

Population Aging in Japan, with Reference to China

*Many countries of Asia
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less developed to show explicit concern
for accommodating an aging population*

By Toshio Kuroda*

The 1980s may be characterized by two demographic issues which are receiving rapidly increasing attention.

One is the problem of urbanization which is taking on a completely new dimension. All urban areas have problems, but in the developing regions problems have a more immediate impact. In fact, urbanization may be one

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Table 1: Absolute numbers, population proportions, and growth rates of the elderly population (65 or more years of age)

Regions, countries and areas	1980		2000		Annual growth rate (per cent)
	Absolute number	Population proportion (per cent)	Absolute number	Population proportion (per cent)	
World	255 939 000	5.7	404 966 000	6.6	2.3
MDCs	129 791000	11.4	168 313 000	13.2	1.3
LDCs	126 148 000	3.8	236 653 000	4.9	3.1
Asia	102 580 000	4.1	193 157 000	5.7	3.2
Bangladesh	3 008 000	3.4	4 154 000	2.8	1.6
China	47 009 000	4.7	85 932 000	6.8	3.0
Hong Kong	325 000	6.5	660 000	9.6	3.5
India	22 187 000	3.2	46 337 000	4.8	3.7
Indonesia	5 047 000	3.3	9 368 000	4.6	3.1
Japan	10 647 000	9.0	21404 000	16.4	2.9
Malaysia	508 000	3.7	934 000	4.5	3.0
Nepal	439 000	3.0	797 000	3.5	3.0
Pakistan	2 482 000	2.8	4 241 000	3.0	2.7
Philippines	1 380 000	2.9	3 083 000	4.1	4.0
Republic of Korea	1496 000	3.9	3 238 000	6.5	3.9
Singapore	114 000	4.7	208 000	7.0	3.0
Sri Lanka	616 000	4.2	1 239 000	5.9	3.5
Thailand	1458 000	3.1	2 954 000	4.5	3.5

Source: United Nations: *World Population Prospects, Estimates and Projections as Assessed in 1984*, New York, 1986.

Note: Data for Japan are from the 1980 Census and also Nihon University Population Research Institute's projections made in 1986 for the year 2000.

of the distinguishing characteristics of a developing country. It is the basic reason why, since 1980, the United Nations Fund for Population Activities (UNFPA) has devoted considerable effort to the holding of serial international meetings on urbanization, large cities, medium-sized cities and small cities. The most recent such meeting was the Conference on Population and Development in Medium-Sized Cities, held at Kobe, Japan, from 11 to 14 August 1987.

The second demographic issue concerns population aging. The World Assembly on Aging held at Vienna in 1982 marked the beginning of accelerated consideration of the aging process and its socio-economic implications. Another reason for the increasing level of attention being given to aging in Asia is the growing recognition that the problem of aging is occurring and will occur in the countries where fertility reduction has been most successful. Thus, many countries of Asia will be the first among the currently less developed to show explicit concern for accommodating an aging population, the size of which is expected to increase in the near future.

Table 1 provides three measures of aging for selected countries and areas of the region: the absolute number of the elderly, the proportion of the population over age 65, and the annual growth rate of the elderly population. Statistics for 1980 and 2000 estimated by the United Nations are shown in order to suggest the magnitude of change. In 1980, the elderly were more or less equally distributed among the more developed and the less developed countries of the world, but in the future the majority of the elderly will live in the less developed countries, especially in Asia.

By the year 2000, the elderly population in Asia will be about 48 per cent of the world total and 82 per cent of the total elderly in the less developed countries despite Asia's still very small elderly population proportion; in the year 2000, 5.7 per cent in Asia compared with 13.2 per cent in the more developed countries during the same year.

More significant for many countries and areas of the region, however, is the fact that the absolute numbers of the elderly are growing rapidly, although the proportions over age 65 are not large, except in Japan and Hong Kong. In particular, there is increasing recognition of the necessity of planning approaches for accommodating their increase in countries such as China, the Republic of Korea and Singapore where the reduction of fertility, the major cause of aging, has been successful.

Demographic transition

Demographic transition is characterized by changing patterns in birth and death rates, and exhibits the following trends: a pattern of high birth

and high death rates in pre-modern times followed by high birth and low death rates during the beginning stages of modernization, culminating in a pattern of low birth and low death rates with the achievement of full modernization.

Demographic transitions inevitably bring about changes in the age structure of a population. These changes occur in a continuous process and must be considered in their totality.

The aging of the population is one type of age structure transition. The speed and extent of aging is determined by the factors controlling demographic changes, the transition, pattern of birth and death rates. With a sharp, rapid decrease in the birth rate, the onset of the aging process is accelerated and its extent deepened.

Effects on age structure caused by changes in the death rate are more complex. Historically, improvements in the general mortality rate were brought about mainly by decreases in the infant mortality rate. Such decreases, when significant, increase the size of the young population, i.e. of children 0 to 14 years old. Consequently, the size of the elderly population decreases proportionally, and the reverse of population aging, i.e. "rejuvenation", occurs.

Until quite recently, a country would experience an improvement in the death rate with the achievement of a decrease in the infant mortality rate, or in some cases in the mortality rate of the young population. However, a new trend in the improvement of the general mortality rate has emerged, brought about by a lowering of the mortality rate of the elderly population. This trend is especially significant in Japan and the United States of America and is receiving widespread attention as a new factor in the aging of the population.

While a decrease in the death rate was once a cause of "rejuvenation" of the population, this newly observed increase in the survival probability of the elderly population has become a factor in the aging of the population. Thus, continuous research into and careful consideration of the implications of this change in the age structure with regard to the mortality rate is necessary.

Transitions in age structure: Japan

The onset of modernization in Japan accompanied the collapse of the feudal system under the Tokugawa Shogunate and the establishment of the Meiji Restoration Government (1868). **Table 2** presents data for the approximately 70-year period from the early Meiji era (1870) to the Second World War and table 3 presents data for the approximately 40-year period from the end of the Second World War to the present. The birth rate shows a rising tendency from 1890 to around 1910, which marks the beginning of a long-term trend towards lower birth rates. Despite considerable fluctuation, the death rate has

Table 2: Vital rates from the early stages of modernization in Japan to Second World War (per cent)

Period	Birth rate	Death rate	Natural increase rate
1870-1874	36.3	31.3	5.0
1875-1879	36.4	31.3	5.1
1880-1884	33.9	28.3	5.6
1885-1889	33.7	28.1	5.6
1890-1894	34.3	27.3	7.0
1895-1899	36.3	27.0	9.3
1900-1904	35.2	24.2	11.0
1905-1909	37.0	25.3	11.8
1910-1914	35.6	22.1	13.5
1915-1919	33.2	22.3	10.9
1920-1924	35.0	23.0	12.0
1925-1929	34.0	19.8	14.3
1930-1934	31.8	18.1	13.6
1935-1939	29.3	17.4	11.9
1940-1943	30.7	16.3	14.4

Sources: The data for 1870 to 1920 are taken from *Population Estimates by Age and Sex from the Meiji Restoration to 1920*, Research Document No. 145 of the Institute of Population Problems, Japanese Ministry of Health and Welfare, 1 February 1962. Statistics for the period after 1920 are based on calculations by the Institute of Population Problems, Ministry of Health and Welfare.

maintained an overall declining tendency to the present, excluding the short period preceding and following the end of the Second World War.

The natural increase rate deserves special note. In Japan's long history before the Second World War, this rate never exceeded the 1 per cent mark until the turn of the twentieth century. Even at its peak in the pre-war era, it exceeded 1.4 per cent only during the five-year period 1925-1929 and the four-year period 1940-1943.

After the Second World War, the natural increase rate temporarily surpassed 2 per cent owing to the "baby boom". Since then, it dropped to 1 per cent in 1956 owing to a sharp decline in the birth rate; it remained at that level fairly steadily with minor fluctuations until 1977 when it dropped below the 1 per cent mark. A further decline to 0.6 per cent was experienced in 1981, since which time the rate has levelled off.

**Table 3: Vital rates in Japan during the period
from the end of the Second World War to 1984 (per cent)**

Year	Birth rate	Death rate	Natural increase rate
1944	* 29.2	* 17.4	11.8
1945	* 23.2	* 29.2	- 6.0
1946	* 25.3	* 17.6	7.7
1947	34.3	14.6	19.7
1948	33.5	11.9	21.6
1949	33.9	11.6	21.4
1950	28.1	10.9	17.2
1951	25.3	9.9	15.4
1952	23.4	8.9	14.4
1953	21.5	8.9	12.6
1954	20.0	8.2	11.9
1955	19.4	7.8	11.6
1956	18.4	8.0	10.4
1957	17.2	8.3	8.9
1958	18.0	7.4	10.5
1959	17.5	7.4	10.1
1960	17.2	7.6	9.6
1961	16.9	7.4	9.5
1962	17.0	7.5	9.5
1963	17.3	7.0	10.3
1964	17.7	6.9	10.7
1965	18.6	7.1	11.4
1966	13.7	6.8	7.0
1967	19.3	6.7	12.6
1968	18.4	6.8	11.6
1969	18.5	6.8	11.7
1970	18.8	6.9	11.9
1971	19.2	6.6	12.6
1972	19.3	6.5	12.8
1973	19.4	6.6	12.8
1974	18.6	6.5	12.1
1975	17.1	6.3	10.8
1976	16.3	6.3	10.0
1977	15.5	6.1	9.4
1978	14.9	6.1	8.8
1979	14.2	6.0	8.2

Table 3: (continued)

Year	Birth rate	Death rate	Natural increase rate
1980	13.6	6.2	7.4
1981	13.0	6.1	6.9
1982	12.8	6.0	6.8
1983	12.7	6.2	6.5
1984	12.5	6.2	6.3
1985	11.9	6.3	5.6
1986	11.4	6.2	5.2

Source: *Vital Statistics*, Ministry of Health and Welfare.

Note: * = Estimated by Japanese specialists, using the *United Nations Demographic Yearbook*, 1951 edition.

Worthy of note is the birth rate and the impact it has had on the aging of the population. The birth rate dropped from a high of 33-34 per thousand population during the baby boom of 1947-1949 to 17 per thousand in 1957, at which point it stabilized; after showing a slight tendency to increase, it started to decline further from a peak of 19.4 per thousand in 1973. Although the rate of decrease has slowed recently, the downward trend has continued with the birth rate falling to 11.4 per thousand in 1986, a decrease of 41.2 per cent in 13 years. This tendency is seen not only in the crude birth rate but also in the total fertility rate, the gross reproduction rate and the net reproduction rate (see **table 4**). However, it is noteworthy that the reproduction rates have exhibited a rising tendency, though slight, from 1982 to 1984; however, they again came back to a low level in 1985.

The age structure transition is the result, in general, of the changes in the vital rates summarized in **table 5**. Projections concerning the age structure of the future population up to the year 2025 have been included in an attempt to clarify the long-term characteristics of this shift over a period of 150 years. Average age, median age, age dependency ratio and aging index are provided in addition to the percentage distribution of each age group in the total population.

Table 6 is a comprehensive summary of the three approximately 50-year-long phases which can be distinguished in the transition of the age structure occurring over the 150-year period. The first phase, from 1870 (the beginning of the Meiji era) to 1925 (the end of the Taisho era), is characterized by the following tendencies: (a) a decline in the proportion of the population

Table 4: Various reproduction rates of the female population of Japan

Year	Total fertility rate	Gross reproduction rate	Net reproduction rate
1920	5.24	2.56	1.59
1925	5.11	2.51	1.56
1930	4.71	2.30	1.52
1937	4.36	2.13	1.49
1940	4.11	2.01	1.44
1947	4.54	2.21	1.72
1950	3.65	1.77	1.51
1955	2.37	1.15	1.06
1960	2.00	0.98	0.92
1961	1.96	0.95	0.91
1962	1.98	0.96	0.92
1963	2.01	0.98	0.94
1964	2.05	0.99	0.96
1965	2.14	1.04	1.01
1966	1.58	0.76	0.74
1967	2.23	1.08	1.05
1968	2.13	1.03	1.00
1969	2.13	1.03	1.00
1970	2.14	1.03	1.00
1971	2.16	1.04	1.02
1972	2.14	1.04	1.01
1973	2.14	1.04	1.01
1974	2.05	0.99	0.97
1975	1.91	0.93	0.91
1976	1.85	0.90	0.88
1977	1.80	0.87	0.86
1978	1.79	0.87	0.86
1979	1.77	0.86	0.85
1980	1.75	0.85	0.84
1981	1.74	0.85	0.83
1982	1.77	0.86	0.85
1983	1.80	0.88	0.86
1984	1.81	0.88	0.87
1985	1.76	0.86	0.85

Source: Latest Demographic Statistics, the Institute of Population Problems, Japanese Ministry of Health and Welfare, 1986.

Table 5 : Demographic indicators of changes in age composition in Japan

Year	Percentage distribution by age group			Average age	Median age	Dependency ratio (per 100)			Aging index *
	0-14	15-64	65+			Total	Young	Aged	
1870	28.1	65.2	6.7	30.7	27.6	53.4	43.1	10.3	23.8
75	30.4	63.0	6.6	30.1	27.1	58.7	48.2	10.5	21.6
80	31.9	61.7	6.4	29.4	26.6	62.1	51.7	10.4	20.2
85	33.0	60.6	6.4	29.1	25.7	65.0	54.4	10.6	19.4
90	32.8	60.8	6.3	28.8	25.0	64.4	53.9	10.4	19.3
95	32.7	61.2	6.1	28.5	24.3	63.4	53.4	10.0	18.6
1900	33.9	60.7	5.4	28.0	24.1	64.7	55.8	8.9	16.0
05	34.8	60.1	5.2	27.6	23.9	66.4	57.9	8.6	14.9
10	36.0	58.8	5.2	27.2	23.1	70.1	61.2	8.8	14.4
15	36.3	58.4	5.3	26.9	22.5	71.2	62.1	8.1	14.5
20	36.5	58.3	5.3	26.7	22.2	71.6	62.6	9.0	14.4
25	36.7	58.2	5.1	26.5	22.0	71.7	63.0	8.7	13.8
30	36.6	58.1	4.8	26.3	21.8	70.5	62.4	8.1	13.0
35	36.9	58.5	4.7	26.3	22.0	71.1	63.1	8.0	12.6
40	36.1	59.2	4.7	26.6	22.1	69.0	61.0	8.0	13.1
45	35.3	59.9	4.8	26.7	22.3	66.9	58.9	8.0	13.6
50	35.4	59.7	4.9	26.6	22.2	67.7	59.4	8.3	13.6
55	33.4	61.3	5.3	27.6	23.6	63.3	54.6	8.7	15.9
60	30.0	64.2	5.7	29.0	25.6	55.9	47.0	8.9	19.0
65	25.6	68.1	6.3	30.3	27.4	47.1	37.9	9.2	24.4
70	23.9	69.0	7.1	31.5	29.0	45.1	34.9	10.3	29.4
75	24.3	67.7	7.9	32.5	30.6	47.6	35.9	11.7	32.6
80	23.5	67.4	9.1	33.9	32.5	48.4	34.9	13.5	38.7
85	21.5	68.2	10.3	35.7	35.2	46.7	31.6	15.1	47.9
90	18.5	69.6	11.9	37.4	37.4	43.7	26.6	17.1	64.6
95	17.0	68.8	14.2	38.9	38.9	45.4	24.8	20.6	83.3
2000	17.0	66.5	16.5	40.0	39.8	50.3	25.5	24.8	97.0
05	17.2	64.3	18.5	41.2	40.8	55.5	26.8	28.8	107.4
10	16.8	62.5	20.7	42.3	42.0	59.9	26.9	33.0	122.8
15	15.7	60.9	23.4	43.3	43.5	64.3	25.8	38.5	149.4
20	14.8	61.6	24.6	44.1	45.1	65.1	24.5	40.6	165.8
25	14.9	60.6	24.5	44.5	45.8	65.0	24.6	40.4	164.1

Source: The data up to 1915 were calculated on the basis of Okazaki's work. The data from 1920 to 1980 were calculated on the basis of census figures. The data for 1985 to 2025 were calculated on the basis of the future population projections prepared by the Nihon University Population Research Institute in 1982.

* Note: Aging index = $\frac{\text{Persons 65 years \& over}}{\text{Children 14 years \& under}} \times 100$

**Table 6: Selected demographic indicators by three phases for Japan
(1870 to 2025)**

Phase	Percentage distribution by age group			Aging index	Dependency ratio	Average age
	65 +	0-14	15-64			
Phase I						
1870	6.7	28.1	65.2	23.8	53.4	30.7
1925	5.1	36.7	58.2	13.8	71.7	26.5
Rate of increase/ decrease	-23.9	+30.6	-10.7	-42.0	+34.0	-13.7%
Phase II						
1925	5.1	36.7	58.2	13.8	71.7	26.5
1970	7.1	23.9	69.0	29.4	45.1	31.5
Rate of increase/ decrease	+39.2	-34.9	+18.6	+113.0	-37.1	+18.9%
Phase III						
Early						
1970	7.1	23.9	69.0	29.4	45.1	31.5
2000	16.5	17.0	66.5	97.0	50.3	40.1
Rate of increase/ decrease	+132.4	-28.9	-3.6	+229.9	+11.5	+27.3%
Later						
2000	16.5	17.0	66.5	97.0	50.3	40.1
2025	24.5	14.9	60.6	164.1	65.0	44.5
Rate of increase/ decrease	+48.5	-12.4	-8.9	+69.2	+29.2	+11.0%

Source: See table 5.

over 65 years of age from 6.7 to 5.1 per cent, (b) a marked increase in the proportion of the population 0 to 14 years of age from 28.2 to 36.7 per cent, (c) a decrease in the proportion of the population between the ages of 15 and 64 years from 65.2 to 58.2 per cent, (d) a sharp drop in the aging index from 23.8 to 14.5, and (e) an increase in the dependency ratio from 53.5 to 71.7. In other words, this phase was marked by what may be called a rejuvenation of the age structure of the population.

The second phase, from 1925 to 1970, which includes the Second World War years, exhibited the following characteristics: (a) a marked reduction in the proportion of the population aged 0 to 14 years from 36.6 to 24.0 per cent, (b) a marked increase in the proportion of the working age-population from 58.2 to 69.0 per cent and (c) a sharp decrease in the dependency ratio from 72 to 45. In 1970, the dependency ratio dropped to the extremely low level of 45.1 per cent, a very rare phenomenon viewed even on an international scale. The average life expectancy exceeded 70 years of age for the first time (males, 69.3 years; females 74.7; average: 72.0). Population migration was also significant during this period, with major influxes into the three large metropolitan areas, Tokyo, Osaka and Nagoya, reaching a peak and starting to decline. In 1967, the Japanese population reached 100 million and various indices indicate that the Japanese population was moving into a new transition period at that time.

The third phase, which will extend from 1970 into the twenty-first century, has as its major characteristics aging and long life expectancy. This period may, however, be divided into early and later stages according to the speed and extent of the aging process.

In the early stage, i.e. the 30 years from 1970 to 2000, aging of the population will proceed at an accelerating pace. Based on data from the 1986 projection of the Nihon University Population Research Institute, it is estimated that the proportion of the population over 65 years of age will rapidly increase from 7.1 to 16.5 per cent, thus nearly equalling the 16.9 per cent level of Sweden in 1980, which among the developed countries currently has the highest level of elderly in the population. The aging index will also show a more than three-fold increase from 29.4 to 97.0 during this period. Thus, the elderly population (people over 65 years of age), which was once less than one-third of the young population 0 to 14 years of age, will grow so rapidly that both populations will be nearly equal in size. However, since the size of the young population will continue to decrease, the ratio of the dependent population, i.e. the combined young and elderly population, to the working age population will be 50.3 per cent.

The latter half of the third phase will be characterized by "heavy aging". The elderly population will exceed 20 per cent of the population in 2010 and will reach the extraordinarily high level of more than 24 per cent in 2020. According to United Nations estimates, the highest ratios of elderly populations to total populations in 2025 for western countries will reach the 22 per cent level, i.e. 22.7 per cent in the Netherlands, 22.3 per cent in Finland, Denmark and Sweden, and 22.1 per cent in the Federal Republic of Germany. In France and the United Kingdom of Great Britain and Northern Ireland, the figures are 19.4 and 18.3 per cent and are not expected to reach 20 per cent.

It is predicted that Japan will far exceed those levels. Japan's aging index will exceed 100 after 2005 and 166 in 2020.

Judged by any indicator, Japan will find itself the most elderly society in the world.

Middle-aged and elderly populations

For a comprehensive study of aging issues, several points require attention. First, as the elderly population comprises merely one part of the total population and has an inseparable relationship with the other portions of the population in the socio-economic environment, it is important to consider the elderly population in the context of age structure shifts. Furthermore, due consideration must be given to the middle-aged population, as it comprises a reserve of people soon to become elderly. Lastly, it is important to understand that the elderly population cannot be viewed as a single homogeneous group, but should be classified into several stages, owing to the great differences in health, level of activity, morbidity and mortality rates, among those in their 60s, 70s, and 80s. It is also clear that while the population over 65 years of age will increase greatly in absolute terms, the increase in the number of the very old will be particularly marked.

Middle-age

"Middle-age" is a vague term that is defined loosely according to the needs of a given study. For convenience sake, middle age will be used in this article to indicate those in the age group 50 to 64 years. These are the years immediately preceding and following retirement, which border on the lower limit of what is considered to be "old age", i.e. 65.

A marked increase in the middle-aged population by the end of this century will parallel the increase in the elderly population, and at nearly the same level. However, it is important to remember that the sharp expected increase in the size of the elderly population, especially in the first quarter of the next century, will be due to the increase during this century in the size of the middle-aged population. Therefore, it will be necessary in the remaining years of this century to focus on the issues of the middle-aged population as a means of addressing the issues of the elderly population of the next century.

As is shown in **table 7**, the middle-aged population will increase by 12.1 million in the 25 years from 1975 to 2000, while the population over 65 years of age will increase by 12.5 million. However, in the 25 years from the year 2000 to 2025, the middle-aged population will decrease by more than one million, while the elderly population will increase by about 10 million (rate

Table 7 : Trends in adult population by age groups with emphasis on the middle-aged population in Japan (1975 to 2025)

Year	Actual No. (Unit: thousands of population)				Index (with 1975 as 100)			
	20-34	35-49	50-64	65 +	20-34	35-49	50-64	65 +
1975	29 100	24 010	14 738	8 865	100.0	100.0	100.0	100.0
1980	27 671	25 645	17 289	10 647	95.1	106.8	117.3	120.1
1985	25 086	28 121	20 347	12 472	86.2	117.1	138.1	140.7
1990	24 941	28 728	22 578	14 801	85.7	119.6	153.3	167.0
1995	27 102	27 293	24 324	17 984	93.1	113.7	165.0	202.9
2000	27 401	24 727	26 882	21 408	94.2	103.0	182.0	241.5
2005	25 886	24 624	27 549	24 430	88.9	102.6	186.9	275.6
2010	22 777	26 777	26 204	27 395	78.3	111.5	177.8	309.0
2015	21472	27 069	23 780	30 879	73.8	112.7	161.4	348.3
2020	21 943	25 540	23 713	31 984	75.4	106.4	160.9	360.8
2025	22 626	22 494	25 796	31 374	77.8	93.7	175.0	353.9

Source: The data up to 1980 are based on census statistics. The data after 1985 are based on future population projections by the Nihon University Population Research Institute, 1986.

of increase: 46.5 per cent). These facts explain why the Japanese Government refers to the remaining years of this century as the “Era of the Middle-Aged.”

Table 7 provides a breakdown of the actual number of individuals and the population index by age group to enable comparison of the middle-aged group with others in the working age population, and with the elderly population in the period from 1975 to 2025. The young working age population 20 to 34 years of age will experience a decrease during this period. The decrease will exceed 4 million people in 1990 as compared with 1975, and it is expected to have great economic and social consequences. In contrast, those in the intermediate working age population, i.e. people 35 to 49 years of age, will have increased in number by 4.7 million by 1990. However, this will change into a sharply decreasing tendency; in the short span of only 10 years until the year 2000, this group will have decreased by about 4 million. These severe fluctuations in the working age population over a comparatively short period are expected to have a grave impact on society.

The population in the 50 to 64-year-old age range will undergo different changes from the other working age population groups, as their numbers are expected to show a tendency towards continuous increase. This group will increase by more than 12 million (for a rate of increase of 82 per cent) in the 25-year period from 1975 to 2000. However, this sharply rising trend will

level off by 2025 and thereafter begin to decline. What should be noted here is the increase in the proportion of the middle-aged population as a part of the entire working age population. If the working age population is defined as comprising individuals 20 to 64 years of age, the proportion of the middle-aged population was only 21.7 per cent in 1975. It rapidly increased to 27.7 per cent in 1985 and will increase to 33.9 per cent in the year 2000 and finally 36.4 per cent in 2025. This tendency may be termed the “aging of the productive population.” As this phenomenon will naturally bring about the aging of labour force population, its effect on the economy and society will be great.

Elderly

As previously mentioned, the aging of the Japanese population, i.e. the increase in the proportion of the elderly population, is expected to proceed at an internationally unprecedented speed and attain levels hitherto never experienced. It is not appropriate to discuss the increase in the elderly population as a single group, since distinct changes will occur in the age groups comprising those over 70 and 80 years of age. Although these groups, as a part of the population over 65 years of age, will exhibit the same tendency to increase in size, the rate at which they will do so will differ greatly. Moreover, marked differences in the areas of health, family status and economic conditions require that these groups be given separate consideration because of wide variances in related political, administrative and socio-economic implications. Therefore, in the following discussion, the population over 65 years of age is divided into three groups: those over 65 years, over 75 years and over 85 years, to enable an examination of the differences in their pattern of increase. **Table 8** shows their actual numbers and proportion of the increase of the aged population of those in the three age groups for the 45-year period from 1980 to 2025.

Table 8: Increase in the elderly population by age group in Japan (1980 to 2025)

Age	1980		2000		2025		1980-2025 Increase
	Number (10,000)	Per cent	Number (10,000)	Per cent	Number (10,000)	Per cent	
65+	1 065	100.0	2 141	100.0	3 137	100.0	2.9 times
75+	366	34.4	822	38.4	1 668	53.2	4.6 times
85+	53	5.0	168	7.8	362	11.5	6.8 times

Source: Future Population Projections, the Nihon University Population Research Institute, 1986.

As may be seen from the table, the rate of increase is markedly different in the case of the over-75 and over-85 age groups, as compared with the over-65 age group as a whole, i.e. 4.6 times for the over-75 age group and 6.8 for the over-85 age group as opposed to 2.9 times for the entire population over 65 years of age. The proportion of those over 75 years and over 85 years will rapidly increase. The population over 75 years of age accounted for about one-third of the population over age 65 in 1980 and will account for more than half of the population (53.5 per cent) in 2025. The very old population, i.e. those over 85 years of age, accounted for only 5 per cent of the population in 1980, but will have more than doubled to 11.5 per cent in 2025. This higher rate of increase in the upper ranges of the aged population is what is meant by the “aging of the elderly population.” It must be emphasized that this aging of the elderly population requires special consideration from the standpoint of policy for the previously mentioned physical, social and economic reasons.

Similarities between Japan and China

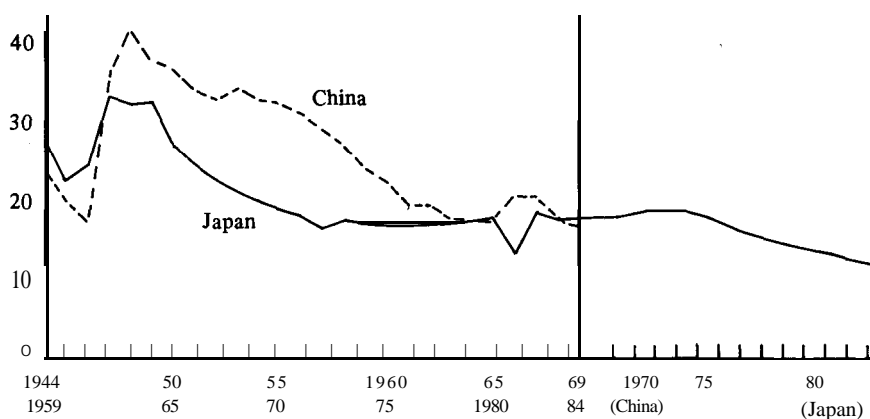
The demographic transition in China is very similar to the one which occurred in Japan in several aspects. An important point to note with regard to these fertility transitions is that, in the case of Japan, the birth rate dropped by half from 34.3 to 17.2 per thousand during the 10 years between 1947 and 1957 and that a comparable change occurred in China (see **table 9**). In

Table 9: Comparison of fertility transitions in Japan and China

Japan			China		
Year	Birth rate		Year	Birth rate	
1947	34.3	50 per cent decrease	1963	43.4	50 per cent decrease
1948	33.5		1964	39.1	
1949	33.0			
....				
....		1969	34.1	
....	
1957	17.2		1976	19.9	
			
			1979	17.8	

Sources: Japanese data from *Vital Statistics* by the Ministry of Health and Welfare. Chinese data from *China Statistical Yearbook*, 1984 edition.

Figure: Comparison of fertility transitions in Japan and China



China, the birth rate declined by almost half from 34.1 in 1969 to 17.8 per thousand in 1979. Both the initial and the final levels of the birth rate and the period required for the decrease are nearly the same. If the rate of 43.4 per thousand in 1963 is considered as the starting point of China's birth rate decline, the halfway point, i.e. 19.9 per thousand, was reached in 13 years (in 1976). In either case, the fact that requires special attention is that the Japanese fertility transition experience, i.e. the achievement of a 50-per cent drop in the birth rate within 10 years which at the time was said to be unprecedented, was repeated in China 22 years later.

For the sake of clarity, the data from Japan and China have been combined by overlapping time scales in the accompanying figure to highlight the similarities in the two fertility transitions. An examination of subsequent fertility behaviour reveals that fertility control was far greater in Japan than it was in China. However, the speed of implementation of fertility control in China was also extremely rapid. It is assumed that the transition which will occur hereafter will be on a level corresponding to that of Japan over the past 15 years. In other words, the transition of fertility behaviour in China has followed the pattern of modern fertility decline with a 15-year delay.

In comparison with China, where the influence of government policies on fertility behaviour is much stronger and far more effective, the Japanese case is remarkably different. In Japan, explicit population measures were not instituted by the Government. Instead, economic and social pressures produced a strong motivation for fertility control. Whether the motivation to practise family planning was provided by the adoption of strict population policies on the part of the Government or whether harsh socio-economic conditions pro-

vided the inducement does not matter, as both were strong enough to achieve an unprecedented level of fertility control.

As previously mentioned, a fertility or demographic transition brings about changes in the age structure of a population in like degree. In view of the marked similarity in the fertility transitions of Japan and China, it may be assumed that their age structure transitions will also be similar. Thus, it may be expected that future age structure shifts in China will follow a pattern similar to that of Japan. Of course, it must not be forgotten that the pattern of the age structure transition will be influenced by the progress of the fertility transition in China. However, considering the trends to date, it is not expected to differ greatly from the Japanese pattern.

As predictions about future age structure transitions must be based on future population projections, this article uses United Nations estimates of the Chinese population.

The latest population census, conducted in China during 1982, reveals an age structure which closely resembles that of Japan in 1955. **Table 10** shows the population distribution by age group, the age dependency ratio and the aging index.

Since the age structure of China in 1982 is similar to that of Japan in 1955, the age dependency ratio and aging index are also similar. The only difference is a 27-year time lag. Thus, although the age structure of China currently is young, it is expected that the marked drop in the birth rate will, in its course, bring about an accelerated aging of the population. The proportion of the population over 65 years of age was less than 5 per cent in 1982, but it is estimated that it will reach 7.3 per cent by the end of this century. In a period of less than 20 years, China will have become an elderly society.

Table 10: Comparison of the age composition of Japan in 1955 and China in 1982

Country	Year	Per cent distribution by age group			Age dependency ratio			Aging index
		0-14	15-64	65 +	Total	Young	Elderly	
Japan	1955	32.4	61.3	5.3	63.3	54.6	8.7	15.9
China	1982	33.6	61.5	4.9	62.6	54.6	8.0	14.6

Sources: Japanese data from the 1955 Census performed by the Japanese Government. Chinese data from the 1982 Population Census.

Table 11: Comparison of the age compositions of China in 2000 and of Japan in 1970 and 2000

Country	Year	Per cent distribution by age group			Age dependency ratio			Aging index
		0-14	15-64	65 +	Total	Young	Elderly	
China	2000	24.3	68.3	1.3	46.3	35.6	10.7	30.0
Japan	1970	23.9	69.0	7.1	45.1	34.9	10.3	29.7
Japan	2000	17.0	66.5	16.5	50.3	25.5	24.8	97.0

Sources: Japanese data from the 1970 Census, and the 1986 projections of the Japanese population in the year 2000 by the Nihon University Population Research Institute. Chinese data from *United Nations: World Population Prospects, Estimates and Projections as Assessed in 1984*. New York, 1986.

A comparison of the degree of aging indicates that China will reach the 1970 Japanese level in the year 2000. **Table 11** compares the age compositions of China in 2000 and of Japan in 1970 and 2000. Particularly worthy of note in this context is the unprecedentedly low dependency ratio of 45 that Japan enjoyed in 1970.

This contrasts sharply with the high ratio of around 70 with which Japan had been burdened for many years prior to the Second World War; this provided a highly favourable demographic environment for Japan's period of rapid economic growth.

The age dependency ratio of the Chinese population in the year 2000 is projected to be 46.3, close to Japan's 1970 level of 45.1. Thus, the burden on people in their productive years will be very light; it will result in a population structure highly conducive to economic development.

What will the age structure of the Chinese population be in the next century and how will it compare with that of Japan? As shown in **table 12**, the age dependency ratio of the Chinese population in 2010 will be 43.7, which is lower than that of Japan in 1970. This favourable structure will prevail through 2020, when the ratio will still be as low as 44.5, and 2025, when it will have climbed somewhat but will nonetheless remain below the 50 mark at 47.8.

In contrast, Japan will experience a rapid rise in its age dependency

Table 12: Comparison of the age structure transitions of the Chinese and Japanese populations after the year 2000

Year	China				Japan			
	Age dependency ratio			Aging index	Age dependency ratio			Aging index
	Total	Young	Elderly		Total	Young	Elderly	
2000	46.3	35.6	10.7	30.0	50.3	25.5	24.8	97.0
2010	43.7	31.7	12.0	37.6	59.9	26.9	33.0	122.8
2020	44.5	28.2	16.2	57.1	65.1	24.5	40.6	165.8
2025	47.8	28.2	19.6	69.6	65.0	24.6	40.4	164.1

Sources: Japanese data from the 1986 projections of the Nihon University Population Research Institute. Chinese data from *United Nations: World Population Prospects, Estimates and Projections as Assessed in 1984*. New York, 1986.

ratio during the next century; the age dependency ratio will be 59.9 in 2010 and 65.1 in 2020. The aging of the Japanese population will be severe. The aging index, which shows the proportion of the elderly population with the young population set at 100, will reach extreme heights as 123 in 2010 and 166 in 2020.

However, the Chinese population in the first quarter of the twenty-first century will have an age dependency ratio as low as 40 and a very low aging index of 38 in 2010. This will be approximately one-third that of the Japanese level. In 2020, the aging index will rise to nearly 60 in China, still a low level which will be close to one-third of the Japanese level.

With such a light dependency structure towards the end of this century and the expectation that this favourable structure will continue for at least 25 years into the next century, China will enjoy demographic conditions conducive to rapid, high-level development, which may be achieved if the next several decades are used effectively.

Policy direction

The following policy recommendations are based on the demographic analysis of population aging presented previously in this article.

The first recommendation concerns the age dependency ratio. In the

case of Japan, the age dependency ratio will remain below 50 throughout the remainder of this century. Therefore, these years have great significance as a preparatory period for developing the means to cope with the serious problems associated with a population which will be experienced in the coming century. It is extremely important to formulate definite measures during this period. Because of the heavy dependent population burdens of the next century, it will be of little use to make hasty policy decisions once the situation has already become a reality.

In the case of China, it is expected that the dependent population burden will be extraordinarily low for the next several decades from the end of this century into the next century. China will easily be able to cope with the expected aging of its population by utilizing this favourable period to its greatest advantage. The problem will involve the policies that China implements to cope with the complexities of the age structure transition.

A second policy consideration concerns the increased burden posed by population aging; measures must be devised to alleviate this problem. For Japan, an extension of the retirement age and creation of employment opportunities for those who wish to work after retirement are two practices which would contribute to this goal. Employment would not only provide income to supplement government pensions, but it would also help the elderly to find meaning in their lives as well as help to promote better health thus reducing medical expenditures. In Japan, it would be practically impossible to bring the population below age 20 into the labour force owing to the increasing proportion attending institutes of higher education. The young population, if defined in terms of dependency, does not comprise those in the 0 to 14 age group, but those in the range of 0 to 19 years. This is another factor that will increase the burden on the productive population. Thus, facilitating the employment of retired and elderly people takes on even greater importance. In fact, 65 per cent of 65 to 69-year-old men and 4.5 per cent of 70 to 74-year-old men are currently employed. This fact indicates that encouragement of employment in those age brackets through government policies is quite feasible. To make it possible for people to work past age 65, it is extremely important, however, to promote and maintain health, which will also contribute to controlling currently sharply rising medical expenditures.

The third recommendation for dealing with the problem of an aging population is not focused on the elderly alone. Policy measures must be comprehensive and systematically developed for society as a whole. The elderly are not a group isolated from society; they are a useful and valuable human resource for the development of society as a whole. Efforts to promote the welfare of all the people including children, the elderly, the ill and the labour force concern the redistribution of social resources.

Aging in India: Its Socio-economic and Health Implications

By the year 2000, India is likely to rank second to China in the absolute numbers of its elderly population

By H.B. Chanana and P.P. Talwar*

The sharp decline in mortality since 1950 and a steady recent decline in fertility has contributed to the process of population aging in India.

India currently ranks fourth among the countries of the world with a large elderly population; by the year 2000, it is likely to be second only to China.

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Conventionally, there are two processes considered to be involved in the aging of a population, i.e. aging at the base and aging at the apex of the population. The former results from a decline in fertility; the latter, mortality reduction among the elderly. In India, both processes are recent phenomena.

The sequence of high birth rates followed by high death rates until 1951 kept the proportion of persons aged 60 or more years of age at a low level. Since 1961, a sharp decline in death rates accompanied by an increasing expectation of life at age 60 set in motion the process of aging in India; furthermore, a steady decline in the birth rate since 1971 accelerated that process (see below):

Crude birth rates (CBR), crude death rates (CDR), and expectation of life at age (e_{60}^o) in census years

Census year	CBR	CDR	Expectation of life at 60	
			Males	Females
1961*	41.7	22.8	11.8	13.0
1971*	41.2	19.0	13.6	13.8
1981+	33.9	12.5	13.8	14.7
1991++	29.7	10.7	14.5	15.5
2001++	23.7	8.4	15.2	16.4

Notes: * = Census; + = sample registration scheme; and ++ = Expert Committee on Population Projections.

Until the middle of the present century, this portion of India's population did not receive much attention. However, the situation is changing owing to changes in kinship and family organization in the wake of urbanization, industrialization and modernization.

The joint family system, which used to provide a form of social security, is disintegrating. Even in the villages where approximately three-fourths of India's population live and where the process of change has been slow, changes have been taking place which are not favourable to the elderly. However, despite the increased vulnerability of the aged, it is fortunate that this problem has not assumed serious proportions; nonetheless, it requires attention.

Table 1: Percentage decadal increase in the general population and the population aged 60 years and over

Years	General population			Population aged 60 +		
	Rural	Urban	Total	Rural	Urban	Total
1951-1961	20.54	26.33	21.64	22.66	26.28	23.25
1961-1971	21.85	38.22	24.80	30.03	45.17	32.39
1971-1981	19.67	46.39	25.00	25.93	50.75	29.97
1981-1991	15.54	44.06	22.19	23.28	52.71	28.94
1991-2001	8.71	41.67	17.77	29.56	68.61	38.46
1951-2001		–	170.29	–		273.89

Growth rate of the elderly population

Since 1951, the population aged 60 years or more has grown steadily (**table 1**). The projected populations for the decades 1981-1991 and 1991-2001 also show an increasing trend in the growth of the elderly sector of the population. When the percentage decadal variation of the general population is compared with the population 60 or more years of age, it is found that the elderly population has grown faster than the general population, mainly because of increases in the expectation of life. According to the Expert Committee on Population Projections, the decadal per cent increase in the elderly population for the period 1991-2001 would be 38.5 per cent – more than double the rate of increase in the general population.

Percentage increase in the elderly population

In 1961, the elderly population comprised 5.6 per cent of the total, increasing to 6.2 per cent in 1981. It is likely to increase to 7.7 per cent in 2001, according to the Expert Committee. The total increase in this portion of the population during the period 1961-1981 was around 10 per cent, i.e. about 0.5 per cent per year. The Expert Committee has estimated that during the period 1981-2001, the increase would be around 1.2 per cent per year (**table 2**).

Although the proportion of India's elderly population is small compared

Table 2: Percentage of population aged 60 +, by place of residence and old age dependency ratio

Place of residence	Years				
	1961	1971	1981	1991	2001
Rural	5.82 (21.0)	6.21 (27.3)	6.53 (34.3)	6.97 (42.3)	8.31 (54.9)
Urban	4.74 (3.7)	4.97 (5.4)	5.12 (8.2)	5.43 (12.5)	6.46 (21.1)
Total	5.63 (24.7)	5.96 (32.7)	6.20 (42.5)	6.55 (54.8)	7.70 (75.9)
Old age dependency ratio	10.6	11.4	11.5	11.3	12.6

Notes: Figures in parentheses indicate actual population (in millions); the old age dependency ratio is defined as the population 60 or more years of age as a per cent of the population 15-59 years of age.

with that of any developed country because of the large size of India's population base, the elderly population is very large in absolute numbers. The number of persons 60 or more years of age was 24.7 million in 1961; this number increased by 72 per cent to 42.5 million in 1981. In 2001 it is expected to increase to about 75.9 million, i.e. more than three times the size of the elderly population in 1961. In other words, it will be equal to three times Canada's entire population in 1981.

The number of elderly, both in absolute and percentage terms, is larger in the rural areas of India than in urban areas. Unlike the trend in most countries, there are more males than females in the elderly population for all the years covered in this study. The usual sex ratio pattern favouring females occurs at 70 or more years of age in the case of India.

Dependency

The relatively faster increase in the elderly population will contribute to a higher dependency ratio of the population in the non-productive age group. The old age dependency ratio, which was 10.6 in 1961, is likely to increase to 12.6 in 2001. Therefore, responsibility for caring for the elderly will fall either on young wage earners or on the Government.

Table 3: Sex ratio of elderly population and general population, by place of residence

Year	Place of residence	Age group (years)				All ages
		60-64	65-69	70 +	60 +	
1961	Rural	975	971	1 062	1000	963
	Urban	939	916	1072	947	845
	Total	969	962	1 064	1000	941
1971	Rural	926	921	957	936	949
	Urban	908	895	978	928	858
	Total	923	916	961	937	930
1981	Rural	937	984	958	949	951
	Urban	933	994	1051	1000	878
	Total	936	986	976	950	935
1991	Rural	904	954	1025	958	958
	Urban	957	1 009	1084	1016	897
	Total	916	966	1 038	971	941
2001	Rural	956	952	1 008	968	964
	Urban	1 005	1 000	1 060	1 039	913
	Total	969	965	1022	987	947

Sex ratio

The sex ratio (number of females per thousand males) of the elderly population, which was 1,000 in 1961 and decreased to 950 in 1981, is projected to be 987 in 2001 (**table 3**). Though comparatively higher than that of the general population in each decade, the sex ratio is not weighted in favour of females, as occurs in more developed countries.

By contrast, the sex ratio of the population in the 7-years-and-over age group favours females when compared with that of the population in the age groups 60-64 years and 65-69 years. As expected, it is also higher than that of the general population in all the decades studied.

This indicates that there will be more women than men aged 70 years and over in 2001. Their numbers will be higher in rural areas than in urban areas. Because most of them will be without income, they will need support either from their children or the Government.

Table 4: Distribution (per cent) of widowed persons aged 60 and over, by place of residence and sex

Place of residence	1961		1971		1981	
	Males	Females	Males	Females	Males	Females
Rural	27.89 (3.0)	75.15 (7.9)	22.70 (3.2)	68.18 (9.0)	20.13 (3.5)	63.86 (10.7)
Urban	25.12 (0.5)	76.52 (1.4)	17.86 (0.5)	69.23 (1.8)	16.32 (0.7)	66.56 (2.7)
Total	27.46 (3.5)	75.35 (9.3)	22.48 (3.7)	68.35 (10.8)	19.40 (4.2)	64.40 (13.4)

Note: Figures in parentheses indicate actual numbers (in millions).

Marital status

A fairly large proportion of the elderly population is single owing to the death of the marriage partner. The incidence of widowhood is much greater among females than among males (**table 4**) owing partly to the comparatively higher expectation of life among the older females and partly to taboos against remarriage, particularly of females.

However, since 1961, there has been a consistent decrease in the percentage of widows and widowers which is likely to continue in the future, firstly because of a relaxation of the taboos against remarriage and secondly as a result of increases in the expectation of life at age 60 and over for males and females.

Literacy

Table 5 presents the status of literacy in the 60 and over age group and in the general population for different decades. It shows that the percentage illiterate among the elderly was higher than that of the general population during each decade. Also, illiteracy was more prevalent among elderly females than elderly males, which parallels the pattern of illiteracy among the general population. However, there was a consistent decline in the percentage of illiterate elderly males and females in succeeding decades, i.e. 70.8 per cent compared with 65.4 per cent in the case of elderly males and 95.7 per cent compared with 92.3 per cent in the case of elderly females (**table 5**). It has been

Table 5: Percentage distribution of population 60 years and over and the general population in census years, by education and sex

Education levels	1961				1981			
	Population aged 60+		General population		Population aged 60+		General population	
	Males	Females	Males	Females	Males	Females	Males	Females
Illiterate	70.8	95.7	65.5	87.0	65.4	92.3	53.2	75.4
Literate (without education)	21.4	3.5	21.4	8.5	12.1	3.4	13.7	8.4
Primary school (below high school)	5.7	0.7	10.0	3.9	17.2	3.8	22.6	12.4
High school and above	2.1	0.1	3.1	0.6	5.3	0.5	10.5	3.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

estimated that in 2001 approximately 52 per cent of elderly males and 83 per cent elderly females will be illiterate.

The majority of the illiterate elderly were engaged either in agricultural pursuits in the rural areas or as unskilled or semiskilled workers in urban areas, many of whom most likely were living from hand to mouth with little or no savings. Since their employment was in the unorganized sectors, they would not be covered by social insurance schemes and thus would be in need of economic support. In the absence of support from their relatives, they would have to look towards the Government for support.

Elderly workers

In India, the majority of the population, including the elderly, is poor. However, one positive feature concerning the elderly population is that most of those 60 or more years old are economically active, presumably because they are engaged in sectors for which there is no specific age of retirement.

Table 6 gives the work participation rates for the elderly population by place of residence and sex and also the proportion of elderly workers in the

Table 6: Labour force participation for workers aged 60 or more years, by place of residence and sex

Year	Place of residence	Sex		Total
		Male	Female	
1961	Rural	79.9(8.4)	24.3(2.5)	52.0(10.9)
	Urban	58.4(1.1)	11.4(0.2)	35.2(1.3)
	Total	76.6(9.5)	22.4(2.7)	49.5(12.2)
1971	Rural	77.5(10.9)	11.5(1.5)	45.5(12.4)
	Urban	55.4(1.5)	6.5(0.2)	31.5(1.7)
	Total	73.8(12.4)	10.6(1.7)	43.2(14.1)
1981	Rural	67.6(11.9)	11.3(1.9)	40.1(13.8)
	Urban	47.5(1.9)	5.8(0.2)	26.7(2.1)
	Total	63.7(13.8)	10.2(2.1)	37.5(15.9)
1991	Rural	58.9(12.7)	11.1(2.3)	35.3(15.0)
	Urban	40.8(2.5)	5.1(0.3)	22.7(2.8)
	Total	55.0(15.2)	9.8(2.6)	32.6(17.8)
2001	Rural	51.4(14.3)	10.9(2.9)	31.2(17.3)
	Urban	39.9(3.6)	4.6(0.5)	19.3(4.1)
	Total	47.4(17.9)	9.4(3.4)	28.3(21.3)

Notes: Figures in parentheses are actual workers (in millions); participation in the labour force is projected for the years 1991 and 2001 on the assumption that the trends of the years 1961, 1971 and 1981 will continue.

total working-age population. It shows that 63.7 per cent of the elderly males and 10.2 per cent of the elderly females were workers in 1981. This means that people work until they reach a relatively advanced age because the expectation of life at birth is around 55 years in India. The proportion of workers in the elderly population was higher in rural areas than in urban areas.

Since 1961, there has been a gradual decline in the labour force participation rate among the elderly in rural and urban areas, the decline being steeper among males than females.

The majority of elderly workers were engaged in agriculture. Modernization of agriculture in the future (which would require fewer workers than currently) accompanied by increases in the number of young adults seeking

employment are factors likely to affect adversely future job opportunities for the elderly. Therefore, planning in respect of future employment opportunities for the elderly is needed urgently before this problem grows to unmanageable proportions.

Non-working elderly

Although the decline in labour force participation rates means fewer jobs in the future, it also means that the proportion of elderly people not working will increase in succeeding decades. About 72 per cent of the elderly population are not expected to be working in 2001; in absolute numbers, this portion of the population will total about 55 million, 69 per cent of whom will be from rural areas and 62.8 per cent of whom will be female.

If the percentage retired in 1981 may be assumed to remain more or less the same as in 2001, then there will be about 4.5 million elderly males and 0.9 million elderly females retired from the organized sector. Although they may not be economically dependent, they would still likely depend to some degree on their children for proper care. The remaining 15.8 million elderly males and 33.4 million elderly females will be almost entirely dependent for their livelihood on their children, charitable institutions or the Government. This would result in increased responsibility for the productive population and diversification of limited resources to provide goods and services for this portion of the population.

Health status of the elderly

The elderly are more vulnerable to disease because of decreased physiological reserves and defence mechanisms. Data on morbidity collected in the National Sample Survey – 28th Round in 1973 revealed that 28.8 per cent of the elderly population in rural areas and 25.6 per cent of those in urban areas were ill at that time. Also, more elderly males in rural and urban areas were ill compared with elderly females (table 7).

Table 7: Prevalence of temporary illness among the elderly, by place of residence and sex (per cent)

Place of residence	Males	Females	All
Rural	31.3	26.0	28.8
Urban	26.1	25.1	25.6

Table 8 : Prevalence of chronic diseases among the elderly, by place of residence and sex (per cent)

Place of residence	Males	Females	All
Rural	9.2	5.3	7.4
Urban	9.4	6.4	7.9

In addition, 7.4 per cent of the elderly population in rural areas and 7.9 per cent of those in urban areas were suffering from a chronic disease, the incidence being higher among males in rural and urban areas (**table 8**).

With regard to the overall morbidity of the elderly population, 40.5 per cent of the males and 35.5 per cent of the females in rural areas and 31.4 per cent of the males and 31.5 per cent of the females in urban areas were either temporarily ill or suffering from chronic disease at the time of the Survey.

If it is assumed that those rates will prevail more or less the same until the year 2000, the number of elderly people who would require medical assistance in 1991 and 2001 would be quite large (**table 9**).

According to this estimate, there would be around 27 million elderly people ill at any given point of time in 2001. Therefore, if the goal of "health for all by the year 2000" is to be achieved, this large section of India's population, who have health problems and requirements different from those of the general population, will have to be looked after.

Table 9 : Number of elderly (in millions) requiring medical assistance, by place of residence and sex

Place of residence	1991		2001	
	Males	Females	Males	Females
Rural	8.8	6.3	11.3	8.2
Urban	2.2	2.0	3.6	3.4
Total	11.0	8.3	14.9	11.6

Currently, elderly people avail themselves of general medical and health services; no concerted effort has been made to provide geriatric medical care. However, there is an urgent need for specialists catering for the elderly.

Physical disabilities

Besides an increased level of illness, the aging process leads to certain disabilities such as blindness resulting from cataracts and glaucoma, deafness resulting from nerve impairment, loss of mobility from arthritis and a general inability to care for one's self. The data collected in the National Sample Survey – 36th Round in 1981 concerning disabilities among the elderly reveal that 10.9 per cent of the elderly population suffered from physical impairments. Approximately half of those affected were visually disabled. The remaining half were suffering from disabilities related to hearing, speech or locomotor functions.

If it is assumed that this rate of physical disability in the elderly population will continue for the next 10 to 20 years, the number of aged persons in 2001 who will suffer from some type of disability, would be about 8.2 million, or twice the number in 1981 (table 10). These people would be dependent either on their families or charitable institutions and in the absence of such support, they would look towards the Government for assistance.

Table 10: Number of elderly (in millions), by type of physical impairment, place of residence and sex

Type of impairment	1991			2001		
	Males	Females	Total	Males	Females	Total
Visual disability						
Rural	1.00	1.48	2.48	1.29	1.93	3.22
Urban	0.20	0.31	0.51	0.34	0.53	0.88
Hearing disability						
Rural	0.51	0.54	1.11	0.74	0.70	1.44
Urban	0.15	0.10	0.29	0.25	0.25	0.50
Speech disability						
Rural	0.70	0.05	0.12	0.10	0.06	0.16
Urban	0.02	0.01	0.03	0.04	0.02	0.06
Locomotor disability						
Rural	0.67	0.44	1.11	0.86	0.58	1.44
Urban	0.15	0.13	0.28	0.25	0.22	0.47

**Table 11: Distribution of States and Union Territories,
by eligibility criteria**

Eligibility criteria	Number of States and Union Territories
The destitute 65 years of age (Relaxation of requirements for physically handicapped destitutes)	9
Persons 65 years of age, widows and the physically handicapped	6
The destitute 60 years of age; widows and the infirm of any age	4
Persons 60 years of age (Relaxation of requirements for the physically handicapped)	4
Persons 90 years of age and invalids 60 years of age	1
The destitute: males, 65 years of age; females, 60 years of age	2
The destitute 80 years of age	1
The destitute: males, 58 years of age; females, 55 years of age	1
All disabled	2
Total	30

Welfare programmes

The problem of the elderly in India was not serious in the past because the numbers were small and the elderly were provided with social protection by the family network. But owing to relatively recent socio-economic changes, aging of the population is emerging as a problem that requires consideration before it becomes critical. However, a few studies indicate that family and relatives still play an important role in providing economic and social security

for the elderly. But most of these studies relate to the middle and higher socio-economic classes where the elderly own the means of production and have sufficient economic resources not to be affected adversely. Those in the lower levels of the social strata, who constitute the majority, will need social and economic support.

The elderly who worked in the organized sectors during their careers have been and are covered by social insurance schemes such as pensions, gratuities, leave encashment and provident fund disbursements made upon their retirement. Such systems have been in use since 1871. They cover approximately 11 per cent the population, who are likely to be economically better off compared with those who worked in the unorganized sectors; the latter constitute around 89 per cent of the elderly population. Since most worked in the unorganized sectors, the vast majority of the elderly probably worked for low wages and thus have little or no savings to enable them to meet their old-age needs.

Old age pensions have been introduced by State Governments mostly for the destitute and infirm. For example, the Government of Uttar Pradesh in 1957 became the first to introduce an old age pension scheme. Since then, similar schemes have been introduced by other State Governments. Such pension schemes were in operation in 16 out of 22 major States prior to 1980; all States and Union Territories, except Arunchal Pradesh, are currently providing such pensions.

**Table 12: Distribution of States and Union Territories,
by size of old-age pension per month**

Pension (Rupees)	Number of States and Union Territories
30	4
35	1
40	2
45	1
50	5
60	17
Total	30



The aging of India's population will pose problems in the future unless they are addressed now with sound policy initiatives.

Size of pension

Table 12 provides data, by State, on the typical pension payment. The amount is small and varies among the States; 10 major States and seven Union Territories pay qualified retirees Rs. 60 per month (\$US1 = about Rs. 13). Four States pay only Rs. 30 per month and the remaining eight States and Union Territories pay Rs. 40-50 per month.

Besides providing only small payments, the pension scheme covers only

a fraction of the elderly population. During the year 1984/85, only 3.7 million people were covered by the scheme; they accounted for about 7 per cent of the total elderly population of India.

Discussion and conclusions

India's demographic contours suggest a steep rise in the elderly population in the coming decades as a result of declining fertility, increasing expectation of life at birth and (partly) at later ages. Although the proportion of the elderly population in 2001 may be low, India will rank second in the world in absolute numbers. There will be about 75.9 million elderly people in India at that time; one out of every twelve persons will be aged 60 years or more in 2001. This phenomenon, coupled with rapid social changes resulting in the gradual breakdown of the traditional joint family system and ever-increasing financial constraints at the national level, is likely to pose serious problems for the elderly.

Two-thirds of the elderly males and 90-95 per cent of the elderly females are illiterate and a large number of them, particularly females, are single. Thus, the level of economic dependency is quite high. It has been estimated that about 18 million elderly males and 3.5 million elderly females would need jobs in 2001. These figures are based on the proportion currently working. This means that a huge amount of resources would be needed in order to create jobs for them in the future. Moreover, finances will also be required to maintain the 55 million not working, the majority of whom probably will not have adequate savings nor family assistance.

It has also been estimated that about 27 million elderly people would be ill at any given point of time in the year 2001 and thus need specialized medical care. In the absence of such medical facilities, large expenditures on infrastructure would be required to meet their needs.

The occurrence of physical disabilities is another important aspect of the aging process. There will be about 17 million disabled elderly persons in India in 2001, half of whom are likely to be visually disabled. The great majority of these would not be able to work and thus would be economically dependent. In the absence of family support, they would expect help from the Government. However, the Government has no old age pension scheme nor has any provision been made for granting aid to the State Governments for this purpose. Although State Governments and Union Territories have initiated schemes to provide some financial assistance to the handicapped or the destitute, the amount of such pensions ranges from only Rs. 30 to 60 per month. Moreover, owing to the paucity of funds available, the pensions cover only a fraction of the persons eligible.

Among the positive factors which have been sustaining the elderly in India is the strong attachment of family members to the elderly. Social pressure continues to be placed on persons who fail to discharge this responsibility to their elderly family members. Thus it is important to strengthen these values and the capacity of families to cope with the problems of caring for the elderly.

The elderly should be considered as human resources and their rich experience and residual capacities should be put to optimum use for the benefit of national development. Their ability to lead healthy and fruitful lives should be ensured by the Government.

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Women's Perceptions of the Pill's Potential Health Risks in Sri Lanka

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The birth control pill has been in use for three decades. By the early 1980s, an estimated 50 million women worldwide were using the pill and approximately three times as many had used it at some time in their reproductive years (Kols *et al.*, 1982).

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The pill is considered one of the most systematically evaluated drugs (*cf.* Ory, Rosenfield, Landman, 1980; Potts *et al.*, 1975) and has been unequivocally demonstrated to confer some important health benefits. For younger women in developed countries, recently demonstrated protection against cancers of the reproductive system counterbalances the better known adverse effects of the pill on the cardiovascular system (Fortney, Harper and Potts, 1986). In the developing world, the health benefits of oral contraceptive use may well outweigh the known adverse effects for all age groups. Yet it remains a widely misunderstood contraceptive; neither the positive effects of the pill nor its negative consequences are correctly understood.

A recent study supported by Family Health International and the International Health Foundation in eight developing countries found that the majority of women believe pill-taking poses substantial health risks (FHI, 1986). Similar perceptions are found in developed countries. In 1985, a poll in the United States found that three-fourths of American women of childbearing age shared a similar perception of the risks of pill use (Gallup Organization, 1985). Surveys in five Western European countries found the pill was considered more risky than the IUD or sterilization (Riphagen, 1986).

Rarely have surveys attempted to measure prevailing knowledge of potential health risks. The few studies that have focused on this topic have found that misperceptions and misinformation consistently affect method choice and contraceptive behaviour (Bertrand *et al.*, 1982; DeClerque *et al.*, 1986; Porter, 1984). Measuring the prevailing misperceptions and finding ways to correct them are critical steps towards improving the acceptability and use of all contraceptives, including the pill. In developing countries, perceived health hazards of contraceptive methods have been found to be the major reason for non-use of contraceptives among women who do not want to have more children (Nag, 1985; Bogue, 1983; Schearer, 1983; Nair and Smith, 1984). Assessment of prevailing knowledge and attitudes towards the pill provides the basis for designing appropriate information-education-communication (IEC) programmes about the pill.

This article presents findings based on a representative sample survey of over 3,000 women in Sri Lanka. The main objective is to assess the prevalence of women's knowledge about the effects of pill-use on their health. It is important to investigate what kind of women are most likely to be misinformed about the pill and what adverse effects are wrongly attributed to pill use.

Sri Lanka is an example of a third world country experiencing a sustained decline in fertility despite relatively low levels of socio-economic development (United Nations, 1986). While much of the initial decline in fertility was the result of a steady increase in age at marriage, the more recent decline has mostly

been due to Increasing contraceptive use (Wright, 1970; Alam and Cleland, 1981). This provides a good setting to investigate the extent to which women in a developing country, who are receptive to contraceptive use, perceive the health risks of pill-taking.

The 1982 Sri Lanka Contraceptive Prevalence Survey showed that virtually all of the ever-married women of childbearing age had heard of at least one modern contraceptive method. Further, although approximately 90 per cent of the Sri Lankan women knew of the pill, only 12 per cent (an estimated 265,000) had ever used the pill and only 3 per cent were currently using it. Similarly, the current prevalence of other reversible contraceptives such as IUDs, condoms and barriers has been low, about 7 per cent (SLDCS, 1983). In view of this, the Sri Lanka National Committee for Study of Contraceptive Requirements of Sri Lanka for 1981-1984 stressed the need to enhance the prevalence of reversible contraceptives, particularly IUDs and the pill, in the family planning programmes in Sri Lanka (Ministry of Plan Implementation, 1981).

Epidemiologic evidence

Many epidemiological studies have assessed the relative risks of pill-taking on women's health. The following brief review of the accumulated evidence is limited to those health aspects that are relevant to the study.

Cardiovascular disease. Myocardial infarction, stroke and pulmonary embolism are the major serious health risks associated with taking the pill (Stadel, 1981a; 1981b), although the risk is largely restricted to smokers and women over 35 years of age as well as women with hypertension, diabetes and hyperlipidemia.

Cancer. The pill's effect on cancer varies with the type of cancer. Women who take the pill are protected from ovarian and endometrial cancers; having about half the risk of never-users (CDC, 1983a; 1983b). While there have been a small number of studies that have shown an association between long-term (greater than eight years among women who *are* less than 25 years old) pill use and breast cancer, the largest case control study carried out by the CDC (1983b) found no increased risk of breast cancer. However, a controversy exists concerning increased risk of cervical cancer among young, long-term pill-users (WHO, 1985). For the vast majority of pill users who are older or have used pills for a shorter time, there appears to be no increased risk of cancer.

Sexually transmitted diseases. The pill reduces the risk of gonococcal pelvic inflammatory disease (PID) (Rubin, Ory, Iayde, 1982). PID attributed to chlamydial infection is less severe and less extensive among pill users than among non-hormonal contraceptive users (Wolner-Hanssen, Mardh, Westrom, 1985).

Sterility. The pill reduces the risk of female tubal infertility secondary to PID by half; PID is a common cause of female sterility in Africa (Cramer, 1985).

Birth defects. The pill has not been consistently associated with any of hundreds of different types of birth defects (Simpson, 1985).

Weight gain. Many studies indicate that an equal percentage of pill-takers lose weight as gain weight during pill use (Dickey, 1985).

Maternal mortality. The risk of death associated with pregnancy, child-birth and puerperium exceeds the risk of death with oral contraception. The disparity between the two risks is greater in developing countries than in developed countries. The risk of dying from childbearing is 50-100 times greater than the risk of dying from pill-taking in most developing countries (Fortney, Susanti *et al.*, 1986). In Sri Lanka, however, the maternal death rate is lower (fewer than 100 per 100,000 live births nationally, and fewer than 30 per 100,000 in Colombo) than in many other developing countries (Peries, 1983; SLDCS, 1981).

Data and methods

The data come from the 1985-1986 Rural Family Planning Survey (RFP) carried out by the Family Planning Association of Sri Lanka in collaboration with Family Health International. The survey was confined to the rural sector (which constitutes three-fourths of the total population) and covered 17 of the 24 districts in Sri Lanka. Within the 17 districts, the universe of villages which the sample represents is characterized by initial high fertility and family planning services which have been available for at least two years.

Multi-stage stratified random sampling with probability in proportion to size was used in selecting the sample. The eligible respondents were defined as currently married women aged 15-44 years at the time of the survey. The survey covered only the Sinhalese population, which constitutes about three-fourths of the total population of the country. A total of 3,253 respondents were successfully interviewed between August 1985 and February 1986.

The background variables included in the study were age, parity, education, current work status, husband's educational attainment and occupation, the couple's wealth status, and the level of development in the area in which the respondent lives. Wealth status is a composite variable which includes availability of electricity, source of drinking water, type of latrine facility and type of building materials used in the house. The variable "areal development level" refers to clusters of the sample villages classified on the basis of multiple indicators of development (FPASL and FHI, forthcoming).

The survey also collected information about the respondent's knowledge about contraceptive methods (including traditional methods), methods ever used and method(s) currently used by the respondent or her husband. In a special module on the pill in the questionnaire, the respondents were asked a general question on whether they thought pill-taking affected the health of women. Of those who said it detrimentally affected health, further specific questions were asked whether pill-taking causes heart disease, cancer, birth defects, weight gain, permanent sterility, stroke/paralysis and venereal disease. Additionally, a separate question was asked about whether the risk of pill-taking was less than, equal to or greater than the risk of childbearing. These questions were similar to those asked in United States-based and multi-country pill studies.

Results

Nearly all (98.6 per cent) of the women had heard of the pill. Of those who had heard of it, two-thirds believed that pill-taking has harmful effects on women's health and body. This perception was remarkably constant across all social, economic and educational groups (**table 1**).

Three characteristics are found to be associated with small but interesting differences in the perception of risk of pill-taking. A slightly higher but significant percentage of those who work outside their home on an irregular basis are more likely to say that the pill detrimentally affects women's health.

A possible explanation may be that such women are more likely to interact with varied types of people than housewives or those who work in one place on a regular basis. Therefore, they might be exposed to varying sources of information.

Second, those who have ever used traditional methods (mainly calendar rhythm and withdrawal) are more likely to have a negative perception than those who have never used any traditional or modern method except the pill. Those who have used a traditional method may have done so precisely because they hold negative perceptions about the pill. This appears consistent with the finding in the table that pill users are less likely than any other group of contraceptors to think that pill use is harmful to health.

Third, women living in developed areas are more likely to think that the pill has detrimental effects on health than women living in less developed areas. Data presented in **table 1** do not, however, distinguish between those whose concern about pill safety are correct and those who are incorrect. Since the pill has, as reviewed earlier, both positive and negative effects, the data must be analyzed by specific health problems in order to assess correct and incorrect perceptions.

Table 1: Percentage of women by their socio-economic and demographic characteristics who believe that pill-taking is detrimental to their health

Characteristic	Per cent	Number
Woman's age		
15 - 24 years	66.4	420
25 - 34 years	67.0	1 465
35 - 44 years	67.8	1 242
Parity		
0-2	67.1	1 014
3-4	66.4	1 330
5 or more	68.8	784
Woman's education		
None	66.4	238
1-5 years	69.3	1 059
6-9 years	66.0	1 027
10 or more years	66.2	804
Woman's work status*		
Income earning		
Regular salaried	70.6	286
Casual wage	76.6	325
Home based/cottage	69.8	222
No direct earning		
Domestic/farm	65.1	2 295
Husband's education		
None	69.5	118
1-5 years	68.1	999
6-9 years	65.3	1 190
10 or more years	68.6	793

Husband's occupation		
Farmer	65.1	1 112
Labourer	66.2	231
Non-agricultural labour, skilled	66.6	530
Non-agricultural labour, unskilled	61.6	412
Teacher/office worker	70.9	361
Business	65.1	209
Other	12.3	213
Couple's wealth status		
Low	66.4	1 870
Medium	67.1	882
High	71.3	316
Couple's contraceptive use		
Traditional methods*		
Ever used	68.2	2 410
Never used	63.8	718
Modern methods		
Other than pill		
Ever used	68.8	1 303
Never used	69.8	1 204
Pill*		
Ever used	58.8	621
Never used	69.3	2 507
Areal development level*		
Low	62.3	939
Moderate	68.3	1 171
High	70.5	1 017
All	67.2	3 128

Notes: * = Differences among the categories are statistically significant ($p < 0.05$). This table excludes those women who had not heard of the pill ($n=44$) and those who gave the "don't know" response ($n=81$). Number of cases for certain variables may not add to the total because of incomplete information.

Table 2: Per cent distribution of women's perceptions of the effect of the pill on specified health problems

Health problems	Yes	No	Don't know	Total
Heart disease	37.6	58.2	4.1	100.0
Stroke/paralysis	15.9	77.7	6.4	100.0
Weight gain	17.5	77.6	4.9	100.0
Cancer	32.3	62.6	5.1	100.0
Sexually transmitted diseases	10.2	82.1	7.7	100.0
Permanent sterility	16.8	79.4	3.8	100.0
Birth defects	31.1	65.1	3.8	100.0
Number	2 102	1025	126	3 253

Note: Total percentages may not add to 100 because of rounding.

Table 2 shows the percentage of the women who believe pill-use causes specific health problems. The seven specified health problems are shown in the table according to whether the perception is correct or not. The first three (heart diseases, stroke/paralysis and weight gain) refer to correct perceptions, while the latter three (birth defects, sterility and venereal diseases) are incorrect perceptions. The perception regarding cancer is placed in the middle since the pill has both adverse and beneficial effects on cancer.

One-third of the women believe that the pill causes heart attack, cancer and birth defects. Only 16-18 per cent of women think that the pill causes weight gain and stroke/paralysis. (Since the vernacular has no word for "stroke," the question asked about the association between the pill and paralysis). About 17 per cent of the women think the pill causes permanent sterility. Only 10 per cent think it causes sexually transmitted diseases.

Table 3 shows the variation in the perceptions concerning the specified health problems among various sub-groups of women. The groups who were more likely to give "correct" responses to the questions of risk of heart disease, included: less educated women or wives of less educated husbands working as farmers, high parity women and casual wage earners, particularly from the low-wealth status group and living in relatively less developed areas. Thus, there

is an inverse association between the correct knowledge and the level of modernity. This may reflect a generalized fear of ill effects from oral contraception, however, rather than real knowledge of genuine ill effects. This is a rather surprising finding. The higher percentage of women who believe the pill causes cancer also share similar attributes.

There are generally no significant differences between various sub-groups of women who think the pill causes birth defects. But the higher proportion of women who incorrectly believe pill use causes venereal disease and permanent sterility constitutes those who are less educated or are wives of less educated husbands. The data in **table 3** also show that women's age is not a significant factor affecting their perceptions.

The findings shown in **table 3** are based on bivariate relationships; they do not control for the joint effects of other relevant independent variables. Furthermore, they do not indicate the relative importance of each of the significantly related independent variables for each specified health problem. In order to achieve this, step-wise discriminant analysis was carried out. Discriminant analysis is a multivariate statistical technique for investigating the extent to which different population sub-groups diverge from one another or overlap on the basis of a given set of independent variables. The application of "step-wise" procedure identifies the relative importance of all the independent variables included in the analysis (Dillon and Goldstein, 1984). Included in the analysis were all those variables which were found statistically significant in the bivariate results (**table 3**). Furthermore, because of the small number of cases, the "don't know" category was excluded from the analysis.

Table 4 summarizes the results of the analysis. The ordinal numbers indicate the relative importance of the variables (1= most important, 2= second most important etc.). The last column indicates the percentage of cases correctly classified by the inclusion of the given number of variables referring to each health problem. It shows, for example, that the three independent variables, namely the respondent's education, her status of pill use and her husband's education, correctly classified or "predicted" in 59 per cent of all women in the study the correct vs. incorrect perception of pill use with regard to heart disease. The ordinal number one indicates that women's education is the most important discriminating factor of the three variables included. The number of variables included for each health problem in the table is based on the strength of the discriminating power of all the variables examined.

Women's education and their status of pill use are the two most powerfully and consistently related factors identifying the women who gave "yes" responses from those who gave "no" responses to each of the seven specified health problems (**table 4**). The results also show that when the effects of all the variables are considered simultaneously, neither the husband's education

Table 3: Per cent of women by their socio-economic and demographic characteristics who think pill-taking causes specific health problems

Characteristic	Heart disease	Stroke/paralysis	Weight gain	Cancer	Venereal disease	Permanent sterility	Birth defects	Number
Woman's age+								
15-24 years	36.6	15.2	17.2	29.4	11.0	17.2	32.9	435
25-34 years	38.0	15.9	16.8	31.9	9.4	16.6	31.2	1499
35-44 years	38.8	16.6	18.9	34.7	11.3	17.5	31.4	1 273
Parity								
0-2	35.8*	14.6	18.5	31.0*	10.7*	18.5	32.9	1042
3-4	36.9	15.9	17.0	31.4	9.0	15.4	30.4	1 362
5 or more	43.0	18.3	17.8	37.1	12.3	17.9	31.6	804
Woman's education								
None	49.6*	28.3*	25.0*	37.7*	14.8*	21.7*	35.7	244
1-5 years	46.3	22.0	20.0	36.2	14.1	20.0	33.1	1093
6-9 years	34.0	12.7	15.7	31.0	8.7	14.8	30.0	1051
10 or more years	29.0	9.0	15.1	28.5	6.3	14.5	30.1	820
Woman's work status								
Income earning								
Regular salaried	33.9*	15.4*	18.8	33.9	8.1*	18.5	34.9	298
Casual wage	51.1	25.1	17.8	35.1	16.6	17.2	33.5	331
Home based/cottage	36.3	14.2	16.4	31.4	7.1	12.8	33.2	226
No direct earning								
Domestic/farm	37.0	15.1	17.7	32.3	10.1	17.3	30.6	2 353
Husband's education*								
None	48.7*	24.4*	28.6*	37.0*	14.3*	20.2*	37.0	119
1-5 years	44.4	20.5	17.6	36.6	13.1	19.2	32.7	1035
6-9 years	36.2	13.7	16.5	29.9	9.1	14.3	29.3	1 216
10 or more years	31.9	12.8	18.2	31.1	8.5	17.7	33.0	810

Husband's occupation									
Farmer	40.9*	18.9*	19.1*	33.7	11.4*	16.5	30.0	1 142	
Labourer	41.6	18.5	13.5	32.4	14.7	16.4	32.8	238	
Non-agricultural labour, skilled	33.9	15.0	13.7	31.1	9.1	16.7	32.8	540	
Non-agricultural labour, unskilled	42.4	17.6	19.9	32.8	12.3	19.5	32.0	488	
Teacher/office worker	28.2	8.1	18.4	32.5	5.7	17.9	33.9	369	
Business	34.3	13.9	13.9	30.6	8.8	13.0	31.0	216	
Other	40.9	13.5	22.8	33.5	8.8	19.1	30.2	215	
Couple's wealth status									
Low	41.1	18.2*	18.5*	33.8*	11.3	17.2	31.3	1 922	
Medium	34.1	13.2	14.1	29.4	9.2	16.0	31.4	901	
High	32.5	12.5	22.3	34.8	8.3	18.7	33.0	385	
Couple's contraceptive use									
Traditional methods									
Ever used	37.1	15.0	18.1	34.3*	10.1	17.0	32.1	2 466	
Never used	39.5	16.4	16.6	27.4	11.3	17.1	29.5	742	
Modern methods									
Other than pill									
Ever used	40.6	17.2	18.5	33.7	11.5	16.7*	33.3	1 340	
Never used	39.8	18.5	19.2	36.0	12.3	20.3	35.0	1 244	
Pill									
Ever used	29.3*	9.0*	13.0*	23.9*	4.2*	11.4*	20.8*	624	
Never used	40.2	17.8	18.9	34.8	11.9	18.4	34.1	2 584	
Area1 development level ⁺									
Low	38.3*	14.8*	22.3*	33.6	9.1*	17.1	26.9	964	
Moderate	41.6	18.6	14.2	33.3	12.3	16.2	33.7	1 198	
High	34.0	14.4	17.5	31.1	9.3	18.0	33.3	1 045	
All	38.1	16.1	17.?	32.7	10.4	17.1	31.5	3 207	

*Notes: + = Case excluded because of incomplete information; ++ = 28 cases excluded because of incomplete information. Table excludes those women who have not heard of the pill (n=45) and 28 cases overall because of incomplete information.

Table 4: Summary results of the importance of independent variables for specific health problems

Health problems	Respondent's education	Pill use	Areal development	Husband's education	Husband's occupation	Respondent's work	Parity	Wealth status	Per cent correctly classified
Heart disease	1	2	-	3	-	-	-	-	59.2
Stroke	1	2	3	-	4	-	-	-	62.1
Weight gain	1	2	3	-	6	-	5	4	55.6
Cancer	2	1	-	-	-	-	3	-	54.8
Birth defects	3	1	2	-	-	5	4	-	52.5
Sexually transmitted diseases	1	2	3	-	4	-	-	-	58.3
Permanent sterility	2	1	-	-	-	-	3	4	53.6

Notes: - = Indicates the given variable was not found important in the Step-wise Discriminant Analysis. The results were obtained from the application of Step-wise Discriminant Analysis. The number shown indicates the order of importance of each variable included in the equation (1 = most discriminating factor; 2 = second most important, and so on). All the variables with ordinal numbers are significant ($p < 0.01$).

nor the respondent's work status remains a significant variable discriminating the sub-groups of women who have correct vs. incorrect perceptions. In other words, the effects of husband's education and respondent's work status are largely explained away by other more important variables already included in the analysis.

Development level of the area and parity are important in four out of seven specified health problems. The percentage of cases correctly classified ranges from 53 to 63, suggesting that the discriminatory power of the variables included in each model is fairly robust.

For the purpose of examining the perception of the risk of pill use compared with the risk of death due to childbearing, the women were also asked whether they think childbearing is safer than pill-taking. **Table 5** shows that one out of three women think that childbearing is safer than pill-taking. Most notably, this perception does not vary significantly across many sub-groups, except for women's work status, contraceptive use, couple's wealth status and the areal development level.

Women who work as casual wage earners are more likely to think that pregnancy is safer than pill-taking. Only a small percentage of pill users think that childbearing is safer. The associations with the wealth status and development level are less clear. This is probably because the percentages of women in different categories of these variables vary considerably. For example, as many as 10 per cent of the women who live in less developed areas are unsure about the relative safety of the pill. Only one out of four women in the more developed areas said childbearing was safer, while one out of three women in moderately developed areas thought so. These assessments may have reflected experience in the community. For example, a socio-economically better off area usually has lower maternal mortality than less developed areas and maternal mortality is relatively low in Sri Lanka. Because the women's knowledge about



The mortality rate is relatively low in Sri Lanka especially in socio-economically better off areas and this has an effect on childbearing.

Table 5: Socio-economic and demographic differentials in women's perception about whether taking the pill is safer than or less safe than childbearing

Characteristics	Per cent believing the pill to be				Number
	Less safe	Safer	Equally safe	Don't know	
Woman's age					
15-24 years	31.1	59.2	4.2	5.5	434
25-34 years	30.9	59.5	4.7	4.9	1 496
35-44 years	31.3	59.6	4.2	4.9	1 271
Parity					
0-2	31.9	57.0	4.9	6.2	1 039
3-4	30.0	61.2	4.0	4.8	1 359
5 or more	31.8	59.1	4.6	3.9	804
Woman's education					
None	21.2	63.0	3.1	6.1	243
1-5 years	32.1	56.7	4.9	5.7	1 092
6-9 years	30.2	61.0	3.9	4.9	1 048
10 or more years	31.2	60.2	4.6	4.0	819
Woman's work status*					
Income earning					
Regular salaried	37.5	56.1	4.1	2.3	296
Casual wage	38.4	58.0	3.0	0.6	331
Home based/cottage	34.7	57.8	4.0	3.5	225
No direct earning					
Domestic/farm	28.9	60.3	4.7	6.1	2350
Husband's education					
None	29.4	58.8	4.2	1.6	119
1-5 years	30.9	58.9	4.1	5.5	1 034
6-9 years	29.8	60.7	4.2	5.3	1 213
10 or more years	33.8	58.5	4.5	3.2	808
Husband's occupation					
Farmer	31.8	57.6	3.9	6.7	1 143
Labourer	35.7	51.6	3.8	2.9	238
Non-agricultural labour, skilled	28.1	62.6	4.8	4.5	538
Non-agricultural labour, unskilled	30.7	59.7	4.1	5.5	486
Teacher/office worker	31.8	60.6	4.1	3.5	368
Business	27.4	64.7	5.1	2.8	215
Other	32.7	56.1	7.5	3.1	214
Couple's wealth*					
Low	31.0	59.2	4.3	5.5	1 917
Medium	31.6	61.3	3.8	3.3	900
High	30.4	56.6	6.5	6.5	385

Table 5: (continued)

Characteristics	Per cent believing the pill to be				Number
	Less safe	Safer	Equally safe	Don't know	
Couple's contraceptive use					
Traditional methods*					
Ever used	31.4	60.5	4.2	3.9	2462
Never used	29.9	56.1	5.2	8.8	740
Modern methods					
Other than pill					
Ever used	31.7	59.0	4.3	5.0	1 337
Never used	34.4	54.6	4.6	6.4	1 243
Pill*					
Ever used	23.0	70.1	4.5	2.4	622
Never used	33.0	56.9	4.4	5.7	2 580
Areal development level					
Low	29.7	54.6	5.6	10.1	964
Moderate	35.8	58.9	3.0	2.3	1 197
High	27.0	64.6	4.9	3.5	1041
All	31.1	59.5	4.4	5.0	3 202

Notes: * = Differences among the categories are statistically significant ($p < .05$). This table excludes those women who have not heard of the pill ($n=44$) and 51 cases overall because of incomplete information. The number of cases for certain variables may not add to the total because of incomplete information.

the relative risk of childbearing and pill use vary little by their socio-economic and demographic characteristics, the multivariate analysis was considered unnecessary.

Discussion

This article has analyzed women's knowledge and attitudes about the potential health risks of oral contraceptives. Two-thirds of rural Sri Lankan women think that pill-taking has harmful effects on their health. One out of three women believe that the pill causes heart disease, cancer or birth defects.

One of the most surprising findings is that there is generally an inverse relationship between the modernity status of the women and their correct perceptions of the potential health risk of pill use with regard to cardiovascular disease and stroke.

A significantly higher proportion of women who are more educated or have more educated husbands, women who work in non-traditional sectors and live in relatively more advanced areas hold more incorrect views than their counterparts. In contrast, a higher percentage of less educated women incorrectly believe that the pill causes venereal disease, permanent sterility and birth defects.

Overall, the results showed that women's educational level and previous use of oral contraceptives are consistently and strongly associated with their knowledge and attitudes. This underscores the importance of investigating the perceptions about the pill among various sub-groups of women. However, there is very little difference in the proportion of women who express concern for actual pill risks and those who express concern for risks that have not been demonstrated by research. This suggests that "knowledge" of actual risks associated with oral contraceptive use is the result of a generalized and uninformed fear rather than informed opinion.

Those women who have used the pill appear less concerned with the potential risks of heart disease and stroke than those who have never used the pill. It could not be determined whether this lessened concern is due to education about the pill among ever-users or to a general lack of concern about health effects which would facilitate a woman's decision to initiate and continue pill use.

It must be noted that the way questions are asked of the respondents does affect the responses. It is also possible that some women in developing countries may not be aware of certain types of health "problems" specified in this as well as in other similar survey research.

More importantly, the perceptions of the potential health "risks" are influenced by cultural factors also. For instance, the potential effect of pill use on weight gain is not necessarily regarded as a "risk" in many developing countries; rather weight gain is often viewed positively. Similarly, in many countries, heart disease is not the serious public health problem it is in Western countries. Therefore, not all of the aspects of the data analyzed in this article may be of equal relevance and significance in every developing country.

Despite this limitation, the overall implications of the study's findings are clear: the prevalence of misinformation about the potential health risks of the pill is very high in Sri Lanka, a country where people are receptive to family planning programmes and where the educational attainment of women is considerably higher than in many other developing countries.

This study reinforces the critical need for IEC programmes to help to eliminate or minimize the prevailing misinformation.

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Magic and Myth of Migration: A Case Study of a Special Economic Zone in China*

Rapid economic and demographic growth propelled the tiny coastal town of Shenzhen (close to Hong Kong) into one of the most dynamic and modern-looking cities in China. Because population movement in China has long been heavily regulated, one may be puzzled by the question of how migration could play any major role in fostering Shenzhen's boom.

The migratory process contributing to Shenzhen's rapid development may be unique; however, its uniqueness can best be understood by analyzing it in the context of migration and the socio-economic development process.

Migration analyses tend to emphasize economic factors as motivating individuals to move from one place to another (Spengler and Myers, 1977).

Although examination of a specific case may not make a major contribution to the development and reformulation of theories of migration, it often

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carries some practical implications for interested policy makers, urban planners and development specialists, among others. Moreover, a well-executed case study enriches the loosely defined field of comparative urban research (Walton, 1976).

In contributing to that goal, this paper reviews an overall picture of the rapid economic and demographic growth in Shenzhen. Further, it examines the sources and mechanisms of migration, and characteristics of migrants to Shenzhen in order to clarify the relationship between rapid economic growth and its demographic consequences in China. It also briefly assesses the problems associated with migration to Shenzhen and how they may affect the city's future.

Growth explosion at China's frontier

The history of population movement towards frontier settlements has varied considerably globally in terms of goals, processes and outcomes among countries and regions. Economic and political considerations for both individuals and Governments have played different roles in the settlement, for example, of the western part of the United States of America, and Siberia in the Union of Soviet Socialist Republics.

Following a change in national leadership in the late 1970s China moved to rediscover its frontier with a set of new economic ideologies. To attract overseas capital and technology for internal economic growth, the Chinese Government in 1980 set up Special Economic Zones (Shenzhen, Zhuhai and Shantou in Guangdong province, and Xiamen in Fujian province) in four cities along its southern coast.

The Shenzhen special zone is the largest of the four Special Economic Zones (hereafter referred to as SEZs) and has experienced the most rapid economic and demographic growth. Its gross industrial output in 1979 rose from 4 million Chinese Yuan (\$US1 = 1.5 Yuan in 1979) the year before the SEZs were formally established, to 30 million Yuan in 1985. Revenue income for the Shenzhen SEZ reached 8.6 million Yuan in 1985, a 14-fold increase over 1979 (Huang, 1986). Shenzhen's population rose from about 30,000 in 1978 to nearly 350,000 in 1984 (*Shenzhen SEZ Yearbook*, 1985).

Although the policy of designating a special zone for growth has resulted in the intensive fusion of economic and demographic forces, the original rationale for setting up the SEZs was primarily economic. The SEZs are designed to play four "window" functions: (a) bringing in foreign capital and advanced technology, (b) absorbing scientific knowledge, (c) introducing modern management expertise, and (d) articulating China's foreign economic policy (Chen, 1986).

There was no clear evidence at the outset that Shenzhen would become a major national industrial growth pole, despite the fact that subsequent events demonstrate that it had the potential to become one. Shenzhen was too small to grow into a city of the industrial and economic magnitude and complexity that would enable it to compete with cities such as Shanghai and Tianjin. In fact, China decided in 1984 to establish Economic Development Zones (EDZs) in 14 cities along the coast. The initially greater size and stronger industrial capacity of those cities as compared with Shenzhen qualify them to be real growth centres (Chen, forthcoming) as instruments of national spatial policy.

It has turned out that Shenzhen represented an unconventional urbanization strategy. On the one hand, it did not have the basic economic and demographic structure to become a metropolis, even with special assistance from the State. On the other hand, Shenzhen's favourable location directly across from Hong Kong (see map) and population characteristics (X. Liang, 1984) were conducive to its growth into a sizeable city.

Map: Location of Shenzhen Special Economic Zone

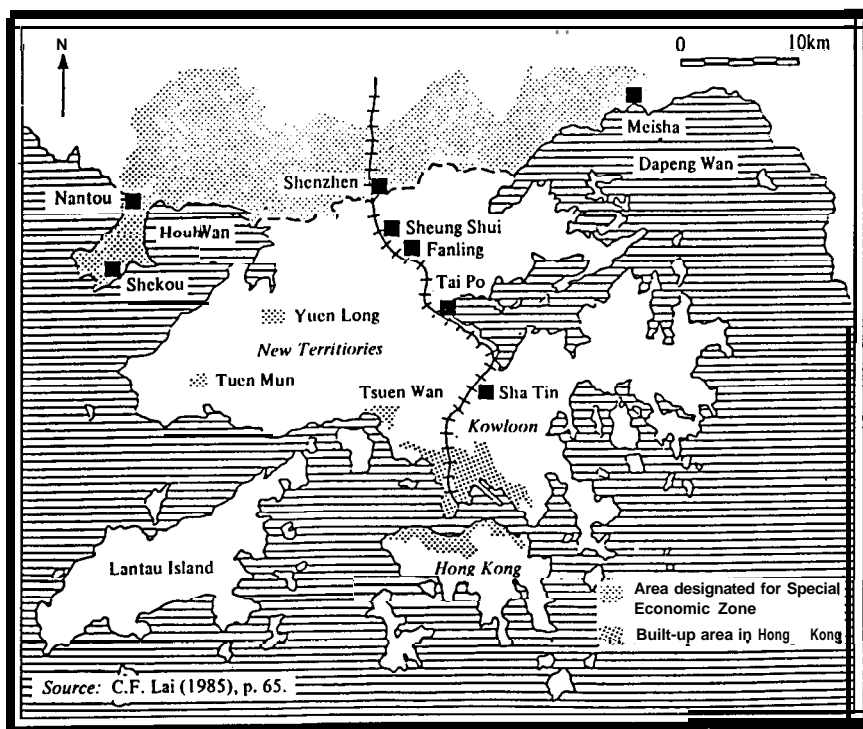


Table 1: Sources of capital investment in basic construction and development in Shenzhen, 1979-1984 (per cent)

Sources	1979	1980	1981	1982	1983	1984
Total investment (in \$US 1,000)	4 988	12 487	27 037	63 265	88 593	163 670
State revenue allocation	47.8	26.4	8.4	7.4	4.9	1.2
State ministries and provinces	24.5	10.5	9.0	9.2	7.8	9.2
Zone government investment	12.5	7.8	12.3	10.1	8.8	13.0
Bank loans	NA	5.6	11.7	32.3	37.9	44.1
Local enterprise investment	4.2	6.5	7.4	7.9	11.3	13.3
Interior enterprise investment	NA	NA	1.1	3.1	4.3	3.0
Foreign capital investment	11.0	43.2	50.1	30.0	24.9	16.2
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sources: Yang (1984), Table 1, p. 38; *Shenzhen Special Zone Yearbook* (1985), pp. 592-593.

The favourable characteristics of Shenzhen won the attention and support of China's central and provincial Governments in the form of flexible trade activities and tax benefits. The combination of institutional and monetary support from the State in turn has increased the attractiveness of Shenzhen's investment environment for foreign capital. The various sources of capital investment in the Shenzhen SEZ are shown in **table 1**.

These data are revealing. The State invested most of the capital to get development in Shenzhen off the ground, as shown by the combined 72.3 per cent of the first two categories (**rows 2 and 3**). The proportion of state investment declined to 10.4 per cent in 1984. Local investment from Shenzhen itself grew rapidly from 16.7 per cent (**rows 4, 5, and 6**) in 1979 to 70.4 per cent in 1984, although most of the money came from bank credits essentially controlled by the central Government. The proportion of foreign capital investment reached its peak in 1981 when state investment started to decrease sharply. This statistic may be misleading, however, for the absolute amount of capital investment in 1984 was almost double that in 1983. The rapid growth in bank loans accounted for a large share of this increase.

Heavy investment in basic construction and development, coupled with government publicity about the rising importance of the SEZs, have created a new image of Shenzhen as a "promising land". The demographic dimension of the general SEZ strategy began to be revealed. People living elsewhere were attracted to new job opportunities occurring in an environment consisting of favourable conditions: emerging economic prosperity, freer political atmosphere, warm climate and proximity to Hong Kong, just to mention a few. Thousands of people began to show interest in seeking new career and living opportunities in Shenzhen in response to some mechanisms used by the Government for facilitating population movement to the city. This resulted in an unprecedented form of migration of people from different parts of China to this southern city. Table 2 presents data on the rapid population growth of Shenzhen over a six-year span.

As **table 2** indicates, population in the Shenzhen SEZ rose sharply from 1979 through 1984, with a net increase of 120,500 (1.7 times) in six years. Shenzhen's small population base led to a limited number of births each year. Consequently, new population growth due to the rate of natural increase was less than 10 per cent annually averaging across the period covered by the data (row 9). In contrast, migration to the Shenzhen SEZ accounted for more than 90 per cent of the population growth except for 1981 (**row 10**). These percentages reflected the influx of at least 20,000 new inhabitants on average each year into an area of 327.5 sq. km. This rate was considerably higher than rates of rural migration to large cities (30-60 per cent) in several developing countries where migration flows largely have been unchecked (Yap, 1977).

Table 2: Total and working population growth in Shenzhen Special Economic Zone, 1979- 1984

Demographic features	1979	1980	1981	1982	1983	1984
A. Total population						
(1) Population (permanent)	70 900	84 100	98 300	128 600	165 000	191 400
(2) Male population	34 500	42 000	49 100	65 000	95 500	108 300
(3) Female population	36 400	42 100	49 200	63 600	69 500	83 100
(4) Sex ratio (2)/(3)	0.95:1	1.00:1	1.00:1	1.02:1	1.37:1	1.30:1
(5) Births per annum	1 524	1561	2 186	2 460	1 872	1 937
(6) Deaths per annum	360	338	412	412	414	414
(7) Net natural increase (5) - (6)	1 164	1 223	1 714	2 048	1 458	1 523
(8) Total net increase	-	13 200	14 200	30 300	36 400	26 400
(9) % net growth due to natural increase (7) / (8)	-	9.3%	12.5%	6.8%	4.0%	5.8%
(10) % net growth due to migration		90.7%	87.5%	93.2%	96.0%	94.2%
B. Working population						
(11) Total working population	23 300	26 500	38 500	66 800	107 600	154 500
(12) Net increase		3 200	12 000	28 300	40 800	46 900
(13) % population working (11) / (1)	32.9%	31.5%	39.2%	51.9%	65.2%	80.7%
(14) (12) / (8)		24.2%	84.5%	93.4%	112.1%	177.7%

Source: Calculated from *Shenzhen Statistical Yearbook* (1985) p. 581.

Another feature of table 2 is the increasing proportion of the population in the labour force from 1981 onward. The proportion of the population working (panel B, table 2) increased rapidly from 32.9 per cent in 1979 to 80.7 per cent in 1984. The largest net increase of working population relative to increases in the total population occurred in 1983 and 1984 (rows 12 and 14).

Two parallel processes seemed to have been operating. First, the data indicate that an increasing proportion of the migrants were job holders. Second, the data suggest a growing number of available employment opportunities for the population as a whole. The nature of the jobs for migrants and local residents may be seen from the differences in the increases in the numbers of males and females, with the former increasingly outnumbering the latter (rows 2 and 3, table 2). (Differences in the distributions of men and women across industrial sectors are elaborated upon later in the paper).

Data in table 2 concern only Shenzhen's permanent population, residents who are formally registered with the Security Bureau of Shenzhen SEZ municipal government. Temporary residents (those holding a "temporary residence card") have also grown rapidly. These include (a) mobile construction workers from other provinces and regions, (b) employees from the interior holding a rotational job in their work units' new office or factory in Shenzhen, and (c) peasants from neighbouring counties and regions within Guangdong province coming in to sell fresh produce on the local free farm markets.

Although data on the distributions of these subgroups in the temporary population are not available, scattered statistics show that the first group (construction workers) makes up the largest share because of the sustained tempo and increasing scale of land development and building construction in the last few years. In 1979, Shenzhen had only one construction company and it employed only 500 workers. The number of such workers grew rapidly to 30,000 in 1981, 70,000 in 1982, 94,000 in 1983, and 104,330 in 1984. Coming from 40 counties and 21 cities in nine provinces, these workers signed construction contracts with the zone government and came to work and stay for the period needed to complete the project. In 1984, mobile construction workers constituted 71.4 per cent of the 146,100 temporary residents in Shenzhen (*Shenzhen SEZ Yearbook*, 1985).

An attractive yet uncertain destination

The data have indicated that more than 90 per cent of Shenzhen's net population growth was due to migration; also that the critical question concerns the factors that motivated over 100,000 people, many of whom were established professionals in big cities, to move to a small, unfamiliar and still

largely underdeveloped town. The question is even more intriguing for China, because, other things being equal, there is a lower propensity to migrate in a socialist than in a capitalist society, owing to a greater degree of equality of incomes, the maintenance of full employment and extensive social services, and relatively more equal distribution of social infrastructure and facilities throughout the country (Fallenbuchl, 1977).

A long-standing anti-urban tradition rooted in predominantly agricultural China, reinforced by the State's rigid registration system, tends to strengthen the idea that migration on a massive scale is rarely likely, except in instances such as the rustication movement during the Cultural Revolution (Simmons, 1981; Goldstein, 1985). This study of population movement to Shenzhen provides some basis for countering the hypothesis that migration tendency is low in socialist countries by applying a modified "push-pull approach" to the situation.

What does Shenzhen offer? Most studies of migrant behaviour in market economies are concerned primarily with the "pull" factors at the destination and "push" forces at the origin (Bogue, 1977). Experts tend to focus on how sensitive and reactive migrants are to economic opportunities (e.g., higher wages, better jobs) which affect individual decisions to move. (Todaro, 1969; Yap, 1977). In essence, most discussions of migration, especially internal migration, suggest an explicit or implicit rationality underlying decisions to move. Insufficient attention has been paid to non-economic State-mediated, and environmentally unique factors that are not of central importance in push-pull terms but that may operate under non-market or quasi-market conditions.

The analysis of Shenzhen's experience calls for a sensitive treatment of these variables within the basic push-pull framework. As a general background, **table 3** (on pages 10-11) shows the socio-economic characteristics of the Shenzhen SEZ compared with the country as a whole and 16 large cities.

Table 3 contains information on several measures of industrial capacity and the standard of living in Shenzhen, information for 1980 (the first year of Shenzhen's status as an SEZ), 1982 and 1984, and both the national average and urban districts of 16 very large Chinese cities (with populations of 2 million or more) in 1982, the only year for which those data are available. (For an analysis of China's very large cities, see Chen, in press).

The data suggest several general features of Shenzhen. Despite its newness, Shenzhen already was more crowded than the country as a whole, although it compared favourably with the much larger established cities (row 1) Shenzhen had an increasingly stronger industrial capacity on a per capita basis, exceeding that of the 16 large cities (**rows 3 and 4**).

Shenzhen seemed to offer more amenities and social infrastructure than the 16 cities, which, in turn, were better than the national average, with few exceptions. Particularly noteworthy are housing, transportation, retail service and purchasing capacity. Shenzhen's residents enjoyed much more living space (row 8) almost approaching the spacious living of the countryside, i.e. 13.4 sq. metres per person in 1982 according to a national sample survey (China Statistical Yearbook, 1983). Per capita access to public buses in Shenzhen was double that for the 16 cities (row 7). The average wage in Shenzhen was about 2.5 times higher than elsewhere and Shenzhen's prices were largely market-driven rather than State-regulated.

With respect to the availability of recreational, educational and medical facilities, the data suggest that Shenzhen generally has lagged behind the 16 cities though, on average, it was more developed in these respects than the country as a whole. Despite its brief existence, Shenzhen has closed the gap between it and the 16-city average considerably since 1982, especially with respect to cultural and health services. For example, Shenzhen's residents' access to hospital beds and doctors in 1984 surpassed that of the 16 cities (rows 17 and 18), despite its rapid population growth between 1982 and 1984. For a young city, its educational system grew rapidly. In 1980, there were only seven high schools and one vocational school in the Shenzhen SEZ; by 1984 there were 14 and seven, respectively. There was no institution of higher education prior to 1983. In that year it took only seven months to complete a campus of 58,000 sq. metres for the new Shenzhen University, and its enrolment exceeded 1,000 in less than a year (Shenzhen SEZ Yearbook, 1985).

Despite this phenomenal growth, Shenzhen has yet to become "a Chinese land of milk and honey." Nonetheless, it has developed a variety of strong pull characteristics in its appealing image, new environment, relative prosperity and unique position in the Chinese system of cities. The appealing image has developed directly as a consequence of Shenzhen's having been designated as an SEZ. More than an eye-catching label, Shenzhen SEZ was granted greater autonomy than had ever been given to any other area in China, having been allowed to engage in various forms of direct co-operation with advanced capitalist countries, to rely primarily on market mechanisms, and to experiment with new ways of organizing economic and social activities with limited interference from higher authorities. To potential migrants, this created an atmosphere that is less politicized, freer of bureaucratic constraints and replete with more varied economic opportunities. Shenzhen offers a more appealing prospect to outsiders, particularly when contrasted to the constraints that exist in other Chinese urban places.

Among the benefits of Shenzhen's location are (a) its proximity to Hong Kong, (b) its abundant entrepôt trade, and (c) its more direct contact

Table 3: Socio-economic characteristics of Shenzhen in comparison with the national average and sixteen large cities (urban district), 1980-1984

Characteristics	National average	16 large cities	Shenzhen Special Zone	
	(1982) ^a	(1982) ^a	(1980) ^b	(1984) ^b
(1) Population density (per sq. km.)	106.00	3 518.00	256.79	392.67
(2) Natural increase rate (%)	1.40	2.13	1.58	1.80
(3) Industrial enterprises per 10,000 population	3.83	7.18	28.66	25.27
(4) Total industrial output per capita (in Chinese Yuan)	542.24	2 735.79	1 004.04	2 815.86
(5) Farmland per capita (acres)	0.25	0.05	0.12	0.05
(6) Grain output per capita (pounds)	626.52	157.51	364.65	175.86
(7) Public buses per 10,000 population	N A	3.87	N A	6.84 ('83)
(8) Living space per capita (sq.m.)	5.60	3.47 [#]	N A	10.80 ('83)
				11.80

(9) Consumption sales per capita (in Chinese Yuan)	214.84	706.67	1 359.69	3 430.33	9 139.39
(10) % labour force employed in retail services	11.06	4.94	12.25	20.20	22.70
(11) Cinemas per 100,000 population	14.15	14.30	13.08	29.55	34.48
(12) Public libraries per 100,000 population	0.19	0.23	1.19	0.78	0.52
(13) College students per 10,000 population	11.36	122.64	NA	13.09	(*83) 36.00
(14) Vocational schools per 100,000 population	0.03	14.39	1.19	3.89	3.66
(15) High schools per 100,000 population	0.21	7.65	8.32	7.78	7.31
(16) Hospitals per 10,000 population	0.65	5.20	0.95	0.70	0.57
(17) Hospital beds per 10,000 population	20.30	52.42	30.20	28.54	59.72
(18) Doctors per 10,000 population	12.90	46.21	29.49	38.26	61.65

Note: # This measure is living space per capita completed by the year-end, rather than the living space in use.

Sources: a. Adapted from Chen (in press, table 3).

b. Calculated from *Shenzhen Statistical Yearbook* (1985), pp. 581, 582, 583, 585, 587, 601, 606, 611, 612, 613 and 614.

with Western cultural and economic influence, especially through Hong Kong television programmes. Direct trade with Hong Kong has enriched and diversified Shenzhen's supply of consumer goods as a port of entry (Molotch and Logan, 1985). Although some of these goods are expensive and can only be bought cheaper with Hong Kong dollars, they are at least more accessible to its residents compared with cities in the interior of China.

Shenzhen has benefited from some degree of overall planning for use of space, housing and a range of social and economic activities (Campbell, 1976). In response to the strip shape of the Zone, planners designed and implemented a blueprint that divided the Shenzhen SEZ into multiple modules. Each module is an integrated district, containing a rational allocation of different functional zones, industrial and residential alike, and is separated from its neighbours by rivers, orchards, or green-belts to enhance environmental quality (*Shenzhen SEZ Yearbook*, 1985). The availability of open land has enabled the construction of spacious housing blocks of various designs and heights. In 1979, there was only one building as high as five stories; by 1986, in addition to hundreds of smaller buildings, 129 highrises of 18 stories or more either were in use or under construction. Plentiful space and pleasant external environment have made Shenzhen one of the most livable cities on China's southern coast. This attribute is particularly attractive to people who are tired of crowded living quarters, polluted air and the inefficient services of the large cities in the interior (Chen, in press).

While the benefits comprise alluring attractions, there are potential costs involved for people who move to Shenzhen; these can be grouped into three general categories. For many potential migrants, Shenzhen represents a new and unpredictable place. Since people in China traditionally rely heavily on long-term relationships, and established personal and community networks, Shenzhen's fluid structure and rapid growth require difficult adaptations for newcomers. The loss of close contacts with old friends and colleagues is likely to generate feelings of lack of status and being lost among migrants in Shenzhen. Knowing that the Shenzhen SEZ is experimental and subject to policy adjustments that can easily reduce or remove its current benefits, potential migrants are concerned about the possibility of getting stuck in a strange place that ultimately can turn out to be worse than their places of origin.

Closely related to these potential costs are what may be called "counter-pull factors" in the hometowns of potential migrants, especially those living in big cities. Places such as Beijing or Shanghai offer an established pattern of life, closeness to family and friends and a sufficient diversity of recreational facilities and consumer goods. Owing to factors such as inefficient transportation and absence of extended annual holidays (except for those whose relocation separates them from spouses or parents), relocation to Shenzhen can create several

inconveniences for those who wish to visit their places of origin. Moreover, since household registration with a big city (especially Beijing and Shanghai) is a major privilege, people are very reluctant to move to a smaller place. In fact, many people find ways of keeping their registrations in such cities while moving to Shenzhen on “temporary residence cards”.

The third type of cost arises from the fact that Shenzhen’s benefits are uneven. For example, some of those already in Shenzhen feel that they have lost continuity in their professional development due to the lack of research facilities, though they are satisfied with a higher salary. Some are worried about the highly limited local opportunities for university education for their children, though they may be happy with their new careers in Shenzhen. Some have chosen to move to Shenzhen for its benefits because they could not secure a similar job in places such as Beijing and Shanghai which would offer them a more comprehensive package of benefits.

Volume, sources and processes of migration

In view of the fact that there are both costs and benefits associated with moving to Shenzhen, several questions arise: (a) How many migrants reside in Shenzhen? (b) Where have they come from? (c) What are the mechanisms through which they have moved to Shenzhen?

Unfortunately, data on the volume of migration are scant even though it is known that over 90 per cent of the net population increase has been accounted for by migration. Scattered statistics, however, can help in piecing together the approximate numbers of different types of migrants and the means by which they have entered Shenzhen.

Because the SEZs were set up primarily for agencies involved in foreign trade and factories with overseas capital and equipment, there was an overriding need for two broad categories of work force from outside the SEZs - professionals (cadres, technicians etc.) and manual workers - who had to be supplied from outside.

There are several channels through which professionals may move to Shenzhen. In a sense, these are innovations in China’s traditional personnel system which transfers professionals from one place to another primarily by assignment. The first of these new mechanisms was called “transfer through consultation and selection”. From 1981 on, personnel officials of the Shenzhen municipal government developed a list of positions to be filled every year. Then a crew of recruiters would travel to different parts of the interior to identify appropriate candidates through recommendations by connections. The candidates were approached about transferring to a new job in Shenzhen.

Once the candidates agreed to move, Shenzhen SEZ's personnel agency would work out the transfer procedures with the candidates' work unit. However the numbers of people who were recruited in this manner have been relatively small (S. Fang, 1984).

In 1982, a more innovative and effective method, which was termed "recruitment through examinations and invitations", was introduced. Recruiting teams from Shenzhen were sent to large cities such as Beijing, Shanghai, Tianjin, Wuhan, Nanjing, Xi'an, and to other places in Guangdong province. Job positions were advertised openly in those cities' newspapers. The applicants were given tests on their field of specialization by qualified professionals. Those who passed were made offers which included promises of spacious housing and, sometimes, a position for a spouse. Those who accepted offers were assisted in moving to Shenzhen without interference from the recruit's prior work unit (*Shenzhen Personnel Bureau*, 1984). A greater number of professionals was brought to Shenzhen in this fashion, while a few eminent scholars and movie stars came to Shenzhen at special invitations and for lucrative offers.

Still another way of bringing needed professionals to Shenzhen is "borrowing and offering joint appointment." Hiring firms in Shenzhen sign contracts with counterparts in the interior to bring some people to work for a specified period of time. Joint appointments have been commonly utilized by academic institutions in Shenzhen. The professionals who have moved to Shenzhen in this way live there on "temporary residence cards". Thus, they belong to the city's non-permanent population.

These State-mediated inducements have been used to sustain an open door for in-migration of professionals for the last few years. In 1978 (before the SEZ was set up), there were only 6,466 professionals in Shenzhen. In 1984, the number reached 26,767, a net increase of 20,301.

Sources and processes for recruiting manual workers to Shenzhen differ from those developed for professionals. Moreover, a considerably larger number of manual labourers was needed to staff the newly established industrial plants and service organizations. While there is no comprehensive information on the places of origin of professionals, a sample survey by Guangdong Social and Economic Development Studies Center (hereafter abbreviated to GSEDSC) provided those data for recruited workers (**table 4**).

In contrast with the professionals, most of whom came from big cities in the interior, the majority of manual workers came from smaller places within Guangdong province (84.9 per cent). Although this reinforces the provincial flavour of the SEZ, the primary reasons for recruiting from these areas were to save the costs of long-distance moving and to avoid problems in migrants'

Table 4: Places of origin of manual workers in Shenzhen special zone, 1985

Place of origin (Province, region, city or county)	Percentage
Guangdong	
Guangzhou (Canton)	7.15
Shenzhen	5.14
Baoan	13.16
Shaoguan City (including suburban counties)	3.57
Zhuhai City (")	2.32
Shantou City (")	10.81
Fuoshan City (")	3.14
Jiangmen City (")	3.83
Zhanjiang City (")	1.92
Maoming City (")	2.53
Hainan Island	1.48
Meixian Region	8.28
Huiyang Region	18.83
Zhaoqing Region	2.79
Beijing	2.40
Sichuan	2.20
Henan	1.70
Other places	7.53
No response	1.22
Total	100.

Source: Adapted from "A report on the preliminary analyses of the questionnaires distributed among the SEZ workers." Guangdong Social and Economic Development Studies Center. August 1985, p. 19.

adaptation to the local culture. All the places of origin listed under Guangdong are not far from Shenzhen. It should also be noted that Baoan, of which Shenzhen was the county seat before the SEZ was set up, supplied the second largest proportion of workers (13.2 per cent).

Workers entered Shenzhen in three ways and, thus, contributed differently to the city's overall population. One category includes permanent employees who have been transferred from a State-owned enterprise outside Shenzhen to a receiving unit in the city. Workers coming through this more traditional channel tend to have their home residence in big cities and distant provinces, and end up in State-owned enterprises in Shenzhen SEZ.

Another category encompasses "contractual workers" who have been recruited through an innovative employment mechanism introduced in 1983. An employer in Shenzhen wanting to hire contractual workers submits a plan to the Zone's labour department for approval, which then allows the employer to recruit in designated areas outside Shenzhen. These workers have to apply and pass tests on basic reading ability and technical skills before they are hired on probation for six months. They are not permitted to move their formal registrations from their places of origin. Those who have met the qualifications at the end of the trial period are given a contract, which usually lasts from three to five years, while those who have not qualified or are unwilling to sign a contract must return home.

The other category includes temporary and seasonal workers who are hired to work and live in Shenzhen on "temporary residence cards". Although the need for such workers varies from firm to firm and time to time, their employment is subject to approval by the Zone's labour department. Almost all construction workers fall into this category. The combination of second and third groups already includes half of the work force in Shenzhen (50.5 per cent).

Manual workers have entered Shenzhen in the following proportions: (a) transfer and assignment (49.1 per cent), (b) direct recruitment by factories (21.1 per cent), (c) introduction by friends and relatives (20.8 per cent), (d) private consulting (1.7 per cent), newspaper advertisement (0.3 per cent), and others (7.0 per cent) (GSEDSC, 1985). The migration of permanent workers in State-owned enterprises has speeded the net increase of permanent population in Shenzhen. So did the majority of contractual workers who are usually employed by Sino-foreign joint ventures, though a certain percentage of them is counted with the temporary population while on probation. The rapid growth of the temporary population in Shenzhen has been fueled primarily by the influx of temporary and seasonal workers.

After migration

Since workers in Shenzhen primarily are settled and temporary migrants, it would be interesting to know how the labour force is distributed and how incoming migrants have fared.

In 1985, workers in electronics (48.7 per cent) constituted almost half of the total labour force, with the garment industry being a distant second (11.7 per cent). This clearly reflects Shenzhen SEZ's stated priorities in developing electronics and textile industries to compete in the international market. In fact, close to 70 per cent of the Zone's total industrial output in 1984 was contributed by the electronics industry.



The manufacture of electronics and precision instruments in Shenzhen is carried out by relatively young people, mostly women.

Second, Shenzhen's labour force was young, especially those workers in such new industries as electronics, textiles and precision instruments, while the average age of workers in older and traditional industries (e.g., chemicals, construction materials) was higher.

Female workers in Shenzhen tended to concentrate in the electronics and garment industries, whereas male workers far outnumbered females in industries such as chemicals and construction materials, reflecting the differential physical demands of these industries.

Total income of Shenzhen workers varies a great deal across industries and is 2.0 to 2.5 times higher on average than that outside the Zone. The educational level of the labour force, however, is quite low.

Problems and prospects

Thanks to heavy investment from the State and the encouragement of migration, Shenzhen seems to have been built almost overnight. Such explosive demographic growth in one restricted area has no parallel in China's recent history.

However, this growth has been substantially initiated and regulated by the Chinese Government at both the national and provincial levels. Such "intentional external facilitation" has complicated in many ways the relationship between voluntary individual migration based on rational calculation and the strong draw of economic forces. This paper has revealed some of the complexities and myths concerning migration to Shenzhen. The lack of more specific data, however, has limited the analysis.

The large volume of migrant population to Shenzhen has provided a badly needed labour force for industrial development in Shenzhen. Of all the professionals in Shenzhen today, 97 per cent came from the interior, while 92 per cent of the manual work force entered Shenzhen from the same source (S. Fang, 1985).

Has the experience of Shenzhen suggested that China should remove or at least considerably loosen its control over population movement and let people move where they are most needed (M. Fang, 1986)?

The answer may be "no" as there have already been serious concerns about the problems associated with a strong demographic response to a booming city-based economy. Population growth in Shenzhen tends to run ahead of the new and fledgling infrastructure in the city. For example, the shortage of public toilets caused a series of complaints which made the headlines of the local newspaper.

The living conditions of a growing temporary population in Shenzhen are another concern. For example, many construction workers live in wooden shacks that lack convenient facilities. Shenzhen's rising trade and consumption fervour also has attracted a large number of businessmen, some of whom have taken advantage of the SEZ's flexible policies to engage in smuggling and illegal trading practices (*Shenzhen Tequ Buo*, 29 December, 1985).

A major effort to impose population regulation and control began early in 1986, aiming to disperse and keep away from Shenzhen illegal residents without "temporary residence cards". A "control" line (a wire fence stretching 84 km and an 86.2-km patrol road) was put into use on 1 April 1986. Although the State intended the line to prevent smuggling and illegal economic activities, it serves to check and stop people trying to come in without visas and identification cards (Zhu, 1986).

Shenzhen SEZ's long-term plan allows its population to grow only to 450,000 by 1990 and to 800,000 by 2000 (Shenzhen *SEZ Yearbook*, 1985). This implies an annual growth rate of 15.3 per cent to 1990 and 5.9 per cent to 2000 (calculating on the basis of 450,000 in 1990).

The rationale behind this planned population growth, similar to the con-

ception of optimal city size (Richardson, 1981), is that Shenzhen's economic system, dynamic as it is, is capable of supporting only a finite population. It is understandable that critics are concerned about Shenzhen degenerating from a "gold town" to a "ghost town" (Chang, 1985) if unchecked population inflow and an overheated economy eventually exhaust all the "gold."

However, Shenzhen's attractive image has been created and will persist for some time. Its relatively higher wages are perhaps the strongest magnet, in contrast to the enterprise zones in many developed and developing countries where concessive wages are prevalent (Goldsmith, 1984). For example, joint venture companies and wholly owned foreign subsidiaries in Shenzhen SEZ offer higher pay to young female workers on their assembly lines than they can possibly get at home. Yet the contractual employment structure which is becoming prevalent in Shenzhen offers only limited security. More importantly, Shenzhen residents and those who may be thinking of moving to Shenzhen may be concerned about the long-term security and stability of the SEZ policy itself. This cloud of concern and doubt may well dim the promise that Shenzhen SEZ has shown thus far.

The creation of the SEZs in China has attracted a lot of international attention. Japanese businessmen who have visited the SEZs suggested that they could become key connecting points along the western "Pacific rim" which is emerging as the central focus of world economic growth in the 1980s. Hong Kong industrialists regard Shenzhen as a "barometer" of their confidence in China's open-door economic policy.

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Committee on Population

Human resources development and the implications of the changing age structure in the Asian and Pacific region were among the major issues covered at the fifth session of the ESCAP Committee on Population during its meeting at Bangkok from 17 to 21 August 1987.

The Committee recognized that further reductions in the population growth rates of countries in the region would require appropriate policy interventions and stronger political commitment. Also, since aging of the population is a phenomenon which every country of the region will ultimately experience, the Committee emphasized that greater attention should be paid to the issue, particularly to such aspects as how the aged segment of the population could make active contributions to society.

Many other issues were covered during the five-day meeting. These included morbidity and mortality, fertility and family planning, people's participation, the role of women in population and development programmes, policy formulation, the role of information, education and communication in population programmes, and the role of the private sector and non-governmental organizations in population as well as strategies for the integration of population and development and the relationship between rural development and urbanization.

The Committee, in recognizing the important role of technical co-operation among developing countries (TCDC), considered the training of population programme personnel through bilateral exchanges and other co-operative means among countries of the region. It also considered the monitoring and evaluation of population programmes, and reviewed the World Population Plan of Action and Implementation of the Recommendations of the Asia-Pacific Call for Action on Population and Development.

Islam and Family Planning

The world's 1.2 billion Muslims comprise about 20 per cent of the total population of the world. The majority of Muslim populations have high fertility rates coupled with high infant, child and maternal mortality, and low rates of life expectancy. As a result, close to 50 per cent are below 15 years of age. In economic terms, this means a very high dependency ratio.

In Muslim populations, literacy is very low and is biased towards males. Early marriage is almost universal and population growth in most Muslim countries is much faster than economic growth, thus making it extremely difficult for Governments to improve living standards.

The United Nations Fund for Population Activities (UNFPA) and other donors have supported national population programmes in most Muslim countries, but although they show some progress, they have not had sufficient impact to curb fertility and mortality and create a balance between population growth and developmental resources.

For this reason, among others, UNFPA in December 1983 organized a meeting of Muslim scholars at Jakarta at which the participants pledged to support Muslim populations. With the support of UNFPA, the World Association of Muslim Scholars on Development, Health and Population was subsequently established to provide technical assistance to help Muslim societies confront their population-related problems.

Furthermore, Dr. Nafis Sadik, Executive Director of UNFPA, thought that national population programmes, which usually include projects in the

areas of women's concerns and information, education and communication, could be enriched by including the Islamic point of view on such issues as status of women in society, family formation, and the bearing, rearing and development of children, including breastfeeding, childspacing, health and literacy. Her thinking was based on the fact that the daily actions of all Muslims are centred on Islamic teachings, which mandate that each and every Muslim should aspire to excellence. Study of the sacred Islamic texts shows that much attention is given to the status and welfare of women, children and the family. Literacy and health are mandated and harmony with the environment and nature is stressed.

Thus, UNFPA, in consultation with Al-Azhar University in Cairo (where UNFPA has provided technical assistance to the Population Studies Centre) and with Muslim scholars, commissioned a reference book on the legacy of Islam in family planning. This book, which documents the views of Islam, supported by quotations from *Al-Qura'an*, *Sunna* and *Fatwa* (judgments) scriptures, is intended as a basis for the design of information, education and communication programmes in Muslim countries. A distinguished group of Muslim scholars from Asia, Africa and the Middle East met at New York in April 1987 and made some recommendations to strengthen the text; they concluded with an overall endorsement. The book, with a foreword by His Eminence the Grand Sheikh of Al-Azhar, will be published before the end of the year.



An Afghani boy learns the word for "grandmother" directly and an appreciation for prayer indirectly through the picture illustrating the Farsi word. Islamic principles pervade all aspects of life in most Muslim societies.