



PERGAMON

Social Science & Medicine 55 (2002) 1803–1812

SOCIAL  
SCIENCE  
&  
MEDICINE

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# The influence of the Chinese zodiac on fertility in Hong Kong SAR

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## Abstract

The annual total of births in Hong Kong SAR fell substantially in the past 20 years; hence the total fertility rate (TFR) followed the downward trend and dropped to a low of 0.9 below replacement level in 2000. Despite the long-term downward trend, short-run increases in the annual total of births and the TFR were exhibited. Such temporary fertility increases are identified in the Dragon Years of 1988 and 2000. The phenomenon of fertility changes associated with zodiacal animal years is examined in this paper with a view to gaining some insight into whether Chinese cultural preferences and folklore beliefs might have influenced prospective parents' reproductive behaviour. The paper explains the underlying philosophy of the Chinese astrological tradition and discusses how zodiacal preferences affect fertility between 1976 and 2000. The paper also explores why zodiacal influences on Chinese fertility before 1976 did not exist. It is unquestionable that the Dragon Year preference exerts an influence on fertility of modern Chinese populations through zodiacal birth-timing motivations. Birth rate rise in the Dragon Year is due to changes in timing of births that will have little effect on cumulative fertility. © 2002 Elsevier Science Ltd. All rights reserved.

*Keywords:* Birth timing; Chinese astrology; Chinese zodiac; Fertility; Hong Kong SAR

## Introduction

The annual total of births in Hong Kong SAR fell rapidly in the past 20 years. It fluctuated around 80,000 in the 1970s, peaked at over 86,000 in the early 1980s, and started decreasing steadily thereafter to reach a low of 48,000 in 2000. The number of married women in the childbearing years, on the other hand, increased by onefold from 0.57 m in 1971 to 1.16 m in 2000. The large decrease in the number of births is the result of substantial declines in the fertility of married women during the same period. Against this background, the annual total of births rose by five and two thousand in 1988 and 2000 respectively compared to the preceding

year. A consideration of the reasons for such increases in births is whether they result from temporary rises in the fertility of married women, or from changes in the proportion of women married in the productive child-bearing years. If the short-run increase in the number of births in 1988 and 2000 are attributable to a temporary rise in the fertility of married women, then it is a puzzle why fertility increase has occurred once every 12 years against the long-term downward trend of the total fertility rate (TFR).

We identify a hypothesis why fertility has defied the downward trend to increase once every 12 years. It is hypothesised that preferences for the dragon, which appears once every 12 years in the procession of the Chinese zodiac, exert an influence on fertility in 1988 and 2000. We believe zodiacal preferences prevail in Chinese population. It is expected that such a phenomenon has occurred in Hong Kong, as over 95 per cent of its population are ethnic Chinese. To understand why

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zodiacal preferences exert an influence on reproductive behaviour, we need to take a glance at the way how Chinese astrology works. Chinese astrology is very old. Records from archaeological sites have revealed evidence for the use of astrology over 4000 years ago in China. The first reference to the relation between time (hour, day, month and year) and animals dates back to the Eastern Han Dynasty (AD 567). The Chinese year has a cycle of 12 signs. Each sign is associated with a symbolical creature. The annual designations begin with the rat, followed by the ox, the tiger, the hare, the dragon, the snake, the horse, the goat, the monkey, the cock, the dog and the pig. The 12 animals correspond to the 12 Terrestrial Branches (linked with the zodiac) in the Chinese calendar. The sages of China believed that we are each governed by one of the 12 animal signs, depending on the year of our birth. According to Chinese astrology, each person is a combination of three animals—the animal of your year of birth (the year animal); the animal of the month in which you were born (the lunar animal); and the animal of the time of the day you were born (the inner animal).

Chinese astrology is closely bound up with Chinese natural science and philosophy (Craze, 1999). Over centuries the astrological way of thought permeated virtually every area of Chinese culture. The Chinese seem to believe that they have some affinity with the animals of the years in which they were born and that their personal traits and fortunes come under their mysterious influence. The dragon is the only mythical animal in the menagerie

and one of the four “divine” animals, the other three being the unicorn, the phoenix and the tortoise. The Chinese have always had strong emotion and affection for the dragon, which they know to be a benevolent creature (symbolising strength and potency). Many literally regard themselves as descendants of the dragon (*long di chuan ren*). According to traditional folklore, the Year of the Dragon is considered an auspicious time for births and marriages. Folk beliefs aside, preference for the Dragon Year is rooted in astrological tradition and cannot be really traced as to how and why it evolved (Eberhard, 1986; Gettings, 1985). In the procession of the Chinese zodiac the dragon appears once every 12 years, and most recently in 2000. Thus, spikes in the TFR in 1988 and 2000 compared with fertility levels in other years can be explained as being associated with preferences for the Year of the Dragon (Fig. 1).

### Method and data

We examine the hypothesis by determining whether the short-run increases in the number of births in 1988 and 2000 result from changes in the proportion married, or from birth rate rise. We analyse the proportion of women married in the productive childbearing ages 20–34 (who take up a major share of the annual total of births) and the fertility of married women in the years under study. We use the TFR as an indicator to show the fertility change of married women. The TFR is

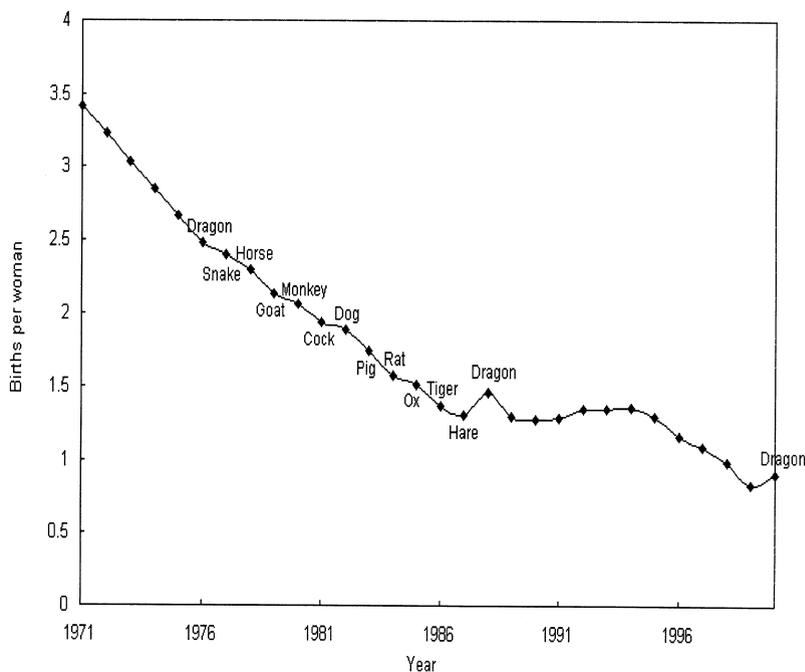


Fig. 1. The total fertility rate (TFR), Hong Kong SAR, 1971–2000.

defined as the sum of age-specific fertility rates multiplied by the width of each age group (5 years in this case), which represents an average number of children that would be born per woman if women experienced age-specific fertility rates of the period in question throughout their childbearing lifespan. Age-specific fertility rate, in fact, is the product of age-specific marital fertility rate and the proportion ever married, provided the number of births out of wedlock makes up an insignificant proportion of the annual total of births. According to the vital registration system, only 1–2 per cent of registered births in Hong Kong (as compared with about one-third in the United States) are not within marriage. Thus, the change in the TFR is directly due to changes in age-specific marital fertility rates on the one hand and in the proportion married on the other, hence reflecting the fertility change of married women. Where data on marital status are available, we also compute the summary index total marital fertility rate (TMFR) by cumulating age-specific marital fertility rates and multiplying the sum by 5 (width of each age group). The TMFR denotes the number of live births a woman married at age 20 is likely to have had on reaching age 50 if she experienced age-specific marital fertility rates of the period in question throughout the childbearing age span 20–49. We also examine the number of marriages, particularly first marriages in the year preceding the Dragon Year compared to other years and changes in the seasonal pattern of births (comparing quarterly incidence of births in the Dragon Year and in other years) to substantiate the Dragon Year hypothesis.

## Results

Table 1 gives that the 75 and 48 thousand births recorded in 1988 and 2000 represent a 7.8 and 4.2 per cent increase over the preceding year. The proportion married in the childbearing ages 20–34 decreased marginally between 1987 and 1988 and the number of married women in these ages remained effectively unchanged. Since there was no change in the number of married women in the productive childbearing ages 20–34, the increase in the number of births in 1988 must be the result of a rise in the fertility of married women. The TMFR increased at an average annual rate of 0.5 per cent during the period 1986–91. Marital fertility should increase from 1987 to 1988 at a rate higher than 0.5 per cent to contribute to a 7.8 per cent increase in births in 1988. The actual change in the fertility of married women between 1987 and 1988 may be indicated by the change in the TFR, which recorded a 6.8 per cent increase during the period.

The same analysis identifies that there was a 6 per cent decrease in the proportion married in the childbearing ages 20–34 between 1999 and 2000 and that the number of married women in these ages also decreased by 7 per cent. With a reduction of the number of married women in the productive childbearing years marital fertility must increase significantly between 1999 and 2000 to account for a 4.2 per cent increase in the number of births in 2000. The TMFR shows a 16 per cent increase during the same period. This represents a large increase for a short period of one year. The TFR being depressed

Table 1  
Total live births, proportions married, total marital fertility rate and total fertility rate, Hong Kong SAR, 1971–2000

Year	Total live births	% Change per annum	Proportion married in ages 20–34	Married women in ages 20–34	Total marital fertility rate <sup>a</sup>	% Change per annum	Total fertility rate <sup>b</sup>	% Change per annum
In (1000)								
1971	79,789	—	61.5	217.8	5.21	3.41	—	—
1975	79,790	—	59.4	267.0	2.70	—	—	—
1976	78,511	–1.6	58.8	280.6	4.01	–5.1	2.52	–6.7
1977	80,027	1.9	58.7	300.2	2.42	–4.0	—	—
1981	86,750	—	58.1	410.8	3.36	–3.5	1.95	—
1986	71,620	—	55.2	453.3	2.67	–4.5	1.39	—
1987	69,958	—	55.0	456.8	1.33	—	—	—
1988	75,412	7.8	54.7	457.6	1.42	—	6.8	—
1989	69,621	–7.7	54.5	457.0	1.32	–7.0	—	—
1991	68,281	—	54.1	454.1	2.73	0.5	1.30	—
1999	45,826	—	46.8	391.5	2.18	0.83	—	—
2000	47,748	4.2	44.0	363.2	2.53	16.0	0.90	8.4

<sup>a</sup>Note: The data on the proportion married for 1975–77 and 1987–89 are a linear interpolation between the corresponding proportions married from census sources (1971, 1976, 1981, 1986 and 1991 census). The data for 1999 and 2000 are from the General Household Survey. (1) Live births per married woman. (2) Live births per woman.

<sup>b</sup>Sources: Census and Statistics Department, Hong Kong Special Administrative Region.

by the decreasing proportion married recorded only an 8.4 per cent increase.

#### *Dragon year preference in 1988 and 2000*

As evident from the TFR trends, the Dragon Year fertility increase is a temporary deviation from a long-term secular decline. It represents changes in birth timing, which will have little effect on cumulative fertility. It is likely though that some of the increase was probably a one-time increase attributable to the Dragon Year preference. The fact that fertility rates of women aged 20–34 (whose fertility contributes to more than four-fifths of the TFR) in the first and second orders rose from 62.8 in 1987 to 68.1 in 1988 (Table 2) suggests that many of the extra births were first and second births occurring earlier than usual, an indication of changes in birth timing. Fertility rate in the third order, instead of continuing its decline since 1971, halted in 1988 (Table 2) also suggesting that some of the extra births were third birth occurring not because of changes in birth timing but rather of the desire of some to have a Dragon Baby. If prospective parents were attempting to give birth to Dragon Babies, one would expect to see increases in fertility in the Dragon Year and decreases in the subsequent Snake Year. While the TFR was higher in both 1988 and 2000 over the preceding year (the Year of the Hare), the fertility rate was down in 1989 (the Year of the Snake) by 7 per cent compared to 1988. Fertility rates of women aged 20–34 in the first and second orders fell after the Dragon Year of 1988, the decrease was of the same order as the increase in 1988 over 1987. As expected, the fertility rate in the third order in 1989 was back to the downward trend, and the fall was not insignificant. Whether the TFR and fertility rates in the first, second and third orders in 2001 will follow these patterns of change remains to be seen.

#### *Dragon year preference in 1976*

The preceding analysis discusses the influence of the Dragon Year on fertility in 1988 and 2000. However, there is no evidence of such an influence in the Dragon Year of 1976. Instead of an increase as in other Dragon Years, the 79 thousand births occurring in 1976 represents a 1.6 per cent decrease compared with the preceding year (the Year of the Hare). The TFR recorded an even larger decrease of 6.7 per cent. To explain why there is a different fertility performance in the Dragon Year of 1976 compared with other Dragon Years, we might begin by analysing the proportion married and Hong Kong's fertility trends. It is noted that the proportion of women married in the productive childbearing ages 20–34 decreased marginally between 1975 and 1976. Because of changes in the age structure of population the number of married women in these childbearing ages increased by 5 per cent instead (Table 1). The TMFR fell substantially from 1971 to 1976 at an average annual rate of 5.1 per cent. With a 5 per cent increase in the number of married women in the productive childbearing ages in 1976 over 1975 marital fertility needs to fall between 1975 and 1976 at a rate higher than the average rate (5.1 per cent per annum) for the period 1971–76 to account for a small decrease in the number of births in 1976. Without an increase in the number of married women in the childbearing ages 20–34, the decrease in the number of births in 1976 would be far more substantial. Continuing the downward trend, the TFR decreased by 6.7 per cent between 1975 and 1976. The TFR decline should reflect the fertility change of married women during the period.

With the influence of the Dragon Year on birth-timing decisions why there is still a fall (at least 6.7 per cent) in the fertility of married women in 1976. An analysis of fertility declines during the period 1971–91 shows that the decline in the TFR between 1971 and

Table 2  
Fertility rates (1) of women aged 20–34 by birth order, Hong Kong SAR, 1971–1991<sup>a</sup>

Year	First and second orders	% Change per annum	Third order	% Change per annum	Fourth and higher orders	% Change per annum
1971	93.7	—	32.3	—	41.8	—
1975	99.9	1.6	22.4	–8.7	19.4	–17.5
1976	101.9	2.0	22.4	— <sup>b</sup>	16.2	–16.4
1977	99.6	–2.3	21.9	–2.1	13.9	–14.2
1981	87.1	–3.3	16.2	–7.2	7.3	–14.9
1987	62.8	–5.3	9.5	–8.6	3.0	–13.7
1988	68.1	8.4	9.4	–0.6	2.8	–8.3
1989	62.2	–8.7	8.3	–11.5	2.5	–11.6
1991	60.6	–1.3	7.6	–4.6	2.0	–10.6

<sup>a</sup>Note: (1) Live births per 1000 women.

<sup>b</sup>Less than 0.5 per cent.

Sources: Census and Statistics Department, Hong Kong Special Administrative Region.

1976 is attributable to the substantial reduction of higher order births despite some increase in first and second births, whereas the decline in the subsequent periods was a result of the reduction of all-order births, though the effect mainly came from the reduction of higher order births (Table 2). The third and higher order births contributed to half of the total number of births in 1971 (Census and Statistics Department, 1983). As fertility declined further this proportion dropped to 30 per cent in 1976, then to 23 per cent in 1981 and 16 per cent in 1991 (Census and Statistics Department, 1997). The significant decrease in the proportion of higher order births is the direct consequence of a change in attitudes towards limiting family size. Any rise temporarily deviating from the fertility trend must be attributable to extra first and second births, which occur earlier than usual. This sort of fertility increase was due to changes in birth timing. The influence of the Dragon Year of 1976 on birth timing is given in Table 2. Fertility rate of women aged 20–34 in the first and second orders actually recorded a 2 per cent increase in 1976 compared to the preceding year. There were more first and second births occurring in 1976, which are attributable to the Dragon Year preference. Fertility rate in the third order remaining effectively unchanged between 1975 and 1976 also signifies some women attempting to give birth to a Dragon Baby (likely to be a one-time increase). Both fertility rates fell again in the subsequent Snake Year. This is an evidence of the Dragon Year preference in 1976.

As a matter of fact, the TFR is sensitive to short-term changes in timing of births, hence a consequent rise

should be expected. However, in rapid fertility declines attributable to the substantial reduction of higher order births, as in the decline between 1971 and 1976, increases in first and second births being outweighed by larger decreases in higher order births still result in smaller annual totals of births, hence a fall in the TFR. The situation in 1988 and 2000 was different. The TFR has fallen conspicuously below replacement level (2.1 live births per woman) since 1981 (Yip, Lee, Chan, & Au, 2001). Under the below-replacement fertility conditions, an over majority of married women would want to have just one or two children. Higher order births contribute to a less significant proportion (12 per cent in 1999) of annual totals of births. Changes in timing of births, as induced by the Dragon Year preference, trigger increases in first and second births (hence an increase in the total number of births), thus resulting in a temporary rise in the TFR. This explains why Dragon Year fertility increases were exhibited in the TFR in 1988 and 2000 and not in 1976. Goodkind (1991) puzzled why Hong Kong did not show a Dragon Year increase in 1976 as Singapore and Taiwan did. The hypothesis, according to Goodkind, was that the consideration of zodiacal birth timing spread from other areas to Hong Kong only in the 1980s; hence a Dragon spike was unmistakable in Hong Kong in 1988. However, it is believed that Goodkind's study has not considered the impact of the large reduction of higher order births in Hong Kong in the 1970s that might have exerted an influence on any short-run increase in first and second births due to zodiacal birth timing. Not surprisingly, Goodkind missed the clue to why there was no fertility increase in 1976.

Table 3  
Quarterly incidence of births, Hong Kong SAR, 1975–99<sup>a</sup>

Quarter	1976	1988	1975 and 2000	1987 and 1977	1988 and 1989	1999
January–March	17926 (22.8)	16,127 (21.4)	10,311 (22.6)	19,073 (23.9)	16,632 (23.8)	10,897 (24.2)
April–June	17173 (21.9)	16,483 (21.8)	10,131 (22.2)	17,939 (22.4)	15,902 (22.8)	10,611 (23.6)
July–September	21,103 (26.9)	20,050 (26.6)	12,116 (26.6)	21,186 (26.5)	18,275 (26.2)	11,609 (25.8)
October–December	22,309 (28.4)	22,752 (30.2)	13,036 (28.6)	21,708 (27.2)	18,980 (27.2)	11,890 (26.4)
Total	78,511 (100.0)	75,412 (100.0)	45,594 (100.0)	79,906 (100.0)	69,789 (100.0)	45,007 (100.0)
	Index (1)			Index (2)		
January–March	91	86	90	95	95	97
April–June	87	87	89	90	91	94
July–September	108	106	106	106	105	103
October–December	114	121	114	109	109	106

<sup>a</sup>Note: (1) Ratio of the number of births in a quarter to the quarterly average number of births of the year (expressed in terms of 100).

Sources: Census and Statistics Department, Hong Kong Special Administrative Region.

Table 4  
Quarterly incidence of marriages, Hong Kong SAR, 1975–2000<sup>a</sup>

Quarter	1973 and 1974	1975	1985 and 1986	1987	1997 and 1998	1999
January–March	7919 (23.3)	8723 (24.1)	11,649 (26.4)	11,607 (23.9)	9043 (26.1)	8333 (26.6)
April–June	8639 (25.4)	9628 (26.6)	10,481 (23.7)	10,856 (22.4)	9125 (26.3)	6619 (21.2)
July–September	7980 (23.4)	8351 (23.1)	9559 (21.6)	10,196 (21.0)	6563 (19.0)	6810 (21.8)
October–December	9497 (27.9)	9490 (26.2)	12,479 (28.3)	15,902 (32.7)	9902 (28.6)	9525 (30.4)
Total	34,035 (100.0)	36,192 (100.0)	44,168 (100.0)	48,561 (100.0)	34,633 (100.0)	31,287 (100.0)
Index (1)						
January–March	93	96	105	96	104	107
April–June	102	106	95	89	105	85
July–September	94	92	87	84	76	87
October–December	112	105	113	131	114	122
First	29,274	33,030	36,592	41,505	30,262	27,040
Marriages	(+11.1%) <sup>b</sup>	(+13.4%) <sup>b</sup>	(–10.6%) <sup>b</sup>			

<sup>a</sup>Note: (1) Ratio of the number of marriages in a quarter to the quarterly average number of marriages of the year (expressed in terms of 100).

<sup>b</sup>Percentage change in number of first marriages in 1975, 1987 and 1999 relative to the preceding 2 years.

Sources: Census and Statistics Department, Hong Kong Special Administrative Region (1973, 1976, 1986, 1989, 1998, 2001)

### Seasonality of births

The influence of the Dragon Year on fertility is also evident from the monthly distribution of births. Table 3 gives the quarterly incidence of births between 1975 and 2000. There is a consistent pattern of seasonality of births throughout the period 1975–2000. Married women have a strong tendency to give birth in the second half year, particularly in the fourth quarter of a year. The larger childbearing occurring in the fourth quarter is mainly due to a sizable proportion of married women giving birth immediately after marriage (Census and Statistics Department, 1983). In fact, the seasonality of marriages resembles closely the seasonality of births. There is a greater tendency of prospective couples to get married in the last quarter of a year (Table 4). Chinese customs and beliefs may exert a subtle influence on marriage-timing decisions. The number of marriages usually peaks in November and December because prospective couples have a strong desire to marry before the Chinese New Year. There is generally a marriage surge in March following the Chinese New Year festival. July and August are among the least popular months for marriages. August being the month of the ‘Ghost Festival’ and July splitting the Chinese lunar year, which normally begins between late January and late February, into two halves (a sign of subsequent breaking up of marital unions) are both considered an inauspicious time to plan for marriages.

As there is a close association of marital timing with birth timing, the Dragon Year preference may induce more marriages taking place in the last quarter of the Hare Year, aiming for birth in the Year of the Dragon. It is noted that marriage has increased in the last quarter of 1987 and 1999 (Table 4). There were over 30 per cent of marriages occurring in the last quarter of 1987 and 1999, compared with an average of 28 per cent for the same period in the preceding two years. No such a change, however, is observed in 1975. The proportion of marriages in the last quarter of 1975 was lower compared to the average for the same period in the preceding two years (Table 4). The number of marriages (particularly first marriages) was higher in 1975 than in the preceding two years, mainly because marriage was on an increasing trend in the 1970s, rising from 27,000 in 1971 to over 50,000 in 1980. The increase in 1975 was not particularly larger than the average annual increase for the period. The number of marriages peaked at 53,000 in 1984, and started falling thereafter. Against this marriage trend, it is unquestionable that there was an increase in the number of marriages (10 per cent for all marriages but 13 per cent for first marriages) in 1987 compared to the average for the preceding 2 years, aiming for birth in the Year of the Dragon. There was no such an increase in 1999, except that the proportion of marriages in the last quarter of the year was larger than the average for the same period in the preceding 2 years. The marriage data though not following the

implicit trend completely seem to support the argument that prospective couples aiming for birth in the Year of the Dragon might have advanced the marriage date to the year preceding the Dragon Year.

In the Dragon Years of 1976, 1988 and 2000 particularly larger childbearing occurred in the last quarter of the year compared to the same period in other years (Table 3). On the contrary, childbearing occurring in the first quarter of the Dragon Year was comparatively smaller, indicating the result of birth timing. There were, on average, 56 per cent of Dragon Year births occurring in the last 6 months of the year, compared with 53 per cent for the same period in other years (Table 3). More births occurring in the last 6 months of the Dragon Year were births that were conceived in the last quarter of the Hare Year or the first quarter of the Dragon Year, possibly in order to give birth to Dragon Babies. This is also evidence of the influence of the Dragon Year preference on fertility in 1976, 1988 and 2000.

#### *Dragon year preferences in other Chinese populations*

The study examines the hypothesis that the Dragon Year was a salient factor in birth-timing decisions among the Chinese in Hong Kong. Quantitative data show the influence of the Dragon Year on fertility between 1976 and 2000. The results support the hypothesis. If the Dragon Year preference has affected birth-timing decisions among the Chinese in Hong Kong, one might expect that such a preference also exists in other ethnic-Chinese dominated societies like China, Taiwan and Singapore (some 77 per cent of the childbearing age population in Singapore are Chinese women). Where birth data are available, a comparison of Dragon Year fertility increases is made between these Chinese populations. Table 5 gives the percentage change in the crude birth rate and the TFR of China, Taiwan and Singapore in the Dragon Years of 1964, 1976, 1988 and 2000. Since 1976, the Dragon Year preference has contributed to temporary fertility increases in Hong Kong SAR (as explained in the earlier part of this paper), Singapore and Taiwan, with the exception of China. There was no birth rate rise in China between 1964 and 2000. A continuous downward trend of the crude birth rate was exhibited. China's strict one-child family policy operated since 1979 might have made zodiacal birth timing highly impractical. In the circumstances, prospective parents have less concerns of the zodiac. Rather, they would be dominated more by the desire to have a child in any year allowed. In the Dragon Years of 1964 and 1976 zodiacal preferences might have been suppressed. During this early era, anything resembled older traditions was criticised, while everything new and revolutionary was lauded (Chu, 1978).

In Taiwan there was an unusually large increase in fertility in 1976. The TFR fell consistently from 5.61 in

Table 5  
Percentage change in crude birth rates or total fertility rate, China, Hong Kong SAR, Taiwan and Singapore, 1964–2000

Dragon year	Crude birth rate % change	Total fertility rate % change
1952		
China	-2.1	— <sup>a</sup>
1964		
China	-9.8	—
Hong Kong SAR	-8.4	—
Singapore	-4.5	—
Taiwan	-4.8	—
1976		
China	-13.5	—
Hong Kong SAR	-2.8	-6.7
Singapore	5.6	1.5
Taiwan	12.8	8.8
1988		
China	-4.1	—
Hong Kong SAR	6.3	6.8
Singapore	19.8	21.0
Taiwan	7.7	9.1
2000		
China	—	—
Hong Kong SAR	5.3	8.4
Singapore	6.3	7.5
Taiwan	—	—

<sup>a</sup> — Not available.

Sources: National Bureau of Statistics, People's Republic of China (1992).

Census and Statistics Department, Hong Kong Special Administrative Region (1973, 1981, 1997, 2000).

Directorate-General of Budget, Accounting and Statistics, Executive Yuan, Republic of China (1966, 1978, 1989, 2000).

Department of Statistics, Republic of Singapore (1992, 2000).

1961 to 2.83 in 1975 but rose to 3.08 in 1976. Despite the anti-Dragon Baby campaign launched in 1987, however, fertility in 1988 rose by 9.1 per cent, suggesting that unless more drastic action is taken in future the Dragon Year preference in Taiwan may be, to a certain extent, "policy proof" (Goodkind, 1991). Data on fertility in 2000 are not yet available. Whether the Dragon Year phenomenon has occurred in 2000 remains to be seen.

Since it declared independence, Singapore has gone through three major stages of population control policy (Saw, 1999). Starting from the late 1960s, a series of anti-natalist measures were introduced. The aim and slogan was "Two-child families for Singapore". The activities included family planning services, legislation of induced abortion, voluntary sterilisation and financial incentives and disincentives. The TFR fell sharply from

3.09 in 1970 to below replacement level in 1977. Against this backdrop of fertility decline, the Dragon Year preference was exhibited in 1976, the TFR rising from 2.08 in 1975 to 2.11. Having reached below replacement level, the decline in the TFR slowed down in the late 1970s. In 1984 the Singapore government initiated eugenic measures to promote marriage and fertility in persons with higher education level. There followed an obvious change in the TFR. In 1987 a drastic re-orientation of population control policy was launched. Having recognised potential problems of sustained below-replacement fertility, the Singapore government relaxed previous anti-natalist measures and introduced pro-natalist measures, such as tax rebate for couples having their third child. The new slogan was “Have three or more if you can afford it”. The TFR centring around 1993 ran roughly parallel to that around 1980 but at a higher level. The Dragon Year preference was exhibited strongly in 1988. The TFR at 1.98 stood out against this background. It was higher than 1.64 (by 21 per cent) in 1987 and 1.79 (by 11 per cent) in 1989. The remarkable 21 per cent fertility increase in 1988 may have been due not only to the Dragon Year preference but also to the strong pro-natalist policies of the late 1980s. The Dragon Year phenomenon occurred once again in 2000; the TFR rose to 1.59 (by 7.5 per cent) from 1.48 in the preceding year. In August 2000 the Singapore government announced a new baby bonus for second and third child, which came into effect in April 2001. This particular measure could not have led to the fertility increase in 2000 since births in the Year of the Dragon were conceived well before its introduction.

### Discussion and conclusion

The Dragon Year preference is a rational decision-making on the part of parents. As couples plan for ever-smaller family prospective parents become more concerned with child quality and wish for a glorious future for their offspring. Chinese astrology holds that the day and hour of birth (i.e. the inner animal) are important in determining the fate of a newborn child. It is not practicable for prospective parents to choose the inner animal for birth timing. Choosing the year animal for birth seems to be their best second choice. Thus, the Dragon Year preference results from a reasoning process that includes the parents’ own psychological satisfaction and a reconciliation of folklore beliefs within the realms of modernism.

In analysing fertility data of Hong Kong SAR, Singapore and Taiwan pertaining to the Dragon Years of 1976, 1988 and 2000, it is unquestionable that zodiacal preferences exert a subtle influence on Chinese birth-timing decisions. As rooted in traditional folklore people believe that their personal traits and fortunes

come under the mysterious influence of the animals of the years in which they were born. The Chinese have always had a liking for the dragon, which has been a symbol of divinity and good fortune. Prospective parents appear to be opting the Dragon Year for birth timing. There is no evidence of such a preference for any other animal year. In foreseeing potential implications brought about by the large single-year cohort of Dragon Year births officials in Taiwan launched an anti-Dragon Baby campaign in 1987 to discourage prospective parents aiming for birth in the Dragon Year of 1988. But their efforts were in vein and fertility in 1988 rose by 9 per cent, no less than that in 1976. This particular instance illustrates that there exists a strong influence of cultural preferences on reproductive behaviour among Chinese population.

In the light of fertility increases in recent Dragon Years it is a puzzle why the Dragon Year preference has not manifested itself in any Chinese population before 1976. One proposition advanced is that fertility was high in 1964 and before, and the unavailability of modern means of contraception would have made aiming for birth in the Dragon Year difficult (Sun, Lin, & Freedman, 1978). If this proposition is established, one might expect that as high, uncontrolled fertility fell in the 1970s due to the practice of contraception, pre-existing zodiacal preferences were automatically revealed. And by implication, larger Dragon Year fertility increases would occur wherever fertility levels were lower. This is not the case as evident from the substantial differentials in Dragon Year fertility changes between different Chinese populations. Taiwan had the largest fertility increase in 1976 despite the fact that its fertility levels were higher than those of Singapore. Hong Kong’s fertility levels were lower than those of Taiwan but it had a not insignificant fertility decline in 1976 instead. As fertility fell further in the 1980s fertility increases in more recent Dragon Years did not necessarily become larger. The “end of uncontrolled fertility” proposition apparently fails to explain why the Dragon Year phenomenon did not occur before 1976.

Taiwan’s fertility increase in the Dragon Year of 1976 was due to changes in timing of births as well as a one-time increase in higher order births (Sun et al., 1978). The Dragon Year preference, to certain extent, seemed to override the desire to limit family size. On the contrary, a fertility decrease was exhibited in Hong Kong in 1976 and an explanation is given in the earlier part of this paper. The gist of the explanation is that the Chinese in Hong Kong would seem to have a stronger urge to practise family planning than the preference for birth in the Dragon Year of 1976. Women having reached the number of children they desired did not want to give birth to a Dragon Baby, hence a continuous significant decline in birth rates in the fourth and higher birth orders in 1976. Nonetheless, there were increases in

low-order birth rates, which indicate that the Dragon Year preference still existed among prospective parents who had not reached their desired family size. In Singapore one might expect that the anti-natalist policies of the 1970s would have weakened the Dragon Year preference, hence a much lower fertility increase in 1976.

In the light of the above analysis it has become a little clearer why the Dragon Year phenomenon did not occur in any Chinese population before 1976. In times before the prevalence of contraceptive practice, fertility behaviour was shaped in particular institutional settings and influenced by cultural preferences. Before sustained declines in fertility, ideals of family size and even the idea of family planning were largely outside the realm of conscious choice (van de Walle, 1992). Influenced by cultural and folklore beliefs, the Chinese had always wanted to bear many children. The old Chinese wish “May good luck, long life and children, all be (yours) in plenty” weighs children in parallel with longevity and fortunes, which people all wished to have. Implicitly, if not explicitly, for the Chinese “children” means “sons”. According to Chinese customs, the more sons a man had the better. This illustrates how important it was for women to bear many children after marriage. One might contend that the Chinese were dominated more by the desire to give birth to sons than the preference for the zodiac. If they made a conscious choice and opted for Dragon Year birth timing, by implication, fertility should have fallen in the preceding year. In the regime of high fertility it is unexpected that this phenomenon could have occurred. As there was no change in timing of births, there should not be any rise in fertility in the Year of the Dragon.

Despite no evidence of Dragon Year fertility increases before 1976, the Chinese would probably have no less preference for Dragon Babies. We identify one hypothesis that may explain why there had not been any fertility increase in earlier Dragon Years while zodiacal preferences might still exist. It is hypothesised that in uncontrolled fertility environment women would have had two conceptions in 3 consecutive years. If that were the case, many could have achieved a conception before the conception window for Dragon Babies closed around the first quarter of the Dragon Year. Under these circumstances, birth rates would have remained high in the Hare Year and the subsequent Snake Year. Consequently, a fertility increase could not have been exhibited in the Dragon Year.

From the above exposition of the Dragon Year phenomenon we conclude that folklore beliefs and cultural preferences have always had an influence on fertility of the Chinese population. In a high and uncontrolled fertility environment before 1976 the Dragon Year preference could have been exhibited in birth rates in each and every birth order. Prospective

parents would not have made any “conscious choice” of the number of children they wanted, hence having no zodiacal birth-timing motivations. Due to the practice of family planning (and the prevalence of contraceptive technology) the fertility of Chinese populations fell to levels close to or below replacement. Under these fertility conditions, the Dragon Year preference could have existed among prospective parents who had not reached their desired family size. It might have exerted an influence on birth-timing decisions. For those who had all or more than the number of children they desired zodiacal preferences would not have affected their reproductive behaviour. Empirical data show that they did not increase fertility in the Dragon Year. As a result, birth rate rise in the Dragon Year is due to changes in timing of births that will have little effect on cumulative fertility. With the prevalence of contraceptive technology it seems a perfectly legitimate situation whereby cultural preferences and folklore beliefs and the practice of family planning could coexist with each other.

#### Acknowledgements

The authors would like to thank the editor Professor Mildred Blaxter and the two reviewers for their constructive comments, and special thanks to Anne Chao and the Census and Statistics Department of the Hong Kong SAR for providing the Taiwan and Hong Kong fertility data, respectively.

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