

*Arthur P. Wolf and Theo Engelen*

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## **Fertility and Fertility Control in Pre-**

**Revolutionary China** The argument of Malthus' *First Essay on Population* is largely developed on the basis of a comparison between three countries—Britain, the United States, and China. England is presented as an example of an “old state” in which population growth has been considerable in the past but is slow at present. The reason is that “a foresight of the difficulties attending the rearing of a family acts as a preventative check, and the actual distress of some of the lower classes, by which they are disabled from giving the proper food and attention to their children, acts as a positive check.” This observation holds for all old states because they lack the resources necessary to support further growth.<sup>1</sup>

Malthus offers the United States as an example of a new state in a “healthy country . . . with plenty of food and room” and institutions that made good land affordable and agriculture a good investment. The result was that, as in new colonies generally, the population grew “with astonishing rapidity.” Malthus underlines the point by asking why an equal number of people did not “produce an equal increase in the same time in Great Britain.” His answer is, “The great and obvious cause . . . is the want of food and room, or in other words, misery.”<sup>2</sup>

China was known to Malthus as “one of the most fertile, best cultivated, most industrious, and most populous countries in the world,” but Smith characterized it as a country in which “the poverty of the lowest ranks of people . . . far surpasses that of the most beggarly nations in Europe.” Quesnay summed up the prevailing

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1 Thomas Robert Malthus, *Population: The First Essay* (Ann Arbor, 1959; orig. pub. London, 1798), 22–24.

2 *Ibid.*, 36–39.

view: “In spite of . . . the abundance that reigns, there are few countries that have so much poverty among the humbler classes. However great the empire may be, it is too crowded for the multitude that inhabit it.”<sup>3</sup>

Malthus therefore viewed China as the third point of a theoretical triangle, belonging to a class of countries with periods “when population increased permanently, without an increase in the means of subsistence.” In such countries, “population appears to have been forced, that is, the people have been habituated by degrees to live almost upon the smallest possible quantity of food.” China answered this description because “if the accounts we have of it are to be trusted, the lower class of people are in the habit of living almost upon the smallest quantity of food and are glad to get any putrid offals that European laborers would rather starve than eat.” A country in this condition “must necessarily be subject to famines.”<sup>4</sup>

Although Malthus never doubted his views of Britain and the United States, he was never entirely happy with his conclusions regarding China. What worried him most was the report that despite every acre of tillable land having long been under cultivation, marriage was early and nearly universal. In his first mention of China, he called for “inquiries [sic] into the manner and habits of the lower classes and the encouragements of early marriage.” “Perhaps,” he wondered, “the fact of the universality of early marriage may not be sufficiently ascertained.” He assumed that if marriage was in fact early and universal, fertility must have been high. He therefore thought it was of “the utmost importance” to ascertain “in what manner the checks to a further population operate; what are the vices, and what are the distresses that prevent an increase of numbers beyond the ability of the country to support.”<sup>5</sup>

It is important to note that Malthus knew little or nothing about most of the conditions that affect fertility. Most importantly, he knew nothing about lactational amenorrhea. If Chinese women married earlier and in greater numbers than British

3 Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (New York, 1976; orig. pub. London, 1776), I, 89; Francois Quesnay, *Le despotisme de la Chine* (Paris, 1767), in Lewis Adams Maverick (ed. and trans.), *China: A Model for Europe* (San Antonio, 1946), II, 141–142.

4 Malthus, *Population*, 45–46.

5 *Ibid.*, 21, 20.

women, he could only conclude that their fertility was proportionally higher, guaranteed by “the passion between the sexes.” But why, then, did the Chinese marry in such great proportions and at the earliest possible age? Many people were already living on “the smallest possible quantity of food.” Why, despite the misery that this must inevitably have entailed, did even the poorest among them marry at the first opportunity?

Until recently, most scholars agreed that developments since Malthus’ time had largely resolved his doubts while confirming his general view of China. Surveys conducted in the 1930s and archival studies of genealogies indicated that despite early and universal marriage, Chinese fertility was not as high as Malthus appears to have imagined, largely because of late weaning, poor nutrition, and female infanticide. It was, however, high enough to produce a population that could appropriately be described as “forced.” All of the evidence pointed to high infant and childhood mortality, low adult life expectancy, widespread poverty, and frequent famines—what we call “the received wisdom.” It is represented most effectively in Ping-ti Ho’s *Studies on the Population of China, 1368–1953*.<sup>6</sup>

Lee and Wang challenge this view in their influential book, *One Quarter of Humanity: Malthusian Mythology and Chinese Realities, 1700–2000*. They agree that marriage was early and universal in China but otherwise reject all of the Malthusian view of China. They argue that China should not be conceived of as a third type of society distinct from both Britain and the United States. In their view, Britain and China were both old states in which population was constrained by preventive rather than positive checks. They differed only in how they managed fertility—the British by controlling marriage and the Chinese by controlling marital fertility. Lee and Wang sum up their argument in Malthus’ own language: “Whereas European couples practiced moral restraint [that is, they did not marry if they did not have the means to support a family] but little marital restraint, Chinese couples practiced no moral restraint but considerable marital restraint.”<sup>7</sup>

A large proportion of Lee and Wang’s text is devoted to demonstrating that marital fertility was lower in China than it was in

6 Ping-ti Ho, *Studies on the Population of China, 1368–1953* (Cambridge, Mass., 1959).

7 James Z. Lee and Wang Feng, *One Quarter of Humanity: Malthusian Mythology and Chinese Realities, 1700–2000* (Cambridge, Mass., 1999), 12, 90.

Britain and other European states. Although their observation that Chinese women bore fewer children per year of marriage than European women is not controversial, they exaggerate the magnitude of the difference. Their further contention that Chinese fertility was generally lower than Europe's because Chinese couples deliberately limited the size of their families cannot withstand scrutiny. The Chinese practiced little, if any, effective birth control. China's marital fertility may well have been lower than Europe's, but its total fertility was far higher.

Lee and Wang's primary thesis concerning the relative importance of positive and preventive checks rests on the claim that marital fertility control in China was the equivalent of marriage control in Britain. To prove it, they must demonstrate that Chinese fertility was no higher than British fertility, but they fail to do so; they do not even try. They report total fertility rates for China, but they never compare them with British or European total fertility rates. Although they repeatedly contrast Chinese and European marital rates, they never risk comparing their total rates. They claim that "Chinese fertility overall was not much higher than European fertility, while marital fertility was significantly lower," but offer no data to support the first half of their claim.<sup>8</sup>

What was the average total fertility rate in China prior to the 1949 revolution, and how does it compare with the average British rate? The one pre-1949 rate that Lee and Wang report is the figure calculated by Barclay et al. on the basis of John Lossing Buck's famous farm surveys—5.5. It is an estimate based on data collected by male students who, as males, were unable to interview their female subjects and had to depend on information provided by husbands or other male relatives. When Wolf revisited seven of the communities included in the study and interviewed women old enough to have been included in the Buck study, he obtained a rate of 5.78. The fact that older women had trouble remembering children who died as infants suggests that the true rate could be close to 6.0.<sup>9</sup>

The best reason for suspecting that the figure from the Buck survey underestimates Chinese fertility is another survey con-

8 *Ibid.*, Table 6.1., 85, 84–86.

9 George W. Barclay et al., "A Reassessment of the Demography of Traditional Rural China," *Population Index*, XLI (1976), 606–633; Wolf, "Fertility in Prerevolutionary China," *Population and Development Review*, X (1984), Table 9, 458.

ducted from 1930 to 1934 by Chiao, Thompson, and Chen. Whereas the Buck survey was a student effort directed by an agricultural economist, the Chiao, Thompson, and Chen study was a professional effort directed by one of the leading demographers of the time. Unlike Buck and his student collaborators, the researchers did not rely on interviews. They set up their own registration system in rural Kiangsu, and recorded births and deaths as they occurred for four years. The result is the most authoritative demographic data collected on the Chinese mainland prior to the fertility survey conducted by the State Family Planning Commission in 1982. The fertility data from this study are reproduced in original form in Table 1. The age-specific rates for the four years yield total fertility rates of 6.86, 6.24, 5.58, and 6.85. The decline in the second and third years of the study is interesting as evidence of the factors effecting Chinese fertility. Chiao, Thompson, and Chen attribute it to a depression that lowered the marriage rate and a malaria epidemic that raised the miscarriage rate.<sup>10</sup>

One of the numerous scholarly failings of Lee and Wang's effort is the failure to discuss the Chiao, Thompson, and Chen study. The work is not even listed as a reference. Equally egregious is their failure to refer to Tuan's 1958 study of fertility in rural Taiwan during the Japanese occupation—one of the seven studies that form the basis of Henry's definition of natural fertility and a seemingly indispensable primary source for any book devoted to Chinese demography. Tuan's data are reproduced in Table 2 in the form of period rates for the years 1903 to 1953. Only the rate for the years 1903 to 1907 falls below 6.0, and there is reason to believe that this figure underestimates the true rate. Concerned that some children who died as infants may not have been registered, Tuan interviewed 463 of the women included in the study. He found that 9.5 percent of births by women aged sixty or older at the time of the study did not appear in the registers. Among women aged forty-five to sixty the figure was only 1.5 percent.<sup>11</sup>

Although Tuan's work suggests that under-registration oc-

10 Chi-Ming Chiao, Warren S. Thompson, and D. T. Chen, *An Experiment in the Registration of Vital Statistics in China* (Oxford, Ohio, 1938), 42.

11 Chi-hsien Tuan, "Reproductive Histories of Chinese Women in Rural Taiwan," *Population Studies*, XII (1958), 40–50; Louis Henry, "Some Data on Natural Fertility," *Eugenics Quarterly*, VIII (1961), 81–91.

Table 1 Age-Specific and Total Fertility in Chiang-Yin County, Kiangsu, 1931-1935

YEAR	AGE							TFR
	15-19	20-12	25-29	30-34	35-39	40-44	40-49	
1931/32	95	337	330	259	251	95	5	6.86
1932/33	67	318	338	242	202	73	7	6.24
1933/34	80	273	277	253	179	69	4	5.58
1934/35	70	372	343	288	198	95	4	6.85

SOURCE Chi-Ming Chiao, Warren S. Thompson, and D. T. Chen, *An Experiment in the Registration of Vital Statistics in China* (Oxford, Ohio., 1938), Table 32, 43.

Table 2 Age-Specific Total Fertility Reported by Chi-hsien Tuan for Yun-lin County in Southern Taiwan

PERIOD	AGE							TFR
	15-19	20-12	25-29	30-34	35-39	40-44	40-49	
1903-07	90	240	240					5.81
1908-12	100	280	300	280				6.32
1913-17	100	310	330	290	210			6.79
1918-23	110	310	300	290	220	110		6.74
1923-27	120	350	330	290	250	110	10	7.30
1928-32	100	330	350	320	250	130	10	7.45
1933-37	90	350	340	300	270	120	10	7.40
1938-42	70	330	320	280	250	110	10	6.85
1943-47	50	300	310	270	210	100	10	6.20
1948-53	10	290	320	320	240	120	10	6.55

SOURCE Chi-hsien Tuan, "Reproductive Histories of Chinese Women in Rural Taiwan," *Population Studies*, XII (1958), Table 2, 45.

curred before 1915, the household registers compiled by the Japanese colonial government are the best basis for estimating the fertility of any large Chinese population. Household heads were required to report all births and deaths to the police within ten days, and the police visited every household at least once a year to make sure that these reports were accurate. The records from twenty-two of the Taiwanese communities subjected to this regime are represented in the fertility rates reported in Table 3. The residents of the localities included in the table were all Hokkien- or Hakka-speaking Han Chinese. Localities with a substantial non-Han population were excluded.<sup>12</sup>

The first point to note about Table 3 is that, with one slight exception, the rates for 1906 to 1915 are lower than the rates for the later periods, undoubtedly because of the under-registration documented by Tuan. All of these rates should be 5 to 10 percent higher than shown. The second point to note is that the rates for 1936 to 1945 are all lower than the rates for 1926 to 1935—almost certainly a result of the many kinds of disruption occasioned by World War II. The third point is that the rates for urban Taiwan are substantially lower than those for peri-urban and rural Taiwan, and the rates for peri-urban Taiwan somewhat lower than those for rural Taiwan. Wolf and Gates reason that urban and peri-urban women were less likely to marry than rural women. During the Japanese occupation, nearly one-fourth of the women raised in Taipei City failed to marry by age fifty.<sup>13</sup>

Table 3 is a set of figures that makes two points: (1) that in rural Taiwan, total fertility averaged approximately 6.0—a little higher than the rates calculated on the basis of the Buck survey but not as high as those documented by Chiao, Thompson, and Chen in Kiangsu; (2) that contrary to Lee and Wang's primary thesis, fertility in Taiwan was conditioned by entry into marriage, not by deliberate control within marriage. Only in Taipei City, where a large proportion of women failed to marry, did rates fall

12 For a detailed account of the registration system, see Wolf and Chieh-shan Huang, *Marriage and Adoption in China, 1845–1945* (Stanford, 1980), 16–33. Working with a team of anthropologists and historians at the Academic Sinica, Wolf and Engelen entered into computer format the data from a number of widely scattered communities originally collected under the Japanese colonial government.

13 Wolf and Hill Gates, "Marriage in Taipei City: Reasons for Rethinking Chinese Demography," *International Journal of Asian Studies*, II (2005), Figure 1, 119.



below 5.0. It took a European-like marriage pattern to produce European-like fertility rates.

Although the evidence from Taiwan is the most reliable evidence available, should it be asked to give testimony in a case trying claims about China as a whole? Taiwan was under Japanese occupation when the evidence was recorded, and it was a lawless frontier not long before the Japanese arrived. Yet, in its favor, Taiwan was settled by farmers from southern Fukien and northern Kwangtung who transplanted all of the institutions of their native places. The manner in which these institutions differed from those typical of other provinces does not appear to have resulted in distinctive demographic characteristics. The fertility rates reported in Table 3 are not exceptional. They fall approximately half way between the rates estimated on the basis of Buck's nation-wide survey and the rates reported by Chiao, Thompson, and Chen for a locality close to the center of the most populated region of the country.

The evidence cited to this point all refers to the years 1900 to 1949. With the exception of the genealogy of the Ch'ing imperial family and the household registers of Han bannermen in Manchuria, the only evidence available for earlier years comes from genealogies compiled by the corporate kinship groups that anthropologists call "lineages." This evidence is invaluable because it is the only evidence, but it has serious limitations. Its flaws can be overcome sufficiently to extract fertility rates but only with the help of assumptions about the nature of vital events in the distant past, the most important of which concern the sex ratio at birth and infant and childhood mortality. Lineage genealogists did not record female births and recorded male births only if the boy survived to an age specified by lineage rules, usually between fifteen and twenty years.<sup>14</sup>

The great majority of the fertility rates published to date is the work of Liu and Telford. Liu analyzed twenty-two genealogies from six provinces in South China; Telford analyzed all the genealogies extant from a county in Anhui province. The rates pub-

14 See Liu Ts'ui-jung, "Chinese Genealogies as a Source for the Study of Historical Demography," in *Studies and Essays in Commemoration of the Golden Jubilee of Academia Sinica* (Taipei, 1978), 849-870; Stevan Harrell, "Microdemography and the Modeling of Population Process in Late Imperial China," in *idem* (ed.), *Chinese Historical Microdemography* (Berkeley, 1995), 1-20.

Table 3 Age-Specific Total Fertility in Taiwan by Location and Period

PERIOD	AGE						TFR	
	15-19	20-12	25-29	30-34	35-39	40-44		40-49
RURAL NORTHERN TAIWAN								
1906-15	132	263	243	206	165	78	6	5.46
1916-25	127	277	264	214	153	66	9	5.55
1926-35	145	319	295	256	201	86	9	6.55
1936-45	111	302	294	259	194	93	8	6.30
RURAL SOUTHERN TAIWAN (INCLUDING PESCADORES ISLANDS)								
1906-15	95	270	272	256	189	72	7	5.80
1916-25	86	282	289	259	195	81	7	5.99
1926-35	87	315	324	297	227	96	7	6.76
1936-45	68	302	299	260	208	95	5	6.19
PERI-URBAN TAIWAN (TAIPEI BASIN)								
1906-15	129	251	232	209	166	85	6	5.39
1916-25	115	261	241	204	158	81	4	5.32
1926-35	128	258	263	231	174	81	6	5.71
1936-45	96	237	247	224	177	92	4	5.39
URBAN TAIWAN (TAIPEI CITY)								
1906-15	113	192	168	147	93	39	7	3.79
1916-25	99	213	195	142	122	50	4	4.17
1926-35	114	226	195	170	133	53	7	4.48
1936-45	83	202	183	158	103	47	3	3.89

NOTE Appendix Table A1 shows woman-years for fertility rates.

lished by Liu range from 4.47 to 6.27, averaging 5.71. Those published by Telford range from 6.78 to 9.56, averaging 8.21. The large difference between the two authors' figures is almost entirely a result of their treatment of the way lineage genealogists recorded births. Liu based her rates on a simple count of the births recorded, whereas Telford adjusted his rates to take account of infant and childhood mortality. He assumes an infant mortality rate of 250 and a childhood and adolescent rate of 100. When Liu's rates are adjusted in the same way, they suggest a fertility rate of approximately 7.9 for the years 1450 to 1900. This rate would be substantially higher given the assumption that infant mortality was as high in these years as it was among the children of the women included in Buck's farm surveys. Barclay et al. estimated their infant mortality rate as 300 and their childhood/adolescent age rate at more than 200.<sup>15</sup>

The rates that Liu and Telford estimate on the basis of the lineage genealogies are all marital fertility rates. To obtain total fertility rates requires the assumption that Chinese marriage rates were as high in the Ming and Ch'ing dynasties as they were in the Republican period. The differences between the total and marital rates reported by the studies cited above can then be used to estimate total fertility in the years covered by the genealogies. These differences are 0.68 births in the case of the rates estimated from the Buck surveys; 1.03 births in the case of the rates reported by Chiao, Thompson, and Chen; and an average of 1.43 births in the case of the rates calculated on the basis of the Taiwan household registers. Hence, the total fertility rate in the three centuries covered by the genealogies must have been at least as high as it was in the early decades of the twentieth century.<sup>16</sup>

Based on these calculations, the average total fertility rate in

15 Liu, "Ming-Qing renkou zhi zengzhi yu qianyi (Growth and Migration of the Population in the Ming-Qing period), in Hsu Cho-yun, Mao Han-kuang, and *idem* (eds.), *Zhongguo Shehui Jingji Shih Yantao Hui Lunwenji* (Papers from the Seminar on Chinese Social and Economic History) (Taipei, 1983), 283-616; *idem*, "The Demography of Two Chinese Clans in Hsiao-chan, Chekiang, 1650-1850," in Susan B. Hanley and Wolf (eds.), *Family and Population in East Asian History* (Stanford, 1985), 13-61; *idem*, "A Comparison of Lineage Populations in South China," in Harrell (ed.), *Chinese Historical Microdemography*, 94-120; Ted A. Telford, "Fertility and Population Growth in the Lineages on Tongcheng County, 1520-1664," in *ibid.*, 8-93; Harrell, "Microdemography," 15; Barclay et al., "Reassessment," 618-620.

16 Barclay et al., "Reassessment," 614; Chiao, Thompson, and Chen, *Experiment*, 45; Wolf, "Fertility," Tables 6 and 7, 454-455.

Late Imperial China was about 6.0—a figure that makes obvious Liu and Wang’s reasons for avoiding direct comparisons of Chinese and European total fertility rates. The comparison completely refutes their claim of a preventive check in China as effective as the one that Malthus identified in Europe. Wrigley et al. estimated total fertility rates for England during the years 1541 to 1871 that vary from 3.75 to 4.50. The average estimate for the period is only 4.35. Total fertility was higher elsewhere in Europe but nowhere as high as in China. Livi Bacci listed 4.27, 4.27, and 4.49 for Sweden in 1800, 1850, and 1870; 5.07, 4.91, and 4.95 for Finland in 1800, 1850, and 1870; 4.60 and 5.23 for the Netherlands in 1850 and 1870; 3.38 and 3.42 for France in 1850 and 1870; and 4.88 for Italy in 1870.<sup>17</sup>

The fact that China’s total fertility was high by European standards does not necessarily mean that Chinese couples did not take steps to limit their number of children. Conceivably, were it not for deliberate fertility control, Chinese fertility would have been as high as Malthus feared. Lee and Wang’s claim that “Chinese couples practiced no moral restraint but considerable marital restraint” needs to be addressed fully.

Lee and Wang introduce their book with the statement, “Chinese married women had a TMFR [total marital fertility rate] of 6 or less.” “This low marital fertility was,” in their view, “one of the most distinctive features of the Chinese demographic system.” Their evidence is gathered in a table reproduced herein as Table 4. The first three figures, which are from Liu’s analyses of lineage genealogies, are gross underestimates that take no account of infant and childhood mortality. The figures in the fourth line of the table refer to Telford’s study but misrepresent his results. The range for the rates from the genealogies that he analyzed was from 7.24 to 9.19—not 5.4 to 8.2; the average figure was 8.2!<sup>18</sup>

The fifth figure—the figure that pulls the average down to “less than 6”—should not be included in the table. Its population, which consists of Manchu noblemen who qualified for notice in

17 E. Anthony Wrigley et al., *English Population History from Family Reconstitution, 1580–1837* (New York, 1997), Table A9.1, 614–615. The reported gross reproduction rate (GRR) has been inflated by 2.05 to give the total fertility rate (TFR). Massimo Livi Bacci (trans. Cynthia De Nardi Ipsen and Carl Ipsen), *The Population of Europe: A History* (Cambridge, Mass., 2000), 136.

18 Lee and Wang, *One Quarter of Humanity*, 8; Telford, “Fertility and Population Growth,” Table 3.1, 51.

Table 4 Total Marital Fertility in China by Period and Location

PERIOD	LOCATION	TOTAL MARITAL FERTILITY RATE	SAMPLE SIZE
1296–1864	Hunan	6.0	2,670
1462–1864	Anhui	6.1	1,654
1517–1877	Jiangsu	5.8	1,784
1520–1661	Anhui	5.4 to 8.2	11,804
1700–1890	Beijing	5.3	3,178
1774–1873	Liaoning	6.3	3,000
1929–1932	22 provinces	6.2	50,000

SOURCE James Z. Lee and Wang Feng, *One Quarter of Humanity: Malthusian Mythology and Chinese Realities* (Cambridge, Mass., 1999), Table 6.1, 85.

the Ch’ing imperial genealogy, is not relevant to the argument. Lee and Wang admit that these people are “atypical, since the Qing imperial lineage was an elite population that depended solely on the state for financial support, was highly regulated, and was required to live in either Beijing or Shenyang.” They should have added that, in addition to being a welfare elite, these people were not Han Chinese.<sup>19</sup>

The sixth figure in the list raises again Malthus’ view of the population in the United States as growing “with astonishing rapidity” because it had “plenty of food and room.” Most scholars now agree that this characteristic was typical of colonies. In the years covered by Lee and Wang’s data, Liaoning was also a colony with plentiful resources. Why do they find that fertility there was no higher than in China proper where resources were scarce? The likely answer is that their data derive from records maintained by the corrupt administration of a military colony. The colonists had good reason not to register their sons and ample opportunity to avoid doing so. As Isett wrote with respect to Lee and Wang’s data from Daoyi,

Lee and Campbell’s TMFR figure for Daoyi [the figure used by Lee and Wang] is by their own recognition an estimate based on incomplete records. Poor official record keeping in Daoyi was entirely in keeping with what we know of bureaucratic oversight in Manchuria as a whole, where commoners lived illegally among serf and banner communities without soliciting much official attention. It is not surprising therefore that by their own estimates Lee and

19 Lee and Wang, *One Quarter of Humanity*, 151.

Campbell believe fully one-half of all persons (one-third of males and two-thirds of females) were never registered on the banner rolls, a proportion that is in turn predicated on their belief that all of those who survived to age sixteen *sui* (age fifteen) were registered. There were good reasons to keep children, especially males, off the banner roll after they reached sixteen *sui*, however. As Lee and Campbell note males in the banner system were liable for uncompensated service to the state, including military service, which heads of household would certainly wish to avoid.<sup>20</sup>

The source of the final figure in the list is Barclay et al.'s reanalysis of Buck's 1930 to 1934 farm surveys. The figure obtained herein from the table that Lee and Wang cite as their source is 6.3, rather than 6.2, which does not matter much. What does matter is that Lee and Wang fail to note that when Wolf revisited a number of Buck's field sites, he obtained a rate of 7.03. What matters even more is that the table does not include the evidence provided by Chiao, Thompson, and Chen. The total marital fertility rates for the four years of their study were 8.00, 7.23, 6.64, and 7.80. The average was 7.41.<sup>21</sup>

Many families in northern Taiwan and the Pescadores Islands gave away their daughters as infants or small children, raising in their stead wives for their sons. Wolf showed that because of early association, couples married in this fashion had markedly lower fertility than couples joined as young adults. When the effect of these "minor marriages" is discounted, the data drawn from the Taiwan household registers agrees with that reported by Chiao, Thompson, and Chen. Allowing for 5 to 10 percent under-registration before 1915, the figures for the rural areas in Table 5 average close to 7.50 before 1925 and rise to well over 8.5 after 1925. The figures for the urban and peri-urban areas are lower but still average well above 6.0 in most years. Only in Taipei city before 1925 can the level of marital fertility that Lee and Wang take to be normal for all of China be found.<sup>22</sup>

Lee and Wang's representation of marital fertility in late traditional China is mistaken. The average rate was approximately 7.5

20 Christopher Isett, *State, Peasant, and Merchant in Qing Manchuria, 1644-1862* (Stanford, 2007), 189-190.

21 Wolf, "Fertility," Table 10, 459; Chiao, Thompson, and Chen, *Experiment*, Table 32, 45.

22 See Wolf, *Sexual Attraction and Childhood Association: A Chinese Brief for Edward Westermarck* (Stanford, 1995).

Table 5 Age-Specific and Total Marital Fertility in Taiwan by Location and Period (Excluding Minor Marriages)

PERIOD	AGE						TMFR	
	15-19	20-24	25-29	30-34	35-39	40-44		45-49
RURAL NORTHERN TAIWAN								
1906-15	263	303	265	229	188	102	6	6.78
1916-25	314	329	287	241	171	73	12	7.14
1926-35	338	373	354	281	238	116	11	8.55
1936-45	363	372	329	298	220	117	10	8.55
RURAL SOUTHERN TAIWAN (INCLUDING PESCADORES ISLANDS)								
1906-15	273	318	285	275	209	93	9	7.31
1916-25	294	353	317	283	236	104	9	7.98
1926-35	364	391	316	326	258	117	11	8.92
1936-45	338	385	332	287	242	119	9	8.56
PERI-URBAN TAIWAN (TAIPEI BASIN)								
1906-15	256	295	264	212	174	93	—	6.47
1916-25	287	336	271	231	190	74	—	6.95
1926-35	360	354	314	261	204	109	—	8.01
1936-45	368	362	316	279	214	107	—	8.23
URBAN TAIWAN (TAIPEI CITY)								
1906-15	266	262	207	155	109	39	14	5.26
1916-25	287	298	243	187	136	57	8	6.08
1926-35	377	340	267	219	167	68	10	7.24
1936-45	367	285	269	224	147	68	4	6.82

NOTE Appendix Table A2 shows woman-years for fertility rates.

rather than 6.0—still well below the typical European rate and far below the rate reported for such exemplary populations as the Hutterites. Thus, the numbers leave room for Lee and Wang’s contention that Chinese couples practiced some form of deliberate birth control. The question is whether the difference between Chinese and the European levels was due to deliberate control or to an involuntary condition. Lee and Wang admit that Chinese mothers “practiced extended breastfeeding” and that this process “contributed to long birth intervals and low fertility,” but they nonetheless insist that their “low fertility” was the result of “their ability and even willingness to regulate coital frequency” and their use of “a wide variety of abortive techniques.”<sup>23</sup>

This claim is all the more surprising because Lee and Wang recognize that Chinese fertility does not exhibit the characteristics that most demographers, following Henry, take to be diagnostic of deliberate fertility control. “Control,” according to Henry, “may be said to exist when the behavior of the couple is bound to the number of children already born and is modified when this number reaches the maximum which the couple does not wish to exceed.” Fertility that is not bound in this way Henry terms “natural fertility.” It is high when people are young and declines slowly as they age, producing a convex curve when fertility is plotted against age. Deliberate fertility control is suspected only when when fertility begins high and declines abruptly, producing a concave age/fertility profile.<sup>24</sup>

Although the fertility of natural-fertility populations is generally high, there is considerable variation. Consequently, fertility that falls short of the highest rates recorded is not necessarily evidence of control. The age/fertility relationship is crucial. In the view of most demographers, deliberate fertility control always produces a concave age/fertility profile; a convex profile is evidence of lack of control. A relevant example is Barclay et al.’s interpretation of the rates estimated on the basis of Buck’s Farm Survey. It characterizes Chinese marital fertility as “very low” but rules out deliberate fertility control as an explanation because “when control of fertility is common, the fertility of older married women is especially low relative to the fertility of young women.

23 Lee and Wang, *One Quarter of Humanity*, 91.

24 Henry, “Some Data,” 81.



Yet the age-specific marital fertility of older Chinese women is as high, relative to that of the younger women, as in many populations judged by Henry to have uncontrolled or natural fertility.”<sup>25</sup>

Lee and Wang agree that Chinese fertility was “natural” in Henry’s sense of the term, but they reject Barclay et al.’s conclusion regarding birth control. They insist that despite presenting a convex age/fertility profile, Chinese fertility was a product of deliberate control achieved by means of “late starting, wide spacing, and early stopping.” Chinese couples married young but deliberately delayed their first birth, deliberately avoided producing a child in their later years, and deliberately spaced all of their births as widely as possible. The result was a fertility profile that looked like natural fertility but was in fact the product of a life of deliberate control.<sup>26</sup>

The reason why Henry’s distinction has served demographers well is that control of the kind hypothesized by Liu and Wang is both difficult and risky—difficult because of the extraordinary restraint required during youth and risky because of a couple’s inability to count on their reproductive capacity surviving the many hazards of aging, particularly in historical societies such as China where famine was frequent, epidemics common, and social stability uncertain. Given that Chinese couples all wanted at least two sons, why would they adopt such a difficult and risky strategy? If they were as adept at birth control as Lee and Wang argue, why not wait until they had the children that they wanted and then initiate a control program, as Taiwanese couples did during the fertility transition.

There is some evidence that Chinese women did not want as many children as their husbands and may have made an effort in their later years to avoid additional pregnancies. Otherwise, Chinese couples bore as many children as possible given their circumstances. What Lee and Wang characterize as abortifacients were, in most cases, emmenagogues, employed to enhance, rather than to reduce, fertility. The fertility rates that they cite as evidence of deliberate control were, with the partial expectation of early stopping, the result of involuntary conditions producing unintended and largely unwanted consequences.<sup>27</sup>

25 Barclay et al., “Reassessment,” 606–633.

26 Lee and Wang, *One Quarter of Humanity*, 83–84.

27 Charlotte Furth, *A Flourishing Yin: Gender in China’s Medical History* (Berkeley, 1999).

Although the interval between marriage and first birth was considerably longer in China than in Europe, and Chinese women were younger at the birth of their last child than European women were, the evidence does not support deliberate birth control. The great majority of Chinese women married at, or shortly after, menarche if not before. A long first interval was therefore inevitable because “the first several years following menarche are characterized by a high fraction of anovulatory cycles” and “an elevated risk of fetal loss should conception occur.” Because child bearing was onerous, some Chinese women may have taken steps to avoid bearing yet another child late in life, but this is only one of many possible explanations of what Lee and Wang call “early stopping.” Another is the possibility that because of poverty and a high incidence of debilitating diseases, Chinese women aged faster than European women. Yet another is suggested by James’ discovery that “coital rates are much more closely related to duration of marriage than to age.” By the time they were in their mid-thirties, most Chinese women had been married twice as long as their European counterparts.<sup>28</sup>

The critical claim in Lee and Wang’s argument—the plank on which their whole argument rests—is that Chinese couples limited their number of children by deliberately prolonging the intervals between their births. The fact that birth intervals were as long in India, Pakistan, and Bangladesh as in China militates against the argument. But the Taiwan household registers provide more direct, and thus more conclusive, evidence. They reveal how many children a woman had borne by any age and how many she bore after that age. This information makes it possible to evaluate Lee and Wang’s thesis by examining how a couple’s past reproductive performance affected their future performance.

The received view of Chinese fertility is that most couples made no effort to control their fertility because they wanted as many sons as possible. It predicts that the more children a woman has borne in the past, the more she will bear in the future because her fertility history indexes her fecundity. Lee and Wang’s view is that since most couples wanted only a limited number of sons, they spaced their births to achieve but not overshoot this mark.

28 James W. Wood, *Dyanamic of Human Reproduction* (New York, 1994), 405–407; William H. James, “The Causes of Decline in Fecundability with Age,” *Social Biology*, XXVI (1979), 333.

Their position predicts that any relationship between past and future performance is bound to be negative. Couples who reproduced too rapidly when young would have made an effort to slow down later, whereas those who reproduced too slowly when young would have made an effort to speed up later.

To test these views, this study calculates fertility rates that take account of how many children a woman has borne, her age at the birth of her last child, and the number of years since the birth of that child. These are duration-specific rates in which the duration is the years elapsed since the birth of a given child (the index child in Figure 1). These rates indicate whether past fertility influences the future fertility of women who bear children at a designated age. Figure 1 says that it does—but in the opposite direction of what Lee and Wang predict. The columns in each of the five age classes all point to the same conclusion: The more children women have borne, the more they will bear in the future. With the partial exception of women nearing the end of their reproductive lives, the columns in each cluster rise in step-like fashion from the lower parities to the higher parities, in exactly the way that the received view of Chinese fertility predicts. Because couples wanted as many sons as possible, they made no concerted effort to control their fertility. The result was a positive correlation between past and future performance because fertility was largely a function of fecundability. Couples who were fecund performed well at all ages; those who were not performed poorly at all ages.

Lee and Wang could reasonably argue that because of deliberate spacing, low fertility below a certain age predicts low fertility later. What their argument cannot accommodate is the evidence showing that high fertility below a certain age predicts high fertility later. To limit their fertility by means of deliberate spacing, a fecund couple had to begin spacing early in life. But if Chinese couples were adept in this regard, why did so many of them produce seven or eight children by the time the wife was thirty? And why, if Chinese couples wanted to limit their fertility, did these same couples bear more children later than their less fertile peers? Only toward the end of their reproductive lives did their fertility fall slightly below that of couples with fewer children. This decrease could be evidence of birth control, but far from necessarily. After having already borne eight or nine children, a wife might have been exhausted or suffering from wear and tear. Or, after

Fig. 1 Marital Fertility by Parity of Index Child and Mother's Age at Time of Birth

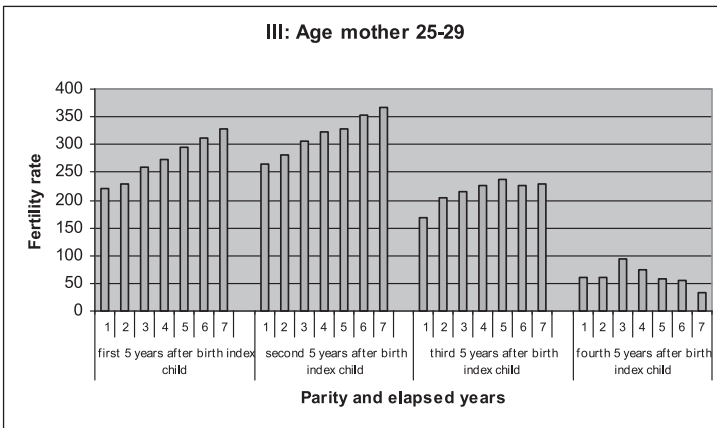
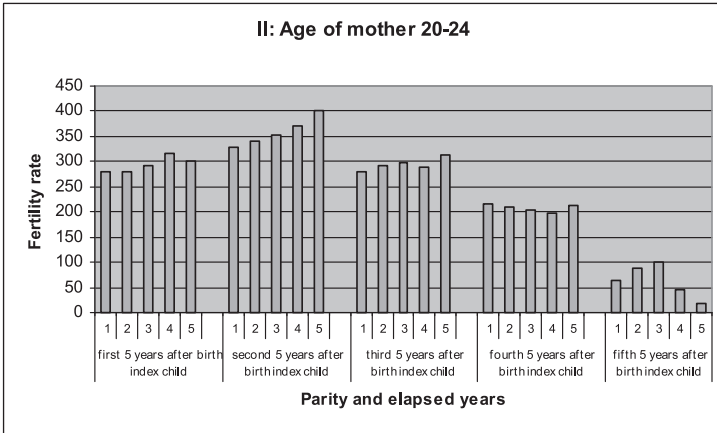
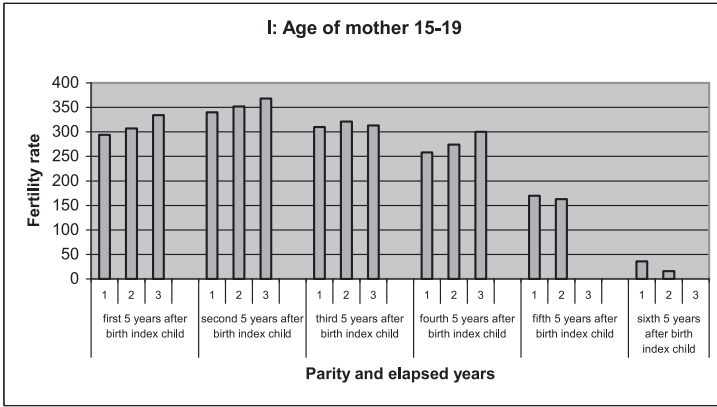
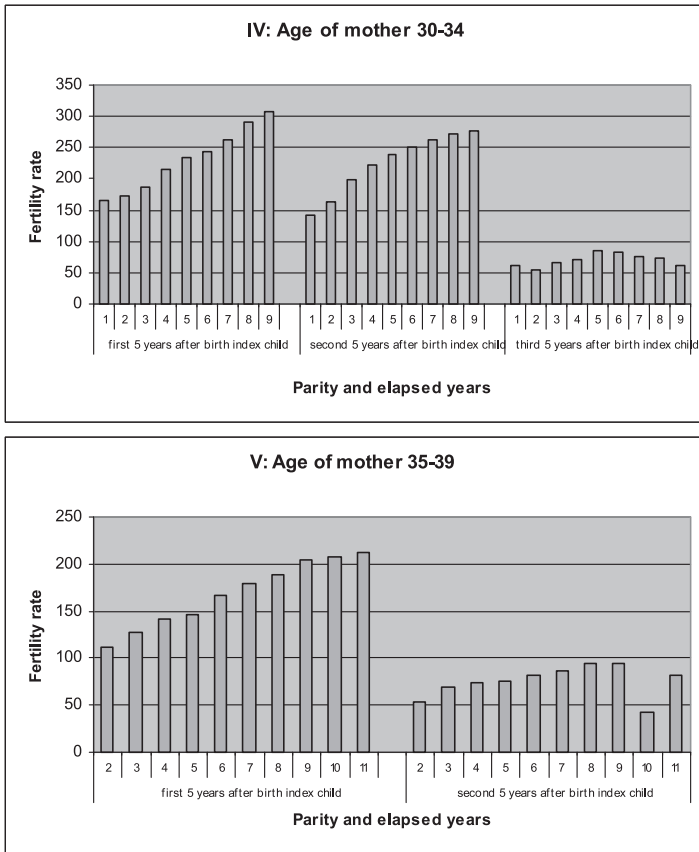


Fig. 1 (continued)



NOTE The fertility rate shown herein is the average of the durations following the birth of the index child. The duration-specific rates are given in Table A3. The woman-years for fertility rates are given in Table A4.

having completely fulfilled her duty as a daughter-in-law, she might have been relieved of further child bearing. This could be considered a form of birth control but is not the strenuous form hypothesized by Lee and Wang and not a form that would have made much difference.

Lee and Wang build their thesis on a comparison of China and Western Europe, particularly China and England. At no point in their book do they mention any of the other old states that, like China, were characterized by early and universal marriage; conse-

quently, they never address the questions raised by placing China in a larger context. Was Chinese fertility low compared to the human average? Was it so low as to make deliberate birth control the only likely explanation? These demanding questions are answerable, thanks to Campbell and Wood, who, during the late 1980s, searched the literature for reliable data describing populations whose fertility qualified as “natural” by Henry’s definition. They found such data for seventy societies and calculated a total fertility rate for each of them. Figure 2 presents their results, together with the total fertility rates of seventy societies showing “controlled” fertility by Henry’s criterion. The mean total fertility rates are 6.1 for the natural-fertility populations and 2.6 for the controlled-fertility populations.<sup>29</sup>

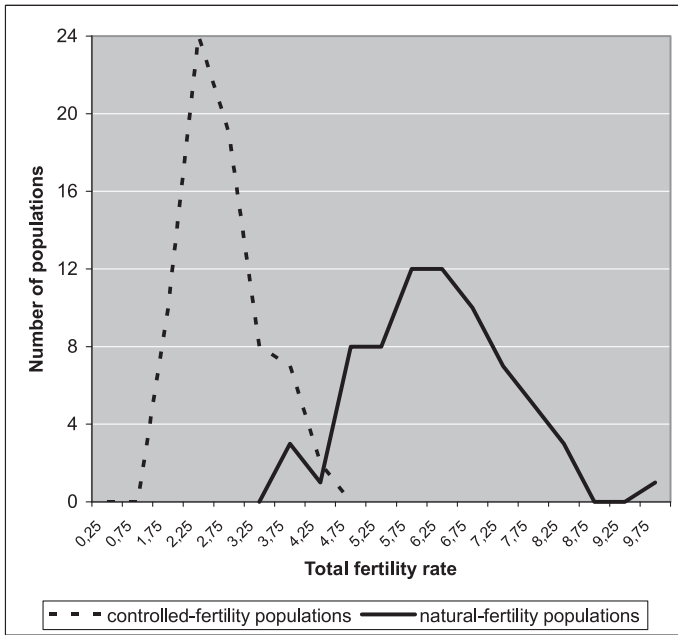
When placed in a global context, Chinese fertility was not low by human standards. In fact, at about 6.0, it was right on the mean for natural-fertility populations. This discovery does not prove that the Chinese refrained from deliberate birth control, but it adds greatly to the burden of proof that Lee and Wang must bear. They must either generalize their thesis to include most historical societies with early and nearly universal marriage, or they must give reasons why birth control in China was necessary to achieve a level of fertility produced by involuntary means in many other societies.

The other societies at or near the norm for natural-fertility populations include India, Indonesia, Pakistan, and Bangladesh. Was deliberate birth control common in these societies? If not, what kept fertility far below the recorded maximum? Bangladesh is particularly instructive because it has been the subject of intensive study, and its reproductive regime shares many of the same characteristics as China’s. In both societies, marriage occurred at a young age (between sixteen and eighteen years for women); the median birth interval was long (thirty to thirty-four months); and the average age at last birth was young, compared to that in Europe (thirty-eight to thirty-nine years).

Some evidence suggests that older Bengali couples practiced coitus interruptus as a means of preventing or delaying additional births, though none of it indicates that this technique was a major

29 K. L. Campbell and Wood, “Fertility in Traditional Societies,” in Peter Diggory, Malcolm Potts, and Susan Teper (eds.), *Natural Human Fertility: Social and Biological Determinants* (London, 1988), 36–69.

Fig. 2 Distribution of Total Fertility Rates in Natural-Fertility and Controlled-Fertility Populations



SOURCE James W. Wood, *Dynamics of Human Reproduction: Biology, Biometry, Demography* (New York, 1994), 48.

determinant of Bengali fertility. The major determinant was a lengthy period of lactational amenorrhea—eighteen to twenty months—and consequently a long inter-birth interval—thirty-three to thirty-five months. Whether this interval was due primarily to Bengali nursing practices or to some combination of nursing practices and malnourishment is not clear. What is certain is that the subtraction of eighteen to twenty months of lactational amenorrhea and nine months of gestation from the average birth interval does not allow much time for birth control. An average of seven or eight months is common for women who do not practice birth control.<sup>30</sup>

30 See Lincoln C. Chen et al., “A Prospective Study of Birth Interval Dynamics in Rural Bangladesh, *Population Studies*, XXVIII (1974), 277–297; Sandra L. Huffman, A. K. M. Chowdhury, J. Charkraborty, and W. Henry Mosley, “Nutrition and Post-Partum Amenorrhea in Rural Bangladesh,” *ibid.*, XXXII (1978), 251–260; Huffman et al., “Nutri-

Estimates of the length of lactational amenorrhea in Late Imperial China do not exist, but Chinese and Bengali women are known to have led similar lives. Like Bengali women, Chinese women were poor, and, like Bengali women, they nursed their children for two or more years. Hence, birth control is neither the only nor the most likely explanation of their low marital fertility. A more compelling explanation, given the known determinants of fertility in similar societies, is a long period of lactational amenorrhea due to some combination of malnourishment and prolonged breast feeding, as first suggested by Barclay et al. to account for relatively low estimates of Chinese fertility. After ruling out deliberate birth control as a plausible explanation of the low marital-fertility rate estimated from the Farm Survey, they wrote:

Lacking further details . . . , we can conjecture its causes on the basis of interesting parallels that are being discovered elsewhere. Frisch suggested that prolonged breast-feeding among inadequately nourished women may lower the fat content of their bodies sufficiently to lengthen the period of postpartum amenorrhea. An average eighteen-month period of postpartum amenorrhea (compared with nine months in a Chilean population) is revealed in records of menstruation collected from a rural population in Camilla district, Bangladesh. The Bangladesh women had average inter-birth intervals indicating a level of marital fertility not much higher than among the Chinese Farmers.<sup>31</sup>

Lee and Wang quote Barclay et al. when they note that “marital fertility as low as that in China would be expected by demographers only in populations in which some combination of contraception and abortion is practiced.” They ignore them, however, when they rule out birth control as an explanation and propose instead “prolonged breast-feeding among inadequately nourished women.”<sup>32</sup>

Lee and Wang’s challenge to the received view of China fails for two reasons. The first is the lack of evidence for widespread, de-

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tion and Fertility in Bangladesh: Breastfeeding and Post-Partum Amenorrhea,” *ibid.*, XLI (1987), 447–462; Noreen Goldman, Charles F. Westoff, and Lois E. Paul, “Variations in Natural Fertility: The Effect of Lactation and Other Determinants,” *ibid.*, XLI (1987), 127–146.

31 Barclay et al., “Reassessment,” 625.

32 Lee and Wang, *One Quarter of Humanity*, 189 n. 10.



liberate birth control. Marital fertility was lower than in Europe but not as low as Lee and Wang claim. Nor was it low enough to make birth control the only plausible explanation, or even the most likely explanation. The second reason is that contrary to Lee and Wang's central thesis, total fertility was much higher in China than in Europe. Whereas most European fertility rates fell far below the mean for natural-fertility societies, the Chinese rate stood precisely at the mean. Late Imperial China remains more or less where Malthus placed it. It did not enjoy the favorable demographic conditions found in the United States, and it did not have the effective means of fertility control found in Britain. Lee and Wang treat it as a special case, but it was, in fact, representative of the great majority of old states with organic economies.

#### APPENDIX: SUPPLEMENTARY TABLES

Table A1 Woman-Years for Fertility Rates Shown in Table 3

PERIOD	AGE						
	15-19	20-12	25-29	30-34	35-39	40-44	45-49
RURAL NORTHERN TAIWAN							
1906-15	4,865	4,539	4,570	4,262	3,573	2,888	2,362
1916-25	6,922	5,469	4,399	4,057	3,940	3,727	3,067
1926-35	7,383	6,815	5,971	4,808	3,870	3,307	3,262
1936-45	9,654	7,662	6,663	6,174	5,385	4,245	3,361
RURAL SOUTHERN TAIWAN (INCLUDING PESCADORES ISLANDS)							
1906-15	4,237	4,342	4,380	3,907	3,174	2,364	1,814
1916-25	5,249	4,368	3,986	3,803	3,665	3,161	2,617
1926-35	6,910	6,143	4,882	3,963	3,402	3,172	3,073
1936-45	7,871	7,204	6,626	5,620	4,393	3,439	2,912
PERI-URBAN TAIWAN (TAIPEI BASIN)							
1906-15	4,570	4,452	4,659	4,098	3,345	2,704	2,132
1916-25	6,775	5,525	4,263	4,116	4,292	3,403	2,830
1926-35	8,040	7,266	6,208	4,998	3,891	3,806	3,832
1936-45	10,318	8,314	7,273	6,554	5,669	4,503	3,472
URBAN TAIWAN (TAIPEI CITY)							
1906-15	1,770	1,744	1,796	1,702	1,389	1,087	765
1916-25	3,671	3,091	2,502	2,461	2,420	2,195	1,808
1926-35	4,793	4,750	4,126	3,116	2,406	2,244	2,207
1936-45	5,216	4,534	4,273	4,090	3,398	2,604	1,959

Table A2 Woman-Years for Fertility Rates Shown in Table 5

PERIOD	AGE							45-49
	15-19	20-12	25-29	30-34	35-39	40-44	45-49	
RURAL NORTHERN TAIWAN								
1906-15	1,365	2,360	2,467	2,224	1,730	1,194	728	
1916-25	1,707	3,077	2,491	2,163	1,978	1,718	1,266	
1926-35	1,903	4,078	3,750	2,938	2,109	1,634	1,409	
1936-45	2,047	4,876	4,383	3,785	3,218	2,369	1,592	
RURAL SOUTHERN TAIWAN (INCLUDING PISCADORES ISLANDS)								
1906-15	1,176	2,873	3,106	2,597	1,882	1,199	765	
1916-25	1,140	2,794	2,667	2,366	2,094	1,647	1,183	
1926-35	1,229	4,081	3,645	2,765	2,032	1,610	1,442	
1936-45	1,340	5,001	5,045	4,112	3,029	2,093	1,447	
PERI-URBAN TAIWAN (TAIPEI BASIN)								
1906-15	998	2,085	2,182	1,783	1,381	1,036	—	
1916-25	1,102	2,465	2,206	2,028	1,185	1,373	—	
1926-35	1,287	3,214	3,234	2,561	1,913	1,684	—	
1936-45	1,465	3,847	3,860	3,510	2,906	2,180	—	
URBAN TAIWAN (TAIPEI CITY)								
1906-15	425	913	967	927	745	460	219	
1916-25	719	1,494	1,422	1,332	1,213	1,006	713	
1926-35	785	2,224	2,269	1,727	1,268	1,097	926	
1936-45	680	1,967	2,298	2,244	1,813	1,304	858	

Table A3 Duration-Specific Fertility Rates Represented in Figure 1

PARITY	YEARS SINCE BIRTH OF INDEX CHILD						
	0-4	5-9	10-14	15-19	20-24	25-29	
AGE OF MOTHER AT BIRTH OF INDEX CHILD—LESS THAN 20							
One	294	340	310	258	170	36	
Two	307	352	321	274	163	16	
Three	334	368	313	300	—	—	
AGE OF MOTHER AT BIRTH OF INDEX CHILD—20-24							
One	279	328	280	216	65	0	
Two	280	341	293	210	89	0	
Three	292	353	297	204	99	0	
Four	317	371	290	198	45	0	
Five	302	400	314	214	19	0	
AGE OF MOTHER AT BIRTH OF INDEX CHILD—25-29							
One	222	264	169	61	1	—	
Two	228	282	204	60	0	—	
Three	259	305	216	93	0	—	
Four	274	323	226	74	0	—	
Five	294	329	236	59	0	—	
Six	312	352	227	55	0	—	
Seven	329	368	229	34	0	—	

AGE OF MOTHER AT BIRTH OF INDEX CHILD—30-34

One	165	143	63	1	—	—
Two	172	162	55	1	—	—
Three	187	198	67	0	—	—
Four	216	222	72	0	—	—
Five	234	238	84	0	—	—
Six	244	251	83	0	—	—
Seven	263	263	76	0	—	—
Eight	290	272	73	0	—	—
Nine	307	276	61	0	—	—

AGE OF MOTHER AT BIRTH OF INDEX CHILD—35-39

Two	112	53	0	—	—	—
Three	127	69	1	—	—	—
Four	142	74	1	—	—	—
Five	146	75	0	—	—	—
Six	167	81	0	—	—	—
Seven	179	87	0	—	—	—
Eight	189	95	0	—	—	—
Nine	204	95	0	—	—	—
Ten	208	43	0	—	—	—
Eleven	212	81	0	—	—	—

Table A4 Woman-Years for Fertility Rates Represented in Figure 1

PARITY	YEARS SINCE BIRTH OF INDEX CHILD						
	0-4	5-9	10-14	15-19	20-24	25-29	
AGE OF MOTHER AT BIRTH OF INDEX CHILD—LESS THAN 20							
One	16,892	11,845	8,140	5,268	3,101	1,680	
Two	4,123	2,867	1,878	1,161	664	318	
Three	415	283	179	110	50	11	
AGE OF MOTHER AT BIRTH OF INDEX CHILD—20-24							
One	17,248	11,754	7,751	4,873	3,035	1,627	
Two	21,239	14,701	9,785	6,130	3,484	1,824	
Three	13,395	9,170	5,955	3,549	2,030	1,106	
Four	4,543	3,115	1,983	1,160	640	305	
Five	981	645	382	215	105	59	
AGE OF MOTHER AT BIRTH OF INDEX CHILD—25-29							
One	3,131	2,097	1,399	940	580	—	
Two	7,019	4,882	3,267	2,179	2,093	—	
Three	11,816	8,178	5,486	3,480	1,548	—	
Four	13,084	8,805	5,727	3,481	2,011	—	
Five	8,668	5,817	3,629	2,155	1,164	—	
Six	3,754	2,457	1,447	770	376	—	
Seven	1,230	800	446	205	89	—	

## AGE OF MOTHER AT BIRTH OF INDEX CHILD—30-34

One	993	686	413	331	—
Two	1,917	1,295	923	639	—
Three	3,706	2,600	1,807	1,237	—
Four	5,739	3,935	2,759	1,854	—
Five	7,533	5,102	3,329	1,126	—
sb40Six	7,349	4,868	3,079	1,875	—
Seven	5,162	3,311	2,029	1,139	—
Eight	2,598	1,627	897	456	—
Nine	1,099	613	278	94	—

## AGE OF MOTHER AT BIRTH OF INDEX CHILD—35-39

Two	741	569	404	—	—
Three	1,354	1,045	751	—	—
Four	2,163	1,618	1,210	—	—
blFive	2,914	2,117	1,518	—	—
Six	3,579	2,538	1,710	—	—
Seven	3,866	2,611	1,753	—	—
Eight	3,475	2,263	1,423	—	—
Nine	2,446	1,557	885	—	—
Ten	1,381	806	438	—	—
Eleven	617	345	168	—	—

