

The Effects of Migration on the Population Distribution in Hong Kong

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In this article a component method is used to examine the effects of migration on population projection in Hong Kong. We assume no migration and use the reported fertility and mortality patterns to simulate the population distribution for the period 1998-2016. It is shown that the ageing phenomenon would be serious if there was no migration. In 1996, the elderly dependency ratio would have been 153 per 1,000 population aged between 15 and 64, as compared with 141 as observed. Similarly, the elderly dependency ratio in 2016 would be 216 as projected instead of 184 estimated on the basis of existing immigration policy. The median age was estimated to be 45 years of age. Possible effects of ageing are discussed.

Introduction

Hong Kong, a former British colony located on the southeast coast of China, has been reverted to Chinese rule since July 1, 1997, as a Special Administrative Region of China. The territory had a population of 6.8 million in 1999 with a density of about 17,000 people per square mile. Hong Kong's population is 98 per cent Chinese. Among them, nearly 50 per cent were born in Mainland China. Migration from China has been a very important element of population growth in Hong Kong in the past. In the Court of Final Appeal ruling in January 1999 on the right of abode of Mainland Chinese children of Hong Kong residents, it was estimated that there were 1.67 million people who would have the right of abode in Hong Kong in the next ten years. The Hong Kong Special Administrative Region government believes that Hong Kong would not be able to absorb the huge

influx of Chinese immigrants and is seeking the National People's Congress in China to overturn the Court of Final Appeal's ruling by reinterpreting Article 24 in the *Basic Law*, the new constitution of Hong Kong since 1997. This has led to widespread concern in the community that Hong Kong might be compromising the independence of its judiciary and hence its autonomy vis-a-vis China. In this paper we would like to examine the effects of migration on the population distribution in Hong Kong to provide another view on the migration issue. Our emphasize is on the effects of migration on the ageing phenomenon in the territory.

Population ageing has been viewed as an important social issue. It has implications for the labour force (Spengler, 1978; Campbell, 1980; Bluestone, Montgomery & Owen, 1990), aggregate expenditure for goods and services (Epenshade & Serow, 1978), mental health (Riley, Hess & Bond, 1983; Yip & Tan, 1998), demand for long-term care (Yip et al., 1998; Rivlin & Wiener, 1988). The median age of Hong Kong's population in 1998 was 35; the territory can be classified as an "old" society. The fertility rate in Hong Kong is expected to remain low and the mortality rate is likely to improve. The latest population projections show that Hong Kong's population will continue to age (Census and Statistics Department, 1997). The median age is expected to rise to 41 in the year 2016.

Population growth and the changing age composition in Hong Kong stem from four sources - fertility, mortality, immigration and emigration. The total fertility rate decreased drastically from 3.35 live births per woman in 1971 to 1.15 live births in 1996, which is one of the lowest in the world. Improvement in health led to a decrease in mortality rate and life expectancy increased from 70 in 1976 to 76 in 1996 for men. The corresponding figures for women were 76 and 82 respectively. The population grew from 5.2 million in 1981 to 6.3 million in 1996 at an average rate of 1.3 per cent of growth each year. The significant factor contributing to population growth during the period 1981-1996 was immigration from China. While still under British rule, the government made an agreement with China to the effect that a fixed number of Chinese immigrants were allowed to reside in Hong Kong (*Hong Kong Annual Report*, 1981-1984). The daily quota was increased from 75 in 1983 to 105 in 1993 and

then to 150 in 1995. There have been around 50,000 to 60,000 immigrants arriving in Hong Kong every year since 1995. The yearly new arrivals from China represent about 1 per cent of the total population. During the years 1981-1996 there were 549,300 Chinese immigrants who made up about half the size of population increase in that period. The relative contribution of natural increase (that is, the difference between the number of births and deaths) to population growth has decreased substantially since 1993. Due to poor economic conditions in the west there were ex-Hong Kong residents returning from overseas which has become another important element in the growth of the population since 1993.

Migration does not only increase the population size but also affects the population's age distribution. Wu (1991) showed that the decline in fertility rates had a more pronounced effect on the pace of ageing than the decline in mortality. Also, Espenshade (1994) suggested that net immigration had only a limited effect in slowing down the ageing trends of the population in the United States of America. Here we shall try to assess the possible effects of migration on Hong Kong's population. Specifically, we shall examine: (1) what would happen to Hong Kong's population distribution especially in terms of ageing, if there were no migration in the period 1981-1996; (2) what would the population age distribution be like in twenty years as from 1996 if there were no migration.

Methods and Data

A component method is used to project the population size and age distribution. The basic principle of the component method is that the number of persons of a given age and gender who will be alive in the population in any year is the number in the population one year earlier and one year younger, less any deaths during the year and plus or minus any migrants. There are three factors to be considered in the component method, which are fertility rate, mortality rate, net gain/loss in migration. Since the study aims to assess the impact of migration on Hong Kong's age distribution, a simulation of the population in the period 1981-1996 is computed under a no-migration assumption. The 1981 population distribution is used as the base and the

population is simulated on the basis of reported fertility and mortality patterns. The method of the simulation exercise is outlined in Annex I (see also Pollard et al., 1990).

For estimates of births in each five-year period (1981-1985, 1986-1990 and 1991-1996) of the study, the average age-specific fertility rates for the respective periods are used. For estimates of deaths, survival ratios derived from life tables based on the age-specific mortality rates in 1981, 1986 and 1991 are used. This assumes that mortality at the beginning of each five-year period, that is, 1981-1986, 1986-1991 and 1991-1996, would remain unchanged throughout the period. The number of births and deaths for each five-year period can be calculated by applying the estimated fertility rates and survival ratios to the population at risk in the respective period. The simulated age-gender population distribution under a no-migration assumption can then be determined. The observed population distribution is compared with the simulated population distribution in 1996. Similarly, the observed 1996 population distribution is used as the base to make projections for the period 2001-2016. The future mortality and fertility patterns are taken from the Hong Kong population projections (Census and Statistics Department, 1997). The total fertility rate assumed in the official projections would rise from 1.15 live births per woman in 1996 to 1.55 per woman in 2016 and the mortality rate would decrease further. The projected life expectancies for males and females in 2016 are 78 and 83 respectively.

Results

Figure 1 shows the simulated population (with no migration since 1981) and observed population pyramids in 1996. A higher proportion of the elderly and a lower proportion of children can be found in the simulated population than in the observed population. On the other hand, a significantly higher proportion of women of age 25-39 is found in the observed population.

Table 1 gives the age-gender distribution of the simulated and the observed population. The net gain in migration over the period 1981-1996 is found to be in the order of 554,396. One quarter of these immigrants fell in the age group under 15 and another half in

Figure 1
Population Pyramid of Simulated and Observed Population of Hong Kong 1996

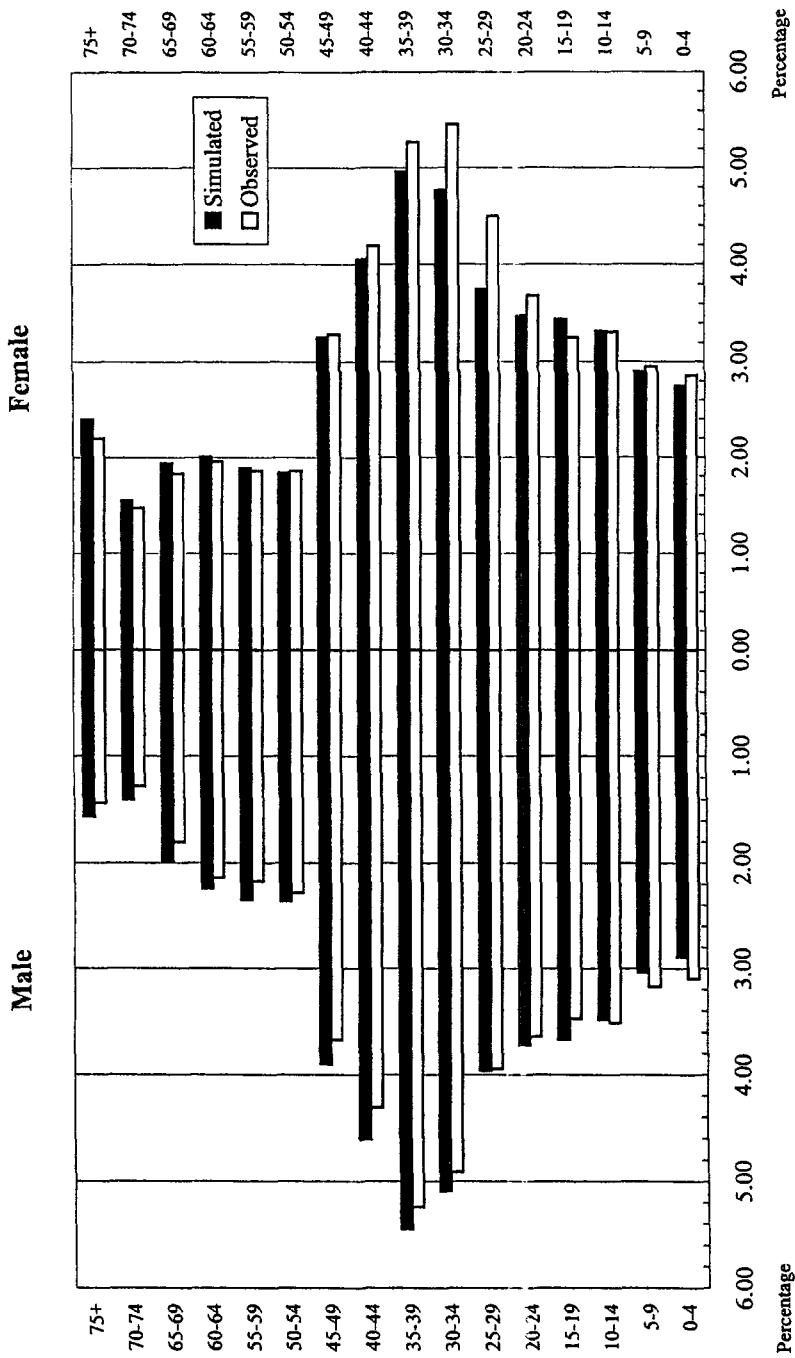


Table 1
Comparison of Age Distribution of Observed and
Simulated Population of Hong Kong, 1996

| Age group | Observed | | Simulated | | Estimated net gain in migration | | |
|-----------|---------------|-------|--------------|-------|---------------------------------|-------|------------------------|
| | Pop. Size (1) | % * | Pop Size (2) | % * | Pop. Size (3) | % * | Sex ratio ^Δ |
| < 15 | 1,192,900 | 18.9 | 1,057,657 | 18.4 | 135,243 | 24.4 | 1,274 |
| 15-24 | 886,400 | 14.0 | 823,737 | 14.3 | 62,663 | 11.3 | 590 |
| 25-34 | 1,187,100 | 18.8 | 1,011,130 | 17.6 | 175,970 | 31.7 | 271 |
| 35-44 | 1,200,000 | 19.0 | 1,097,871 | 19.1 | 102,129 | 18.4 | 293 |
| 45-54 | 700,000 | 11.1 | 654,131 | 11.4 | 45,869 | 8.3 | 463 |
| 55-64 | 512,900 | 8.1 | 488,395 | 8.5 | 24,505 | 4.4 | 305 |
| ≥ 65 | 631,700 | 10.0 | 623,683 | 10.8 | 8,017 | 1.4 | |
| Total | 6,311,000 | 100.0 | 5,756,604 | 100.0 | 554,396 | 100.0 | |

Notes: (i) *-Figures may not add up to totals due to recording.
(ii) Δ-Number of males per 1000 women.
(iii) Population size (3) = Population size (1) - Population size (2)

the prime working age group 25-44. Significant sex differential in migration is also noted. Among these immigrants, there were more males than females aged under 15. On the contrary, there were more female immigrants than male immigrants in all other age groups (as many as 3.6 times in the 25-44 age group).

The dependency ratios of the simulated and observed population for the period 1981-1996 are given in Table 2. The elderly dependency ratio is estimated to be 153 against 141 as observed in 1996. Also, the child dependence ratio is estimated to be 260 against the observed 266 in 1996. The simulated and observed population in 1996 were 5.76 million and 6.31 million respectively. Their median ages were 34.4 and 34.0 respectively.

Table 2

**Dependency Ratio and Median Age of the Simulated Population
(without Migration) of Hong Kong 1981-1996**

| Year | 1981 | 1986 | 1991 | 1996 |
|--------------------|------|-------------|-------------|-------------|
| Child Dependency | 359 | 323 (333) | 290 (297) | 260 (266) |
| Elderly Dependency | 97 | 114 (111) | 132 (124) | 153 (141) |
| Total Dependency | 455 | 438 (444) | 422 (421) | 413 (407) |
| Median Age | 26 | 28.5 (28.6) | 31.4 (31.5) | 34.4 (34.0) |

Note: 1. Dependency ration is defined as the number of dependents per 1000 persons of working age (15-64, years).

2. Numbers shown in brackets represent the observed values.

Table 3 gives the projected dependency ratios and median ages for the period 2001-2016. The elderly dependency ratio of the projected population (with no migration) in 2016 would be 216 per 1,000 population aged 15-64, against 184 estimated based on the existing immigration policy. The corresponding figures for the child dependency ratio were 195 and 200 respectively. The median age is estimated to be 44.5 against 41.0 as estimated by Census and Statistics Department.

Table 3

**Dependency Ratio and Median Age of the Projected Population
(without Migration) of Hong Kong 2001-2016**

| Year | 1996 | 2001 | 2006 | 2011 | 2016 |
|-----------------------|------|-----------|-----------|-----------|-----------|
| Child Dependency | 266 | 234 (228) | 212 (211) | 194 (197) | 195 (200) |
| Elderly Dependency | 141 | 158 (149) | 167 (153) | 173 (155) | 216 (184) |
| Total Dependency | 407 | 392 (377) | 379 (364) | 366 (351) | 412 (384) |
| Median Age | 34 | 36.7 (37) | 39.9 (39) | 42.4 (40) | 44.5 (41) |

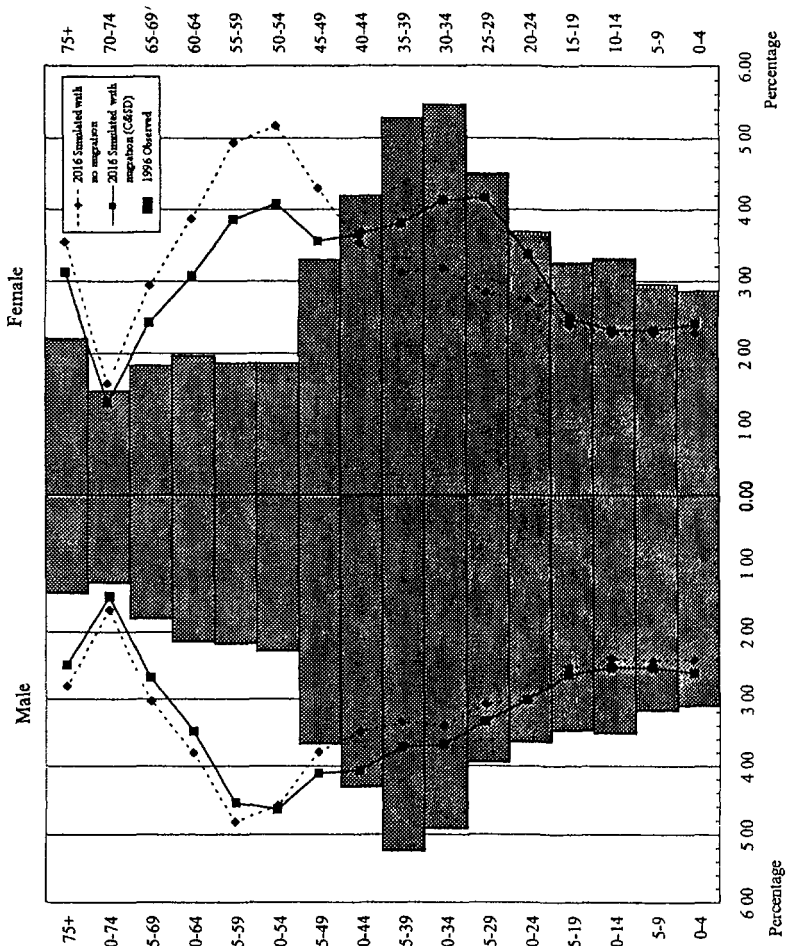
Note: Numbers shown in the brackets represent the values estimated by the Census and Statistics Department based on existing immigration policy.

Figure 2 shows the age distribution of the population in 1996 compared with the distribution of the projected population (with migration and with no migration) in 2016. The bulge at age 30-39 in 1996 has gradually moved up to the old age group enlarging the top of the population pyramid. The bulge would be at age 50-59 in 2016. It is expected that the ageing process would be intensified by 2021-2026. Furthermore, the bottom of the pyramid would be constricted and become narrower than the top, indicating an increase in the population size of old people over that of young people.

Discussion

Population ageing is inevitable. However, the pace of ageing in Hong Kong poses some serious problems. Rapid decrease in the total fertility rate, significant improvement in life expectancy, and the relatively high level of migration with respect to the population size have led to a significant change in the population distribution of Hong Kong. The total fertility rate of 1.15 live births per woman (equivalent to a net reproduction rate of 0.55) in 1996 suggests that the population would not be able to replace itself over the longer term, if this low level of fertility is maintained. The rapid decrease in fertility

Figure 2
Age Distribution of Observed Population in 1996 and Projected Population
(with, and without Migration) in 2016 in Hong Kong



was attributable to a postponement of the age of marriage, an increased prevalence in spinsterhood, a postponement of low-order births, and a curtailment of high-order births (Census and Statistics Department, 1997; *Hong Kong Annual Digest of Statistics*, 1987-1997). In 1971, 79 per cent of women aged 25-29 were married; the corresponding figure in 1996 was 47 per cent. The number of marriages decreased from 42,000 in 1981 to 37,000 in 1996 despite a population growth from 5.2 million to 6.3 million in the same period. There was also a significant increase in the proportion of never-married women among all age groups. Concurrently, the proportion of third and higher-order births declined rapidly from 27 per cent in 1981 to 12 per cent in 1995. The household size was only 3.2 in 1996. The drastic decline in the total fertility rate in the past was to some extent attributable to a sizable number of Hong Kong residents (mainly men) marrying and having their children in China rather than in Hong Kong. If these children and their mothers were to be enumerated, the total fertility rate in Hong Kong would be higher.

The simulated population in 1996 has a higher proportion of the elderly aged 65 or over, a lower proportion of children under 15, and a lower proportion of women aged between 25-39 than the observed population. The observation is consistent with the existing immigration policy under which family reunification is accorded priority in the granting of the right of residence in Hong Kong. About 80 per cent of those arrived in 1995 were aged under 35 (International Social Service, 1997). Given the fact that there are always people emigrating from Hong Kong (estimated to be in the order of some 20,000 per year during the period 1981-1996) and that most of these emigrants fall in the 20-44 age group, the ageing of the population would be much more serious if there were no Chinese immigration to offset the effects of emigration. It is therefore evident that Chinese immigrants to Hong Kong during the period 1981-1996 have had a significant impact in slowing down the pace of population ageing. Furthermore, the new migrants tend to have a higher fertility rate, which will subsequently affect the level of fertility in Hong Kong. This is of particular relevance when the total fertility rate of the population has already been well below the "replacement level."

Espenshade (1994) showed that net immigration cannot slow

down the ageing process in the United States of America. It is mainly due to the assumption of the total fertility rate of 1.83 live births per woman under Espenshade's low scenario which is still significantly higher than a rate of 1.15 in Hong Kong. Furthermore, the size of annual net immigration in the United States accounts only for 0.6 per cent of the total population. It is not surprising that net immigration would have a limited effect in retarding the ageing trends in America. In Hong Kong's situation, migration also has a less significant impact in slowing down the pace of ageing in the period 1981-1996. The median age of the observed and simulated population was 34.0 and 34.4 respectively. This can be explained by the fact that in the earlier part of the 1981-1996 period the rate of fertility had just fallen below the "replacement level"; it only decreased rapidly towards the latter part of the period.

However, the effect of migration on the population distribution would be much more significant over the projection period of 1996-2016. The current total fertility rate in Hong Kong is 1.15 live births per woman and the annual net migration is about 1 per cent of the population. The projected 2016 population distribution is made based on the assumption that the total fertility rate would rise from 1.15 in 1996 to 1.55 in 2016. If fertility remains at the 1996 level throughout the period, ageing of the population would become even more radical by 2016 and the elderly dependence ratio would rise to an even higher value than that estimated. Furthermore, the bulge at age 30-39 in 1996 due to the baby boom taking place between 1960 and 1970 will reach the age of 60 from 2016 onwards. This would inevitably accelerate the ageing process.

Population ageing would have significant effects on the whole society, and its impact is particularly evident in the case of medical and health care services. Increase in the size of the elderly will change the structure of the diseases. Cardiovascular disease, the second leading cause of deaths, affects mostly the elderly. In 1996, 90 per cent of those who died from this cause were aged 60 or over. Expenses on medical care will grow with an increase in the size of the elderly because old people pay more hospital visits, constitute a larger number of in-patients, have a longer duration of hospitalisation, and incur higher hospitalisation charges compared with people from other age

groups. Furthermore, the treatment cost of those diseases frequently seen among the elderly, such as malignant neoplasms, and cardiovascular and cerebrovascular complaints, is higher than that of other diseases. It is therefore essential to plan for the provision of healthcare services in the face of an ageing population. A medical insurance system for the elderly should be put in place and advocated, otherwise the costs would have to be borne solely by the government. As prevention is better than cure, activities on health education should be promoted and disease prevention measures should be undertaken. An active and healthy lifestyle should be promulgated among Hong Kong people well before they approach the stage of decline.

The other issues that need to be addressed are social security and the pension system. The Hong Kong government has set up a Mandatory Provident Fund which is made up of 5 per cent contribution from the salary of the employee, matched by another 5 per cent from the employer. It is important to set up the scheme for economically active persons so that they can save up to support their own retirement. At the same time, due to improved longevity of the population, more people aged 60 or over still remain healthy. It would be worthwhile considering modifying the legal age of retirement and redeploying the elderly workforce. This move is particularly relevant when there is a need to maintain the labour force against the radical ageing process of the population.

In view of the recent Court of Final Appeal decision on the right of abode, it is expected that many more Mainland-born children of Hong Kong residents would be allowed to reunite with their families in Hong Kong. The Hong Kong Special Administrative Region government's reactions and public opinion have so far been negative. Local concerns that the new arrivals may have difficulties assimilating into the community, and that they may strain the provision of social welfare, education and health services and facilities are legitimate and cannot therefore be readily dismissed. However, the ageing process in Hong Kong would have accelerated if there were no immigration from China. These immigrants therefore play an important role in keeping Hong Kong young and vibrant. What is more important, an economically active population is needed to support an increased number of elderly people. For a community like Hong Kong

with a low level of fertility, a no-migration scenario implies that the ageing process would become more radical than would otherwise be. The positive effect of migration, especially the distinctively younger age structure of immigrant groups, on the age distribution of Hong Kong's population cannot be underestimated.

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Annex I

The component method of projection by age and gender in five-year age groups involves:

- i. Taking a base population distributed by gender and age in five-year age groups, that is the components.
- ii. Applying survival ratios to each gender and age group to obtain the population still alive five years older.
- iii. Obtaining the number of births during the intervening period by applying the age-specific fertility rates to the average number of women aged 15-49 during the period. These births must be divided into male and females birth by multiplying 105/205 and 100/205 respectively, assuming boy to girl ratio at birth is 105 to 100 (Pollard et al., 1990). Births surviving to the 0-4 age group at the end of a five year period can be obtained by multiplying by the survival ratio $\frac{{}_5L_0}{5 \times l_0}$ where L_0 and l_0 are the entries of the life tables in 1981, 1986 and 1991, that is, the beginning of the respective periods. For other age groups, apply survival ratios (usually $\frac{{}_5L_{x+5}}{L_{x+5}}$ or in the highest age group $\frac{T_{x+5}}{T_x}$). We adopt the male and female life tables from the Census and Statistics Department.
- iv. Repeating the process for each subsequent five-year period to obtain the projected population after the starting date.