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POPULATION POLICY IN CHINA SINCE 1950 AND ITS DEMOGRAPHIC AND ECONOMIC IMPLICATIONS

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Population, Health and Nutrition Department

A B S T R A C T

The study reviews China's population policy and demographic trends since 1949, discusses the different population policies open to China during the period 1983-2100, and evaluates the demographic and economic implications of such policies. China's demographic history has been reconstructed with the assistance of Ken Hill from the administrative censuses of 1953 and 1964, the 1975 cancer epidemiology survey, provisional results from the 1982 census, and official birth and death registers. Four sets of projections of total population for the period 1983-2100 are provided: one representing a relatively slow fertility reduction, two corresponding to the official target of 1.2 billion in the year 2000, and one approximating 50 percent adoption of the one child family policy. The relative merits of these four alternative fertility paths are evaluated in terms of their respective age structure, population densities, private savings, levels of investment and employment, and other demographic and economic implications.

Population policy in China was officially pronatal until the 1956 and 1962 family planning campaigns. These campaigns had only limited demographic impact, however, and the 1959-61 famine was the only effective constraint to population growth during the 1950s and the 1960s. The 1971 birth planning campaign, however, initiated a remarkable fall in fertility through the promotion of later marriage, longer birth intervals, and fewer children. In 1979, Sichuan instituted a one child family policy and similar policies have since been widely implemented throughout China. Given the success of population policy during the 1970s, the officially declared demographic target of 1.2 billion people in the year 2000 appears to be obtainable.

A limited band of alternative fertility paths are compatible with a wide range of demographic outcomes during the next century. Until the year 2000, the economic impact of these alternative fertility paths are undramatic. After 2000, the effects of alternative patterns of fertility change on the age structure of the population at different points of time are likely to be of much greater economic significance than population size itself. Lower fertility results in an earlier drop in the population of working age and potentially protracted economic adjustment difficulties. The number of elderly dependents is greatly increased in a stationary population and this increase is accelerated, furthermore, with lower fertility. Until at least the end of the century, economic gains from lower fertility would accrue primarily to the families joining the one child family programs rather than to the community as a whole. If fertility remains too low -- for example by staying below replacement after the year 2000 — the adjustment and transfer problems posed by a changing age composition and increasing number of retired elderly will become increasingly serious.

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Prepared by: Timothy King
Development Research Department

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POPULATION POLICY IN CHINA SINCE 1950 AND ITS DEMOGRAPHIC AND ECONOMIC IMPLICATIONS

Tables

POPULATION POLICY IN CHINA SINCE 1950 AND ITS DEMOGRAPHIC AND ECONOMIC IMPLICATIONS 1/

POPULATION GROWTH IN CHINA 1950-82

A substantial amount of new information on the Chinese demographic experience since 1949 has recently become available from a variety of sources, and it has been possible to compile tables such as Table 1, with data taken from official sources. Unfortunately there is no way to make such a table internally consistent. For a number of years the rates of natural increase are not in accord with the reported changes in population size. For instance, for 1956 and 1957 the rate of natural increase is below the growth rate. The application of the natural increase rates to the 1957 population would result in a mid-1964 population 20 million larger than the census total. In the late 1960s and early 1970s the growth rates again systematically exceed the rates of natural increase. Such discrepancies cannot be plausibly explained in terms of net international migration because the numbers involved are so large relative to the populations of neighboring countries, and because very little in-migration took place.

1/ This paper could not have been written without the assistance of Ken Hill in reconstructing demographic history and of My Vu in making population projections. Bee-Ean Gooi also provided valuable research assistance. Helpful comments on earlier versions were provided by Leo Orleans and Dean Jamison, Jim Goering and Tom Wiens, Judith Banister and participants at a World Bank Workshop on Population and Health in China, June 20-21, 1983.

Table 1: CHINA - OFFICIAL TOTAL ESTIMATES OF POPULATION AND VITAL RATES, 1949-82

Year	Year end population (million)	Apparent annual growth rate (%)	Mid year census total (million)	Birth rate (per '000)	Death rate (per '000)	Natural Increase (per '000)
1949	541.7	-	-	36.00	20.00	16.00
1950	552.0	1.9	-	37.00	18.00	19.00
1951	563.0	2.0	-	37.00	17.00	20.00
1952	574.8	2.1	-	37.00	17.00	20.00
1953	588.0	2.3	582.6	37.00	14.00	23.00
1954	602.7	2.5	-	37.97	13.18	24.79
1955	614.7	2.0	-	32.60	12.28	20.32
1956	628.3	2.2	-	31.90	11.40	20.50
1957	646.5	2.9	-	34.30	10.80	23.23
1958	n.a.	n.a.	-	29.22	11.98	17.24
1959	n.a.	n.a.	-	24.78	14.50	10.13
1960	n.a.	n.a.	-	20.86	25.43	-4.57
1961	n.a.	n.a.	-	18.13	14.38	3.80
1962	n.a.	n.a.	-	37.22	10.08	27.14
1963	n.a.	n.a.	-	43.60	10.10	33.50
1964	n.a.	n.a.	694.6	39.34	11.56	27.78
1965	n.a.	n.a.	-	38.06	9.55	28.51
1966	742.1	n.a.	-	35.21	8.87	26.34
1967	760.3	2.4	-	34.12	8.47	25.65
1968	782.0	2.8	-	35.75	8.25	27.50
1969	803.4	2.7	-	34.25	8.06	26.19
1970	825.4	2.7	-	33.59	7.64	25.95
1971	847.8	2.7	-	30.74	7.34	23.40
1972	867.3	2.3	-	29.92	7.65	22.27
1973	887.6	2.3	-	28.07	7.08	20.99
1974	904.1	1.8	-	24.95	7.38	17.57
1975	919.7	1.7	-	23.13	7.36	15.77
1976	932.7	1.4	-	20.10	7.29	12.72
1977	945.2	1.3	-	19.03	6.91	12.12
1978	958.1	1.4	-	18.34	6.29	12.05
1979	970.9	1.3	-	17.90	6.20	11.70
1980	982.6	1.2	-	n.a.	n.a.	12.00
1981	996.2	1.4	-	20.91	6.36	14.55
1982	-	-	1008.2	-	-	-

Source: Leo Orleans, "The Imperative of Birth Planning in China" (Library of Congress, September 1982). Based on Hou Wenruo, "Population Policy," in Liu Zheng et. al., China's Population: Problems and Prospects (Beijing: New World Press, 1981) (population 1949-79) and Zhang Kuaiyu, et.al. Outline of Population Theory (Henan Publishing House, 1981) (vital rates 1949-79). Populations and rates of increase 1980 and 1981 are from Xinhua, April 29, 1981; 1964 and 1982, census totals and 1981 vital rates are from the 1982 Census, Xinhua, October 27, 1982

There are many other obstacles to attempting to reconstruct Chinese demographic history. No one published source gives a complete series of all that is available, and not all published information is itself consistent. Information on the age distribution is available from censuses held in 1953 and 1964, and from a 1973-75 survey of cancer epidemiology. The 1975 survey is possibly weakened as a source by the facts that it was not simultaneous in all areas of China, and that its sampling procedures were not random, with some of the excluded groups likely to have been far from typical in age structure or mortality experience.1/ Only very limited information from China's latest census, held on July 1, 1982, is yet available, but this does include data on age distribution in three provinces.

Chinese authors have pointed to a plethora of sources of possible inaccuracy and discrepancies in the underlying data, quite apart from human or typographical errors in calculating, transcribing or reporting the results, and there are several reasons for believing that the relative importance of these has varied considerably over time. One such source of error is the traditional method of calculating age in China, which gives an age of one to two years above the conventional figure and which may have led to an inflation of age in censuses./2 Another problem is the likelihood, for which there is considerable supporting evidence, that where a baby has died in the first few

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1/ See Judith Banister and Samuel H. Preston, "Mortality in China", Population and Development Review, 7, March 1981, pp. 98-108.

2/ Traditionally a Chinese baby is regarded as one year old at birth, and becomes two years old in the following New Year.

weeks of life, both its birth and death have often gone unregistered.1/ A major problem reflects the disruption in the routine collection and transmission of statistical data caused by the Great Leap Forward and the subsequent economic crisis. Population totals for the period 1958-63 have never been released. After beginning to recover, statistical work was again devastated during the Cultural Revolution. Another source of error is possible fraud on the part of households in order to obtain or retain a larger number of ration cards than those to which they were legally entitled. This may have led to an underreporting of deaths. Another problem stems from the eagerness of local authorities to report results which reflect well on their ability to implement national policy rather than the truth; this is reported to have led to the underreporting of births, especially in the early 1970s. Birth rates obtained through data collected by the birth planning system continue to be lower than those implied by the rate of increase of population totals, even though in principle commune authorities are supposed to reconcile such data with information from household registers and commune accountants.2/

Considerable demographic detection work has gone into trying to reconcile or explain discrepancies among different sources of information and

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1/ A 1973 survey in Shanghai municipality, the most economically advanced part of China, found that 23.7% of infant deaths were not reported. Ninety-eight percent of these were deaths under 1 month, of which 50% were not reported. See Dong Hengde et.al. "Measures Taken by the Shanghai Municipality to Control the Failure to Register Infant Deaths and Their Results" in Population Study (Renkou Yanjiu), April 1982, pp. 49-50.

2/ William R. Lavely, "China: Rural Population Statistics at the Local Level." Population Index, Vol. 48, No. 4 (Winter 1982), pp.665-677.

to derive an internally consistent and plausible series that seems to match adequately the available data, taking into account the relative degree of accuracy of different components./1 It is now possible to take into account both the 1982 Census total and recently released single-year age distributions for 1953 and 1964. Single-year distributions for 1982 are available only for three provinces (Henan, Zhejiang, and Hebei) but together these include 166 million people and are probably reasonably representative demographically./2 The estimates in Table 2 have been made by Kenneth Hill, following procedures to be described in a separate supplementary paper for the Report of the Rural Health and Medical Education Mission./3 They are based on repeated forward and reverse projection, using forward projection and comparison with a later observed age distribution to refine estimates of mortality, and reverse projection largely to refine estimates of fertility. The younger age cohorts in the later censuses provide an indication of the joint effects of fertility

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1/ See for example, John S. Aird, "Recent Demographic Data from China: Problems and Prospects", in U.S. Congress Joint Economic Committee, China Under the Four Modernizations: Part I, p. 794. August 13, 1982, pp. 187-194.

Also three articles in Population and Development Review. Ansley J. Coale, "Population Trends, Population Policy and Population Studies in China" March 1981, pp. 85-97 and "A Further Note on Chinese Population Statistics" September 1981, pp. 512-518; John S. Aird, "Population Studies and Population Policy in China", June 1982, pp. 267-297.

2/ See Table 4, p.29.

3/ Kenneth Hill, "Demographic Trends in China, 1950-82", Supplementary Paper Number 1 to Health Sector Issues in China, forthcoming, May 1983.

Table 2: SUMMARY PARAMETERS OF ESTIMATED FERTILITY AND MORTALITY TRENDS, 1950-1982; CHINA

Year	Mid Year Population (millions)	Birth Rate (per '000)	Death Rate (per '000)	Rate of Natural Increase (per cent)	Total Fertility Rate	Infant Mortality (per '000 live births)	Expectation of Life at Birth
1950	602.8	42.0	33.5	1.05	6.1	252	32.1
1951	609.3	43.5	32.4	1.11	6.3	246	32.8
1952	616.3	45.0	31.5	1.35	6.5	240	33.6
1953	625.6	45.5	30.7	1.48	6.6	233	34.4
1954	635.5	46.5	29.9	1.66	6.7	225	35.3
1955	646.4	44.0	26.6	1.74	6.4	216	36.3
1956	658.0	43.0	24.7	1.83	6.2	207	37.3
1957	671.3	45.0	23.4	2.16	6.5	200	38.3
1958	683.9	41.5	25.8	1.57	6.0	214	36.1
1959	690.6	35.0	31.4	0.36	5.1	252	32.1
1960	687.8	24.5	36.0	-1.15	3.6	330	24.5
1961	684.9	26.5	23.5	0.30	4.2	246	32.5
1962	693.4	41.0	19.5	2.15	6.5	193	39.1
1963	710.8	47.7	19.6	1.81	7.5	175	41.5
1964	729.3	43.5	20.2	2.33	6.6	180	41.1
1965	746.8	41.5	17.5	2.40	6.2	165	43.8
1966	764.9	39.4	15.5	2.39	5.8	155	45.6
1967	783.4	37.5	13.5	2.40	5.5	139	48.3
1968	803.7	39.3	12.2	2.71	5.7	132	49.8
1969	825.1	36.9	11.4	2.54	5.2	122	51.9
1970	845.7	34.0	10.1	2.39	4.8	109	54.5
1971	865.1	31.0	9.6	2.14	4.4	104	55.4
1972	883.5	30.1	9.4	2.07	4.3	100	56.4
1973	901.1	28.3	9.4	1.89	4.0	91	58.4
1974	916.9	25.1	9.4	1.57	3.6	87	59.2
1975	930.5	23.2	9.4	1.38	3.3	84	59.8
1976	942.0	20.1	9.3	1.08	2.8	75	61.6
1977	952.0	19.2	8.9	1.03	2.6	64	64.1
1978	962.0	18.7	8.0	1.07	2.5	59	65.5
1979	972.5	18.7	7.8	1.09	2.5	57	66.1
1980	983.1	18.5	7.8	1.07	2.5	53	67.1
1981	994.8	20.9	7.8	1.31	2.8	48	68.4
1982	1008.2					45	69.0

and infant and child mortality. Not all discrepancies can be eliminated but a reasonably consistent demographic history can be constructed.1/

The course of events from 1958 to 1964 is of very great interest, especially since this is the birth period of the cohorts now reaching marriageable age. As noted, population totals for this period have never been released and most Chinese writing on population gives no demographic information at all. However estimates of birth and death rates have been trickling out in Chinese publications (Table 1). These suggest the most cataclysmic swings in vital rates during the period. They imply, as does Table 2, that the economic collapse that followed the Great Leap Forward saw an extremely severe famine -- with death rates more than doubling during 1958-60, and birth rates plummeting, so that the birth rate reported for 1961 is only about one-half of the level given for most years of the 1950s.2/ Reported population growth rates for 1960 were actually negative -- a most unusual, possibly unprecedented, occurrence for any developing country since

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1/ The population figures have been constrained to accept the 1982 census population totals. Some experts believe that the Chinese census like many others involved a substantial undercount. One reason for this is that it came very close indeed to the totals of a household registration system whose totals were available to the census takers, but which showed itself inaccurate with respect to vital events in 1981, which were recorded afresh in the Census. See the remarks of John Aird reported in Intercom, Vol. 11, No. 1/2, January/February 1983, pp. 3-4.

2/ These figures suggest that there were about 24 million extra deaths during 1958-63. This is based on an assumption that the normal level would be the trend line between the level of the mid 1950s and the mid 1960s. Some might have reflected disruption during the Great Leap Forward, but most of this additional mortality was the result of the famine. (The net demographic effect was of course much greater because of the parallel effect on the birth rate.)

the Second World War. After 1961 the birth rate recovered to levels that by 1963 are reported to be much higher than any previous level. It is likely that this very marked year-to-year fluctuations in cohort size, implicit in official data, will have an echo in fertility levels during the 1980s.

Except for the 1958-62 period, Chinese demographic experience in the 1950s and 1960s was not very different from that of many other developing countries in Asia or elsewhere. Fertility appears to have remained high with little change (apart from the famine years) until the late 1960s. Since then it has fallen at a quite extraordinarily rapid pace. In contrast, mortality has shown a steady, rapid improvement throughout the period (except for the famine years). In general these birth and death rates are substantially higher than the official estimates before 1958. This is not surprising, since there was a fully national system of vital registration only after 1956, and soon after this came the statistical chaos of the Great Leap Forward. Another statistical collapse accompanied the Cultural Revolution, so a further discrepancy between the rates estimated for the second half of the 1960s and those officially reported is also plausible. In the early 1970s the underreporting of births to achieve family planning norms has been officially acknowledged./1 Nevertheless data from the 1973-75 cancer survey and the 1982 Census confirm that a substantial decline in fertility began in the late 1960s and proceeded very rapidly through the 1970s.

1/ Sun Yefang, "Consolidate Statistics Work, Reform the Statistics System" Economic Management (Jingju Guanli), February 15, 1981, pp 3-5, in FBIS, March 26, 1981, L4-9 gives this as one example of statistical falsification, among many.

Another supplementary paper for the Rural Health and Medical Education Mission examines various correlates of mortality levels./1 In this paper, we shall consider first the past relationship between population policy and fertility trends. Then, based on this discussion of policy and on the estimated age structure of the population in 1980, we shall discuss the alternative demographic prospects that appear to be open to China, and some of their economic implications.

CHINESE POPULATION POLICY

Marriage and the Family

Very early in its administration, the Communist Government of China promulgated a new marriage law. The declared purpose of the Marriage Law of 1950 was to abolish 'arbitrary and compulsory' feudal practices of arranged marriages and 'the supremacy of man over woman'. It established a minimum legal age of marriage at 18 for women and 20 for men, two years above the age set in the Family Law of 1931 and widely disregarded. The law was seen as an important step towards the establishment of a new socialist society, but it was not in any sense an attack on the institution of monogamous, life-long marriage itself or on the family as the basic unit of society./2 A few years

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1/ N. Prescott, D. Jamison and N. Birdsall, "Determinants and Consequences of Health Service Availability in China", Supplementary Paper Number 8 to Health Sector Issues in China, June 1983.

2/ Both the intention and consequences of the Marriage Law are discussed in Elizabeth Croll, The Policies of Marriage in Contemporary China (Cambridge: CUP, 1981).

later, in the Great Leap Forward, an attempt was made to reduce the role of the household both in production and consumption, but the dormitories and communal dining rooms established in the newly formed people's communes were quickly abandoned. So too were the service stations for urban housekeeping and many of the homes for the elderly and nurseries for the children. The 1980 revision of the Marriage Law reiterates the importance of free choice of partners, monogamy and equality of rights of both sexes; it also stresses the duty of parents to rear, educate and discipline their children, and the duty of children to support and assist their parents. Inheritance of property within a family group is permitted.

The evident intent of the marriage laws to confirm that there is a social as well as a private interest in marriage, and to promote what to Western eyes is a modern model of marriage and the family, marks a departure from Chinese tradition but does not differ from the practices of many other countries. In contrast, the measures adopted to apply social control over individual fertility have been much more radical.

Early Family Planning Campaigns

The 1950 Marriage Law had no demographic intent, even in its raising of the marriage age. At the time, Mao took an explicitly orthodox Marxist view of Malthus as a Western bourgeois economist whose concerns about food supplies had been refuted in liberated China and the Soviet Union. However, the results of the 1953 census and the evidently rapid population growth prompted some rethinking and in 1956 Zhou Enlai personally endorsed a family planning campaign with an explicit intention of controlling population growth,

as well as of preserving the health of women and children./1 There is general agreement that this campaign had little, if any, demographic impact. In spite of the use of mass media and a stress on education and on the use of public health facilities and personnel, the campaign faced too many handicaps. It preceded the availability of the contraceptive pill and of modern IUDs. Conventional contraceptives were in short supply. There was no extensive network of paramedical workers in rural areas which could be readily harnessed to provide information and services. And the campaign lasted only a short time, before it was abandoned during the Great Leap Forward amid the general euphoria that production problems were being solved.

The apparent drop in the birth rate in the late 1950s may have initially reflected some of the economic and social confusion of the Great Leap, but was principally the consequence of the widespread famine of 1959-61. In 1962 another family planning campaign began. There appears to have been less emphasis on mass media but more on political and professional discussion of the promotion of contraception and sterilization, and on making abortion more readily available. While the delivery of services, which relied heavily on mobile medical teams, remained the responsibility of the public health system, political cadres were expected to organize local committees, meetings and exhibitions, to provide information and encourage the adoption of family planning. New IUDs and vacuum-suction methods of abortion were introduced to support the effort. Sterilization was widely publicised, and

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1/ Aird comments that Zhou's support was only lukewarm. John S. Aird, "Fertility Decline in China" (U.S. Bureau of the Census, Foreign Demographic Analysis Division, February 1980.), p. 110.

conventional contraceptives were made readily and freely available. An estimated 14-15 million women were practicing contraception by the end of 1965./1 This was equivalent to 10-11% of the women of childbearing age and by the international standards of the time was a respectable effort among such a large population. For comparison, India, with an older and more continuous family planning program, took until about 1970 to reach a comparable level of contraceptive practice. Nevertheless, the campaign had only a limited demographic impact. Following the famine, the birth rate rose to levels at least as high as those of the 1950s -- the official birth rates for 1963, 1964 and 1965 all exceed any other figures reported since Liberation.

Although the 1950 Marriage Law set 18 and 20 as the minimum marriage age, advocacy of much later marriage became increasingly important. At first, stress was placed on the advantages to the couple in terms of improved health, economics and judgement, rather than reduced fertility and population growth. Increasingly men were urged to wait until they were at least 25 -- some recommended 28 -- and women until they were 23. By the 1960s, however, later marriage was seen as an important aspect of the family planning campaign.

Birth Planning Since 1971

The Cultural Revolution swept aside the family planning campaign, as so much else, and among other things disrupted the production and distribution

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1/ Joan Kaufman, A Billion and Counting: Family Planning Campaigns and Policies in the People's Republic of China (San Francisco: San Francisco Press, 1983), p. 16.

of contraceptives. There was some resumption of family planning activities in 1969, and in 1971 a new birth planning campaign was launched, on very different lines from before. Since then birth planning has been considered as an integral part of other social and economic planning. Individuals have been expected to conform voluntarily to established social norms of reproductive behavior -- summarised as later marriages, longer birth intervals and fewer children -- once their basis has been explained and understood./1 But, just as with productivity, recent policies have stressed the need for individual incentives as well as mere acceptance of social goals, so economic and social incentives for smaller families and disincentives to large ones, established and financed on a local basis, have increasingly been required.

The adoption of the new policy in 1971 led to the establishment of a hierarchy of birth planning institutions and individuals. This is headed by the "Birth Planning Leading Group" (since 1981, the State Family Planning Commission), reporting to the State Council, and there are corresponding committees at each governmental level down to the brigade or its urban equivalent. The birth planning system is administratively independent of the health system, though dependent on it for services. Senior party officials play a leadership role in the local birth planning committee, which is served by a local office with responsibility for supervising the operation of the program at that level. The local committee also has links with mass organizations such as the Woman's Federation.

1/ In the early years of this campaign, paid leave was given following surgical procedures but it was emphasised that this was compensation for lost time, not a form of material incentive.

The 1971 State Directive establishing the new policy did not specify a target growth rate for population but provincial administrators soon did. Since the mid-1970s, a national population growth target has been translated into a maximum rate of natural increase allowed for each province, taking into account the level of development and ethnicity (minority areas are permitted higher birth rates). /1 In turn (at least in principle) the province provides each county with a birth quota, the county allocates this among communes, and so on down to the level of production teams or urban residential units which assign permission to individuals to have children. At this level policies are reinforced by part-time family planning workers. The extensive network of work and residential groups, established to study and discuss economic and social issues and policy, has facilitated the mobilisation of peer pressures on couples to accept community birth planning decisions. The virtual absence of migration possibilities and the collective nature of income distribution must, in rural areas at least, have provided a real sense of the social interest at stake in individual fertility decisions, and encouraged the community to take the task of collective birth planning seriously. Such groups could also be harnessed to discourage marriage until the age of 28 and 25 for men and women respectively in cities, and 25 and 23 in rural areas. Sometimes individual local governments promulgated regulations to enforce such marriage ages.

1/ Population policies have been distinctly more lenient in minority areas. Data given to a World Bank health project mission show that several of the counties in Ningxia Autonomous Region still had birth rates of over 40 in 1981 (two were 45) — which, with reported death rates of around 8, gave reported population growth rates of up to 3.7%.

This process of top-down target setting does not preclude a good deal of local participation in the establishment of local birth plans and the relative importance of the two probably varies from time to time and place to place. Plans of individual and lower level units are reviewed at higher levels to see that they conform reasonably well to the norms of the one-child family policy (established in 1979), or its permitted exceptions. Women who marry at 23 or later seem normally to be allowed to have one child as soon as they wish but in principle should be discouraged from having a second. Those who marry earlier than 23 may be discouraged from having a child immediately.

For couples without permission to bear a child, contraceptives, sterilisation and abortion are widely available free of charge to the users. The birth planning system supplies contraceptives free and reimburses the health system for surgical services provided. The most widely used contraceptive is the IUD, probably used by about 50% of contraceptive users, followed by sterilisation (30%, with female sterilisation accounting for about 60% of the total).1/ Although abortion may sometimes be carried out by paramedicals in remote brigades, patients are normally referred to county or commune hospitals.

1/ Pi-chao Chen and Adrienne Kols, "Population and Birth Planning in the People's Republic of China". Population Reports, Series J, March 25, January-February 1982, p. 590. This report as a whole is a very useful source of information.

To summarise the achievements of the 1970s, it can be said that the birth planning program was remarkably successful in achieving its objectives, partly by providing an efficient network of contraceptive services through the already extensive health system, but mainly by the unabashed use of moral suasion and social pressure on individuals to raise the age of marriage and reduce marital fertility. By these means fertility was brought down sharply; it appeared to be heading steadily towards replacement by the late 1970s.

The One Child Family Policy

Though impressive, these successes began to appear insufficient to Chinese policymakers. The population continued to grow. Food output per head was little higher in 1977 than it had been in 1957. Looking ahead to the 1980s, the cohorts born in the high fertility years beginning in 1962 would be reaching marriageable age. In 1979 Sichuan instituted a policy designed to persuade married couples to have no more than one child. This policy was backed by a system of economic rewards to parents with one child who committed themselves to have no more, and penalties for those who persisted in having more than two. This soon became a national policy and individual provinces are all expected to implement such incentive and disincentive systems. In 1979-80 a draft National Birth Planning Law was prepared and widely discussed at many levels including the National People's Congress. But the latter -- citing "many unresolved problems" -- declined to approve it. Among the apparent reasons for this were anxieties among rural delegates that old age security would be jeopardized, and, within the army, that families would be

reluctant to have only children follow a military career./1 In addition there may have been a readily understandable reluctance to move from measures devised to penalise large families to ones that would make them actually illegal. Furthermore any system of nationally established incentives and disincentives might create an obligation on the national government to finance them, at least in the last resort if local enterprises and activities had insufficient resources, and this would go counter to other policies of fiscal decentralisation. Passage of a family planning law remains, however, a government intention. It was recently stated that one would be drafted within the next two years. 2/

Responsibility for establishing the details of policies as well as for implementation therefore currently falls on provincial and local governments concerned. Main responsibility for financing incentives falls on work units -- those of the father and the mother are expected to share equally. In consequence, there is considerable local variation in the rewards offered to parents with one child who pledge to have no more, and in the penalties attached to having two or more children. A typical package offers parents of a single child an allowance, often described as health care subsidies, of 60 yuan per year in urban areas /3 and some equivalent allowance in rural areas, until the child is 14. Preferential treatment will

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1/ Chen and Kols, op.cit., p. 600.

2/ Qian Xinzhong, "China's Population Policy," Beijing Review, February 14, 1983, pp. 21-24.

3/ This is equivalent to about 8% of a typical urban wage.

be given in the allocation of urban housing and the same space given to the family with one child and two children. An only child may be given adult rations and count as 1.5 or 2 persons in the allocation of private plots. Maternity leave benefits are more generous for the first child. Parents are promised that an only child will get priority in educational admissions and employment assignments; that special physical checks will be provided by hospitals; that special events may be laid on for only children; and that there will be a guarantee of their own relative living standards when they become old or widowed.

The spread of eligibility for such benefits was rapid. By the end of 1979 some 6 million out of 14 million couples with one child held such certificates; by the end of 1980 it was 11 million out of 20 million and by mid-1981 it was 12.5 million out of 22 million. /1

In May 1980, an interesting survey of one-child families in a district of Hofei, Anhui Province was carried out by a population research group at Anhui University./2 This revealed how much variation in incentives there could be even within a small local area.

1/ Beijing Center of Communications and Family Planning, Topics in Population Theory (Renkou Li Lun Xuan Jiang), p. 40. At least in part, the rise in the number of couples eligible for such certificates must reflect a rise in coverage of the schemes.

2/ Population Research Office, Anhui University, "A Survey of One-Child Families in Anhui Province, China". Studies in Family Planning, Vol. 13, June/July 1982, pp. 216-221.

"The bonus standard differs from factory to factory, from factories to schools or administrative units, and from state units to collective units. Some of the more profitable factories or commercial enterprises provide monetary bonuses to one-child parents amounting to over 100 yuan, or bonuses in the form of woolen blankets, transistor radios, brocade sheets, and so on. On the other hand, some units, such as administrative organizations, have no special funds for family planning and have to use money from their general welfare funds. Bonuses are as low as 10 or 20 yuan or a few towels, a thermos bottle, some toys, a wash basin, or even nothing at all.

There is also a large disparity in the welfare benefits provided for single children. According to the "Provisional Regulations on Policy Problems Concerning Family Planning," promulgated by the government, health funds are to be provided to single children from the age of four. In practice, however, differences exist among various units. Some prosperous factories, commercial enterprises, and military units provide health funds to single children from birth, in addition to free medical care, free kindergarten, and free schooling. Other units, according to their individual financial situation, offer one or two such benefits free for single children, and the parents are relatively satisfied. On the other hand, less profitable factories or commercial enterprises and such units as schools and administrative organizations can only provide health care benefits because they do not have a budget for family planning. As a result of these disparities, people often demand an explanation or apply for a transfer to units with greater benefits."

The disparity in incentives was a considerable source of dissatisfaction and a reluctance to apply for a one-child certification. Interestingly the Anhui survey found that poorer, less educated parents were less likely to become certificate holders, suggesting that the economic benefits did not outweigh traditional norms for this group. It is also possible that the poorer workers worked for less profitable enterprises which gave smaller bonuses. Even having made the pledge, nearly 10% of couples were wondering whether to change their minds./1 Reasons for not cooperating were not given by more than half of the families but the authors suggest that a major reason was a lack of

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1/ This may not sound like many, but it must not be forgotten that this survey was taken during the first year of the scheme.

confidence in the scheme; "some nonholders fear that promised economic benefits for one-child families will not materialize; others expect that in the future the government will change its policy and extend the same benefits to families with two children." Traditional desires for a male child remain evidently important. The child of sixty percent of certificate holders was male.

Penalties for excessive fertility also vary. Couples who have a second child must return any bonuses obtained for the first child. In some areas there may be other disincentives — for example, a couple having a second child may be required to pay a large amount for the privilege./1 Of course, second children may be permitted for a special reason — for example because the first child was seriously handicapped. Grain for a second child born outside the plan may in some localities have to be purchased at a higher price — in others this may be a penalty only on third and later children. Additional penalties on the third child are likely to include a tax of 5-10% of income, and an elimination of medical and maternity leave benefits.

Chinese attempts to reduce fertility have of course always had to struggle with the preference for sons, which receives very strong reinforcement from traditional cultural practices. For the one-child family the problems are magnified. Considerable attempts are being made to

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1/ In a brigade in the Beijing municipality visited by the Rural Health and Medical Education Mission, several couples had been willing to pay Y 750 for a second child. This was over twice the annual per capita distributed collective income (but this was a brigade where sideline income appears to be large).

counteract such feelings; for example, posters usually show the only child as a girl. Attempts are made to persuade new husbands to join the wife's household rather than the traditional pattern, but it is thought they have had little success. In some places larger economic incentives have been given for an only daughter than for a son. But it is clearly an uphill struggle. A November 1982 article in a Chinese paper, Youth News, said that reports of infanticide and abandonment of girl children were so widespread that it was concerned that the sex ratio might be significantly altered, and today's newborn boys might have difficulty in finding marriage partners. In his report to the Fifth Session of the Fifth National People's Congress on the Sixth Five-Year Plan, Premier Zhao Ziyang referred to the need to protect infant girls and condemn female infanticide.1/ In April 1983, the People's Daily reported that in one county in Anhui Province in 1980, 56% of surviving new-born were male; in 1981 the figure was 58%. Female infanticide was sometimes practiced before the Revolution but its apparent resurgence is obviously very disturbing to the Chinese leadership. There have also been reports of the use of amniocentesis to determine the sex of the child followed by selective abortion of female fetuses./2

The possibility that infanticide may have increased can find some additional support in the age/sex distribution in the three provinces for

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1/ Beijing Review, December 20, 1982, pp. 18-19.

2/ The New York Times, August 1, 1982, citing a Chinese publication, Health News. The Rural Health and Medical Education Mission was informed that where amniocentesis is being carried out, medical authorities are refusing to release information on the sex of the child.

which 1982 census data are available. The ratio of males to females is 1.08 for children under one year, 1.09 for one-year olds, 1.08 for two-year olds, 1.07 for three-year olds, and between 1.06 and 1.07 for children born earlier during the 1970s.1/ Since young boys show higher rates of mortality than girls, some decline in the sex ratio is to be expected, but sex ratios at birth as high as 1.09 have not been observed for countries with substantial populations and reliable data. It must be noted that abnormally high mortality rates for girl babies compared to boys need not reflect the deliberate killing of children at birth. It might simply imply that parents pay less attention to nutrition or to the health problems of girls. It is also possible that some girl babies may have gone unregistered, and subsequently were not reported to census-takers.

Attempts are being made to eliminate any pro-natalism within the system that allocates resources or benefits to individual households, which in the past have often been on a per capita basis. Of particular importance is the allocation of land, especially under responsibility systems which make the household, rather than the team, the beneficiary of higher output. A recent article complained that in some areas farmland was distributed solely on a per capita basis and that this was having an adverse effect on family planning efforts./2 Official policy, however, is that family planning should be explicitly linked to the adoption of a production responsibility system and in

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1/ The demographic evidence is discussed more extensively in Kenneth Hill, op. cit., Appendix 2.

2/ People's Daily, February 5, 1982.

some places contracts between a household and the team specify agreement about both production and childbearing./1 Failure to meet either target results in a substantial fine.

Couples undeterred by the penalties from having an unsanctioned second or third pregnancy become subject to considerable pressure from local family planning authorities and others to have an abortion. Although it is contrary to stated official policy, at least at the central level, to allow coercion to proceed beyond this to compulsory abortions, sterilization, or the insertion of IUDs, there are widespread reports of local abuses -- for example, of abortion campaigns which included third trimester abortions -- and in 1983 a campaign was begun to get one parent in a two-child family to be sterilized.2/ This is supposed to stop short of physical coercion, but it is impossible to imagine that in a country of China's size, all local cadres would know exactly where to draw the line between friendly counselling and unreasonable pressure.

The reasons put forward to justify the one-child family policy are those commonly used in discussions of the consequences of population growth in other developing countries./3 In a general way, reduced population growth is

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1/ Directives on Population Control issued by the Communist Party Central Committee and the State Council, March 13, 1982.

2/ International Herald Tribune, May 27, 1983.

3/ A relatively accessible statement of them is Liu Zheng "Population Planning and Demographic Theory" in Liu Zheng, et. al. China's Population: Problems and Prospects, Beijing, New World Press, 1981, pp. 1-24.

seen as facilitating the achievement of targeted improvements in per capita income. The shortage of cultivable land and its implication for food supplies and rural incomes is a continuing worry to Chinese officials. Indeed, given the history of the 1959-61 famine, it is likely that food anxieties are the main motivating force. In spite of improvements in average per capita food availability in the late 1970s, official reports sometimes acknowledge that supplies in many areas were often very tight. Acute difficulties with food supplies were evidently experienced in Sichuan in 1976. Grain remains rationed and in the late 1970s showed considerable variation from year to year in both quantities and in the grains of which the rations were composed.1/ In early 1981, it was admitted that 130 million people in at least 9 provinces faced "varying degrees of food shortages" with 21 million "seriously affected." The Government requested disaster relief for the first time, and after surveying the provinces of Hubei and Hebei, a U.N. Disaster Relief Organisation team reported that China needed $700 million in food and other aid.2/

Other concerns are the difficulties in raising education levels and problems of providing adequate urban housing and employment. The Chinese point to the demographic momentum implicit in the present youthful population, and the enormous growth in the cohorts reaching marriageable age; some of this appears to be based on official data on birth rates (which, as we have seen,

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1/ Vaclav Smil "China's Food: Availability, Requirements, Composition, Prospects", Food Policy, Vol. 6, May 1981, pp. 72.

2/ New York Times, April 25, 1981, cited in Lillian Li, "Introduction: Food, Famine and the Chinese State", The Journal of Asian Studies, XLI, August 1982, p.688.

exaggerate the fluctuations of the late 1950s and 1960s), but some appear to be based on more detailed age distributions than have been officially published.

Considerable anxiety has been expressed about some of the problems that the one-child family policy might create./1 The single-child cohorts may acquire undesirable psycho-social characteristics -- they may be more spoilt but also more pressured by their parents. Several surveys comparing the characteristics of children from homes of different parities have been carried out. The results of different surveys seem rather inconsistent with each other but a broad picture of the more rapid intellectual development of a single child, offsetting possibly greater wilfulness, emerges./2 Some military authorities are reportedly worried that parents of only sons may be reluctant to see them adopt a military career. There is also the worry that the eventual problem of supporting the elderly may be serious -- that individual couples may find themselves obligated to support four parents and eight grandparents. The answer normally given is that, of course, the one-child family policy is not proposed as a permanent policy. (If it were, it would imply that the Chinese people would die out.) It is expected that

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1/ The problems are discussed (and largely dismissed) in Demographic Economic Research Institute, Beijing College of Economics, A Guide to Family Planning Knowledge (Ji Hua Sheng Yu Zhi Shi Jiang Hua)) Beijing Center of Communication and Education for Family Planning, pp. 47-67.

2/ See C.C. Ching, "The One-Child Family in China: The Need for Psychosocial Research", Studies in Family Planning, Vol. 13, No. 6/7, June/July 1982, pp. 208-212; Xiao Fulan and Zhang Qibo, "A Survey of the Education of Elementary School Children From Only-Child Families, Population and Economics (Renkou Yu Jingji), No. 1, 1982, pp. 43-46, 55).

somewhere in the next century replacement-level fertility will be restored. Support for the elderly, it is argued, will be easier because of the increased affluence resulting from slower population growth and more rapidly rising productivity. What is required are pension schemes, such as have already been started by a small number of communes, brigades and teams.

The Demographic Impact of Population Policy

There can be no doubt that the remarkable fall in fertility in the 1970s is due mainly to the impact of population policies. The main evidence are the facts that the fertility decline began shortly after the instigation of the thoroughgoing family planning program, and the absence of any change in socioeconomic conditions that might have triggered a massive change in the desire of parents for particular numbers of children. There is no plausible competing explanation.

Nevertheless, as in other countries, a willingness to accept family planning was undoubtedly influenced by the socioeconomic circumstances in which families find themselves and there is evidence that fertility has continued to reflect the level of development, though to a diminishing degree. For example, Birdsall and Jamison used the limited interprovincial data on rates of natural increase in 1975 and 1979 and various development variables to show that there was an inverse correlation between estimated fertility and income levels (serving as a proxy for the degree of

development). 1/ Data was also available on birth rates and income levels for the 68 counties of Jiangsu province in both 1975 and 1979. Counties with higher incomes had lower fertility in both 1975 and 1979. However the effect of income (as a proxy for development) appeared to weaken over the period -- it had a lower explanatory value in 1979 than it had in 1975. Birdsall and Jamison suggest that the initial effects of the family planning policy were greatest in high-income areas and may have initially widened the dispersion of fertility. But as the scope for further fertility reduction was reduced in these areas, and the policies became effective elsewhere, the differential narrowed.

The impact of the one-child family was also greatest in more developed areas. Already by 1980 the policy appeared to be having an effect. The proportion of births that were first- or second-order was reported to be 70% in 1978 /2 and about 80% in 1980 (Table 3). The table also shows a very considerable range among provinces especially in the proportion of third births -- less than 5% in the major cities and 5-10% in several provinces, but around 40% in some areas. In general, the less developed provinces (as measured by indicators of per capita income and the proportion urban) have a

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1/ Nancy Birdsall and Dean T. Jamison. "Income and Other Factors Influencing Fertility in China". Supplementary Paper Number 3 to Health Sector Issues in China, March 1983.

2/ Chen and Kols, p. J 600.

Table 3: PROVINCIAL BIRTH AND DEATH RATES AND PROPORTION OF BIRTHS BY PARITY, 1980 /a

Region	Birth rate	Death rate	Percent of Births by Parity		
			First	Second	Third and later births
China	15.35	6.16	51	27	19
Beijing	15.57	6.30	74.7	22	3
Tianjin	13.26	6.03	74.4	21.2	4.4
Hebei	15.66	6.46	62	29	9
Shanxi	15.68	6.49	48.3	29.3	27.4
Nei Monggol	16.48	4.95	44	29	27
Liaoning	14.09	5.38	67	25	7.9
Jilin	15.81	5.79	58	27	15
Heilongjiang	13.56	4.86	63	26	11
Shanghai	11.79	6.48	77.7	19	0.3
Jiangsu	12.15	5.90	68	24	8
Zhejiang	12.98	5.91	50	33	17
Anhui	15.16	4.62	43	31	26
Fujian	15.19	5.82	43	34	23
Jianxi	15.49	6.38	42	35	23
Shandong	13.90	6.40	67	25	8
Henan	15.84	6.31	50.4	26.2	23.4
Hubei	15.58	7.00	54	30	16
Hunan	15.81	6.88	51	30	19
Guangdong	20.34	5.36	43	30	28.8
Guangxi	22.30	5.80	36	25.4	38.4
Sichuan	11.20	6.75	63	19	7
Guizhou	19.97	6.83	30	27.4	42.5
Yumnan	17.76	7.36	34	30	36
Xizang	23.04	8.26	-	-	-
Shaanxi	11.58	6.84	53	29	18
Gansu	14.03	5.15	49	26	25
Qinghai	21.14	5.61	-	-	-
Ningxia	24.95	4.22	30	28	42
Xinjiang	20.87	7.46	-	-	-

a/ Birth and death rates are almost certainly underestimated. The failure of the percentage parities to add to 100 in some but not all provinces also suggests significant inaccuracies in these data.

Source: Beijing Center for Communication and Education for Family Planning, Topics in Population Theory (Renkou Li Lun Kuan Jiang), pp. 184-185.

higher rate of births of 2nd and later parities./1 Scattered data also suggest substantial regional variation in the proportion of eligible couples who had received one-child certificates. In 1980 several provinces, including the two largest, Sichuan and Shandong, reported that about 80% of eligible couples had received certificates. In contrast, in Gansu and Guangdong the proportions were 26 and 29% respectively. (It should be noted that 1980 was the first full year of the scheme, and that regional variations in incentives offered may have been greater at that time.)

In 1981 the policy suffered some setbacks. The birth rate appears to have risen -- from probably a little over 18 per thousand in 1980 (no official birth rate has been published) to 20.9. At least in part this reflects a once-for-all rise in the number of marriages as a consequence of the 1980 Marriage Law. It is virtually certain that Table 3 underestimates the birth rate for China as a whole, and therefore for individual provinces. Although the data were provided to the author of the Chinese study by the State Statistical Bureau, the SSB has not itself published a birth rate for 1980 and

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1/ Regressions of the ratio of births of 2nd and later parities to total population in 1980 (B2+) on indicators of the level of provincial economic development in 1979 show significantly negative regression coefficients. For example,

$$B2+ = 120.54 - 13.67\ Urb - 11.85\ Ln\ Yr$$
$$(2.665) \qquad (2.725)$$

$$R^2 = 0.350$$

t statistics in parentheses

where Urb is the proportion of the provincial population that is urban and Ln Yr is the natural logarithm of distributed collective income per worker.

the population totals for each year suggest a birth rate closer to 18 than to 15. But whatever the figure, there is no doubt that there was a significant rise in the birth rate in 1981, which the 1982 Census reports to have been 20.9.

Some of this rise reflects an increase in the number of marriages. In the first half of 1981 there were 6.37 million marriages compared with 3.26 million for the first half of 1980 and 7.45 million for the whole of 1980. This does not reflect an increase in the numbers of people reaching marriageable age -- the late 1950s and early 1960s were a period of falling birth rates, and the cohorts born in the peak birth years of 1962-8 will not affect the numbers marrying until 1982 at the earliest. Table 4 illustrates this point with data on age distribution from 15-30 from the 1982 census for the only three provinces for which they are available.1/ The increase must therefore reflect the 1980 Marriage Law which had the effect of voiding local regulations which had kept the marriage age substantially higher. Although local authorities often try to discourage those who marry before the age of 23 from having children immediately, this is very contrary to traditional practice and may be difficult to achieve.

Since it is generally accepted that premarital pregnancy is rare in China, the rise in the number of marriages can have only a limited impact on

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1/ The lower rows of the table enable a rough comparison of the degree of development to be made with the country as a whole. It can be seen that they encompass a wide range of development levels, but taken together, are fairly representative.

Table 4: POPULATION AGED 15-30 BY SINGLE YEARS, JULY 1, 1982 IN THREE PROVINCES (thousands)

	Hebei	Zhejiang	Henan	Total
15	1,074.5	845.6	1,787.3	3,707.4
16	1,269.6	1,028.5	1,973.7	4,271.8
17	1,264.1	991.9	1,679.5	3,935.5
18	1,335.5	1,002.1	1,822.2	4,159.8
19	1,430.3	1,123.8	2,112.2	4,666.3
20	654.7	670.7	1,122.1	2,447.5
21	562.4	511.4	523.4	1,597.2
22	925.0	690.7	878.9	2,494.7
23	869.1	589.9	870.4	2,329.4
24	1,116.3	853.0	1,311.1	3,280.4
25	1,104.6	808.5	1,331.9	3,245.0
26	1,056.8	756.9	1,269.7	3,083.5
27	1,122.6	804.6	1,461.4	3,388.5
28	1,076.6	763.5	1,366.2	3,206.4
29	998.7	683.7	1,287.7	2,970.1
30	1,011.7	710.5	1,325.8	3,047.9
Total population (all ages)	53,006.0	38,885.0	74,423.0	166,313.0

				China
% urban	13.7	25.7	14.1	20.6
1981 rural net income per capita (yuan)	101.7	129.3	113.9	117.4
1981 birth rate/'000	24.0	17.9	20.6	20.9
1981 death rate/'000	6.1	6.3	6.0	6.4
Pop. growth rate, 1964-82	1.7	1.8	2.2	2.1

Source: Demographic data: 1982 Population Census
Income data: Statistical Yearbook of China, 1981

the birth rate in the year in which it takes place. It is also likely that in 1981 there was some reduction in the success of the one-child policy. For example, the Sichuan family planning authorities told the Rural Health and Medical Education Mission that the proportion of first-order births was lower and that of second order births higher in 1981 than 1980./1 The back-sliding does not, however, seem to be universal. In Shandong the proportion of first births rose from 67% in 1980 to 76.9% in 1981; in Jiangsu it rose from 68% to 72%; and in the provinces of Liaoning, Jilin and Heilongjiang, it surpassed 70% for the first time in 1981./2

Since the once-for-all rise in marriages must have accounted for some of the rise in fertility in 1981 (and no doubt will also be reflected in higher fertility in 1982), fertility differentials in that year may be a poor guide for the future. It is interesting to note that the provincial data show that the degree of urbanisation continued to affect the level of fertility, though to what degree this reflects underlying socioeconomic forces that make urban fertility universally lower than rural fertility in developing countries and to what degree it reflects the urban-rural bias in the application of the

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1/ In 1981, 67% were first order, 21% second-order, and 12% were third or higher order. Unfortunately the 1980 figures for Sichuan in Table 3 sum only to 89%, so the comparison is hard to make. It is also difficult to interpret such figures. With an increase in the marriage rate it is inevitable that there would be a rise in the proportion of first births, unless there were offsetting changes in the reproductive patterns of the already married.

2/ Beijing Review, November 1, 1982, p. 3.

one-child policy is not clear.1/ Income levels in most areas were not a significant determinant of birth rates.

The reduction in the effectiveness of the one-child policy has been widely and prominently attributed to the introduction of the responsibility system in agriculture.2/ Several reasons have been advanced for this. Since the allocation of land under the production responsibility system is -- in many areas at least -- not a once-and-for-all affair, many peasants may feel that larger families will entitle them to more land. It has been suggested that parents view the potential contribution of children to family income as a reason for wanting more of them. Analysis in other countries suggests that if there are alternative possibilities for saving, even with fairly low interest rates, children would be a poor investment on this score (though parents may not know this)./3 A much more powerful reason may be a desire for children, especially sons, as a source of possible support in disability or old-age, bearing in mind the limited return available on savings, the likelihood that

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1/ Regressing 1981 provincial birth rates on the proportion urban in the province gives

$$BR = 24.78 - 11.49\ Urb \qquad R^2 = .19$$
$$(2.527)$$

2/ For example, by Premier Zhao Ziyang, in his 1981 report on the economic situation, given to the Fourth Session of the Fifth National People's Congress. Zhao Ziyang, China's Economy and Development Principles (Beijing: Foreign Languages Press, 1982), p. 62.

3/ Mead Cain, "Risk and Insurance: Perspectives on Fertility and Inequality in Rural India and Bangladesh", Population Council, Center for Policy Studies Working Papers, No 67, April 1981, p. 51. Robert G. Repetto, "Direct Economic Costs and Value of Children" in Ronald G. Ridker, Population and Development: The Search for Selective Interventions (Baltimore: Johns Hopkins Press, 1976), pp. 77-97.

one's daughter will live outside one's village, and the natural reluctance to rely on one's neighbors, especially if the effect of the responsibility system is to reduce collective welfare funds. But the simplest explanation may also be the strongest -- parents get pleasure from their children and their children's accomplishments, and are reluctant to place all their hopes and aspirations on the shoulders of one child. The responsibility system has raised incomes, and has made it easier to afford having children. With higher incomes, the economic incentives offered to a one-child family have also become relatively less attractive.

Even under the responsibility system, teams retain some collective obligation for the welfare of their poorest members. Whether the responsibility system will lead to a breakdown in this sense of obligation and hence in collective pressure on individual couples to limit their fertility is too early to predict. If the responsibility system leads to the assignment of land to individual households on a permanent basis (which might well be advantageous to encourage investment in land improvements, and to promote crop rotation, etc.) it is possible that this might occur, but there is no evidence that this has yet begun to happen.

It is also possible that, at least in some areas, family planning efforts have slackened. It is well-known that it has proved difficult for many brigades to retain barefoot doctors and that these have often returned to full-time farming, now made more lucrative by the responsibility system. Women's cadres at the production team level who carry principal responsibility for holding meetings, checking on family planning practice and reporting on

pregnancies to the brigade women's leader, may have similarly been devoting more effort to production and less to family planning. It has also been reported that the reduction in collective funds has caused some brigades to abolish the brigade level women's work cadre, who had previously been responsible for the birth planning activities of the brigade and supervising the family planning activities of the barefoot doctors. Data on the proportion of women of reproductive age who are practicing family planning show a rise from 74% in 1979 to 82% in 1980, falling back to 74% in 1981./1 Some places have responded to these problems by introducing a "birth control responsibility system" which provides bonuses for family planning activities in excess of target quotas, and penalties for poor performance.2/

In sum, the new policies have suffered from the fact that they represent an attempt to increase centralized social control in one field, while trying to reduce such control in others. It is clear that in spite of the government's proven ability to influence fertility, there are limitations on this even in China, and it is therefore misleading to believe that fertility is totally or instantaneously under government control. Nevertheless, fertility is remarkably low for a country at China's level of development and the degree of social control to which it is subject is unprecedented.

1/ Beijing Center of Communication and Education for Family Planning, Topics in Population Theory, p. 40.

2/ Xin Dan and Peng Zhiliang, "The Experience Gained in Carrying Out the Birth Control Responsibility System in Peng County, Sichuan". Population Study (Renkou Yanjiu), June 1982, pp. 29-31.

ALTERNATIVE DEMOGRAPHIC COURSES AND THEIR ECONOMIC IMPLICATIONS

Current Targets for the Year 2000

There is no expectation that every couple will only eventually have one child. In 1979 Vice Premier Chen Muhua suggested that China's demographic objectives required 80% of all couples in cities and 50% in rural areas to have only one child. But in 1980 she proclaimed an objective of 95% in the cities and 90% in rural areas. The March 1982 directive states that in urban areas couples should have only one child "except for extraordinary circumstances". It is recognised that in minority areas and other rural areas this policy may not be practicable, and those who show "a real need" for a second child may receive approval to plan for one. But in no circumstances should couples have a third child.

These objectives are considerably more ambitious than the officially declared demographic target of 1.2 billion people in the year 2000. This, the Chinese estimate, could be achieved with an average family size which drops to 1.7 per couple around 1985 and is then maintained to the end of the century. Table 5 shows that such a projection is consistent with the demographic estimates of this report.1/ In Table 5, the total fertility rate is assumed to drop from an average of 2.3 in 1980-85 to 1.7 after 1985. Mortality is

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1 The "average" does not of course include past family sizes. Until the 1970s these were very large, since total fertility rate exceeded 6.0.

Table 5: PROJECTED BIRTH AND DEATH RATES TO 2000, TO MATCH OFFICIAL TARGETS

	Total population (mid-year) (million)	Birth rate (per '000)	Death rate (per '000)	Total fertility rate (5-year average)	Life expectation at birth
1980	979.8				
		18.5	5.8	2.3	70.6
1985	1043.9				
		14.9	5.8	1.7	71.7
1990	1092.3				
		16.0	6.2	1.7	72.5
1995	1146.6				
		15.2	6.6	1.7	73.3
2000	1197.1				

assumed to continue to fall, but bearing in mind its already low level, only at a slow rate./1 (This is projection B below.)

Given the successes of the Chinese population policy to date, this target appears to be attainable. Indeed it permits much more slippage from the target of one child per family than the authorities appear to be tolerating. If the number of 3-child parities is kept insignificant the majority of couples could have two children, rather than one. Alternatively, a relatively vigorous application of policy could reduce the size of the 2000 population significantly below 1.2 billion. For example, if the TFR were to be reduced to an average of 2.0 during 1980-85, and 1.5 thereafter (which still permits about half of all couples to have two children) the population in 2000 would be 1.17 billion. (This is projection C below.)

Economic Implications of Alternative Projections

What economic difference will be made over the remainder of this century if one alternative path of fertility decline is followed rather than another? Let us make a comparison of three of the infinite number of possible paths (Tables 5 and 6). Projection A demonstrates comparatively slow fertility reduction -- a TFR of 2.4 in 1980-5 declining to replacement in

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1/ All of the projections are based on the Coale-Demeny South Model Life Tables until 2000-05, and West Model Tables thereafter. Mortality slowly improves, until a life expectancy of 81 is achieved in 2055-60. This projection is very similar to the World Bank projection to be published with the World Development Report, 1983, but the latter is based on somewhat slower, smoother changes in fertility, reaching a TFR of 1.5 in 1990-5 and then rising to replacement in 2000-5.

Table 6: TWO ALTERNATIVE PROJECTIONS TO 2000

Year	A				C			
	Population (million)	Birth rate --(5-year average)--	Death rate	TFR	Population (million)	Birth rate --(5-year average)--	Death rate	TFR
1980	979.8				979.8			
		19.2	5.8	2.4		16.2	5.7	2.0
1985	1047.7				1032.4			
		20.2	6.0	2.3		14.7	5.9	1.5
1990	1124.4				1078.8			
		20.5	6.3	2.3		15.6	6.3	1.5
1995	1207.4				1130.2			
		18.7	6.4	2.2		13.6	6.6	1.5
2000	1283.7				1170.2			

2000-5. Projection B is the projection of Table 5 above, and projection C is the case of more rapid fertility decline just mentioned.

Since neither A nor C can be regarded as in any way extreme assumptions, the difference of 113 million in population in 2000 is striking. But though very large in absolute terms and by the standards of other countries, it represents a difference of less than 10% of the smaller figure. The difference in the average annual growth rate of population is only 0.5%.

(i) Density and Food Supplies

Although Malthus himself remains anathema to Marxist economists, the problem of feeding a growing population is bound to be of major concern to the Chinese authorities. The 1959-61 famine will not yet have been forgotten. China has been a net importer of grain ever since the famine years and the amounts have steadily increased since the mid 1970s. They now exceed more than 12 million tons a year (though this is still less than 4% of total consumption). Given the size of China's population and considerable uncertainties about the adequacy of grain supplies in other parts of the world, China must aim at remaining essentially self-sufficient in its food supplies. Moreover with more than 70% of its labor force still dependent on agriculture, successful development must involve raising agricultural productivity in rural areas. Population growth makes this task considerably harder: China already has one of the world's highest ratios of people to arable land and, under pressures from competing uses, the estimated total arable land has been shrinking — from about 111 million hectares in 1957 to

about 99 million in 1980. This means that there are currently a little over 1000 people per square kilometer of arable land -- a figure very similar to that of Bangladesh in 1980, but below that of Egypt (1400) or the Republic of Korea (1730). It is also well below that of the Netherlands (1640 in 1980) or Japan (2360). The alternative projections imply a ratio of population to arable land in the year 2000 of between 1180 and 1300 (assuming no further changes in the cultivable area).

It is very difficult to interpret these numbers without a great deal of regional analysis and consideration of the further possibilities for multiple cropping or development of new lands. China is already intensively farmed -- the cropped area in 1979 was about 1.5 times the estimated arable area. The area under grain remained roughly constant from about 1965 to 1979, falling from 83.5% to 80.3% of the total sown area; since then it has fallen slightly. Grain yields have risen fairly steadily from 1.6 tons per sown hectare in 1965 to 2.8 tons in 1981. A World Bank mission which visited China in 1980 felt that it was plausible to hope for a rise to 3.5 tons by 1990 -- a growth of 2.2% a year. This allows for some margin over population growth under all three projections. But under all three, the food situation is likely to remain tight -- there will be continued competition for land from non-grain products, whose output has tended to grow faster than grain in recent years, and rising incomes will cause consumers to increase their demand for meat products and hence indirectly for grain.

Beyond 1990, it seems reasonable to expect further rises in grain output per hectare. Several countries have yields that are already higher

Table 7: FAMILY AND PUBLIC COSTS OF RAISING A CHILD TO AGE 16 IN URBAN AND RURAL AREAS: CHINA, 1979

Item	Large cities		Towns		Villages	
	Yuan	Percent of total	Yuan	Percent of total	Yuan	Percent of total
Family expenditures						
Food, etc.	4,224	61.2	3,466	71.9	1,100	67.3
Health	240	3.5	240	5.0	24	1.3
Education	225	3.3	150	3.1	72	4.4
Total for family	4,689	68.0	3,856	80.0	1,196	73.0
State or collective costs						
Health	241	3.5	241	5.0	49	3.1
Education	560	8.0	550	11.4	365	22.6
Urban services, etc.	1,120	16.2	0	0	0	0
Other	297	4.3	173	3.6	20	1.3
State or collective total	2,218	32.0	964	20.0	434	27.0
Overall total	6,907	100.0	4,820	100.0	1,630	100.0

Source: H. Yuan Tien, "China: Demographic Billionaire". Population Bulletin, Vol.38, No. 2, April 1983. Based on Liu, Wu and Zha, Population Statistics (Renkou Tongjixui) (Beijing: Chinese Peoples University Press, 1981)

than those of China, and further technological progress can be expected./1 This would require continued high priority to agricultural research. Eventually these higher yields will need to be obtained with a smaller labor force, as a shift takes place into non-farm activities. However the alternative projections make very little difference to the labor force before the end of the century. The main effects of alternative rates of fertility decline will be on the population of school age and younger. (After 2000, the situation is of course very different, of course, but we discuss this further below.) Obviously children do useful work in agriculture (even if not enough to be regarded as a "good investment") so the lower fertility projection may be associated with slightly lower output as well as lower consumption demand. (Although there is generally thought to be substantial rural underemployment this is not of course the case for each household and few mechanisms exist to let labor scarce households tap labor surplus ones.) This lower consumption demand is not proportional to the change in size of population, since it is only the number of children that varies and their demands are below those of adults. But the important thing is that if the alternative courses of future population growth remain within the range considered here, differences among them are not likely to be the vital consideration in determining the adequacy of food supplies.

1/ A yield of 3.5 tons in 1990 would be comparable to average current yields in Europe, and well below the 5 tons obtained in Japan and sometimes in the Republic of Korea.

(ii) Dependency and Savings

Since children are net consumers, the lower fertility projections imply families will devote fewer resources to child support and there may consequently be somewhat larger private savings. A Chinese study has suggested that the savings to both household and community resulting from reduced fertility would be substantial, especially in urban areas (Table 7). It is estimated that a family in a large city would spend, at 1979 prices and expenditure patterns, nearly Y4,700, of which 61% would be on food and the rest on health and education. In smaller towns expenditures were significantly lower. These are very substantial amounts in relation to income. For example the average wage in a state-owned enterprise in 1979 was Y705. Data on income from collectively owned units is not available for 1979 but in 1981 it was a little under 80% of the figure for state enterprises, so with a similar differential it would have been about Y557 in 1979. Annual private child costs of Y293 in cities and Y241 in towns are very high in relation to this.1/ In rural areas the expenditure figures are lower, but so

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1/ At first sight they seem implausibly high, considering that children usually cost on average only about 0.5 adult levels, so that expenditure for a family with two adults and two children would be three times this level. See Joseph van den Boomen "Age-cost Profiles: A Common Denominator" in International Union for the Scientific Study of Population, International Population Conference, Manila 1981, Selected Papers, Vol. 3, pp. 286-293. The Chinese expenditure patterns, however, are probably different from elsewhere, and it is not known how these figures were derived, so 50% may be an inappropriate rule of thumb. Furthermore labor force participation rates of married women are high, so that a family expenditure of 1.5 times the average wage is conceivable. In 1981 annual expenditure per capita in households of staff and workers was Y457, which compares with average wages of Y812 in state-owned units and Y642 in collective units.

of course are incomes. The average annual expenditure per child of about Y75 is plausible in comparison with an average rural income of Y160 per head.

Although these figures suggest a substantial savings potential from the lower fertility projections there are several offsetting factors. As we have seen, substantial economic incentives are offered to persuade parents to have one rather than two children. Some of these — where, for example, parents get the same allocation of housing with one or two children — eliminate any resource savings. Others are distributional — e.g. treating an only child as 1.5 or 2 for the purpose of land allocation — and do not affect the total volume of resources. But raising the incomes of parents with one child, such as the payment of child allowances equivalent to 8-10% of earnings plus other benefits, will lead to greater per capita consumption inside the families concerned as well as possible savings. Furthermore the higher (implicit) taxes involved for the rest of the community may have a negative impact on effort. These considerations make it difficult to assess the net consequences for the rate of capital accumulation, but it is reasonable to assume that the differences due to following one of the above demographic paths rather than another is unlikely to be very significant (especially given the extraordinarily high rates of savings in the Chinese economy — about 32% of GNP in 1981).

The data of Table 7 include the potential savings to parents from lower health and educational expenditures. Very young children are relatively intensive users of health care at the lower echelons of the service, but Chinese costs here are very low. The Chinese pattern of health expenditure

has a very high proportion (over 60%) of expenditures on drugs compared with most other countries. It seems reasonable to assume that drug expenditure on each child is below the national average per capita figure of about 10 yuan (of which about two thirds is public expenditure). Resource savings from lower fertility here would be relatively small.

Such savings are potentially far more significant in education where needs and opportunities are particularly affected by fertility patterns (Table 8)./1 The difference between Projections A and C in the number of children of primary school age (7-11) widen during the 1990s and exceed 30 million by the end of the century. By that time there are very marked differences in the numbers of children of both junior and senior secondary ages as well.

1/ The projections of Table 8 have to be treated with even more caution than the other projections of this paper. All of our projections are designed solely to illustrate the consequences of a small number of alternative fertility patterns. Fertility is assumed to change abruptly between periods, stay constant for a time, and then changes abruptly again. Analysts concerned to make the most plausible prediction of the passage of total population or its components over time would probably prefer to make these changes more smoothly. The assumptions about the pattern of age-specific fertility also differentiates very sharply between different five-year cohorts, and smoothing here would also have been possible. Moreover, as we have seen, the age structure for 1980 is not known with certainty and itself reflects some sharp fluctuations in past cohort sizes. Small changes in assumptions could easily therefore change dramatically the number of births projected for any one year. The projection techniques used elsewhere in the paper are concerned only with estimates of five-year age groups at five-year intervals, so that year-to-year fluctuations in the number of births can be ignored. However projections of the population in school-age categories means that the five-year age groups have to be disaggregated and assigned to individual years, which has been done by the computer following a standard set of interpolation procedures. These are not designed to cope with situations of abruptly changing fertility patterns and introduce another arbitrary element into the projections.

Table 8: SCHOOL AGE POPULATION UNDER TWO ALTERNATIVE PROJECTIONS, 1980-2000 /a

	A	C
	(million)	
(1) Primary (ages 7 - 11)		
1980	124.7	124.7
1985	96.0	96.0
1990	85.0	78.6
1995	99.3	73.5
2000	109.5	76.1
(2) Junior secondary (12-14)		
1980	77.8	77.8
1985	71.0	71.0
1990	54.7	54.7
1995	52.1	46.0
2000	60.4	43.7
(3) Higher secondary (15-16)		
1980	42.9	42.9
1985	53.4	53.4
1990	41.2	41.2
1995	32.5	32.5
2000	38.8	29.7

a/ Please see cautionary footnote in text.

There are some conflicts between the data of Table 7 and other sources with respect to potential resource savings in education. The study of child costs suggests that city families paid 28.6% of total education costs, town families paid 21.4% and rural families paid 16.5%. In contrast, data given to a World Bank mission, also for 1979, estimate that private expenditure on education amounted to 8% of the total. This proportion was as high as 16% for primary but dropped to 4% for secondary education. The fact that the Bank estimates also include expenditure on higher education, where private expenditure was less than 2% of the total, cannot, of course, explain the difference. The Bank data also suggest that an average child spending five years in primary would have cost a total of Y150 at 1979 prices. Four years in secondary would add Y296 for a total of Y446. This is close to the study estimate of Y437 for rural areas but far below the figures of Y600 in towns and Y795 in cities, and consequently much less than the estimated national average.

Even if the study data are regarded as correct, they suggest that the education savings to the community would be eliminated by the payment of Y60 per year to a child allowance over a ten year period. (This assumes a child allowance paid from the child's 4th to 14th birthdays -- in some places it is larger since it is paid from birth.) Use of discounting would increase the relative costs of the child allowance since it is a flat rate and paid earlier in the life cycle, while education costs rise with age.

It also cannot be assumed that, even if educational standards are held constant, savings on educational expenditure will be proportional to

differences in population size. In the first place, while there are still reports of high drop-out rates, especially among girls, and many over-age students, China appears already to have the potential for near universal enrollment at a primary level. In 1980, 146 million pupils were enrolled in primary school, substantially larger than the estimated 125 million in the 7-11 age group (which suggests that there were still many over-age students in school). Under all the above projections the population in this age group will fall rapidly to 96 million by 1985, reflecting the decline in fertility in the 1970s. Costs per pupil are bound to rise, since it seems inconceivable that there would be a proportionate elimination of classrooms and schools, or dismissal of teachers. Even in developed countries, with much more urbanised communities, better public transport and more of a tradition of dismissing redundant employees, it has proved difficult to consolidate educational facilities in the face of declining educational needs. Although there is undoubtedly much local variation, China has at primary level already fairly modest student-teacher ratios (averaging 27 in 1979) and average class sizes (34 in 1979) and there are an average of about 5 classes per school, which, with a five-year curriculum, gives little opportunity for consolidation.

At the secondary level things appear somewhat different. Enrollment in 1979 was about 46 million in the 3 years of junior secondary and 12.9 million in general senior secondary schools (almost all 2 years)1/. For unexplained reasons this total represents a fall from 67.8 million two years

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1/ These exclude non-formal and vocational secondary education, and training schools for skilled workers.

before; a further decline to 55.1 million was experienced in 1980 and again in 1981, when only 48.6 million were in secondary school. These figures compare with an estimated 77.8 million aged 12-14 (junior secondary) and 42.9 million aged 15-16 in 1980. So falling cohort size does offer an opportunity for improving enrollment ratios, but it also seems clear that capacity has not recently been the main constraint on enrollment levels. However, most of the gains in this respect will be made during the 1980s, reflecting falling fertility in the 1970s. It does not appear as though it should be difficult for the government to achieve its declared target of making junior secondary education universal in cities, towns and relatively developed rural areas. Looking at primary and secondary levels together, the main issue is not going to be the government's ability to build adequate classrooms, but to provide teachers of adequate quality. High priority has to be attached to upgrading existing teachers at existing secondary levels — it is estimated that 50% of current staff at senior secondary and 70% of staff at junior secondary are inadequately qualified. Demographic trends should certainly make this easier.

About 65% of educational finance for primary and secondary education comes from the Ministry of Education and a further 25% from provincial and county authorities, and brigades, enterprises etc. Any savings that result from slower demographic growth presumably accrues to them. But for the reasons given this is not likely to be large. In particular the local authorities and public institutions below the central level who bear the cost of the population incentives will not find these matched by educational savings.

To sum up the economic implications of trying to lower fertility much below replacement level through the one-child family policy, rather than settling for the fertility level slowly declining to replacement (Projection A): there are some economic advantages during the remainder of this century but they are undramatic. Lower fertility might entail somewhat greater savings and investment, and might also increase the labor force participation of women more than it reduces child labor, but both savings and participation rates are already very high and the effect on aggregate output would probably be very small. Neither considerations of food supply nor public services give the state or local communities strong reason to try to influence private fertility decisions, if this requires incentives of the magnitude offered to achieve a one-child family, assuming that a two-child family could be achieved without them. While this assumption cannot be tested, the fertility trends of the 1970s suggest that it is certainly plausible.

Of course, the full implications of a demographic policy cannot be seen merely by looking at a 20-year period. We need now to discuss the implications of these alternatives during the next century.

The Twenty First Century: Alternative Routes to a Stationary Population

(i) Population Size and Rate of Growth

A number of Chinese authors have attempted to calculate an optimum population for the country./1 Song Jian describes a set of estimates, made by a group of natural and social scientists, based on their interpretation both of Chinese experience since the Revolution and of the pattern of development elsewhere. They "assumed that a desirable population is a form of stationary population. Its age structure must be rational, and its size must conform with China's natural resources, ecological balance and level of economic development. It must also be conducive to the creation of a high level of material and spiritual culture for the population" (p. 28). Separate estimates were based on (i) ecological factors, especially the capacity of water resources to support sustained development, (ii) the potential for agricultural development, taking into account rising incomes and changing dietary composition, and (iii) compatability with desirable rates of economic development, taking into account likely rates of capital accumulation and technological progress and the changes in production structure and labor allocation which must result from the changing patterns of expenditure as living standards rise.

These estimates appeared to converge on a range of 650-700 million. Song Jiang then proceeds to discuss alternative demographic routes to achieve

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1/ Song Jian, "Population Development — Goals and Plans" in Liu Zheng et. al., op cit., pp. 20-31; Hu Baosheng et.al. "Setting a Target for Our Country's Total Population "Population and Economics (Renkou Yu Jingji), No. 5, 1981, pp. 15-18, 64.

a stationary population of 700 million, arguing in favor of the most rapid immediate decline in fertility (a total fertility rate of 1 achieved in 1985 and held constant for several decades).1/

The most serious problem with these calculations is that the discussion of alternatives does not separate questions concerning population size from those concerning rates of change.

Even the very limited band of alternative fertility paths we have been considering are compatible with a wide range of alternative demographic outcomes. The four projections of Table 9 and Chart 1 all have as their starting points one of the three projections already discussed, and all have in common the fact that within relatively few decades fertility is brought back to replacement and maintained there, so that the population eventually stabilises. Projections A and C are simply extensions of the previous A and projections. In A, after its gentle decline to replacement in 2000, fertility remains constant, and the population stabilises at about 1665 million. C is

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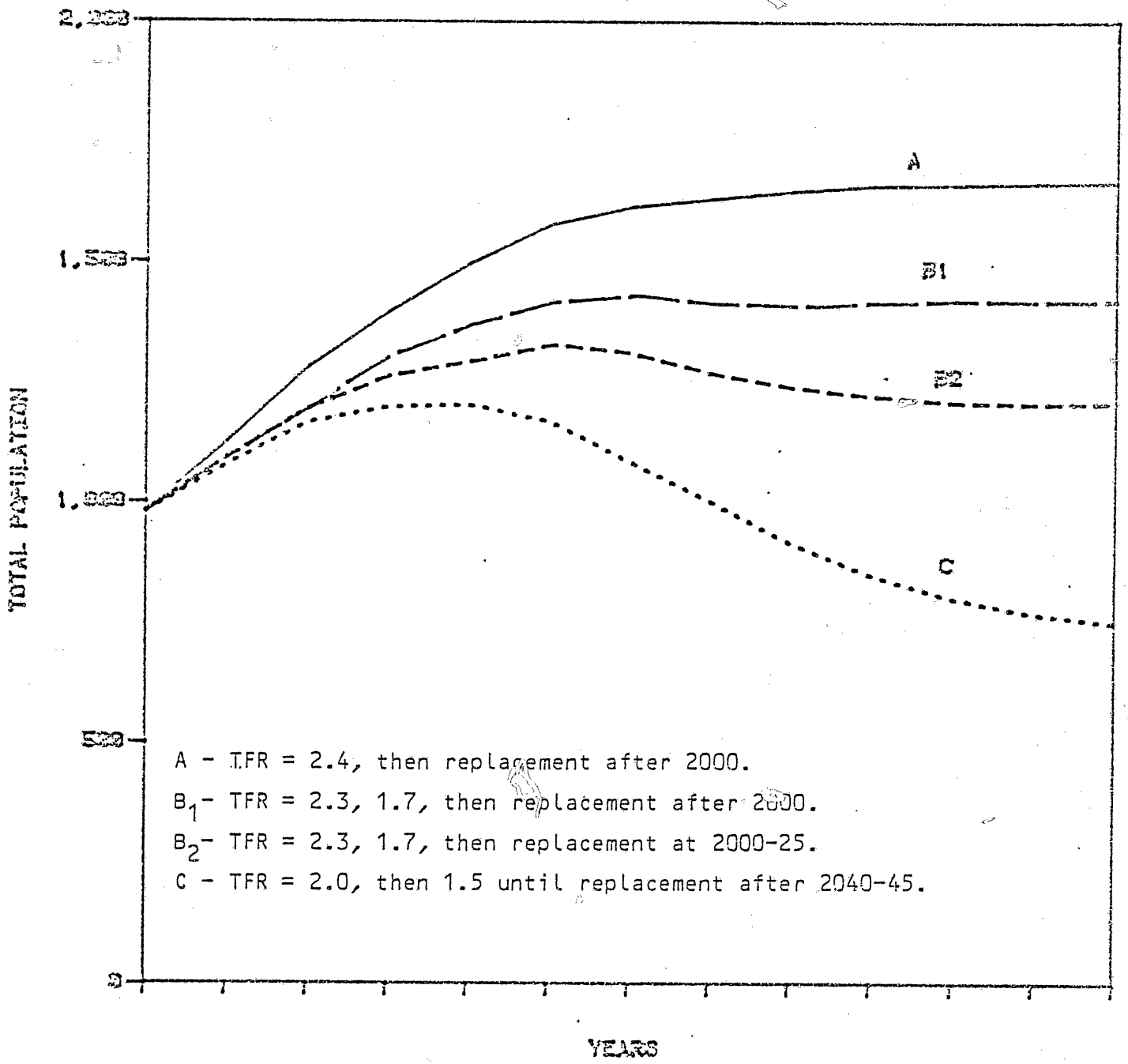
1/ The projections are optimistic about the speed with which this figure could be attained, and below-replacement level fertility would have to be kept for decades longer than the article implies. For example, it suggests that if the TFR were brought down to 1.5 per couple in 1990 and held there until 2025-2040, when it would be raised to replacement, the population would stabilize at 700 million in about 2100. This has a somewhat higher fertility than Projection C, which our projections imply would give a stationary population of about 750 million. The specification of a total fertility rate for every year does not, however, uniquely determine either the rate of growth of population, nor the ultimate stationary population size (following decades of replacement-level fertility). These variables also depend on the age pattern of fertility and also on mortality, which will determine what proportion of women survive their full reproductive years.

Table 9: FOUR PROJECTIONS OF TOTAL POPULATION, 1980-2100
(million)

Year	A	B_1	B_2	C
1980	979.8	979.8	979.8	979.8
1990	1124.4	1092.3	1092.3	1078.8
2000	1283.7	1197.1	1197.1	1170.2
2010	1399.7	1306.8	1265.9	1202.1
2020	1500.0	1370.8	1295.6	1206.6
2030	1582.0	1417.7	1329.0	1172.0
2040	1621.0	1434.2	1313.9	1087.4
2050	1636.9	1419.1	1271.9	1006.8
2060	1654.1	1411.9	1243.0	919.2
2070	1666.8	1420.7	1225.1	852.9
2080	1667.6	1424.9	1212.4	804.7
2090	1671.1	1422.8	1210.0	772.3
2100	1672.7	1425.1	1212.9	754.7

CHINA: FOUR PROJECTIONS OF TOTAL POPULATION, 1980-2120
(MILLIONS)



the case of rapid fertility decline — after a TFR of 2.0 in 1980-5, a TFR of 1.5 is maintained until 2040-5, when it rises again to replacement. This leads to an ultimate size of about 750 million, less than half that in A. Projections B_1 and B_2 both follow the course of B above until 2000; in B_1 the TFR of 1.7 rises to replacement in 2000-5 and remains there; in B_2 this change occurs twenty years later. In consequence the two projections diverge until B_1 exceeds B_2 by roughly 215 million people.

It is impossible to say how much better off China would be with a population size at the lower end of this range rather than the upper end. It is true that it is difficult to think of any reason for preferring a larger to a smaller size, on size grounds alone. China certainly has enough consumers to make possible any economies of scale, subject to the provision that market size is a matter of incomes, not merely numbers. We have already discussed the problem that China is relatively poor in agricultural resources and her arable land is already intensively farmed. The problems of providing a good livelihood for a dense rural population and maintaining self-sufficiency in the face of potentially diminishing returns to agricultural expansion are serious ones. There are doubtless several ecological problems asociated with a move towards more intensive farming, as well as with the expanded urban population. But future technological possibilities and opportunities for substituting one technique and product for others are both unknown and we have no grounds for estimating a single long-run optimum size. Assuming no further shrinkage of arable land, population per square kilometer of cultivable land in 2100 would be 762 with Projection C and 1690 with Projection A. Even considering the highest of these figures, and taking into account the need for

self sufficiency and to raise living standards, the density and productivity levels elsewhere in the world already noted suggest that the economic implications of size alone should not be a dominant reason for preferring one projection to another. Of course, economics is not the only consideration in viewing alternative sizes. Different densities have other implications for the physical, social and cultural qualities of life. A nation with 1.6 billion people will differ in many ways from one of only half that size, but it is beyond the means of this paper to attempt even to identify the most important differences, let alone evaluate them.

A rather different question is whether China can raise its output fast enough to satisfy its economic ambitions, and how this is affected by alternative growth paths of population. Even the most rapid decennial growth in the next century of any of the projections is only 8.8%, and there therefore seems to be little reason to assume that China could not adapt to the increasing pressure on resources that the further growth will involve. Authors like Song Jian would not necessarily dispute this point but they would probably argue that the issue is not whether China can cope with a larger population -- rather it is whether and how quickly its consumption levels can catch up with those in developed countries. They would, however, probably argue that the populations projected in A and B are technologically incompatible with Chinese consumption at Western European or North American levels.

(ii) Change in Age Structure

(a) Population of Working Age

The Appendix contains four charts of age-pyramids to illustrate the changing age distributions under he different projections. Differences among them in the years 2000 and 2100 are very small; the difference in 2040 however is striking. In general, the effects of alternative patterns of fertility change on the age structure of the population at different points of time are likely to be of much greater economic significance than size itself. As we have already seen, fertility decline initially manifests itself in reduced cohort sizes at younger age groups, easing demands on educational resources. These potential resource savings continue after 2000 in the projection in which fertility is held below replacement, but they will not be very large. Fertility decisions made now only start to have broader economic effects in the next century when the smaller cohorts start entering the labor force. The effects of the marked fertility decline in the 1970s will be felt much sooner. All projections show growth in the population of working age (here taken as 17-64) for the next 30 years (Table 10). Eventually, however, the number of those entering the labor force will fall below those retiring from it and one can anticipate complaints of serious labor shortages. This is especially true in 2030-40 when those born into the large cohorts of the mid to late 1960s and early 1970s retire, and all the projections, even A, show declines in the labor force.

Slower growth of the labor force will undoubtedly be welcomed by economic policy makers. In the last few years the authorities have had considerable difficulties in placing workers in their first urban jobs, and

Table 10: POPULATION OF WORKING AGE (17-64) UNDER FOUR ALTERNATIVE PROJECTIONS, 1980-2100

Year	A		Average annual growth rate	B_1		Average annual growth rate	B_2		Average annual growth rate	C		Average annual growth rate
	Pop.17-64	% Total		Pop.17-64	% Total		Pop.17-64	% Total		Pop.17-64	% Total	
1980	554.5	56.6		554.5	56.6		554.5	56.6		554.5	56.6	
			2.8			2.8			2.8			2.8
1990	727.7	64.7		727.7	66.6		727.7	66.6		727.7	67.5	
			1.1			1.1			1.1			1.1
2000	814.2	63.4		812.7	67.9		812.7	67.9		808.1	69.1	
			1.2			0.6			0.6			0.5
2010	913.4	65.3		862.2	66.0		862.2	68.1		848.4	70.6	
			0.6			0.2			0.1			-0.1
2020	972.7	64.8		881.4	64.3		872.8	67.4		836.2	69.3	
			0.1			0			-0.5			-1.0
2030	978.7	61.9		878.3	62.0		827.5	62.3		755.0	64.4	
			-0.3			-0.8			-1.2			-1.8
2040	951.8	58.7		810.9	56.5		731.4	55.7		628.5	57.8	
			0.3			0.1			-0.1			-1.2
2050	984.1	60.1		820.1	57.8		722.9	56.8		556.0	55.2	
			-0.1			0.2			-0.2			-1.3
2060	974.7	58.9		839.6	59.4		710.7	57.2		488.6	53.2	
			0			-0.1			-0.2			-0.6
2070	973.2	58.4		828.8	58.3		698.2	57.0		460.1	54.0	
			0.1			0			0.2			-0.4
2080	982.9	58.9		831.0	58.3		711.4	58.7		441.5	54.9	
			-0.1			0.1			-0			-0.3
2090	977.3	58.5		838.1	58.9		709.9	58.7		429.8	54.9	
			0			-0.1			-0.1			0.3
2100	977.4	58.4		831.9	58.4		710.9	58.0		442.1	58.6	

the problem of overstaffing has been publicly discussed.1/ Concerns have also been expressed about a high degree of surplus labor in rural areas. Although this may appear to contradict the view that fertility has risen under the responsibility system because farming parents want the labor-services of their children, the two ideas are quite consistent (though, of course, either or both may be wrong). The absence of anything resembling a freely functioning rural labor market, and strict controls on migration, means that it is perfectly possible for excess labor and labor shortages to co-exist in areas only a short distance apart, let alone in different parts of a vast country.

It is not at all unlikely that these problems will still be serious ones after the turn of the century, and the continued easing of the situation implicit in even Projection A will probably appear highly desirable. In the period 2000-2010, Projection C appears to have favorable conditions for relatively rapid growth in incomes per head. In contrast to Projection A, the number of dependents would shrink in absolute numbers as well as in relation to the population of working age, and there is therefore potential for relatively more rapid capital accumulation. The degree to which this potential would be realised depends on savings propensities which are impossible to predict, and the net effect on output of faster capital accumulation and slower labor force growth depends on the prevailing relative returns to both factors which cannot be sensibly estimated. It is likely that

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1/ For example, Xue Muqiao "Economist talks on major problems in reform efforts", China Daily, March 11, 1983. See also Liu Xianghai "Tentative Ideas on Reform of the Labor Employment System", Population Study (Renkou Yanjiu), No 5, 1982, pp 8-12.

the activities most affected will be in agriculture. If China achieves its ambitious economic target of quadrupling its 1980 output by 2000, and thereby attains an income per head of between $900 and $1000 in 1980 prices, analogy to present day middle income countries suggests that it will still be predominantly agricultural, at least as far as employment patterns are concerned. It is not unreasonable to assume that, at the turn of the century, the return to additional manpower in agriculture may be fairly small, and the difference in net output between Projections A and C be also correspondingly limited. Furthermore even the growth rate of the labor force projected under A is not large by postwar Chinese or international standards and is hardly a decisive reason for choosing among alternative paths.

After 2010 the population of working age begins to shrink under Projection C, presumably accompanied or closely followed by a corresponding drop in the labor force. Under the other projections, this drop comes somewhat later and to a lower degree. Negative labor force growth does not carry the same economic advantages as slower but still positive growth. Inevitably there are adjustment difficulties. New activities cannot be staffed principally from the growth in the urban labor force; they require the absolute shrinkage of old activities and perhaps the scrapping of plant. Furthermore, the average age of the labor force will be rising — there may be difficulties in adapting to new production possibilities requiring substantially different skills, since these are more easily taught to younger workers. These problems will be felt under all of the above projections, even A, but they will be most serious and prolonged under C.

Historically, other situations of labor force decline have either reflected international migration under conditions of severe economic distress, such as from 19th century Ireland, or are regional phenomena within the context of a growing labor force. It is clear that neither is a useful precedent to China in the next century. In principle one could argue that a large well-organized appropriately planned economy could readily cope with a shrinking labor force, even over several decades, and even at rates as high as 1.8% per year which are reached under Projection C. It might be argued such a shrinkage is trivial in relation to the scrapping of equipment in manufacturing and that the spur to less labor-intensive methods will lead to a rapid rise of productivity. In agriculture, opportunity for consolidating holdings and mechanisation may be welcomed. But such optimism depends on confidence in an adjustment process that reallocates productive resources smoothly and efficiently among activities. If plants have to be closed to preserve economies of scale in others, in a different location, labor will have to be able to move geographically. Prices, if set by market forces, could be the most useful signal of surpluses and shortages which will undoubtedly occur.

Until very recently the Chinese economy operated on principles which appeared to minimise the chances of such successful adjustment. Labor has been, and remains, extremely immobile both geographically and between work units. Prices still do not signal relative resource scarcities or returns to factors at all well. Recent reforms do, however, indicate an intention to move in this direction. Declining labor force growth, and the prospect of periods of shrinkage even under the highest fertility projection, add even more importance to the need for such reforms.

(b) The Elderly

An even more serious problem, which will also be worse under Projection C, will be that of supporting the elderly. Once a stationary population is reached, the proportion of the population of 65 and over will be 20.6% (on the common mortality assumptions used for all these projections) (Table 11). The population of working age (17-64) will be 58.5%, slightly greater than the 56.5% of 1980, so the proportion of dependents per member of the labor force need not be very different from today. The demographic structure of dependency will be very different, however, since in 1980 only about 1 out of 8 dependents (excluding non-working dependents ages 17-64) was 65 or over; in the stationary population it will be about 1 out of 2.

The problems associated with elderly dependency are more complex than those arising from high levels of youth dependency. The elderly typically

Table 11: POPULATION AGED 65 AND OVER AS A PROPORTION OF TOTAL AND IN RELATION TO WORKING AGE (17-64) POPULATION, UNDER FOUR PROJECTIONS, 1980-2100

Year	A			B_1			B_2			C		
	Pop. 65+	% Total	17-64/65+	Pop. 65+	% Total	17-64/65+	Pop. 65+	% Total	17-64/65+	Pop. 65+	% Total	17-64/65+
1980	50.5	5.2	11.0	50.5	5.2	11.0	50.5	5.2	11.0	50.5	5.2	11.0
1990	73.5	6.5	9.9	73.5	6.7	9.9	73.5	6.7	9.9	73.5	6.8	9.9
2000	103.5	8.1	7.9	103.5	8.7	7.8	103.5	8.7	7.8	103.5	8.9	7.8
2010	130.3	9.3	7.0	130.3	10.0	6.6	130.3	10.3	6.6	130.3	10.8	6.5
2020	186.3	12.4	5.2	186.3	13.6	4.7	186.3	14.4	4.7	186.3	15.4	4.5
2030	246.7	15.6	4.0	246.7	17.4	3.6	246.7	18.6	3.4	246.7	21.1	3.1
2040	318.5	19.7	3.0	318.5	22.2	2.5	318.5	24.2	2.3	318.5	29.3	2.0
2050	305.1	18.6	3.2	301.7	21.3	2.7	301.7	23.7	2.4	291.8	29.0	1.9
2060	326.9	19.8	3.0	276.4	19.6	3.0	276.4	22.2	2.6	264.5	28.8	1.8
2070	343.8	20.6	2.8	291.2	20.5	2.8	271.9	22.2	2.6	241.9	28.4	1.9
2080	335.1	20.1	2.9	296.2	20.8	2.8	249.9	20.6	2.8	203.7	25.3	2.2
2090	342.7	20.5	2.9	286.7	20.2	2.9	245.3	20.3	2.9	184.4	23.9	2.3
2100	345.3	20.7	2.8	294.1	20.6	2.8	255.3	21.1	2.8	158.0	20.9	2.8

have greater consumption needs than the young, especially for house space./1 Traditionally, Chinese elderly parents have lived with married sons but modernization and urbanization may make it difficult for them to reside with their children. If the elderly remain in separate economic units, there must be a mechanism for providing them with an income. As we have already noted, the 1980 marriage law still refers to the traditional filial duty to support elderly parents, but the Chinese have already realised that parents cannot reasonably be expected to depend solely on one child. In at least some provinces, parents have been led to understand that if they agree to have only one child, the community will supply them with an adequate alternative source of economic support.

The main issue is what is regarded as "adequate". Since the collectivization process of the mid 1950s, the rudiments of a community welfare system have been in place. The so-called "five guarantees" system has

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1/ A review of several studies of age profiles of consumption suggests that attributing to children under 15 an expenditure equivalent to 0.5 adults, and to people of 65 and over an expenditure of 0.9, would be consistent with observed patterns. Joseph van den Boomen "Age-cost Profiles: A Common Denominator" in International Union for the Scientific Study of Population, International Population Conference, Manila 1981, Selected Papers, Vol. 3, pp. 286-293. In many circumstances this appears to be true even when taking into account educational needs, at least at primary level. However there is no unambiguous way to measure children's consumption needs as a proportion of adult levels; there are still conceptual difficulties and they obviously differ with income and size of family. For a discussion, see Angus Deaton "Inequality and Needs: Some Experimental Results for Sri Lanka" in Income Distribution and the Family, supplement to Population and Development Review, Vol. 8, 1982, pp. 35-49. Educational costs also differ greatly in proportion to per capita income. See M. Zymelman, "Patterns of Educational Expenditures", World Bank Staff Working Paper No. 246, November 1970. China's costs appear low by international standards.

been supposed to ensure a minimum standard of food and clothing, shelter and medical care and burial expenses. This appears to have been generally regarded as a last resort and, for the elderly, might be at the expense of the right to bequeath their homes. The elderly have often been encouraged to continue working as long as possible. There are, however, retirement pensions for workers eligible under labor insurance schemes, and in 1978 benefits for state sector workers (about 19% of the labor force) were improved in an attempt to encourage them to retire earlier and to reduce the unemployment problem among urban youth. 1/ Such pensions are about 60-75% of the preretirement wage, depending on length of service. A further 6% of the labor force work in urban collectives which normally pay somewhat lower benefits. Rural workers must rely on the five guarantees. The present system clearly does not encourage most Chinese to rely on the state for old age support.

Once a stationary population has been reached, the proportion of the elderly is determined by the pattern of mortality, and it is reasonable to assume that eventually there will be few international differences in this respect. China is likely to find the problem more serious than other countries, however, both because the country is likely to reach a stationary population sooner and at a much lower level of development than most other developing countries, and because fertility has fallen so fast and to such low levels that there is some danger of incurring even more serious problems of

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1/ See John Dixon, The Chinese Welfare System, 1949-79 (New York: Praeger, 1981), esp. pp. 247-63; Lillian Lin, "Mandatory Retirement and other Reforms Pose New Challenges for China's Government", Aging and Work, Vol. 5, No. 2, p. 125.

supporting the elderly, some decades before a stationary population is reached. As Table 10 shows, the alternative projections show very different paths. In Projection A, the proportion of the elderly increases slowly to its ultimate size with very little fluctuation. B_1 is not very different. In contrast, in Projection C, and to a lesser extent, in B_2, the elderly become an extremely large proportion (about 29%) of the population for several decades after 2040.

Supporting such a large ratio of pensioners to producers could prove very difficult. If not anticipated, the need to finance such a level of support could be a severe drain on potentially investable resources, and the taxation needed might be a deterrent to productive effort. The generation that will create the most severe burden is, of course, the large cohorts of the later 1960s and early 1970s. These are now beginning to enter the labor force. It is not too soon for the Chinese to promote the establishment of proper pension funds to cover the retirement of these workers, with opportunities to earn interest and reinvest the very substantial net income that such funds would receive in their early years. Even though any pension constitutes a claim on resources in the year in which it is paid, however it is financed, there is both a political and an economic advantage in not having to pay it from tax revenues. If a pension is clearly the return on a capital investment earlier in life then it need not be seen as a burden on the present generation of workers, but the reward of saving by the previous generation which has made possible the present (presumably higher) level of productivity.

In the absence of a well-functioning capital market, it is not easy to envisage how such pension funds might operate. But it is an important and urgent issue if present population policies continue. Such pension schemes should not be seen as ways of supporting today's (non-contributing) elderly but as ways of marshalling investment funds. Properly organised, they would become a very powerful economic force, and might be used to channel funds from one part of the Chinese economy to another.

A particular problem will be to develop mechanisms of old age support which are compatible with the need for increased flexibility. It would be a mistake, for example, to make pensions dependent on continuing to work for a particular enterprise or reside in a particular community, if other reforms are simultaneously trying to impart smoother adjustment mechanisms to facilitate the movement of labor from one activity to another.

Questions of how best to replace children by community or national government as a source of support in old age are almost certainly going to be the most difficult of the issues raised in this paper. This question is one which is looming increasingly large in developed countries. Nowhere yet, however, has the proportion of the elderly reached those that will be encountered in China in a few decades, but already, at much higher levels of income, there are serious problems. This paper cannot begin to explore the many issues that are raised, but it is clear that there are few, if any, models which could usefully guide the Chinese. China must be prepared to think seriously about some of the norms which have been adopted more or less automatically in the developed world with respect to the age of retirement, or

the right of the elderly to life-prolonging medical care, and perhaps to innovate here as dramatically as she has already done in the area of fertility reduction.

The Distributional Impact of Population Growth

In any society, alternative patterns of population growth have very different economic consequences for different groups and generations, and these are at least as interesting and important as the effects on aggregate or per capita output. A different pattern of population growth will affect the relative welfare of the families which may or may not have another child; it will affect their local communities, and taxpayers more generally, who may or may not have to finance public services. The size of a cohort will affect the employment and earnings possibilities of its individual members, and its relative position vis-a-vis earlier and later cohorts. The relative size of different generations will affect their potential ability to save, and their ability to provide for the retired population. The total size and demographic composition of the population affects the pattern of demand, which affects the distribution of resources and incomes between different sectors of production and areas of the country. In sum, in the long term, demographic events play a very important and complex role in determining the pattern of output and its use by different parts of the community. The practical magnitude of individual efforts can vary enormously, however, and many are relatively distant in time; it is often not easy to predict the net result. Only a very partial and summary treatment can be attempted here.

In the early years — to approximately the end of this century — only the size of the population under working age is affected by different fertility levels. The main consequences will be felt within the families concerned, and to a lesser degree, the communities in which the families are live. Households that have lower fertility will enjoy improved consumption levels. There may be some additional private saving, but it is unlikely to affect the rate of capital accumulation and hence society as a whole, very much. Resource savings, if any, in the rest of the community would be relatively small, since there is already in place a good network of public services for children, and because lower fertility is assumed to imply the continuance of the present system of incentives.

It is reasonable to assume that under present policies, the main variable determining the path to be taken by fertility is the strength of population policy in rural areas. It is not quite clear, however, what would be the relative effect of different fertility levels on the rural-urban distribution of income. Lower fertility would raise potentially rural disposable income. But it would also lead to a relative shift in consumption patterns away from basic foods towards the manufactured products of urban areas. This might ease diminishing returns in agriculture, and make it easier to raise output per head. In any case, compared with the strength of similar consequences from rising incomes in general, those resulting from alternative fertility patterns would be small.

After the year 2000, the disparity in potential economic effects between alternative projections becomes much greater, as marked differences

occur in rates and, soon, directions of change in the population of working age. While the effect on aggregate output is ambiguous, in the earlier decades of the 21st century, growth in incomes per head will be faster in the low fertility case. The lower fertility projections will be associated with a relative easing of the pressures on agricultural land, and a labor force growth of a rate modest enough to pose no special difficulties in providing new workers with productive employment, but rapid enough to permit adjustments in labor allocations among sectors. These gains from slower population growth should be widely diffused, both among the families with lower fertility and the rest of Chinese society.

After ten or twenty years of the next century, however, the benefits obtained from lower fertility in the closing years of this century and the early years of the next, look much more dubious. By then economic progress may be greatly impeded by difficulties in adjustments required by a shrinking, aging labor force, and by problems in supporting the elderly. It is not easy to pick particular losers and winners in this process in sectoral or geographic terms. Unless suitable mechanisms are developed for supporting the elderly, the main distributional conflicts will then be between age groups as the smaller post-1970 birth cohorts struggle to support those born during the preceding two decades.

CONCLUSION

No country can have its population grow for ever — the world has fixed dimensions. While it is possible to imagine a situation of indefinite

fluctuations in size, so that at any one moment the population of any country was either growing or declining, it is not unrealistic to assume that mankind will eventually introduce social controls over individual fertility to keep it at a steady replacement level. The size of such a stationary population and the consequent pressure exerted on the fixed supplies of natural resources will be one factor -- but only one among many -- determining eventual living standards. This size will be determined partly by the date at which a steady replacement level of fertility is reached, and partly by the path taken to get there. Once in a stationary state, the age structure of the population will be determined by the pattern of mortality, but en route, the age structure is greatly affected by the path taken. Since some of the most important consequences of alternative patterns of population growth are not those of size itself but of age structure, the path to replacement is obviously of great importance.

In this respect, the current policies of China are of very great interest. Over the past decade the Government has shown a remarkable ability to impose social control over individual fertility decisions. If any country appears to be in a position to control its own demographic destiny, it is China. Nevertheless even the Chinese system does not permit precise control over the level of fertility. Since it is not possible to require every couple to have exactly, say, 1.7 children -- pressures have to be brought to bear on couples when they have either one or two children. The Chinese have opted for one, in the knowledge that there will be some fertility which is higher than the social norm. There is considerable evidence that, in spite of substantial economic incentives, this is not very popular in a very family-oriented