou, 1986:II-28).

In short, a large increase in the educational allocation from the central and local governments is urgently required to keep pace with the development of education in China, but the scale and speed of education development have to be controlled within the capacity of the growth of the national economy.

2.7. Efficiency

Education systems in most developing countries are inefficient in using financial and human resources and often do not achieve their quantitative and qualitative objectives. Effective utilization and supervision of teachers is particularly important, since teacher costs, which range from 75 per cent to 95 per cent of total expenditure, constitute the most important single factor determining education expenditures. The inefficiencies are reflected in two aspects: first, in the performance of the school systems, indicated by dropout, repeater and promotion rates; second, in measurement of student achievement (World Bank, 1974:36-37). Children in school today are tomorrow's labour force. The academic and vocational skills that they acquire can affect all sectors of society. It is desirable to reduce both repetition and drop-out as far as possible since they

contribute to excessive educational expenditure and to a lowering of the effective educational output.

According to the National Sample Survey on Children conducted in 1983 (CPIC, 1985:376), there currently are large numbers of drop-outs from primary schools. In 1983, the number of drop-outs accounted for 9.2 per cent of the total number of students and the corresponding figure for high schools was 5.2 per cent. According to the sample survey conducted by the State Statistical Bureau (Jiao, 1988), most drop-outs are in rural areas; for instance, in some rural areas in Liaoning, Hebei and Jiangxi provinces, the drop-out rates for children aged 6-11 range between 30 and 50 per cent.

This phenomenon can be explained by the following aspects. First, because of the current residence registration system practised in China, rural people are not allowed to move to urban areas for better jobs and higher income. Most likely the future for rural children is either to enter the technical schools and college or university or to go back to the fields after graduation. So, when some children cannot study well enough to be able to enter college or university in the future, their parents think it is useless for them to continue studying. The children themselves also do not want to continue studying as they cannot see any hope in the future other than working in the fields. The backward mode of production in rural areas makes more schooling seem unnecessary. Second, with rapid inflation, the incidental expenses and tuition fees for each student,

which are paid by the parents, are rising greatly so that some students drop out because of financial difficulties. Third, the shortage of qualified teachers and poor quality of education and teaching conditions in rural schools make many peasants reluctant to send their children to school.

The promotion rate from primary schools to junior high schools (that is the number of primary school graduates who are enrolled in junior high schools divided by the total number of graduates) was 68 per cent according to the data for 1983. This is much lower than the corresponding figure of 82.5 per cent in 1965 (MOE, 1984:38). Besides, the quality of education in the rural areas is generally low, with only 60 per cent of the primary school graduates reaching the set standards.

In general, the development of education in China has been seriously constrained by the shortage of qualified teachers and funds. This is mainly reflected by the high illiteracy and semi-literacy rates of the population aged 12 and over, by the large disparity in the enrollment in primary and junior high schools between urban and rural areas, and between males and females, as well as by the low efficiency of the current educational system. Therefore special efforts are required from the government and the society to complete the arduous task of the realization of nine years of compulsory education in the set period.

CHAPTER 3

POPULATION PROJECTIONS FOR CHINA (1982-2012)

3.1 Introduction

Population projection currently plays an important part in the planning of every aspect of social and economic development (UN, 1975b:1) as well as government policy formulation. The study of population trends and their effects on the educational system is an essential prerequisite in forward planning because population projection serves as the basis for predicting the future school enrollment and relevant costs (investment, buildings, teachers, and equipment). The differential effect of the various population projections on the school-age population and consequently on the cost of education depends solely on the difference between the assumptions made. It is valuable to analyse this effect, since it indicates that the achievement of the assumed objective, namely universal nine years of compulsory education in China, may call for relatively different effects according to the future trend of fertility (Chau, 1972:15).

In demographic terms, population growth is affected by births, deaths and migration; this chapter intends to illustrate the results of 30-year population projections which are made separately according to residence (rural/urban) for China during the period 1982-2012 with the consideration of the existence of fertility and mortality differences between rural and urban China. The total national population growth is obtained by adding the rural and urban population together, with migration between the two ignored during the projection

period due to lack of necessary data. The projected number of school-age population for rural areas can be regarded as a maximum number while that for urban areas as a minimum because the process of rural to urban migration probably will continue throughout the period. This projection is calculated by the cohort component method (Shorter and Pasta, 1978) under three different assumptions, that is:

(1) constant fertility and slow mortality decline;

(2) slow fertility and mortality decline;

(3) rapid fertility decline and slow mortality decline.

3.2. Fertility assumptions

The future trend of fertility depends on a number of factors and assumptions can be made about it in the light of the present level of fertility, the attitude of the government towards population growth, and the possible reaction of individuals. The difference between these assumptions may indicate the degree of success of population policy (Chau, 1972:15). In this context, three sets of fertility assumptions are devised separately for rural and urban China based on high (constant fertility), medium (slow fertility decline) and low (rapid fertility decline) variants.

Table 3.1.

Fertility Assumptions (TFR) for Population Projections, China, 1982-2012

	1982	1987	1992	1997	2002	2007	2012
URBAN							
HIGH	1.405	1.405	1.405	1.405	1.405	1.405	1.405
MEDIUM	1.405	1.35	1.30	1.25	1.20	1.15	1.10
LOW	1.405	1.30	1.20	1.10	1.05	1.05	1.05
RURAL							
HIGH	2.7	2.7	2.7	2.7	2.7	2.7	2.7
MEDIUM	2.7	2.6	2.5	2.4	2.3	2.2	2.1
LOW	2.7	2.5	2.3	2.1	1.9	1.7	1.7

Source: 1982 National Sample Survey on Women (Zhao, 1985:33)

Note: High variant refers to constant fertility;
Medium variant refers to slow fertility decline;
Low variant refers to rapid fertility decline;

In Table 3.1, it is evident that a pronounced fertility differential existed between rural and urban China in the base year (1982) (Zhao, 1985:33) and this is projected to continue in the three variants. This is based on the current reality in China which will most likely continue in the near future. The contrast is mainly due to the general difference between urban and rural areas, such as the difference in educational attainment, the degree to which people are influenced by traditional ideas of "more children, more blessings", the intensity of family size desire stimulated by several factors, and the intensity of the government's intervention.

3.2.1. The high variant based on the assumption of constant fertility

At the present time, China's fertility is quite low compared with other developing countries and almost approaches the fertility of some developed countries (for example, the TFR is 1.405 for urban and 2.7 for rural in 1982). Further decline both for urban and rural areas does not seem to be easy. The high variant is based on the assumption of constant fertility. Based on the figures obtained from the 1982 National Sample Survey on Women (Zhao, 1985:27), under this assumption, fertility would remain constant during the whole projection period with a total fertility rate (TFR) of 1.405 for the urban population, and 2.7 for the rural population.

The basis of this assumption is as follows. In China, fertility is mainly under the integrated influence of economy, culture and government intervention. In general, urban people enjoy better education and are less influenced by traditional ideas; and this results in better acceptance of government policy. More specifically, from an economic viewpoint, the majority of urban people are affiliated to certain working-units by means of salary/wages and are entitled to a pension after their retirement, therefore they are not influenced by economic reasons to have more children. At the same time, urban residents in general are under government control through a centralized, well-organized administration system. Their daily life, including childbearing, is strongly affected by the government's intervention through a vigorous family planning program aimed at fertility reduction. Since it is impossible to expect the administrative, political, and

economic system to change much in the next decades, the assumption that there will not be a large fluctuation in fertility in urban areas during the projection period is quite plausible.

In rural areas, the situation is the opposite. From the economic point of view, each family has become a unit of production and peasants have become more independent since the adoption of the "family responsibility" system since the end of the 1970s (Zhao, 1985). More hands are urgently needed for agricultural production and economic benefits. This has strongly influenced fertility desire and son preference, as males are more valuable than females in the fields under the current conditions of low mechanization in agriculture, and males are also the main guarantee of security for old people. In addition, the economic independence of the peasants has given them more authority in their own decision-making about issues such as childbearing, and has greatly reduced the effect of government control; for instance, economic independence has also made financial penalties for and administrative interventions in childbearing much less effective than before. In addition, the components of fertility in rural China are distinctly characterized by third or higher births. For example, when analysing the distribution of a rural TFR of 2.48 in 1980, it is found that 36 per cent of the value was in the first parity, 25 per cent in second parity, and 39 per cent in third and higher parities (Xiao and Li, 1983:54). Considering this unconventional distribution of TFR and the recent relaxation of birth planning policy in rural areas in order to ease the acute

contradiction between desired fertility and the government's policy, it can be expected that fewer rural couples would have one child, and more would have two children or more.

In sum, based on the above analysis, the constant fertility both in urban and rural areas looks reasonable and conforms with the current reality in China. The high TFR of 2.4 for the whole country in 1987 (PRB, 1987) justifies this assumption and indicates that at present it seems very difficult for the Chinese government to push the one-child campaign further and to change peasants' fertility attitudes and behaviour during the coming twenty or thirty years.

3.2.2. The medium variant based on the assumption of slow fertility decline

Under this assumption, fertility would decline slowly. Specifically, the TFR in urban areas would drop at the steady rate of 0.05 every five years from 1.405 in the period 1982-1987 to 1.1 in the period 2012-2017; the TFR in rural areas would drop at the steady rate of 0.1 every five years from 2.7 in the period 1982-1987 to 2.1 in the period 2012-2017. The speed of fertility reduction is different in urban and rural areas as the TFR in urban areas is quite low already, so rapid decline seems impractical and will bring about the danger of rapid population aging. The basis and justification of the assumptions are as follows.

According to the recent reports from the State Family Planning Commission in China, the rate of third or higher birth has been reduced. For instance, the rate of third or higher birth was 28.1 per cent among all births in 1981 but

only 17.3 per cent in 1986 (People's Daily, 1987). This figure indicates the decreasing contribution of third or higher order births and gives the signal for the potential advance of the family planning program in China. The possibility of future occurrence of this assumption can be supported by two aspects. Firstly, the slow decline of TFR at the rate of 0.05 in urban areas and stopping at 1.1 indicates the general acceptance of the "one-child" policy and the successful implementation of the family planning program in those areas. As explained before, because of strong government intervention, further progress of the "one-child family" campaign is quite possible in urban China according to the current situation, while in rural areas, TFR declining at the rate of 0.1 every five years and stopping at the replacement level of 2.1 makes the assumption plausible.

Secondly, the Chinese government has been strongly committed to the elimination of third or higher order births, the key point to make this assumption reality. Some progress has been made in this aspect recently in .spite of the relaxation of birth planning policy. However, it should be understood that there are some obstacles to reducing the TFR of 2.7 to 2.1. Mainly, the government's relaxed policy on easing the acute contradiction between the government's target and fertility desires of local people has greatly reduced the possibility of further fertility decrease in rural, minority, and remote mountain areas where third or higher births occur most frequently.

3.2.3 The low variant based on the assumption of rapid fertility decline

Under this assumption, fertility would drop rapidly. The TFR in urban areas would decrease at the rate of 0.1 every five years from 1.405 in the period 1982-1987 to 1.1 in the period 1997-2001, after that, it would remain constant at 1.05 from 2002 for the rest of the projection period. For rural areas, the TFR would decrease at the rate of 0.2 every five years from 2.7 in the period 1982-1987 to 1.9 in the period 2002-2006, then remain constant at 1.7 from 2007 for the rest of the projection period. Although this assumption sounds the best and conforms quite well with the government's expectation of a total population of 1.2 billion by the year 2000, the prerequisite is a sharp drop in the TFR which will inevitably face a challenge when considering the reality in China. For example, 78 per cent of all couples with one child in urban areas claimed one-child certificates but the corresponding figure was only 31 per cent in rural areas (Li and Shao, 1983:137). It thus seems unlikely that the third assumption will eventuate, but is used here because it more clearly conforms to the government objectives.

3.3. Mortality Assumptions

According to the UN (1975b:15), the widespread practice of using only one assumption in regard to mortality is mainly because of the belief that future age composition is not sensitive to alternative mortality assumptions and that mortality would decline rapidly in the developing countries to levels comparable to those in developed countries. So, only

one assumption is made with regard to mortality. Specifically, the same set of data about the mortality level represented by life expectancy at birth by sex and residence (rural/urban) is adopted to match the three fertility variants and the Coale-Demeny Model Life Table (West pattern) is chosen as the 1981 life table by sex and residence is closer to the West pattern than to other patterns. The figures used in the base year are obtained from the 1982 population census. The life expectancy at birth for urban areas is assumed to increase steadily at the rate of 0.9 years every five years, from 72.1 to 77.5 years for females and 69.1 to 74.5 years for males during the period 1982-2012; while life expectancy at birth for rural areas is assumed to increase at the rate of 1 year every five years from 68.6 to 74.6 years for females and 65.2 to 71.2 years for males during the period 1982-2012. More rapid increase of life expectancy in rural than in urban areas is assumed on the basis of the government's commitment to further improvement of health services, focusing on their availability, in rural areas.

The mortality assumption is based on the great achievements which have been made in mortality reduction since the founding of the People's Republic of China in 1949. This is indicated by the increase of life expectancy from 35 years before 1949 to 67.9 years in 1981. Considering the future advances in medical technology and socio-economic development in China, there is still adequate room for China to further prolong its life expectancy at birth. Besides, due to the stable situations in the society, regime and progress of economic development in China, it is implausible to expect a

large fluctuation in mortality in the near future (ignoring the possibility of nuclear war or environmental catastrophe). But this kind of increase can only be slow rather than rapid as China's current life expectancy at birth of 67.9 years (CPIC, 1985:315) is quite high compared with other developing countries in the world and has almost approached the level of developed countries. So, further rapid increase seems impractical at this stage according to the experience of many developed countries; which is, "the rate of mortality decline decreased with lowering levels of mortality" (UN, 1975b:15).

Table 3.2

Mortality Assumptions (Life Expectancy At Birth) For Population Projections, China, 1982-2012

YEAR	1982	1987	1992	1997	2002	2007	2012
URBAN							
FEMALES	72.1	73	73.9	74.8	75.7	76.6	77.5
MALES	69.1	70	70.9	71.8	72.7	73.6	74.5
RURAL							
FEMALES	68.6	69.6	70.6	71.6	72.6	73.6	74.6
MALES	65.2	66.2	67.2	68.2	69.2	70.2	71.2

Source: 1982 Population Census of China cited in Liu, (1986:13)

3.4 Other factors related to the projection

3.4.1 International migration

It is assumed that no international migration occurs during the projection period. Because of China's current political system and strict government control, the cases of international migration occur quite rarely and the number of migrants is too small to be taken into consideration compared with the large size of China's total population.

3.4.2. Urbanization

Urbanization, which is mainly attributed to government's policy, economic development and income per capita, is one of the important factors affecting the results of population projection by residence. Based on research by Chinese scholars (Ma, 1987; Tu, 1987; Wang, 1986), it is estimated that the urban population will be 450 to 500 million and the urbanization level (proportion of population in urban areas) will be around 30 per cent to 40 per cent in China around 2000. This estimation is justified by the consideration of marketable grain available, GNP per capita, and the developing speed of industry. Based on the production in 1983, it is estimated that in year 2000 the provision of a marketable grain surplus of 15,000 million kilos will be available and able to support 500 million urban people according to average grain consumption per capita for urban people at present. In addition, it is estimated that GNP per capita will reach U$ 800-1000, and that the corresponding urban population will account for 36-40 per cent of the total, according to the experience of other countries.

In this study, due to the unavailability of the data on rural to urban migration, the influence of migration is ignored. Thus the projected size of school-age population for rural areas is regarded as a maximum, that for urban areas as a minimum (refer to section 3.1) as the process of rural to urban migration will continue in the future. As the majority of migrants from rural to urban areas are in reproductive ages, especially around 20 to 30, it can be expected that with the migration process from rural to urban, the births and future school-age population will increase in urban areas to some extent. On the other hand, with the rural-urban migration, births and school-age population will relatively decrease in rural areas compared with the previous years.

3.5 Population projections

Comparisons and brief descriptions will be made for some aspects of the projection results which are of concern to this study.

3.5.1. The trends of total population and age-structure

(1) Total population

From Table 3.3, comparing the total population in the end year 2012 with the base population of 1003.7 million in 1982, there is a general increasing trend under all variants. It is found that under the high, medium and low variants, the population increases by 48 per cent, 41 per cent, 34 per cent respectively during the 30-year period. This result specifies the arduous task and urgent need for population growth control facing China in the coming decades.

Table 3.3

Projected Total Population Under Different Fertility Variants, China, 1982-2012 (million)

VARIANT	1982	1987	1992	1997	2002	2007	2012
HIGH	1004	1070	1156	1251	1338	1413	1486
MEDIUM	1004	1070	1151	1231	1310	1366	1416
LOW	1004	1070	1147	1223	1281	1320	1348

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)

Note: (1) High variant refers to constant fertility;
Medium variant refers to slow fertility decline;
Low variant refers to rapid fertility decline;

(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978).

By referring to Table 3.4 on the trends of population growth by residence(rural and urban) separately, it is found that there are different patterns from the general trends for the whole country. For the urban population, under the high and medium variants during the period 1982-2007, the population shows an increasing tendency, and increases by 14 per cent and 11 per cent respectively, but during the period of 2007-2012, the population begins to decrease; under the low variant, during the period 1982-2002, the population increases by 11 per cent, but the decrease appears in 2002-2007, earlier than under the high and medium variants. The rural population shows an increasing tendency, and increases by 57, 48 and 40 per cent respectively under the high, medium and low variants.

It should be noted that such a large difference in population growth between urban and rural areas is due to the difference in fertility assumptions and this difference also indicates that success of the family program is a decisive factor for population control.

Table 3.4

Projected Total Population By Residence Under Different Fertility Variants, China, 1982-2012 (millions)

VARIANTS	1982	1987	1992	1997	2002	2007	2012
URBAN							
HIGH	206	214	222	230	234	236	235
MEDIUM	206	214	222	228	231	231	228
LOW	206	214	221	227	228	227	224
RURAL							
HIGH	798	856	933	1021	1104	1177	1250
MEDIUM	798	856	929	1009	1078	1135	1187
LOW	798	856	925	996	1053	1093	1124

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB,1983)

Note: (1) High variant refers to constant fertility; Medium variant refers to slow fertility decline; Low variant refers to rapid fertility decline;

(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

(2) The age composition of the population

Comparing the age composition under the three variants in 2012 with that in 1982 by referring to Table 3.5, it is found that the percentage of population in the age group 0-14 shows a decreasing trend relative to other age groups; for the rural population the decrease is from 35 per cent to 21-27 per cent and for the urban population, the corresponding decrease is from 27 per cent to 11-14 per cent. On the other hand, populations in the age groups 15-64 and 65+ show increasing trends. For the rural population, the percentage increases for the age group 15-64 are from 60 per cent to 66-72 per cent, while for the urban population the corresponding increase is from 69 per cent to 74-76 per cent. For age group 65+ in the rural population, the percentage changes from 5 per cent to 6.6-7.3 per cent and for urban population from 4.5 per cent to 12-12.6 per cent. From the above analysis, it is obvious that the changes in age composition are greater for the urban population than for the rural population. These changes in age structure from an expansive to a constrictive one indicate that China's population is probably now in the transition which would greatly reduce population momentum and benefit future efforts at population control. On the other hand, these figures give a warning signal of the rapid aging process occurring in China, especially in urban areas.

TABLE 3.5

Projected Age Structure By Residence Under Different Fertility Variants, China, 1982-2012 (%)

YEAR	1982	1987	1992	1997	2002	2007	2012
AGE GROUP (URBAN)							
0-14							
HIGH	26.7	21.7	19.8	18.7	17.9	16.2	14.2
MEDIUM	26.7	21.7	19.6	18.1	16.8	14.8	12.5
LOW	26.7	21.7	19.4	17.5	15.8	13.5	11.3
15-64							
HIGH	68.7	73.1	74.1	73.7	72.7	73.0	73.9
MEDIUM	68.7	73.1	74.2	74.3	73.7	74.2	75.2
LOW	68.7	73.1	74.4	74.8	74.6	75.3	76.1
65+							
HIGH	4.5	5.3	6.2	7.6	9.4	10.8	12.0
MEDIUM	4.5	5.3	6.2	7.6	9.5	11.0	12.3
LOW	4.5	5.3	6.2	7.7	9.6	11.2	12.6
AGE GROUP (RURAL)							
0-14							
HIGH	35.4	30.0	28.7	30.3	30.9	29.3	27.0
MEDIUM	35.4	30.0	28.4	29.4	29.2	27.0	24.1
LOW	35.4	30.0	28.1	28.5	27.5	24.6	21.0
15-64							
HIGH	59.6	64.6	65.5	63.7	62.9	64.4	66.4
MEDIUM	59.6	64.6	65.8	64.5	64.4	66.4	68.9
LOW	59.6	64.6	66.0	65.4	66.0	68.6	71.7
65+							
HIGH	5.0	5.5	5.8	6.0	6.2	6.3	6.6
MEDIUM	5.0	5.5	5.8	6.1	6.4	6.6	7.0
LOW	5.0	5.5	5.8	6.1	6.5	6.8	7.3

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB,1983)

Note: (1) High variant refers to constant fertility; Medium variant refers to slow fertility decline; Low variant refers to rapid fertility decline;

(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

3.5.2. Population in the age group 0-14 years

The age group 0-14 includes the current and immediate future school-going population, which is the focus of this study. In Table 3.6, it is observed that the population under all variants shows fluctuating trends: a sharp decrease during the period 1982-1987; gradual increase during the period 1987-2002; and a decrease again during the period 2007-2012. Comparing 2002 with 1987, the population aged 0-14 will increase by 26 per cent under the high variant, 17 per cent under the medium variant, and 7 per cent under the low variant. The phenomenon of an increasing population in the age group 0-14 during the period around 1997-2007 results from the previous large cohorts born in the periods 1954-57 and 1962-71 entering their peak reproductive period in 1979-82 and 1987-96 respectively.

Table 3.6

Projected Total Population Aged 0-14 Under Different Fertility Variants, China 1982-2012, (millions)

VARIANT	1982	1987	1992	1997	2002	2007	2012
HIGH	337	303	312	352	383	383	370
MEDIUM	337	303	308	338	354	341	315
LOW	337	303	303	323	326	299	261

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)

Note: (1) High variant refers to constant fertility;
Medium variant refers to slow fertility decline;
Low variant refers rapid fertility decline;

(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

CHAPTER 4

PROJECTION OF SCHOOL-AGE POPULATION, ENROLLMENT AND CONSEQUENT DEMANDS

4.1. Introduction

It is recognized that demographic factors have an overwhelming impact on the ability of the education services to meet the requirements of the population. The population trends and composition affect educational needs and capacity in a number of ways, and have serious implications for enrollment, teaching facilities, curriculum, finance and policy.

The size of the population affects the school system directly: the number of children determines the quantity of education and funds that must be provided and this in turn may influence the quality of education. Therefore, the trends of growth in the school-age population have widespread consequences (Zsigmond and Devereaux, 1980:119). It is obvious that the higher the fertility levels, the larger is the share of the school-age population in the total population. As the rapid population growth associated with high fertility and a young age distribution puts a heavy demand on national resources, the reduction of fertility and population growth may have a substantial effect on educational needs (UN, 1975a:422).

This chapter intends (1) to project the trends of the school-going population and school enrollment for primary and junior high school during the period 1982-

2012 as well as to estimate consequent demands for teachers and funds; (2) to compare the size of the school-going population and enrollment trends under various fertility assumptions; and (3) to examine and evaluate some of the implications of the projected school-going population trends in both education planning and policy aspects.

The focus will be on three aspects: school enrollment, number of teachers required, and recurrent costs. Particular attention will be paid to the age group 6-11 as they are the first to reflect demographic changes, and they are the target population for the goal of full primary school participation. Fluctuations in the size of this age group finally work their way up through later age groups affecting demand for educational services (Zsigmond and Devereaux, 1980:77).

4.2. Projection of school-age population

As the school-age population (6-14) provides the basis for further projections of school enrollment, number of teachers, and recurrent costs, the trend in the projected school-age population (children aged 6-14 in this context) in rural and urban areas (including the patterns and turning points of the trend, as well as the percentage change at such points) will be discussed in this section.

Based on the projected results for single year intervals (Appendix 1-1 and 1-2) shown in Tables 4.1, 4.2 and Figures 4.1 and 4.2, the projected trends of the

Table 4.1

Projected Trends of School-going Population (6-14) by Residence for China Under Different Fertility Variants, 1982-2012 (000)

Year	1982	1987	1992	1997	2002	2007	2012
Rural							
High Variant	186066	156297	144060	166583	199990	212539	203271
Medium Variant	186066	156297	144191	163865	189412	193694	177783
Low Variant	186066	156297	144321	161149	178835	174841	152282
Urban							
High Variant	36267	29687	26639	25203	26400	24992	21467
Medium Variant	36267	29687	26658	24799	24985	22789	18816
Low Variant	36267	29687	26675	24432	23664	20670	16508

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)

Note:(1) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline.
(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

Table 4.2

Turning Points and Percentage Changes in School-age Population by Residence in China under Different Variants, 1982-2012

Age group 6-14	Direction of change	% change from 1982	Turning point	Direction of change	% change	Turning point	Direction of change	% change	End point
RURAL									
High	decline	-22.7	1992	increase	+47.5	2008	decline	-4.1	2012
Medium	decline	-22.6	1992	increase	+35.3	2006	decline	-8.8	2012
Low	decline	-22.5	1992	increase	+25.0	2005	decline	-15.1	2012
URBAN									
High	decline	-30.7	1997	increase	+4.9	2004	decline	-18.3	2012
Medium	decline	-31.6	1999	increase	less than +0.01	2002	decline	-24.7	2012
Low	decline	-54.5							2012

Source: Primary analysis on projection results based on The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)

Note: (1) High variants refer to constant fertility; medium variants refer to slow fertility decline; low variants refer to rapid fertility decline.

(2) The projecteed results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

Figure 4.1

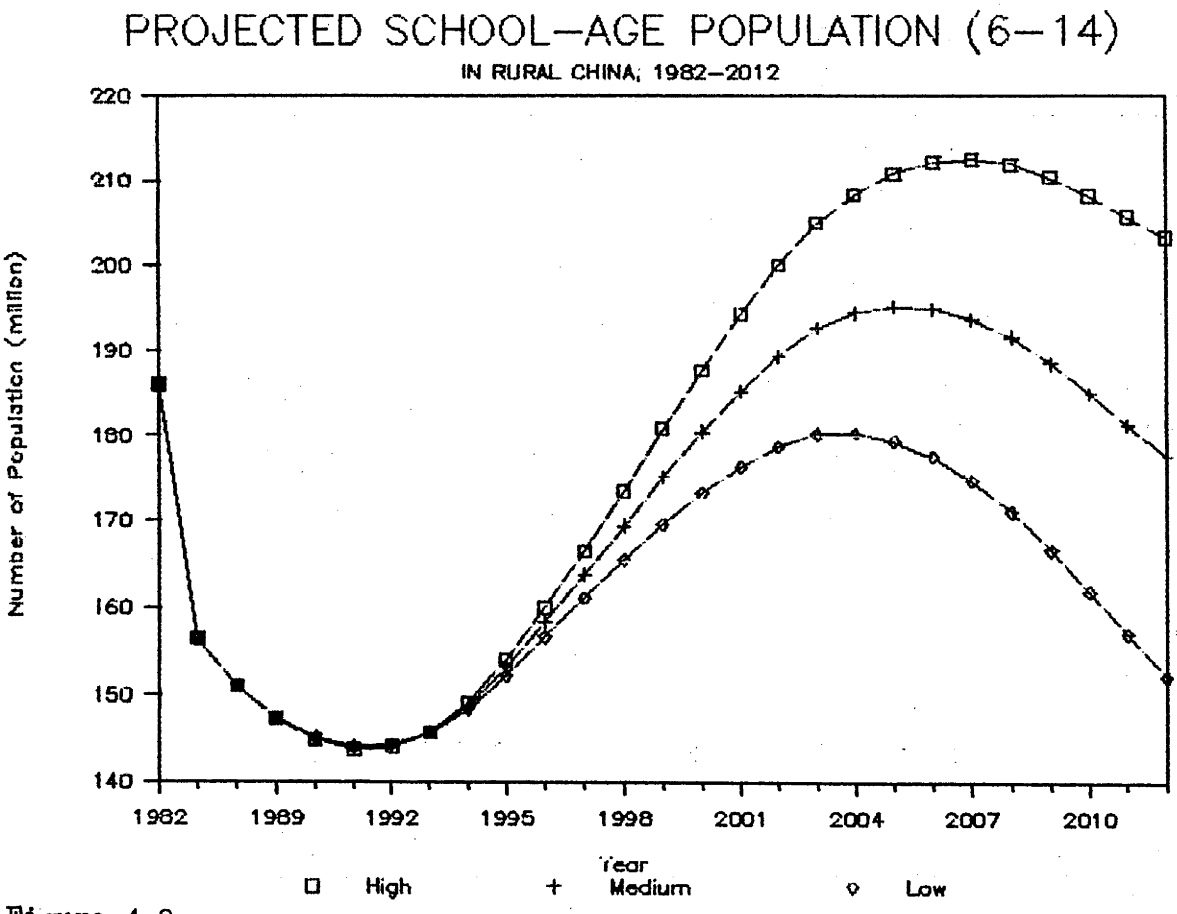
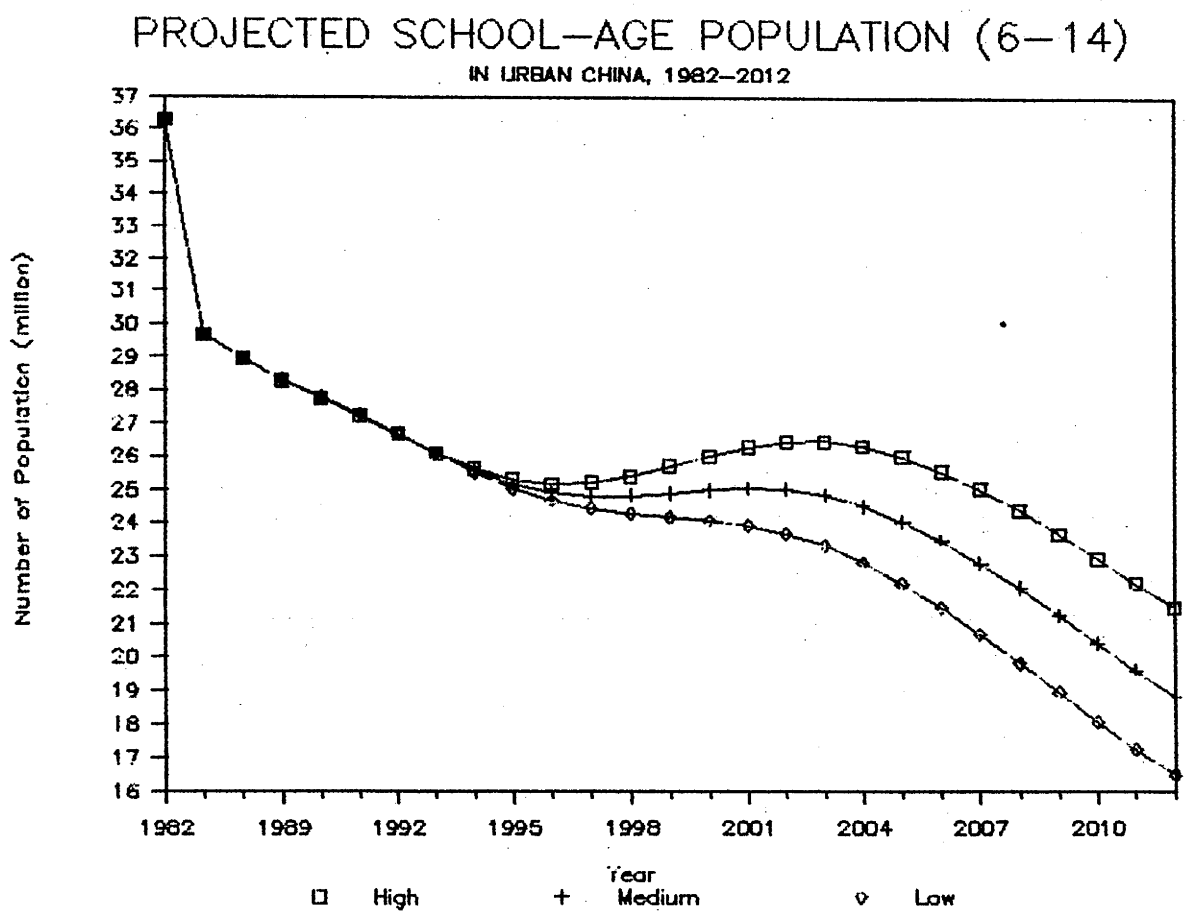


Figure 4.2



school-going population by residence under different fertility variants are shown. In general, population growth trends during the whole projection period both for rural and urban areas change direction except for the trends under the low variant for urban areas, which show a continuous decline.

From Figures 4.1 and 4.2, it is observed that trends for rural and urban areas show both similarities and disparities. In common in both areas, the trends under high, medium and low variants for urban and rural areas show a similar pattern in an "S" shape. There is a sharp initial decline appearing during the period 1982-1986 due to the influence of the "one-child family" campaign implemented since the beginning of the 1980s, and a gentle decline appearing at the end of the projection period, with an increasing trend in the middle. On the other hand, the range of change and the duration of the increase or decrease are different in the two areas. The trend in the rural area shows a shorter decreasing period with smaller percentage change and a longer increasing period with larger percentage change compared with the trend for urban areas. Specifically, as shown in Table 4.2, under different fertility variants, the first decreasing period lasts about ten years in which the number of school-age children decrease by 23 per cent; the increasing period lasts about 14 to 16 years, with increase of 25 per cent (low variant) to 47.5 per cent (high variant); thereafter the numbers decrease to the end of the projection period by between 4

to 15 per cent. A similar phenomenon occurs in urban areas. For urban areas (except for the low variant), the first decreasing period lasts about 15 to 17 years, with a decline of about 31 per cent; in the medium and high variant, there follow an increasing period which lasts 3 to 7 years, but only minor increases in number, less than 5 per cent; the numbers then decrease by 18 to 25 per cent to the end of the projection period.

As shown in Table 4.1, depending on fertility variants, the school age population will be between 161.0 and 166.6 million in rural China and between 24.4 and 25.2 million in urban China by the year 1997 (the first half of the projection period). But by the end of the projection period, the difference becomes much greater. Compared to 1997, the size of the urban school-age population decline will be between 3.7 and 7.9 million under different fertility variants; the size of the rural school-age population will increase by 36.7 and 13.9 million under the high and medium variants respectively and will decrease by 8.9 million under the low variant.

4.3. Projection of school enrollment

4.3.1 Assumptions underlying the projection of school enrollment

School enrollment consists of two components: the enrollment ratio of the school-age population, and the proportion of over-aged students. Assumptions concerning both components will be discussed in this section.

(1) Assumptions of enrollment ratio

The enrollment ratio of the nine-year compulsory education group, 6-14 year olds in China, is an indication of the extent to which a country reaches universal primary and junior high school education (UN, 1975 a:319). In this study, the enrollment ratios (age-specific school participation rates) by residence (urban and rural) for children aged 6-14 will be used to calculate the total population at primary and junior high schools. At present in China, as in most less developed countries, there are enrollment differentials between girls and boys in rural areas, and also between urban and rural areas. As mentioned in the section on the data and their limitations in Chapter 1, due to the unavailability of data of school attendance by single year of age, sex, and residence, the participation rates for rural children aged 6-14 by age and sex are estimated indirectly (Appendix 3.1) under the assumption that there is no bias towards boys and girls going to school in urban areas. This seems reasonable, given the current situation in China. Thus only one set of age-specific participation rates for children aged 6-14 is used for urban areas.

In Tables 4.3 and 4.4, the figures for 1983 are based on actual data, while for 1997 and 2002, it is assumed that the school participation rate will increase for all ages but at different speed for urban and rural areas separately. In Table 4.3, in urban areas, the participation rates will increase more rapidly than those

Table 4.3.

Current and Assumed Age-Specific School Participation Rates (%) for Children aged 6-14 Years in Urban China, 1983, 1997, 2002

AGE	1983*	1997	2002
6	28.4	95.0	98.0
7	81.2	99.0	99.8
8	95.3	99.8	99.8
9	98.2	99.8	99.8
10	98.3	99.8	99.8
11	97.4	99.8	99.8
12	95.6	98.5	99.8
13	92.6	98.0	99.8
14	85.9	97.0	99.8

Source: The National Sample Survey on Children (CPIC, 1985:381)

Note: *Figures for 1983 are obtained from survey data.

Table 4.4.

Current and Assumed Age-Specific School Participation Rates (%) for Children Aged 6-14 in Rural China by Sex, 1983, 1997, 2012

	1983 *		1997		2012	
AGE	M	F	M	F	M	F
6	14.0	12.1	60.0	55.0	98.0	95.0
7	62.1	54.2	92.0	88.0	99.8	99.0
8	87.4	76.7	98.0	90.0	99.8	99.5
9	94.4	84.2	98.0	95.0	99.8	99.5
10	92.9	88.3	98.0	95.0	99.8	99.5
11	95.5	82.3	98.0	95.0	99.8	99.5
12	93.0	75.5	97.0	90.0	99.8	99.5
13	85.1	63.7	90.0	80.0	99.8	99.0
14	70.3	49.1	86.0	75.0	99.8	99.0

Source: The National Sample Survey on Children (CPIC, 1985:381-383)

Note: *Figures for 1983 are calculated from survey data.

for rural areas. For children aged 6, 7, 13 and 14, the rates increase at a slower pace than those for the other ages up to 1997. There are two reasons for this. First, in some cities children postpone entering school for one or two years due to the lack of schools and the bias of the parents. Second, because of the current prosperity of private business in urban areas some parents want their elder children, such as children aged 13 and over, to stay at home to help them earn money. The 2002 participation rates are comparatively high and this is based on the assumption that the universal nine years education will have been realized in all urban areas by then.

In Table 4.4, it is assumed that the age-specific school participation rates for rural children aged 6-14 increase more slowly than for urban children, and participation rates for females increase more slowly than those for males, taking into consideration cultural and economic constraints as well as the availability of schools in rural areas. Specifically, only in 2012 will the age-specific participation rates by sex for rural children be the same as those achieved ten years earlier in urban areas.

(2) Assumption regarding over-aged children

As mentioned in Chapter 2, according to the stipulation of the law on education and the target of nine- year universal education in China, primary school students are defined as children aged 6-11 and junior high school students are defined as children aged 12-14

in this study. This age-range (6-14) is used as the standard schooling age to calculate the total school enrollment including over-aged children. Based on the total urban and rural enrollment, the overall proportion of over-aged children of 19 per cent (MOE, 1984:226) is used in the calculation in order to get more accurate results of school enrollment by level of school. It is assumed that this proportion will be reduced gradually with the realization of nine years of compulsory education. The proportion of over-aged children is estimated to decrease from 0.19 in 1982 to 0.15 in 1992, 0.05 in 2002 and 0.01 in 2012 shown in Column 11 in Tables 4.7 and 4.8.

4.3.2 Projections of school enrollment

School enrollment is associated with two factors: one is the school enrollment ratio, the other is the size of the school-age population which is mainly influenced by fertility trends. Analysis and comparisons will be made of the trends of school enrollment under various fertility assumptions in primary and junior high school for urban and rural areas separately. It is noted that only one set of enrollment ratios and pupil/teacher ratios is used in the projection, and all the differences among projection results are due to the influence of fertility variation.

(1). Projection of school enrollment by residence

As school enrollments by residence (urban and rural) are based on the previously projected school-age

population, the trends and patterns of the projected school-enrollment show similar features to those of projected school-age population mentioned before. According to Tables 4.5 and 4.6, all school enrollment projections (except for the projection under the low fertility variant for urban areas) show fluctuation and have two decreasing segments at the beginning and end of the projection period, and one increasing segment in the middle of the period. However, the location of turning points, the length of the increasing or decreasing segment, and the absolute and percentage changes are varied. For example, for school enrollments under the medium variant during the increasing segment, the percentage difference is 60.5 over 16 years for the rural areas and 2.0 over 4 years for urban areas, respectively. Also, it is observed that the turning point from increasing to decreasing trend appears earliest under the rapid fertility decline and latest under constant fertility assumption.

In Table 4.6, for rural China, the school enrollment shows fluctuations during the whole projection period no matter what fertility assumptions are used. In general, the decreasing trend appears during the period 1982-1991, followed by an increasing trend to 2009, 2007, or 2005 for the high, medium and low fertility variants respectively. Another decreasing trend then occurs to the end of the projection period for all variants.

For urban China, school enrollments under either constant fertility or slow fertility decline show

Table 4.5

Projected School Enrollment (6-14) by Residence for China Under Different Fertility Variants, 1982-2012 (000)

Year	1982	1987	1992	1997	2002	2007	2012
Rural							
High Variant	134775	119350	117509	145593	183906	203776	201732
Medium Variant	134775	119350	117646	143388	174277	185761	176457
Low Variant	134775	119350	117783	141184	164648	167741	151167
Urban							
High Variant	31682	26572	25149	24824	26294	24898	21386
Medium Variant	31682	26572	25169	24427	24886	22708	18746
Low Variant	31682	26572	25188	24067	23573	20596	16446

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)

Note: (1) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline
(2) The projected results are obtained by using Fivfiv/Sinsin package (Short and Pasta, 1978)

Table 4.6

Turning Points and Percentage Changes in School Enrollment by Residence Under Different Variants, China, 1982-2012

Age group 6-14	Direction of change	% change from 1982	Turning point	Direction of change	% change	Turning point	Direction of change	% change	End point
RURAL									
High	decline	-14.8	1991	increase	+77.2	2010	decline	-1.2	2012
Medium	decline	-14.7	1991	increase	+60.5	2008	decline	-4.7	2012
Low	decline	-14.7	1991	increase	+46.3	2006	decline	-10.6	2012
URBAN									
High	decline	-22.6	1996	increase	+6.1	2004	decline	-18.3	2012
Medium	decline	-23.0	1997	increase	+2.0	2002	decline	-24.7	2012
Low	decline	-48.1							2012

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)

Note: (1) High variants refer to constant fertility; medium variants refer to slow fertility decline; low variants refer to repid fertility decline;
(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta,1978)

Table 4.7

Projected Enrollment for Children Aged 6-11 in Primary School in China Under Different Fertility Variants, 1982-2012 (000)

Year	Enrollment for children aged 6-11 at primary school									Proportion of over aged	Total enrollment		
	Urban			Rural			Total						
	High	Medium	Low	High	Medium	Low	High	Medium	Low		High	Medium	Low
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1982	-	18931	-	-	86051	-	-	104982	-	0.19	-	124929	-
1987	-	16723	-	-	74826	-	-	91549	-	0.17	-	107112	-
1997	-	16377	-	-	101307	-	-	117684	-	0.10	-	129452	-
2002	17672	16533	15461	128562	120547	112529	146234	137080	127990	0.05	153546	143934	134390
2007	15981	14398	12855	135970	122493	109010	151951	136891	121865	0.03	156510	140998	125521
2012	13539	11712	10219	131654	113667	95664	145193	125379	105883	0.01	146645	126633	106942

Source: Primary analysis on projection results based on The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)
The National Sample Survey on Children (CPIC, 1985)

Note: (1) High variant refers to slow fertility decline; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline.
(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

Table 4.8

Projected Enrollment for Children Aged 12-14 in Junior High School in China Under Different Fertility Variants, 1982-2012 (000)

Year	Enrollment for children aged 12-14 at junior high school									Proportion of over aged	Total enrollment		
	Urban			Rural			Total						
	High	Medium	Low	High	Medium	Low	High	Medium	Low		High	Medium	Low
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1982	-	12751	-	-	48724	-	-	61475	-	0.19	-	73155	-
1987	-	9848	-	-	44524	-	-	54372	-	0.17	-	63615	-
1992	-	9185	-	-	38523	-	-	47708	-	0.15	-	54864	-
1997	-	8050	-	-	42081	-	-	50131	-	0.10	-	55144	-
2002	8622	8353	8112	55344	53731	52120	63966	62084	60232	0.05	67164	65188	63244
2007	8917	8310	7741	67806	63268	58731	76723	71578	66472	0.03	79025	73725	68466
2012	7847	7034	6227	70078	62790	55503	77925	69824	61730	0.01	78704	70522	62347

Source: Primary analysis on projection results based on The Census Ten Per Cent Sample Tabulation (SC and SSB,1983); The National Sample Survey on Children (CPIC,1985)

Note: (1) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline.
(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

Figure 4.3

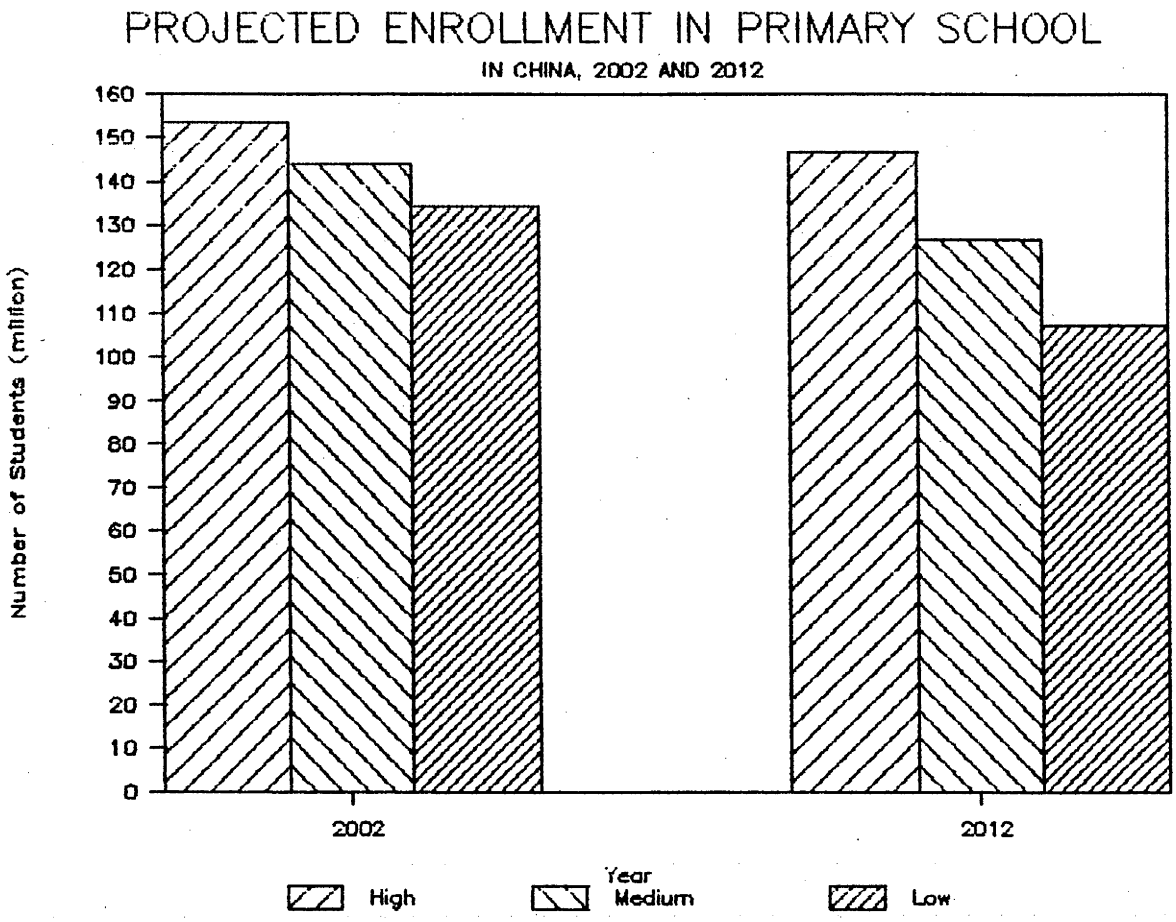
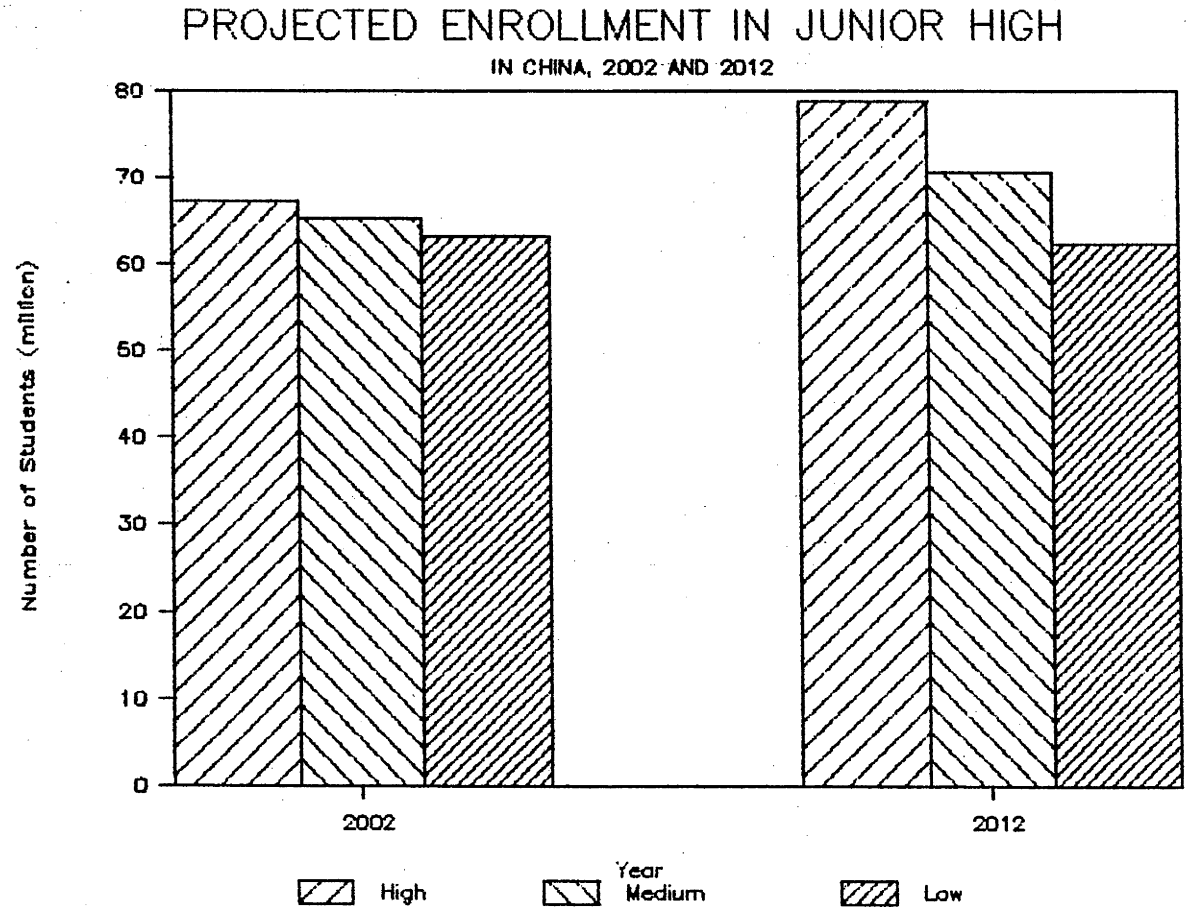


Figure 4.4



fluctuations similar to the rural pattern (but of lower magnitude) during the whole period. Under the rapid fertility decline assumption there will be a decrease throughout the projection period. This is due to the influence of different fertility assumptions as only one set of enrollment ratios is used to obtain the results. Under constant fertility, two decreasing trends appear during the period 1982-1995 and 2004-2012. Under slow fertility decline, the increasing trend appears during the period 1996-2003, the declining trends are in the period 1982-1996 and 2002-2012; the increasing trend appears during the period 1997-2001.

(2). Projection of school enrollment by level of school

Based on the projections under different fertility variants, numbers of enrolled children aged 6-11 in primary schools and 12-14 in junior high schools are summarized in Columns 8, 9 and 10 in Tables 4.7 and 4.8. (As the medium variant is the most plausible and the projections under this variant are the most likely to occur, and also due to the limitation of interpolation in the computer package (Fivfiv/Sinsin), only the projected results under the medium variant are used during the period 1982-1997). In Tables 4.7 and 4.8, a set of assumed proportions of over-aged children listed in Column 11 is used to obtain a more accurate number of total enrollments by level of schooling in Columns 12,13, and 14. On the basis of figures for 2002 and 2012 listed in Columns 12,13 and 14 in Table 4.7 and 4.8, Figures 4.3 and 4.4 are drawn. They illustrate that with the passage

of time the differences between school enrollments under various fertility assumptions become larger as a result of the intensified influence of fertility.

4.4. Projection of demand for teachers

4.4.1. Assumptions underlying the projection of demand for teachers

When considering the requirements for teachers, it is imperative to take four elements into consideration:

(1). pupil/teacher (P/T) ratio;

(2). the surplus of teachers caused by declining numbers of pupils;

(3). the number of new entrants (the recent graduates from teachers' training school or college who are joining the teaching staff); and

(4). the normal loss of teachers due to mortality, retirement and job change.

(1). Assumption regarding pupil/teacher ratio

The Pupil/Teacher (P/T) ratio reflects the quality of education in certain situations. The P/T ratio in China is low compared with other developing countries, and further reducing the ratio seems impractical and unnecessary. Since the P/T ratio is not available by rural/urban breakdown, the total P/T ratio by level of school for the whole country is applied to the total enrollment of urban and rural China in order to obtain the projected number of teachers by level of school (primary and junior high school) but not for urban and rural areas separately. Based on the government targets

of realization of nine years of universal education and gradual improvement of the quality of education, it is assumed, as Table 4.9 shows, that the target P/T ratio will decline slowly from 25:1 (MOE, 1984:35) during the period 1982-1991 to 24.5:1 during the period 1992-2001, then drop to 24:1 during the period 2002-2011, and to 23:1 at 2012. In Table 4.10, it is assumed that the target P/T ratio for junior high schools will gradually decrease from 17.6:1 (MOE, 1984:35) during the period 1982-1991 to 17:1 during the period 1992-2001, then to 16.5:1 during the period 2002-2011, and to 16:1 at 2012.

(2). Estimates of new entrants and normal attrition

In regard to the supply of teachers, according to the Ministry of Education (MOE, 1984:24), there are about 175,000 graduates annually from secondary teacher training schools who become new teachers in primary schools. It is thus assumed that the annual new entrants from secondary teacher training schools will be 175,000 during the period 1982-1996, and will increase to 200,000 during the period 1997-2012. For the junior high schools, there are about 100,000 graduates annually from teachers' colleges according to MOE (1984:24). Thus, it is assumed that there will be 100,000 graduates annually during the period 1982-1996, and then the annual numbers will increase to 125,000 during the period 1997-2006, and to 150,000 during the period 2007-2012. According to the UN (1975a:327), the normal attrition of teachers due to mortality, retirement, and job change can be estimated to be 3 to 5 per cent of the total staff. So it is

estimated that the annual normal attrition rate is 4 per cent. Thus, the cumulative attrition rate over each five-year period is 18.5 per cent based on the formula $Pt = Po\ (1 + r)^{t}$.

4.4.2. Projected trends of demand for teachers

It is obvious that given a fixed P/T ratio, the demand for teachers closely follows the trends of enrollment. Here the projected results under the medium variant are used as an example for analysis and shown in Tables 4.9 and 4.10. According to an annual attrition rate of 4 per cent (18.5 per cent over each five-year period) and the number of annual new entrants, the calculation of the projected supply of teachers is shown as follows.

For example:

$$P_{1987} = P_{1982}\ (1 + r)^{5} + \text{the number of new entrants}$$

Thus as shown in Table 4.9, stock in 1987 equals stock in 1982 minus attrition during 1982-1987 plus new entrants during 1982-1987, that is:

$$4,949,000 = 4,997,000 - 4,997,000*18.5\% + 175,000*5$$

In Table 4.9, in accordance with trends in enrollment, there is a fluctuation in the demand for primary school teachers. Approximately, the demand decreases at the beginning and end of the projection period, that is the periods 1982-1991 and 2003-2012, and increases at the middle part, that is the period 1992-2002. In Table 4.10, there is a decreasing demand for

Table 4.9

Projected Number of Primary School Teachers in China Under Medium Fertility Variant, 1982-2012 (000)

	Projected total enrollment	Target P/T ratio	Projected No.of teachers required	Projected supply of teachers	Difference of projected supply compared with projected demand	Projected P/T ratio
	Medium		Medium		Medium	Medium
1	2	3	4	5	6	7
1982	124929	25	4997			
1987	107112	25	4284	4949	+665	21.6
1992	109373	24.5	4464	4910	+446	22.3
1997	129452	24.5	5284	4878	-406	26.5
2002	143934	24	5997	4977	-1020	28.9
2007	140998	24	5875	5058	-817	27.9
2012	126633	23	5506	5124	-382	24.7

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)
The National Sample Survey on Children (CPIC, 1985)

Note: (1) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline;
(2) P/T ratio refers to pupils per teacher.
(3) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta,1978)

Table 4.10

Projected Number of Junior High School Teachers in China Under Medium Fertility Variant, 1982-2012 (000)

	Projected total enrollment	Target P/T ratio	Projected No.of teachers required	Projected supply of teachers	Difference of projected supply compared with projected demand	Projected P/T ratio
	Medium		Medium		Medium	Medium
1	2	3	4	5	6	7
1982	73155	17.6	4157			
1987	63615	17.6	3614	3890	+276	16.4
1992	54864	17	3227	3672	+445	14.9
1997	55144	17	3243	3494	+251	15.8
2002	65188	16.5	3951	3474	-477	18.8
2007	73725	16.5	4468	3458	-1010	21.3
2012	70522	16	4408	3570	-838	19.8

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)
The National Sample Survey on Children (CPIC, 1985)

Note: (1) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline;
(2) P/T ratio refers to pupils per teacher.
(3) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta,1978)

junior high school teachers during the period 1982-1992, and an increasing demand during the period 1997-2012. It may in fact be better to see what the need for new teachers will be, then estimate how many should be trained. However, the trends of projected number of teachers by level of school fluctuate greatly (shown in Tables 4.9 and 4.10) between a surplus of 665,000 to a shortage of 1,020,000 for primary school and a surplus of 445,000 to a shortage of 1,010,000 for junior high school due to the fluctuation of the enrollment trends. So it is very hard for the educational planners to make a corresponding response in the enrollments at teachers schools or colleges taking into consideration capacity, funds available and the normal running of these educational institutions, as these schools can only adjust their enrollments to a certain extent and cannot greatly expand or contract their enrollment suddenly.

Since large fluctuations will exist in the demand for teachers in the next decades, it is essential, though difficult, for educational planners to prepare not only for the substantial and inevitable decline of demand in the next few years, but also to plan for a reasonably certain upturn thereafter. For example, issues such as the following must be addressed: how to recruit enough qualified teachers when the baby boom children enter the education system; and how to make use of the surplus teachers when the enrollment decline occurs. Many suggestions can be made in this respect, and these will be discussed in detail in Chapter 5.

4.4.3. Some implications of the projected P/T ratio

Referring to last column in Table 4.9 and 4.10, by means of the P/T ratio, the issue of demand for teachers is analysed from a different point of view and an attempt is made to provide information for policy-makers and planners so that they can prepare alternative ways to deal with the issue as the education system has its own specific features. One such problem is inherent inflexibility.

It is known that the education system is quite inflexible in some aspects and this makes the adjustment problem more difficult. For instance, the school facilities have been built already, and it is not normally possible for the government to alter the school facilities for other purposes, or to dismiss surplus teachers in proportion to decreasing student numbers. This may be the case even in the situation of extremely low P/T ratios and low efficiency within the educational system. In China, most schools are owned and funded by the government, and most of the teachers are public servants and paid by the government, and the government takes full responsibility for the schools and teaching staff. Therefore, if the government really wants to reduce the number of surplus teachers and to raise the P/T ratio in the educational system, it is the government's responsibility, under the current political and economic system in China, to arrange new and appropriate jobs for the surplus teaching staff.

The last column in Tables 4.9 and 4.10 show the projected P/T ratio under the assumption that those surplus teachers cannot be shifted to other occupations and stay in the educational system. There is a big fluctuation in these new P/T ratios. In Table 4.9, for primary schools, the ratios range from 21.6:1 to 28.9:1 and this is far from the target P/T ratio (ranging from 25:1 to 23:1). In 2002 and 2007, the projected P/T ratio reaches 28.9:1 and 27.9:1 respectively, much higher than the corresponding target P/T ratio of 24:1. When there is a smaller school-age population, the projected P/T ratios obviously reach a very low level; for example, in 1987 and 1992, the P/T ratio drops to 21.6:1 and 22.3:1 respectively, while the corresponding target P/T ratios are 25:1 and 24.5:1.

In Table 4.10, the projected P/T ratios for junior high school range from 14.9:1 to 21.3:1 while target P/T ratios range from 17.6:1 to 16:1. In 2007 and 2012, P/T ratios will reach 21.3:1 and 19.8:1, respectively; these are much higher than the corresponding target ratios of 16.5:1 and 16:1. In 1992 and 1997, the projected P/T ratios reach 14.9:1 and 15.8:1, respectively; both lower than the corresponding target one of 17:1.

Compared with target P/T ratios, the high projected P/T ratio indicate the great shortage of teachers. However, the low P/T ratios do not necessarily mean an improvement in quality and efficiency of education in the current situation in China and this will be discussed in Chapter 5.

4.5. Projection of total recurrent costs in primary and junior high schools

Total recurrent costs consist mainly of teachers' salaries and other recurrent costs. The cost of teachers depend on their number and salary, while the other recurrent costs mainly depend on enrollments, that is, numbers of students.

4.5.1 Assumptions regarding increase in teachers' salary and other recurrent costs

In regard to the funds available for the next decades, the assumptions for projection of total recurrent costs are based on the government's commitment and targets as well as the experience during the period 1980-1985 (SSB, 1987:117, 164). The law on compulsory education set by the Chinese government in 1986 states that the average annual growth rate in the state's financial allocation to compulsory education should be higher than that of state revenue, and the educational expenditure per student should be increased gradually (Wang, 1988a:1). The seventh five-year plan (1986-1990) also states that within the next five years, the expenditure on education, science, health and sports will be increased at an average annual growth rate of 8 per cent, which is higher than the growth rate of the state revenue (6.7 per cent) (AOCE, 1986:I-51). Therefore, it is assumed that the financial allocation for education will be increased at an annual growth rate of 8 per cent;

Table 4.11

Measures of Effect of Different Fertility Assumptions on Increase in Recurrent Costs of Education in Primary School, China, 1982-2012

			2002			2012		
	1982	1992	high	medium	low	high	medium	low
	1	2	3	4	5	6	7	8
* enrollment								
(a) (000)	124929	109373	153546	143934	134390	146645	126633	106942
*number of teachers								
(b) (000)	4997	4464	6398	5997	5600	6376	5506	4650
* average teacher's salary raised 93% every 1 0 yrs at average annual growth rate of 6.8%								
(c) (RMB yuan)	830	1602		3092			5967	
* total teacher's salaries								
(d) (million RMB yuan)	4148	7151	19783	18543	17315	38046	32854	27747
*other recurrent costs per student raised 179% every 10 yrs at average annual growth rate of 10.8%								
(e) (RMB yuan)	35	98		273			762	
*total other recurrent cost								
(f) (million RMB yuan)	4373	10719	41918	39294	36688	111743	96494	81490
* total recurrent costs								
(g) (million RMB yuan)	8521	17870	61701	57837	54003	149789	129348	109237
(h) percentage of cost savings				6.3%	12.5%		13.6%	27.1%

Source: Primary Analysis on projection results based on The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983); The National Sample Survey on Children (CPIC, 1985)

Note:(1) Base-year (1982) costs per primary teacher =RMB yuan 830

(2)Base-year(1982) other recurrent cost per student in primary school=RMB yuan 35

(3) Percentage of cost savings, in 2002, 6.3%= (61701-57837)/61701, by comparing constant fertility with slow fertility decline, the same procedures with the figures in brackets in year 2012

(4) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline.

(5) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

Table4.12

Measures of effect of various fertility assumptions on increases in recurrent costs of education in junior high school in China, 1982-2012

			2002			2012		
	1982	1992	high	medium	low	high	medium	low
	1	2	3	4	5	6	7	8
* enrollment (a) (000)	73155	54864	67164	65188	63244	78704	70522	62347
* number of teachers (b) (000)	4157	3227	4071	3951	3833	4919	4408	3897
*average teacher's salary raised 93% every 10 yrs at average annual growth rate of 6.8% (c) (RMB yuan)	850	1641		3166			6111	
* total teachers' salaries (d) (million RMB yuan)	3533	5296	12889	12509	12135	30060	26937	23815
*other recurrent costs per student raised 179% every 10 yrs at average annual growth rate of 10.8% (e) (RMB yuan)	80	223		622			1735	
*total other recurrent costs (f)(million RMB yuan)	5852	12235	41776	40547	39338	136551	122356	108172
* total recurrent costs (g)(million RMB yuan)	9385	17531	54665	53506	51473	166611	149293	131987
(h) percentage of cost savings				2.9%	5.8%		10.4%	20.8%

Source: Primary analysis on projection results based on The Census Ten Per Cent Sample Tabulation (SC and SSB,1983); The National Sample Survey on Children (CPIC, 1985)

Note:(1) Base-year (1982) costs per junior high school teacher= RMB yuan 850

(2)Base-year(1982) other recurrent cost per student in junior high school =RMB yuan 80

(3) Percentage of cost savings, in 2002, 2.9%= (54665-53056)/54665, by comparing constant ferrtility with slow fertility decline, the same with the figures in brackets in year 2012

(4)High variant refers to constant fertility; medium variant refers to slow ferrtility declinline; low variant refers to rapid fertility decline

(5) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta,1978)

Figure 4.5

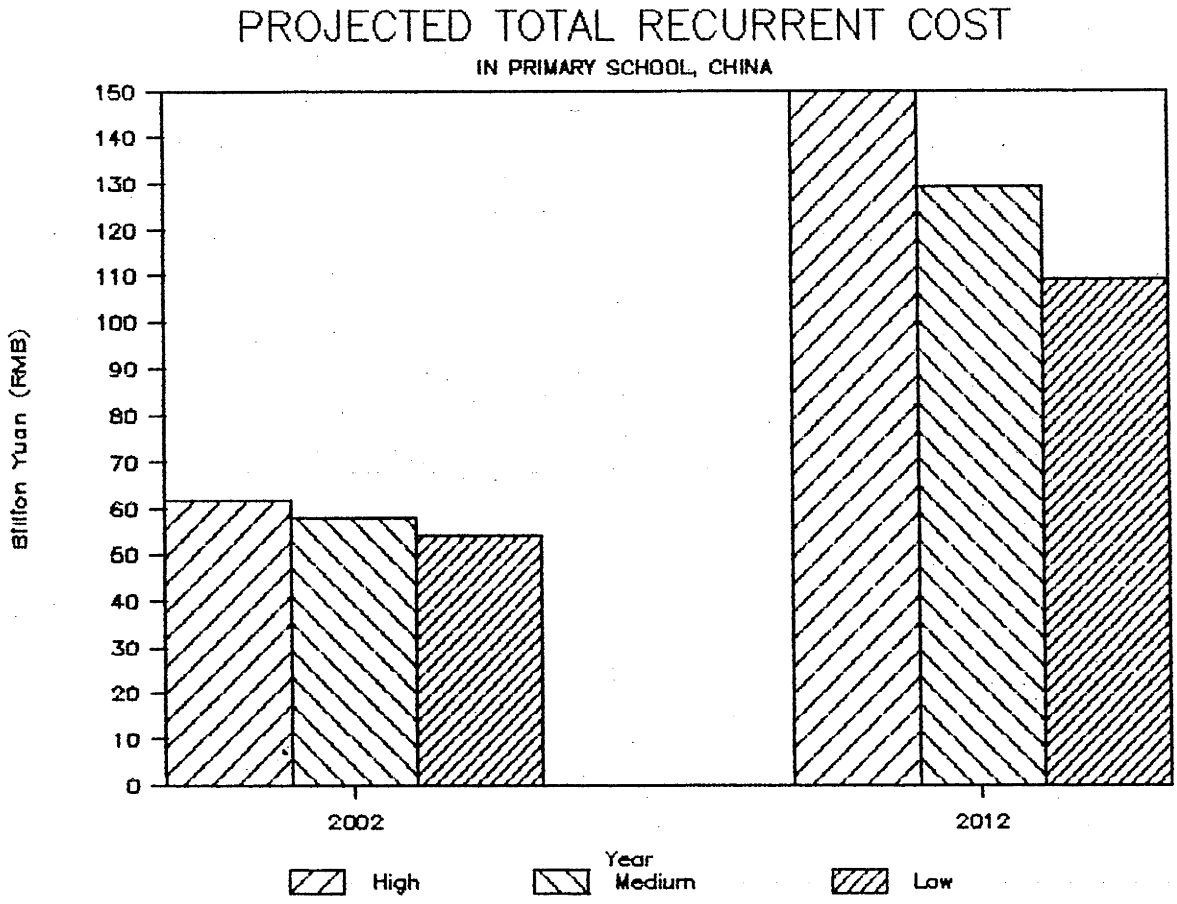
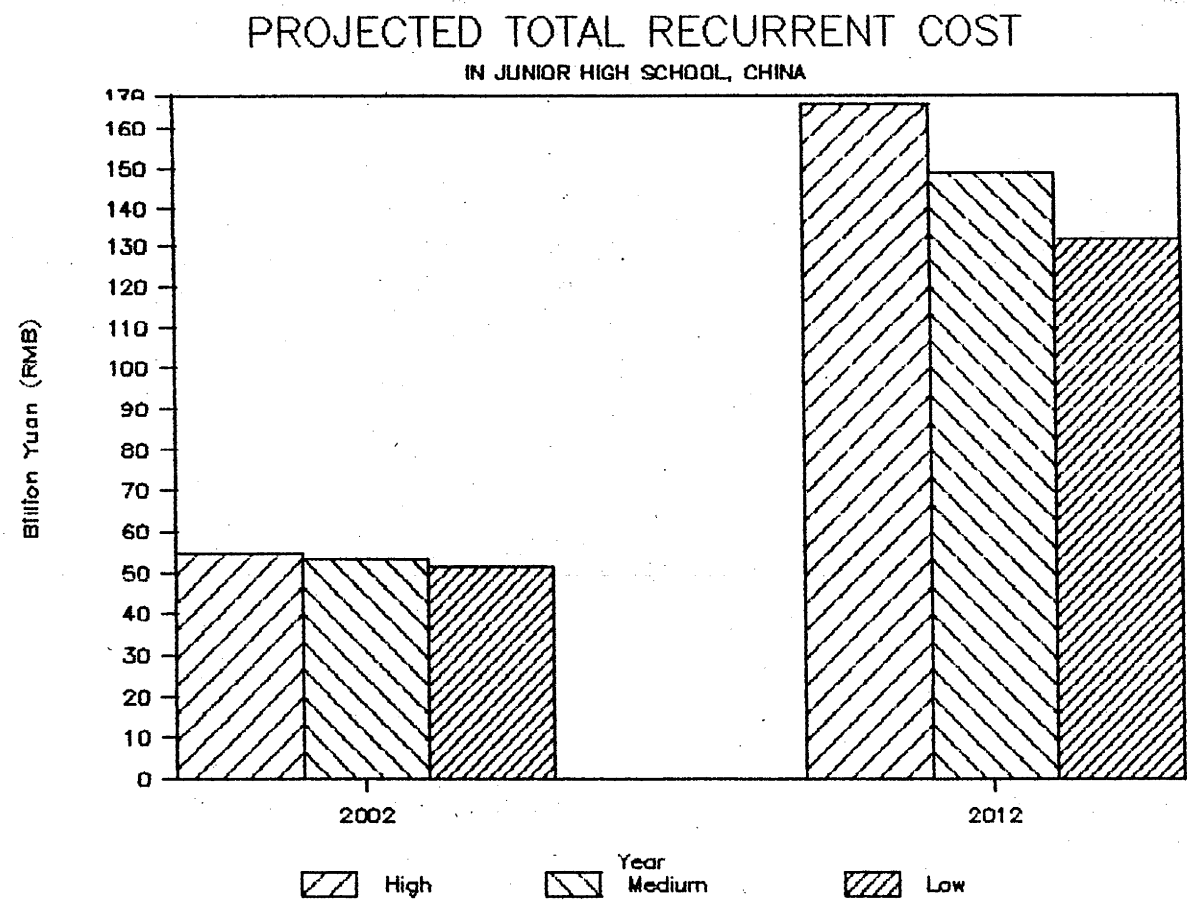


Figure 4.6



thus the cumulative increase over the 10-year period will be 115.9 per cent based on the formula $Pt = Po (1 + r)^n$.

The money will be spent on two items: teachers' salaries and other recurrent costs. Teachers' salaries account for about 70 per cent of the total expenditure, slightly more in primary schools and less in junior high schools. It is assumed that the salary component will be raised at an average annual growth rate of 6.8 per cent with a cumulative increase of 93 per cent every 10 years. Other recurrent costs per student will be increased at an average annual growth rate of 10.8 per cent, a cumulative increase of 179 per cent every 10 years. It should be noted that the percentage increase implies the an unadjusted increase in teachers' salary and the recurrent cost per student, ignoring the effects of inflation.

4.5.2 Projection of total recurrent costs by level of school

Based on the assumed increase rates in teachers' salary and average teachers' salary, that is RMB yuan 830 per year for primary school teachers and RMB yuan 850 per year for junior high school teachers in the base year 1982, the average teachers salary in 1992, 2002 and 2012 are calculated shown in Tables 4.11 and 4.12--that is RMB yuan 1602, 3092, 5967 respectively; the corresponding figures for junior high school are RMB yuan 1641, 3166 and 6111 respectively. The calculation is briefly explained as follows. For example, under the assumption that average teachers salary raised 93 per cent every

10 years, the average teachers salary in 1992 equal to 830 yuan (row c, column 1) * 1.93 = 1602 yuan (row c, column 2). The same procedure is used for the calculation for figures for 2002 and 2012. The total teachers salary in 1982 equals to average teachers salary multiplied by the number of teachers, that is 830 yuan (row c, column 1) * 4997,000 (row b,column 1) = 4148 million yuan (row c, column 1). Compared with the government's target that the national income per capita should be equivalent to U$ 800-1000 (that is RMB yuan 2960 to 3700 at the current rate of exchange), by the year 2000, those figures are reasonable even from a conservative point of view.

According to the assumed cumulative increase rate of 179 per cent every 10 years and previous figures about other recurrent costs per student in 1980 and 1987 (CEY, 1984:198; Wang, 1988a:1), the calculated corresponding figures in 1982 are RMB yuan 35 for primary school and RMB yuan 80 for junior high school, shown in Tables 4.11 and 4.12. The other recurrent costs per student per year in 1992, 2002 and 2012 are RMB yuan 98, 273, 762 for primary schools, and RMB yuan 223, 622, 1735 for junior high schools, respectively. The calculation for other recurrent cost is as follows. Under the assumption that other recurrent cost per student will increase 179 per cent every 10 years. The figures of 1992 equal to 35 yuan (row e, column 1) * 2.79 = 98 yuan (row e, column 2), the same procedure is used for the calculation of figures for 2002 and 2012. Total other recurrent cost

equal to 35 yuan (row e, column 1) * 124,929,000 (row a, column 1) = 4373 million yuan (row f, column 1).

In the light of enrollment, the total recurrent costs of education, that is, the sum of the total teachers salary and other recurrent costs, in primary schools and junior high schools are obtained, as shown in Tables 4.11, 4.12 and Figures 4.5, 4.6 respectively. It is obvious that enrollment, which is heavily affected by fertility, directly determines the number of teachers, and further strongly affects the total recurrent costs of education. In 2002, for junior high schools, the percentage of costs saved is 2.9 per cent when the high and medium variants are compared and is 5.8 per cent when the high and low variants are compared; the corresponding figures for primary schools are 6.3 per cent and 12.5 per cent. In 2012, the corresponding figures are 10.4 per cent and 20.8 per cent for junior high schools, and 13.6 per cent and 27.1 per cent for primary school, respectively. It can be seen that the cost savings when the high and low variants are compared are approximately twice those when the high and medium variants are compared. Referring to Figures 4.3, 4.4, 4.5 and 4.6, it is observed that over time, the differences in total recurrent costs under different fertility assumptions become distinct as a response to the expanding gap among the corresponding enrollments.

CHAPTER 5

SUMMARY AND CONCLUSION

5.1 Summary

From the results of the projected school-age population growth during the period 1982-2012 discussed in the previous chapters, it is shown that there is a large fluctuation in the trends of school-age population aged 6-14 years and school enrollment for primary and junior high schools. These future ups and downs in school-age population and enrollments will substantially affect the demand for teachers, the total recurrent costs as well as the efficiency of the whole education system. Therefore it is essential for policy-makers and educational planners to consider strategies which respond flexibly to fluctuating enrollment change, to formulate proper policies, and to plan in advance in order to tackle this difficult situation.

As mentioned before, at present China is facing a great challenge with the shortage of qualified teachers and funding as well as the low efficiency of education system caused by the surplus number of unqualified teaching staff and poor management. Lack of preparation for the future decline in school enrollments will surely contribute to a great waste of resources, particularly human resources. Therefore, in this chapter the implications of changing school enrollments for policy and planning will be discussed and some suggestions will be made about general action the schooling system might

take to orient themselves to the changes anticipated on the basis of projected enrollment fluctuations at the national level.

5.2 Implications and suggestions

The implications and suggestions will be illustrated according to the following four aspects: population control; finance; teaching staff; and efficiency of the school system.

5.2.1 Implications of population control

From the figures for projected school enrollment, demand for teachers, and recurrent costs, it is evident that population control through the family planning programme is absolutely necessary for national benefit and the development of education in China as the size of the school-age population directly affects the size and the quality of the service the educational system must provide. In this context, the size of the population aged 6-14 dominates the size and quality of service that primary and junior high schools must provide. In short, fertility reduction can obviously save a great deal of educational funding, speed up the popularization of nine years of compulsory education and promote the development of education. However, the changes in fertility due to the inconsistent population control policy implemented in China previously has resulted in the large fluctuation in the trends in size of population, namely the school-age population (aged 6-14) and corresponding school

enrollments in this context. This fluctuation forms a serious and difficult problem for the educational planners to deal with in the near future.

5.2.2. Finance

At present, the Chinese government has been committed to the increase in expenditure on education in its public statement that, in the future, the growth rate in educational appropriation by the central and local governments should be greater than the growth rate of state revenue (YPRC, 1985:505). However, it is suggested that the source of funding should not solely depend on the allocation from the central and local government. The local community, various institutions and individuals should be actively involved in money-raising for education, including institutional and personal donations, and charging school fees when feasible, as it is difficult for the government to appropriate a sum adequate enough to meet the great demands of educational development at all levels.

The distribution of funding is another important issue. The percentage of total recurrent costs for teachers' salaries and for students should be in a rational balance. In China, a large amount of money, (about 70 per cent of the total outlay) is used to pay teachers' salaries. Only a small amount of money goes to meet other recurrent costs for students. This situation has greatly hindered the development of education and will lead to further deterioration of its quality.

At present, the average teacher's salary in primary and junior high schools is quite low compared with persons engaged in other occupations in China and with the teachers' salaries in Taiwan and Hong Kong. Thus resignation from teaching and transfers to other occupations, such as business and other enterprises, have become common. As the retention of adequate qualified teachers is insurance for the quality of education, it is better to reduce the total amount of expenditure on teachers' salaries, increasing the average salary of the qualified teachers and reducing the number of teachers in order to prevent teachers from drifting to other occupations. Accordingly, the expenditure on other recurrent costs will be able to be raised to improve the teaching facilities if the total recurrent cost is not reduced.

Expenditure cannot be reduced in proportion to the enrolment decline. In fact, on a per student basis, operating a school is more expensive when fewer are enrolled because maintenance and administration must continue whatever the number of students and whatever the P/T ratio. Therefore, when enrollments show a downturn, it is better to take this advantage to improve the quality of teaching facilities, and to prepare for the future increases in enrollments. A decrease in the prevailing pupil/teacher ratio should give teachers the opportunity to devote more attention to the progress of individuals and thereby help reduce the dropout rate so that the efficiency of the whole system can be improved.

5.2.3. Teaching staff

One of the most urgent tasks encountered by the education system in China is to supply sufficient numbers of qualified teachers to provide basic education to the growing number of children. This implies that teacher education should be reinforced and extended without delay.

In regard to the supply of teachers in primary and junior high schools in the whole country, two points regarding quantity and quality should be considered. In general, the shortage of qualified teachers and the poor qualifications of the teaching staff are the main issues, though the situation is quite different in rural and urban areas. Most teachers, regardless of their qualifications, prefer working in towns and cities because of better living conditions, better schools and better teaching facilities. Hence, the distribution of teachers is uneven in the country as a whole. Proper policy for a more reasonable distribution of teaching staff by means of various kinds of incentives should be put into practice in order to encourage teachers to work in rural, mountainous, and other less developed areas.

In China, mobility from one area to another and transfer from one position to another are under the government's strict control by means of the current residence registration system. At present, except for the attraction of the better living and working conditions in urban areas, there are two main obstacles preventing the urban teachers and the graduates of

teachers' college from working in rural areas. Firstly, they do not want to have their urban residence registration cancelled, which is a symbol of privilege compared with rural people, and secondly they do not want to stay in rural areas forever, especially when they consider their personal development, and the future of their family and children. Therefore, in order to encourage teachers to work in rural areas, it is better for the government to adopt appropriate policies, for instance, to pay high salary incentives and guarantee their free return to the cities after working in rural areas for a certain period without cancellation of their urban residence registration, and to be responsible for arranging proper positions for them. As a result, more and more teachers, especially young college graduates, will prefer working in rural areas voluntarily as they either are stimulated by the salary incentives or need the unusual experience for their future career development. Another alternative is the adoption of a combination of enrollment with compulsory assignment; that is, it needs to be publicly stated that a certain number of students will be enrolled into the teachers' college according to a lower entrance standard, and that these people will definitely be assigned to rural or poor areas after graduation. As there is intense competition in the university entrance examination in China, some people will prefer to be enrolled in these positions, in particular those from rural areas.

With respect to the quality of teaching staff, as mentioned in Chapter 2, the poor professional qualifications of the whole teaching staff applies in general, but especially in rural areas. Therefore, the retraining of teachers should be arranged according to the projected gap between the supply and demand of teachers during the different periods. According to the projected results illustrated in Section 4.4.2, during the period 1982-2012, the difference of projected supply of teachers compared with projected demand ranges between a surplus of 665,000 to a shortage of 1020,000 for primary schools and a surplus of 445,000 to a shortage of 1010,000 for junior high school. In order to deal with this fluctuation appropriate measures must be taken in advance. It is obvious that the short-cut and cost-effective way for teachers' training is to have some unqualified teachers retrained during the surplus period for the preparations of the coming shortage period. This kind of retraining can be conducted through different channels, such as correspondence or TV courses, on-the-job training and short-term intensive training. Normally, it takes one year to complete this kind of retraining and to obtain the certificate of qualification.

5.2.4 Efficiency.

It is essential to improve the low efficiency of the educational system that has resulted from the burden of surplus teachers and poor management. About 70 per

cent of the expenditure goes to pay teachers' salaries and an even higher percentage in some rural primary schools. Thus there is a serious shortage of money for other recurrent costs, including purchase of books, teaching equipment and improvement of general teaching facilities, when there is a large surplus of teachers. This results in poor teaching facilities, often accompanied by poor teaching quality and a low P/T ratio. In general, a low P/T ratio should mean better quality education but under the specific circumstances in China, a low P/T ratio should be examined carefully. As mentioned before, the surplus number of teachers often means a heavy burden on and low efficiency of the educational system. For example, due to the shortage of qualified teachers, in some urban schools, qualified and competent teachers are over-loaded in their work and do an extra share of the work for their unqualified colleagues but earn almost the same salary. Consequently, over-loading of work plus low salary drives some of the teachers to other occupations. This inevitably results in poor quality education. In rural areas, low efficiency is mainly reflected by a high drop-out rate with the increase of illiterate and semi-literate as well as low promotion rates from one level of school to the next level of school.

The alternative way to solve the problem of these unqualified teachers is to get some of them retrained in preparation for the increasing requirement for teachers in the next decades. In urban areas, it is also

suggested that unqualified teachers in primary and junior high schools should be transferred to some other positions. For example, local community groups, such as neighbourhood committees, often need to recruit new staff for their local continuing education schools as many young people, such as those waiting for their first jobs, want to continue their study in order to be able to be assigned a job. A similar situation applies in all kinds of enterprises too because more and more employees are involved in continuing education for adults. In general, there is an increasing requirement for teachers in continuing education for young school-leavers and adults. This results from the government's policy that qualifications are an important criterion for employment and career promotion. Recently, the government has required all employees in government-owned and collective-owned enterprises to reach a certain level of education and to pass the relevant exams. If not, employees will be in an inferior position for promotion and salary increases.

In short, comprehensive and flexible preparations, including allocation of financial and human resources, for the fluctuations in school enrollment must be planned in advance according to specific situations. Special attention should be paid to training and supply of teachers as well as the quality of education as they are the key factors associated with the achievements of the whole education system.

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Appendix 1-1

School Age Population (6-14) by Single Year Intervals Under Different Fertility Variants in Rural China, 1982-2012 (000)

year	high variant	medium variant	low variant
1982	186066	186066	186066
1987	156297	156297	156297
1988	151058	151057	151057
1989	147262	147303	147345
1990	144888	145001	145114
1991	143811	143977	144141
1992	144060	144191	144321
1993	145727	145741	145748
1994	149188	148814	148339
1995	154117	153159	152203
1996	160055	158360	156665
1997	166583	163865	161149
1998	173562	169543	165566
1999	180846	175282	169746
2000	187748	180558	173385
2001	194184	185315	176452
2002	199990	189412	178835
2003	204960	192637	180313
2004	208253	194444	180361
2005	210829	195138	179441
2006	212130	194867	177601
2007	212539	193694	174841
2008	211916	191584	171246
2009	210353	188578	166795
2010	208164	185111	162042
2011	205711	181455	157182
2012	203271	177783	152282

Source:The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)

Note:(1) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline.

(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

Appendix 1-2

School Age Population (6-14) by Single Year Intervals Under Different Fertility Variants in Urban China 1982-2012 (000)

year	high variant	medium variant	low variant
1982	36267	36267	36267
1987	29687	29687	29687
1988	28960	28958	28960
1989	28286	28293	28298
1990	27750	27768	27783
1991	27210	27235	27259
1992	26639	26658	26675
1993	26069	26069	26071
1994	25620	25556	25496
1995	25290	25144	25012
1996	25145	24890	24658
1997	25203	24799	24432
1998	25382	24796	24268
1999	25677	24885	24159
2000	25986	24979	24053
2001	26243	25031	23902
2002	26400	24985	23664
2003	26434	24827	23322
2004	26274	24491	22802
2005	25954	24020	22176
2006	25519	23451	21460
2007	24992	22789	20670
2008	24360	22048	19819
2009	23656	21235	18944
2010	22911	20407	18079
2011	22174	19594	17259
2012	21467	18816	16508

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB, 1983)

Note: (1) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline.
(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta,1978)

APPENDIX 2-1

School Enrollment (6-14) by Single Year Intervals Under Different Fertility Variants in Rural China, 1982-2012 (000)

year	high variant	medium variant	low variant
1982	134775	134775	134775
1987	119350	119350	119350
1988	116925	116919	116913
1989	115288	115297	115350
1990	114843	114906	114968
1991	115577	115703	115829
1992	117570	117546	117783
1993	120714	120806	120899
1994	125409	125240	125072
1995	131524	130903	130282
1996	138729	137443	136156
1997	146300	144028	141808
1998	153867	150445	147063
1999	161824	156986	152177
2000	169614	163237	156876
2001	177018	169039	161065
2002	183906	174277	164648
2003	190117	178778	167435
2004	195124	182039	168946
2005	198941	184207	169469
2006	201790	185433	169072
2007	203776	185761	167741
2008	204759	185162	165559
2009	204821	183661	162491
2010	204249	181660	159056
2011	203383	179425	155449
2012	201732	176457	151167

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB,1983)

Note: (1) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline
(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

APPENDIX 2-2

School Enrollment (6-14) by Single Year Intervals Under Different Fertility Variants in Urban China, 1982-2012 (000)

year	high variant	medium variant	low variant
1982	31682	31682	31682
1987	26572	26572	26572
1988	26208	26208	26207
1989	25928	25931	25934
1990	25705	25718	25730
1991	25453	25475	25495
1992	25149	25169	25188
1993	24831	24837	24843
1994	24613	24561	24515
1995	24527	24394	24274
1996	24636	24390	24168
1997	24854	24456	24096
1998	25085	24509	23986
1999	25436	24652	23934
2000	25798	24801	23882
2001	26110	24904	23784
2002	26294	24886	25573
2003	26329	24732	23232
2004	26172	24398	22718
2005	25856	23933	22094
2006	25422	23363	21380
2007	24898	22708	20596
2008	24270	21966	19750
2009	23567	21157	18876
2010	22826	20332	18014
2011	22090	19522	17196
2012	21386	18746	16446

Source: The Census Ten Per Cent Sample Tabulation (SC and SSB,1983)

Note: (1) High variant refers to constant fertility; medium variant refers to slow fertility decline; low variant refers to rapid fertility decline
(2) The projected results are obtained by using Fivfiv/Sinsin package (Shorter and Pasta, 1978)

Appendix 3-1

Calculation Of Age-Secific Participation Rates by Sex and Residence

Step 1.

Use age structure of urban population by single year of age for age group 6-14 to get proportion of males and females in each age group. e.g. (urban males at 6)/(urban children at 6)= proportion of urban males at 6.

Step 2.

Assume sex ratio is the same for urban school -going population and school population, use the results of step 1 and figures for urban school attendance by single year of age to get figures of corresponding urban school attendance by sex; e.g. (proportion of urban males at 6) * (urban school population at 6) = urban male students at 6.

Step 3.

Use figures of total school attendance by single year of age and sex and the result of step 2 to get rural school attendance by single year of age and sex; e.g.(total male students at 6) - (urban male students at 6)=rural male students at 6.

Step 4.

Use age structure of single year of age by sex and residence and results from step 3 to get age-specific participation rate by sex and residence. e.g. (rural male students at 6)/(rural males at 6) = participation rate of rural males at 6.