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MARRIAGE AND FERTILITY IN CHINA: 1950-1989*

1. INTRODUCTION

The 1980s were a momentous decade in China. The economic reforms launched at the end of the 1970s and the beginning of the 1980s led to rapid economic growth and substantial social change. Various demographers inside and outside China have analyzed the development of marriage and fertility in the 1980s, including Feeney et al. (1989), Gu et al. (1990), Luther et al. (1990), Coale et al. (1991), Zeng et al. (1991). This article supplements this research by providing a graphical analysis that summarizes some 14,000 values of data by single year of age and time on marriage and fertility in China up to 1989, with a emphasis of discussion of 1980s.

2. DATA AND METHODS

The data between 1982 and 1988 are from China's two-per-thousand fertility and contraceptive survey conducted in July 1988 by the State Family Planning Commission. This study of 2.15 million people included an intensive survey of 459,269 ever-married women aged 15 to 57. These women were interviewed in detail on 67 items concerning their background, marriage, history of pregnancy, contraception, breast-feeding, childbearing and mobility, etc. The survey covers all provinces, autonomous regions and municipalities in mainland China. The data for 1989 and 1990 are from China's fourth census conducted in July 1990. To provide an overview of the trends of Chinese marriage and fertility in the past 50 years, we also present first marriage and fertility rates before 1981, based on data from another national fertility survey with a sample size of one million persons conducted in 1982.

Lexis maps-shaded contour map of demographic surfaces-are used to display the data. We used this graphical device in an earlier analysis of marriage and fertility in China up to 1981 (Zeng, Vaupel and Yashin, 1985); this article takes advantage of more recent computer technology that permits clearer diagrams¹, and

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1. The program used to draw the contour maps in this article was developed by Wang Zhengliao working with J.W. Vaupel. The horizontal and vertical axes of the Lexis

the most recent and more detailed data. Lexis maps efficiently display both persistent global and prominent local patterns, simultaneously over age and time. They offer a panoramic view of population surfaces that is often superior to three-dimensional perspective plots in providing a clear, yet detailed, representation of an entire population surface. In contrast to perspective plots, Lexis maps precisely indicate the exact ages and years to which data values pertain. It takes a bit of effort to learn how to read Lexis maps, but the reward is substantial.

We calculate and present both unconditional rates and conditional probabilities of first marriage and fertility, for single years of age and time. The numerator of the unconditional rates is the number of women age x who experience the event (e.g., marriage or birth at same parity i) in year y ; the denominator is the total number of women age x at the middle of year y . The conditional probabilities are calculated as the number of women age x who experience the event in year y divided by the number of women age x at risk (e.g., never married women or women at parity $i-1$) at the beginning of year y .

Total fertility rates and parity-specific total fertility rates for each year can be computed by summing the unconditional age-specific rates. Analogously, a total first marriage rate can be calculated as the sum of the age-specific unconditional first marriage rates. For a cohort such total rates correctly indicate the propensity to marry and the level of fertility, but it is not possible to compute total rates for cohorts younger than the maximum age at marriage or childbearing at the time of the survey or census.

The period total first marriage rate, total fertility rate, and total fertility rate by birth order can be calculated. These rates, by definition, indicate the proportion that would marry, the average number of children per woman, and the average number of children by birth order per woman over the lifetime of a hypothetical cohort subject to the given unconditional age-specific vital rates for the period.

When age at first marriage and age at childbearing are declining, as happened in China in the 1980s, period total rates may overestimate the underlying propensity to marry and the underlying fertility level. Indeed, both the total period first-marriage rate and the total period fertility rate for first births can exceed one. The reason is that the marriage and childbearing of younger and older women overlap (Coale, 1984, p. 41). On the other hand, when age at first marriage and age at childbearing are increasing, as happened in China in the 1970s, the period

maps present calendar years and ages respectively. Different levels of the rates (or other measurement) at different years and ages can be distinguished by different colors in a color display or shades of grey in a black-white display. As indicated in the key for Figure 1, for example, eleven levels of marriage rates are distinguished. Note that the scale on the key refers to the contour lines that separate different levels of grey, not to the levels of grey themselves. Thus the lightest area on the map represents periods when marriage rates were less than 0.5 percent, whereas the darkest area represents periods when marriage rates exceeds 20 percent. In learning to read the maps, it may be helpful to note that more than 20 percent of all 18-year-old women in 1962, and more than 20 percent of all 22- and 23-year-old women in 1981 got married. It is possible to produce smoothed Lexis maps with curvilinear or diagonal contours, but we decided to present the rectangular patterns that indicate the nature of the underlying data.

total rate may underestimate the underlying marriage intensity and fertility level.

Total first-marriage rates were as low as 0.67 in 1975 and as high as 1.27 in 1981, and 1.13 in 1986 (see Tab. 1). It is erroneous to conclude that marriage levels in 1975 implied that only 67 percent of Chinese women would eventually marry, and it is illogical to infer that marriage levels in 1981 and 1986 implied that Chinese women would, on average, have 1.27 or 1.13 first marriages. Total first-birth rates were 0.833, 1.115, and 1.30 in 1980, 1981, and 1982, respectively (see Tab. 1). The 1980 fertility level does not imply that only 83.3 percent of Chinese women would eventually have a baby, and the 1981 and 1982 fertility levels do not mean that Chinese women would have more than one first birth.

Period total fertility rates of birth order over one suffer from the same kind of problems during years in which age at childbearing is changing, but the distortion is not as obvious or dramatic as in the case of total first-marriage rates and total first-birth rates. Consequently, the perils of possible distortion are not recognized by many researchers who analyze period total fertility rates.

A life table approach does not entirely solve the problem of distortion caused by changing ages at marriage and childbearing (Feeney and Yu, 1987; Zeng et al. 1991, endnote 6, p. 455). Nevertheless, life table calculations provide measurements of marriage intensity and fertility levels which tend to be much closer to underlying values, and life table calculations never lead to such impossible results as more than one first birth per woman.

Based on cohort data from the one-per-thousand fertility survey and census results, the marriage propensity for females in China is more than 99 percent (Coale, 1984) and the proportion of women eventually giving birth to at least one child is around 96 percent (Zeng, 1991, p. 26 and p. 117-118). Table 1 shows that period total rates differ substantially from the expected values. On the other hand, the life table calculations, while somewhat distorted, are much closer to the true values.

Women who are unmarried at the time of a survey or census may still marry; married women under age 49 may still give birth. We address this "right-censoring" problem by the approach usually used in the construction of marital and parity status life tables. Specifically, we assume that the censored women drop out of the risk population at the middle of the year (Elandt-Johnson and Johnson, 1980, p. 157). The mathematical formulas for constructing marital and parity status life tables are presented in the footnote 3, 2

2. Formulas for constructing marital and parity-status life tables.

Let: $s(x)$ be the proportion of women age x who have never married, with $s(15)=1$; $m(x)$ be the probability that a never-married woman of exact age x will marry between exact ages x and $x+1$; $p(x,i)$ be the proportion of ever-married women age x at parity i ; $b(x,i)$ be the probability that an ever-married woman of exact age x and parity $i-1$ will give birth to her i th child between exact ages x and $x+1$; $b^0(x)$ be the probability that a newly-married woman age x will give birth in the same year as her marriage. Then, for $x=a$ to β : (a and β are the lowest and highest age at childbearing)
 $s(x+1)=s(x)(1-m(x)); p(x+1,0)=p(x,0)+s(x)m(x)(1-b^0(x))-p(x,0)b(x,1);$
 $p(x+1,1)=p(x,1)(1-b(x,2))+s(x)m(x)b^0(x)+p(x,0)b(x,1);$
 $p(x+1,i)=p(x,i)(1-b(x,i-1))+p(x,i-1)b(x,i), 1<i<H; \text{ and}$

3. MARRIAGE

3.1. Timing of first marriage

Before 1980, age at first marriage tended to increase; after 1980, this trend reversed. The pattern can be seen in Figure 1, which presents a Lexis map of age-specific unconditional first marriage rates for women by single calendar years from 1950 through 1987.³ Age at first marriage shifted upward by about four years between 1950 and 1980; most of this increase occurred in the 1970s. The substantial increase in age at first marriage in the 1970s was mainly due to the impact of the emphasis put on delayed marriage in the Chinese family planning program of "Wan, Xi, Shao"⁴. Coale (1984), Banister (1987) and Zeng, Vaupel and Yashin (1985) discussed the increase of age at first marriage in China in the 1970s.

Since 1980, age at marriage has fallen. As shown in Figure 1, the ages when unconditional first marriage rates were higher than 10 percent declined from ages 21 to 25 in 1979 to ages 20 to 24 after 1980. Figure 2, which presents age-specific first marriage probabilities for never-married women, reveals the same trend from another perspective. Consider the contour line at the 10 percent level. Above this line, more than a tenth of unmarried women get married each year. Because most Chinese women marry within a narrow age range, the 10 percent line can be viewed as representing the start of a period of intense marriage activity during which virtually all Chinese females marry. In Figure 2, the 10 percent line starts at age 18 in 1970, increases to age 21 in 1977, and then declines to age 19 after 1980. The 25 percent contour line exhibits the same general pattern, albeit at higher ages.

These changes in the age-specific probabilities of marriage are reflected in corresponding changes in the female mean age at first marriage. This age decreased from 23.0 in 1979 to 22.4 in 1982 and to about 22.2 in 1987. Since no direct survey data on timing of marriage is available after 1987, Zeng (1992) estimated this age (the so-called "singulate mean age at first marriage") during the period 1987-90 as 22.0. This calculation was based on the single-year age-specific proportion never-married at mid-year 1987 and 1990, derived from the 1987 one-percent population survey and the 1990 census. The lower quartile, median, and upper quartile of the distribution of age at first marriage, based on the 1987 survey and 1990 census data, fell from 21.0, 22.9, and 24.7 in 1987 to 20.8, 22.3, and

$p(x,H)=p(x,H)+p(x,H-1)b(x,H)$. Where H is the highest parity considered.

³ The first marriage rates for years 1950-1981 and for years 1982-1987 are derived from the 1982 one-per-thousand fertility survey and the 1988 two-per-thousand fertility and contraceptive survey, respectively. No first marriage rates after 1987 are available in the Chinese 1990 census because no census questions on dates (or age) at marriage were asked.

⁴ Wan, Xi, Shao are the major policy components of the successful Chinese family planning program in the 1970s: Wan - late marriage, mid-20's for women, late 20's for men; Xi - large birth intervals (3-4 years); Shao - fewer children, no more than two children per couple in the cities and three in the rural areas.

Figure 1 - Age-specific first marriage rates among women aged 15-35, China, 1950-87.

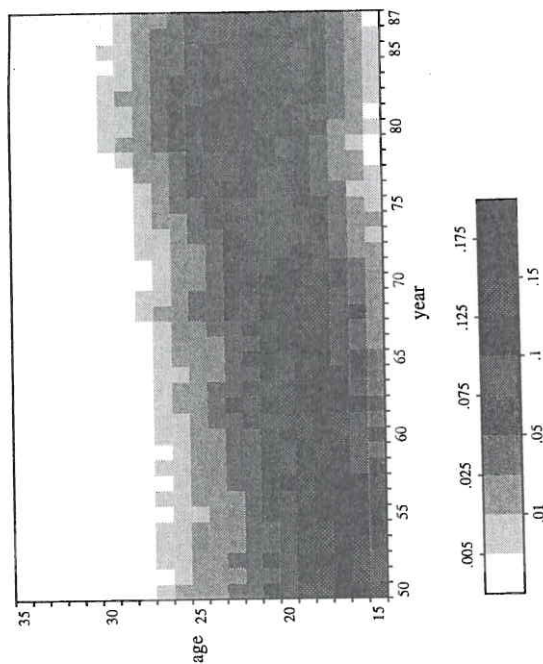
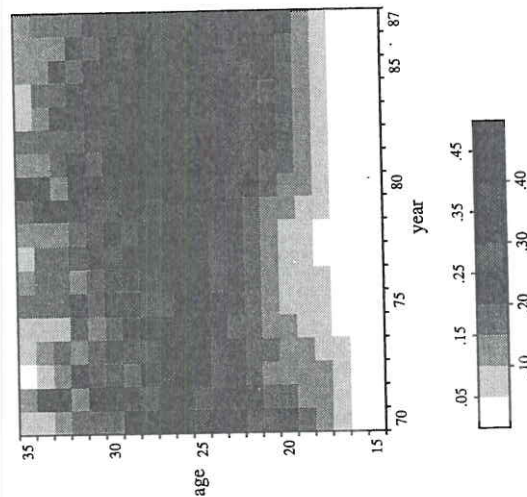


Figure 2 - Age-specific first marriage probabilities among women aged 15-35, China, 1950-87.



23.9 in 1990 for females. For males the corresponding ages were 23.0, 24.9, and 27.1 in 1987 and 22.1, 23.6, and 25.6 in 1990.

The decrease in age at first marriage at the beginning of 1980s was mainly due to relaxation of the restriction on age at first marriage enforced in the 1970s: a "new marriage law" officially took effect on January 1, 1981. The new marriage law actually raised the minimum legal age of marriage of 20 for males and 18 for females, as specified by the old marriage law of 1953, to 22 for males and 20 for females. The old marriage law was not followed in 1970s, however, and the administratively controlled minimum age at first marriage was effectively in the mid-20s for females and the late 20s for males. With the introduction of the new marriage law, these administrative regulations were no longer implemented.

China's economy developed rapidly and living standards improved substantially since 1980. Given the theoretical expectation of a positive relationship between age at marriage and economic level, why did age at first marriage in China continue to gradually decline after 1984? Several explanations shed light on this issue.

First, starting from the beginning of the 1980s, many governmental agencies as well as the media emphasized the important functions of the legal system. Departments of civil affairs took control of marriage registration from family planning program offices. Departments of civil affairs usually emphasize citizens' rights in choosing when to marry under the new marriage law. This makes it more difficult for family planning offices to encourage late marriage for birth control purposes. Leaders of family planning programs frequently complain that civil affairs officials do not support efforts to promote late marriage; civil affairs officials respond that they must follow the law.

Second, even in places where family planning offices maintained their control over marriage⁵, administrative decentralization since the economic reform has generally lessened governmental control over people's behavior, including age at marriage.

Third, economic growth has enabled many people to finance their own or their children's marriage at ages younger than in the less prosperous 1970s.

Since brides usually marry into grooms' households in rural areas, and since nearly all females participate in the labor force, earlier marriage (and earlier childbearing) is one of the ways to increase the labor force in grooms' households.

Fifth and finally, the "marriage market" has, as Tian (1991) pointed out, encouraged earlier marriage. Grooms are usually two to three years older than brides in China. Because of extremely low fertility in 1959-61⁶, the number of women born in this period and in their 20s in the 1980s is much smaller than the number of males, born in 1956-58, who are three years older than them. Consequently, some of these males may have married women four or more years younger than themselves. This might have led to some decline in the age at

⁵ In some areas, the authority of the local government may persuade the department of civil affairs to cooperate with the family planning office in implementing late marriage regulations, even though they are not required in the New Marriage Law.

⁶ The sudden radical decrease in fertility in 1959-61 was caused by the Great Leap Forward and natural calamities in the three years that followed.

marriage for females. On the other hand, the number of women born in 1962-64 is much larger than the number of males born in 1959-61. The desire to ensure marriage may have encouraged these women to marry as soon as possible. As Tian (1991, p. 37) states, this demographic explanation of the cause of the decline in the age at marriage in China in the 1980s is a qualitative speculation that can be verified or refuted only on the basis of careful analysis of survey data.

3.2. Concentration of first marriage in a narrow age interval

As indicated in Figure 1, marriage in China is concentrated in a narrow age interval. The 0.05 percent contour line in Figure 1 runs from age 27 in the 1950s and 28 in the 1960s to 28-29 in the 1970s and 29 in the 1980s. This means that few women got married after their mid twenties in the 1950s and 1960s and after their late twenties in the 1970s and 1980s. In 1950 over half of women were married in their teens. By the late 1960s the intensive period of marriage had shifted upward, so that most women married between age 18 and 21. In the 1980s the typical age of a woman at first marriage was between 20 and 23.

This remarkable concentration of marriage is grounded in Chinese cultural traditions. Chinese parents have always believed that once sufficient maturity is attained and other conditions of marriage under given socio-economic conditions are fulfilled, their sons and daughter should get married as quickly as possible. Since cohabitation outside of marriage and pre-marital sexual activities are culturally and legally prohibited, there are emotional and practical pressures for eligible young men and women who fall in love to get married as soon as possible. Moreover, many Chinese consider single men and women in their 30s as abnormal: this social pressure also makes young people try to marry quickly.

3.3. Continued universality of marriage

The near universality of marriage in China up to 1982 is evident on a Lexis map presented in our earlier article (Zeng, Vaupel, and Vaupel 1985). The map was based on Coale's estimates (Coale, 1984) of the proportion of women ever married from age 15 to 35 from 1950 to 1982. For the cohort reaching age 35 in 1982, more than 97.5 percent of the women were married by age 35, and for most of the other cohorts the total exceeded 99 percent. Has this universality of marriage persisted in the 1980s? We can extend Coale's estimates to 1988 by using data from the two-per-thousand fertility and contraceptive survey data, but the future marital behavior of persons under age 35 in 1988 is uncertain. Life table calculations provide an adequate if imperfect measurement of period marriage intensity.

Table 1 presents the proportion of women who have married by age 50 according to period life tables from 1970 to 1987. It is evident that the virtual universality of marriage has continued into late 1980s: the proportion married by age 50 was more than 99.5 percent in 1970, and 99.2 percent in 1974 and then increased to more than 99.9 percent after 1980.

TABLE 1
A comparison of the probability of first marriage and of first birth, for females,
measured by total rates and by life table calculations

Year	Percent eventually married		Percent eventually giving 1st birth	
	Total rate	Life table	Total rate	Life table
1970	86.25	99.63	123.05	98.21
1971	69.72	99.08	104.32	95.94
1972	70.04	99.29	89.97	95.30
1973	71.35	99.29	82.66	94.71
1974	67.54	99.22	84.91	94.59
1975	67.17	99.32	74.01	94.24
1976	72.20	99.32	74.91	95.40
1977	72.23	99.24	71.24	95.71
1978	85.78	99.48	73.77	97.08
1979	96.74	99.84	82.08	97.74
1980	119.22	99.97	83.28	98.90
1981	126.99	99.98	111.47	99.55
1982	121.99	99.97	129.88	99.63
1983	107.69	99.94	116.05	99.29
1984	103.22	99.90	110.02	98.18
1985	105.46	99.91	102.43	98.98
1986	113.13	99.91	112.47	99.26
1987	102.94	99.94	120.44	99.09

While the universality of marriage persists in China, there was a deviation from this pattern between 1971 to 1978, a deviation so slight that it is of interest only because it stands out against the remarkable uniformity of the background pattern. The slightly lower values of the life table proportion married at age 50 in the period of 1971-78 may be due to two factors. First, age at first marriage declined, distorting the life table calculations. Second, there were relatively more spinsters in their late 30s or 40s in this period, because opportunities to marry were severely affected by the delay in marriages of high school graduates who were sent to mountainous and rural areas for political "re-education" in the late 1960s and early 1970s, and the political disasters of the 1957 "movement against the rightists" as well as the Cultural Revolution in 1966-76. The high school graduates sent to countryside returned cities, and the persons who were victims of the political disasters were rehabilitated and subsequently married or reunited with their lovers, so that the life table proportion eventually married became normal again after 1978 when the Cultural Revolution ended.

4. FERTILITY

4.1. Overall level and age pattern of fertility

Figure 3 presents a Lexis map of Chinese unconditional fertility rates by single year of age from 15 to 49 and for single calendar years from 1940 to 1989⁷. The most striking feature of the map is the rapid fertility decline in the 1970s. This decline is well known and often summarized by the dramatic drop in the total fertility rate from 5.8 in 1970 to 2.6 in 1981. After 1981, total fertility rates in China fluctuated between levels of 2.35 and 2.59; the total fertility rate decreased to 2.35 in 1984, increased to 2.59 in 1987 and decreased to 2.35 again in 1989. What the map graphically reveals is the age pattern of the decline. Consider, for example, the ages when the fertility rate exceeds 15 percent. Before 1970, this period of high fertility stretched from age 19-20 through 39. By 1981, in contrast, the period of high fertility was concentrated from age 22 to 28 and the fertility rates above age 33 and under age 20 were less than 5 percent. After 1981, this age pattern of fertility remained more or less the same with a slight downward shift in ages of high fertility.

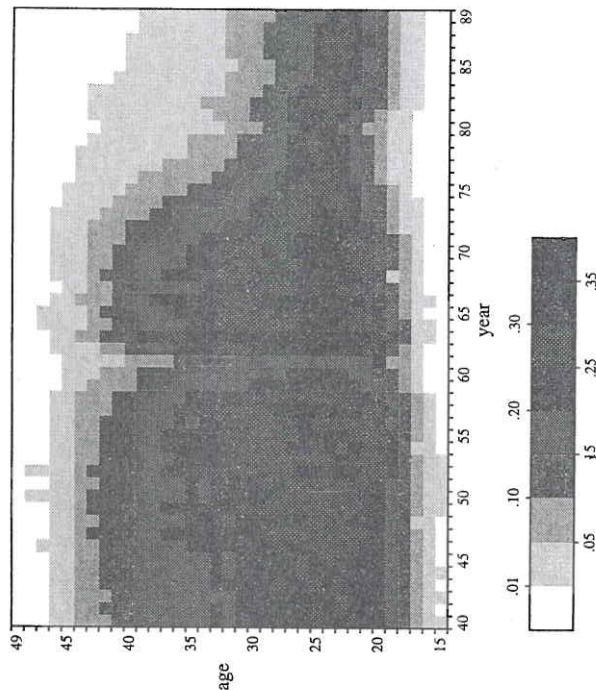
The information shown in Figure 3 on unconditional fertility rates provides only a partial picture of changes in fertility patterns because changes in the parity composition of fertility have been substantial. Fertility in societies where contraception is widely practiced is not only age dependent but also, and often even more importantly, parity dependent: a couple's decisions about reproductive behavior depend on how many children they have had. Birth control policy in China, which prohibits births of order three or higher among the majority Han people, increases the dependency of fertility on parity. Age-specific fertility rates not classified by birth order can be misleading when the fertility of higher birth orders is declining. For example, in the 1970s the female mean age at childbearing decreased from around 29 in the first half of the 1970s to less than 28 in 1980. This shift was not, however, a result of earlier childbearing: people actually delayed childbearing under the "Late marriage, longer interval and fewer children" campaign in 1970s. The reason why the mean age at childbearing declined in the 1970s is that there were far fewer births of higher order by older women in the late 1970s.

4.2. Fertility decomposed by parity

Figure 4 and Figure 5 present unconditional fertility rates and conditional birth probabilities by birth order. Both the unconditional fertility rates of birth order one and the conditional birth probabilities of birth order one increased at ages 20-25 from the middle of the 1970s through the end of the 1980s. The Lexis maps

⁷ The unconditional fertility rates for years 1940-81 are from the 1982 one-per-thousand fertility survey, the rates for 1982-87 are from the 1988 two-per-thousand fertility and contraceptive survey, and the rates for 1989 are from the 1990 census. The rates for 1988 are interpolations based on the 1987 and 1989 rates.

Figure 3 - Age-specific rates among women aged 15-49, China 1940-89



demonstrate clearly that although overall fertility levels have declined substantially since 1970, almost all Chinese women still have at least one child. This is in marked contrast to the increase in childlessness that has accompanied the decline in fertility in many Western countries. The maps also reveal the changes in timing of fertility for the first child: later in the second half of the 1970s and slightly earlier in the second half of the 1980s. Female mean age at birth of the first child increased from less than 23 at the beginning of the 1970s to more than 24 at the beginning of the 1980s but then fell to 23.4 in 1989. Since few women in China adopt contraception immediately after marriage, the increase of mean age at first birth in the 1970s was due to the "late marriage" campaign and the decrease in the 1980s was due to the decrease of age at first marriage, as explained in the previous section.

The second panels in Figures 4 and 5 reveal the remarkable changes in fertility for the second child from 1970 to 1989. The age interval when unconditional fertility rates of birth order 2 exceed 4 percent changed from ages 20 through 29 in 1970-73 to a narrower interval of ages 21 through 28 in 1974-78 and to a still narrower interval of ages 22 through 28 in 1978-85. The contour lines of the conditional fertility probabilities of birth order 2 (second panel of Figure 5) reveal the same trend. For example, the age interval when the annual

probability of giving birth to a second child was more than 25 percent (among women who had a first child) stretched from age 21 through 33 in 1970 but only from 22 through 28 in 1979. By 1980 there was not any age at which the probability of a second child exceeded 25 percent. The convergence of contour lines in Figure 4 and Figure 5 in the 1970s and early 1980s reveals the extraordinary impact of the Chinese family planning program. As a result of the relaxation of the one-child policy after 1984⁸, the age intervals with relatively high fertility begin to widen somewhat again.

The third panels of Figures 4 and 5 show the dramatic decline of fertility of birth order 3 in the 1970s and lack of much change thereafter. Finally, the fourth and fifth panels of Figures 4 and 5 reveal the sustained decline of fertility of birth orders 4 and 5 and higher from 1970 through 1985. This decline can be attributed both to the effective efforts of the Chinese family planning program and to the impact of socio-economic development. After 1985, fertility rates of order 4 or more changed very little.

4.3. Completed fertility under the fertility regimes from 1970 to 1987

The Lexis maps discussed so far provide an informative overview of the general pattern and trends of fertility in China. It is also useful to consider how many women would eventually give birth to 0, 1, 2, 3, 4, or 5 or more children under the fertility regimes that have prevailed in China since 1970. This information is useful in summarizing patterns of fertility and in ascertaining the effectiveness of policies encouraging one-child families and discouraging large families. As explained in the first section of this article, total fertility rates by birth order provide distorted information because total rates are affected by changing age at marriage and childbearing. The conditional birth probabilities by parity presented in Figure 5 do not provide a summary measure. Marital and parity status life tables based on the conditional probabilities of first marriage (Figure 2) and fertility by parity (Figure 5) can, however, provide the statistics needed⁹. Table 2

⁸ The Chinese government issued Document Number 7 in 1984. Document 7 is more permissive toward second children among rural couples with "real difficulties". From early 1984, revisions of provincial family planning regulations generally expanded the categories of couples who qualified for approval of a second child. Some provinces started officially to allow rural couples whose first child was a girl to have a second child and this policy was officially granted for all rural areas of the country in 1988. Six provinces and autonomous regions (Guangdong, Hainan, Yunnan, Ningxia, Qinghai and Xinjiang) even practiced a policy in rural areas of universally allowing two children per couple with spacing.

⁹ Feeney and his colleagues first calculated Chinese period parity progression ratios following the parity status life table approach, using data from the Chinese 1982 one-per-thousand fertility survey and 1987 one-percent population survey (Feeney and Yu 1987; Feeney et al. 1989). Following the same procedure used by Feeney and Yu (1987) and based on the application of a recently developed extension of the "own children" method of fertility estimation to a five percent sub-sample of the Chinese one-percent population survey, Luther et al. (1990) computed the period proportion eventually

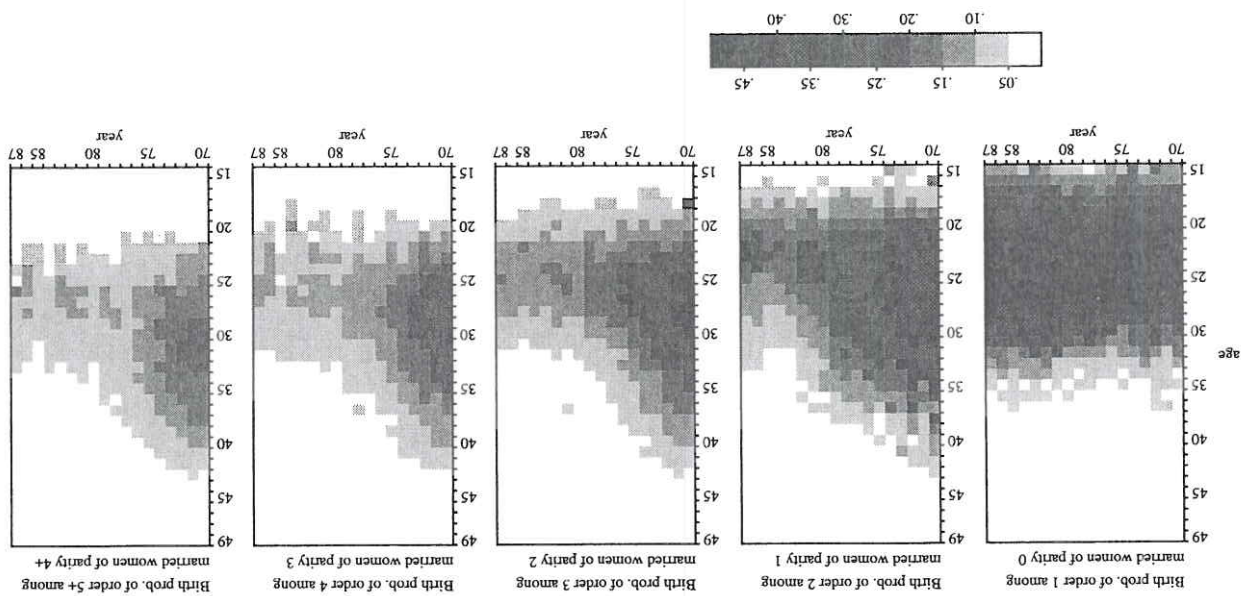


Figure 5 - Conditional age-specific birth probabilities among women aged 15-49, China, 1970-89

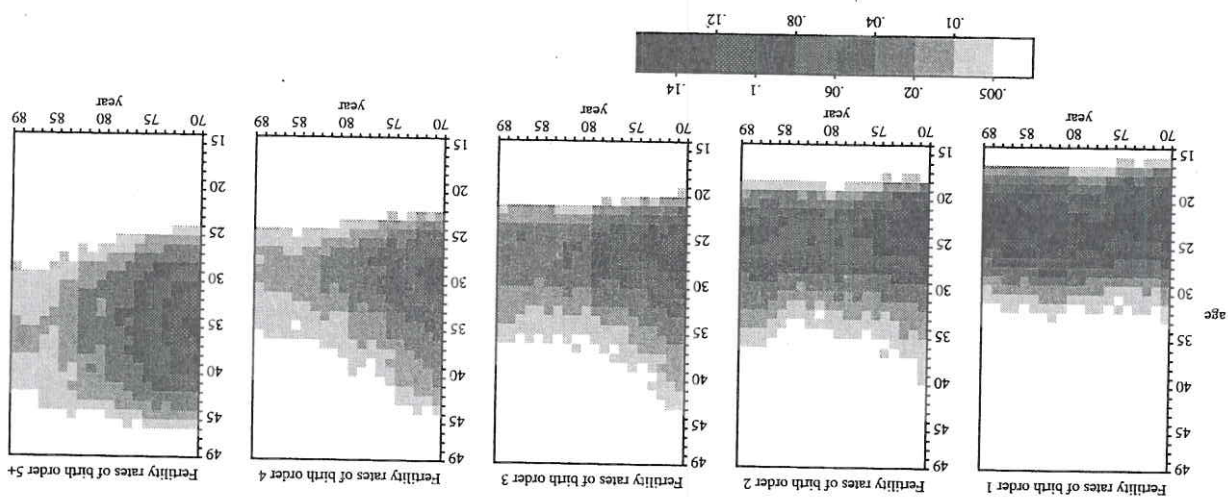


Figure 4 - Age-specific fertility rates among women aged 15-49, China, 1970-89

TABLE 2
Percent of never married and ever-married women who have had exactly 0, 1, 2, 3, 4, or 5+ births by age 50, according to marital and parity status life tables, China, 1970-87.

Year	Never married	No. of births given by age 50 for those ever married						Total
		0	1	2	3	4	5+	
1970	0.37	1.42	1.05	3.49	9.62	19.01	65.04	100.0
1971	0.92	3.14	2.32	4.37	10.50	20.14	58.61	100.0
1972	0.71	3.99	2.31	6.17	13.28	21.30	52.24	100.0
1973	0.71	4.58	2.32	7.63	16.40	24.47	43.90	100.0
1974	0.78	4.63	2.81	10.30	19.72	25.91	35.85	100.0
1975	0.68	5.08	4.17	14.91	26.30	25.25	23.62	100.0
1976	0.68	3.92	4.28	18.13	31.26	24.17	17.57	100.0
1977	0.76	3.53	5.76	28.11	34.30	28.55	9.01	100.0
1978	0.52	2.40	4.07	30.77	36.93	17.52	7.79	100.0
1979	0.16	2.10	4.45	34.15	35.09	17.43	6.62	100.0
1980	0.03	1.07	8.67	47.88	30.64	9.40	2.32	100.0
1981	0.02	0.43	10.53	43.16	33.08	9.68	3.11	100.0
1982	0.03	0.34	12.57	44.16	30.07	9.61	3.22	100.0
1983	0.06	0.65	19.57	50.38	22.12	5.83	1.41	100.0
1984	0.10	0.72	24.32	46.23	21.80	5.41	1.42	100.0
1985	0.09	0.93	23.64	50.53	19.44	4.63	1.02	100.0
1986	0.09	0.65	16.36	51.56	23.69	6.09	1.57	100.0
1987	0.06	0.85	14.77	51.75	24.09	6.59	1.89	100.0
1988	0.06	0.70	21.03	48.80	21.65	5.39	2.38	100.0
1989	0.06	0.58	29.83	43.83	18.81	4.31	2.60	100.0

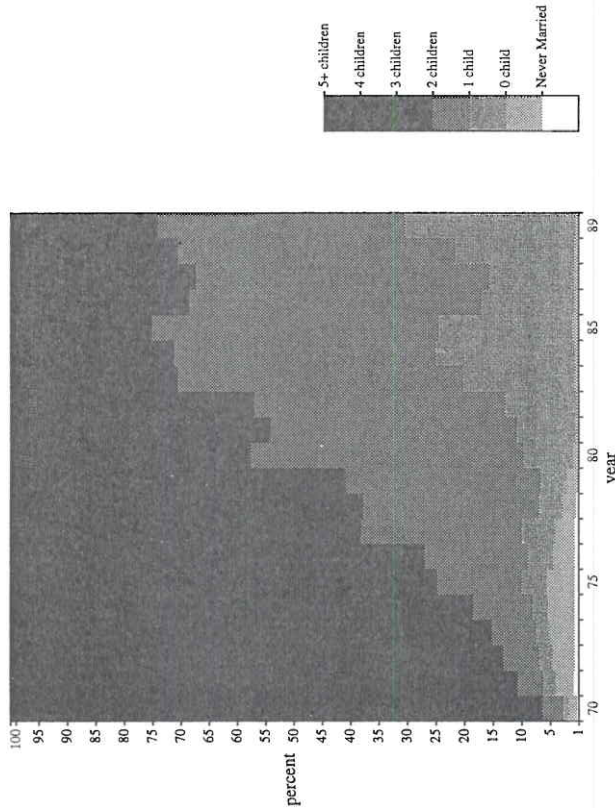
and Figure 6 summarize the results of such calculations.

Table 2 and Figure 6 show that the pattern of fertility in 1970 implied that 65 percent of women would eventually have 5 or more children. In contrast, this proportion has been reduced to about 2 percent during the second half of 1980s. The fertility level in 1970 implied that nearly 94 percent of Chinese women would eventually have at least three children: this proportion declined to under 25 percent in 1985, increased to more than 32 percent in 1987 and then fell to under 26 percent in 1989.

The period life table proportion of women who have only one child increased from 1.1 percent in 1970 to more than 24 percent in 1984. After 1985, the proportion with one child decreased to less than 15 percent in 1987 but then

married and parity progression ratios for years ending June 30, 1955-87. We here essentially address the same question by presenting never-married, ever-married and parity-status distributions at the end of the reproductive age span, following the life table approach.

Figure 6 - Percent of never married and ever-married women who have given exactly 0, 1, 2, 3, 4, 5+ births by age 50, according to marital and parity status life tables



increased to almost 30 percent in 1989.

The period life table proportion of women who eventually have two children increased from 3.5 percent in 1970 to roughly half in the 1980s. Two-children families have become much more common due to the dramatic decrease of fertility of birth order 3 and higher.

These summary indices of marital and parity-status life-table analysis clearly show the tremendous decline of higher parity births in the 1970s and the continuation of this trend, at a slower pace, in the first half of 1980s. The proportion of women who eventually have three or more children slightly increased in 1986-87 due to the relaxation of the one-child policy in rural areas; decentralization resulting from economic reform also played a role¹⁰. The

¹⁰ This conclusion--based on data from the 1988 two-per-thousand fertility and contraceptive survey and presented in the Lexis map (Figure 6) and in table 2 of the completed parity distribution--is confirmed by the period parity progression ratios estimated for the years ending June 30, 1972-87 by Luther et al. (1990, p345, Figure 1)

proportion of higher-order births decreased again after 1987, perhaps because of more effective implementation of family planning policies or because of more severe under-reporting of births at higher parities.

The period life table proportion of ever-married women who remain childless increased from 1.4 percent in 1970 to a peak of 5 percent in 1975 and then decreased to less than one percent after 1981. This pattern mimics the increase in age at first marriage in the 1970s and the decrease in the 1980s. When the timing of births is changing, both period total age-specific unconditional fertility rates and completed parity distributions produced by life table analyses are subject to the same kind of distortion (Feeney and Yu, 1987; Zeng et al. 1991, endnote 6, p.455). Nevertheless, as demonstrated in Table 1, this sort of distortion in life table calculations based on age-specific conditional probabilities is much less serious than the distortion in total unconditional rates. The life table proportion childless in 1971-79 may be slightly higher than the real value due to delayed births and the estimated proportions in 1981-89 may be somewhat lower than the true ones due to the decrease of age at childbearing¹¹.

5. CONCLUSION

The Lexis maps presented in this article provide a useful supplement to standard modes of graphical and numerical analysis of Chinese marriage and fertility. The major trends in China since 1950 are vividly summarized in the maps. In the 1970s, age at first marriage shifted upward by about four years, and fertility dramatically declined, especially before age 20 and after age 30, and especially for parities higher than 2. The maps also reveal the substantial impact of the disturbances associated with the Great Leap Forward, three years of famine, and the Cultural Revolution as well as the decrease in age at marriage and childbearing in 1980s associated with the new Marriage Law announced in 1980 and some other socio-economic and demographic factors, as explained in the text. Fertility rates for second children slightly increased in the second half of the 1980s, from their low level in 1984. Fertility rates of birth orders 3, 4, and 5 and higher continued to decline in the 1980s, with a small increase or random fluctuation around 1987¹². Despite the remarkable changes in Chinese marriage

based on the 1987 one-percent population survey and the extended "own children method".

¹¹ The observed proportion childless among ever-married women in China varies from 1 to 3 percent, depending on the data source used. For example, the In-Depth Fertility Surveys conducted in 1985 show that these proportion among ever-married women aged 45-49 were 1.6, 0.8, and 2.9 percent in Hebei, Shaanxi and Shanghai, respectively. According to a widely used standard pattern of sterility estimated by Henry (1965), the proportion of sterility is about 3 percent at age 20 and 5 percent at age 25. The very low level of childlessness observed in the Chinese surveys and census may be due to a tendency for adopted children to be reported as births to the adopting mother (Feeney et al. 1989, p. 310).

¹² Some most up-to-date information have indicated that in China age at marriage is increasing and fertility is decreasing after 1990. We are so far not able to analyze and

and fertility, some striking regularities persist. Marriage remains virtually universal by age 35 and concentrated in a narrow age interval. Although the fertility level declined dramatically, especially in the 1970s, age-specific birth rates and probabilities of birth order one remain as high as they used to be, and a large majority of married Chinese women have their first birth at rather young ages.

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discuss the latest trend in 1990s because lack of reliable and detailed data, but this may be done after release of the data to be collected from the Chinese mini-census scheduled in the middle of 1995.

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**NUMBER AND TIMING FAILURES AMONG BIRTHS
 IN INDONESIA**

1. INTRODUCTION

Interest in the extent of unwanted childbearing is grounded in fertility theory and its potential application where existing fertility levels are believed suboptimal. Easterlin (1983) argues that unwanted fertility occurs when the potential supply of children is greater than the demand, and when the costs of birth regulation outweigh the perceived benefits (also see Cleland, 1983 and Hermalin, 1983). Thus, where there are no birth prevention costs, the extent of unwanted fertility is an indicator of how much fertility levels could be lowered independent of changes in demand. Bogue (1983), Shearer (1983), and Hermalin (1983) provide extensive inventories of the costs of birth prevention. Cost reductions are traditionally achieved by setting up a family planning program, but affecting reductions in demand usually involve achieving basic changes in a society's social structure. Although setting up a family planning program is more complex than it appears at first glance (cf. Warwick, 1982 for some case studies), this is usually more straightforward, and it can usually be achieved before the types of changes in social structure which will reduce demand can be accomplished. Unwanted childbearing is also closely linked to quality of life issues. It is one indicator of the extent to which persons fail to control a key area of their lives - their reproductive behavior which is regarded internationally as a basic human right (United Nations, 1967). Moreover, there is increasing evidence to show that unwanted and/or unplanned pregnancies develop more slowly as children, and fare less well later in life than do wanted and planned births (David, et. al., 1988).

While there has been heightened interest in unwanted pregnancies, there has also been debate over how such pregnancies should be measured. One measure of demand is family size preferences or desires which may or may not be realized. In some countries substantial proportions of women do not have as many children as they desire. Failure to reach a number goal can be involuntarily the result of biological or health conditions, but it can also be voluntary such as when responses to a question about desired family size reflect circumstances more favorable to childbearing than those actually had (Weller, 1974). That is, number goals may be deliberately restricted as a way of adapting to actual circumstances. Moreover, we know that family size preferences change from one point in time to the next and that they are made sequentially (Rosenzweig, 1976). Measure of desired family size are also biased because of rationalization of past behavior, and they are confounded by infant and child mortality as well as gender composition preferences (Bongaarts, 1990; Westoff, 1980).

Finally, it is important to bear in mind that numbers represent only one dimension of reproductive goals. Demand exists not only as a lifetime concept, but as a temporal-specific concept for different periods of a person's life. Thus, even