

A Comparison of Lineage Populations in South China, ca. 1300-1900

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INTRODUCTION

Chinese genealogies are indispensable, though not the only, source materials for the study of Chinese historical demography. There are thousands of genealogies kept in the world's major Chinese-language library collections; these genealogies belonged to lineages residing in various parts of China, but mostly in the southern provinces. Some genealogies are voluminous, containing records of many branches of a lineage; some are rather small and record only descendants of a single line. Whether a genealogy is useful for the study of historical demography depends on its completeness in recording vital dates of persons involved. Earlier preliminary studies have told us that a genealogy that provides birth dates for about 80% of the people recorded and death dates for about 50% can be quite useful in estimating the fertility and mortality rates of its subject population.

This paper presents vital statistics taken from five lineage genealogies. The five genealogies are the Jiangdu Zhu 江都朱 in Jiangsu, the Tongcheng Zhao 桐城趙 in Anhui, the Wuchang Xu 武昌徐 in Hubei, the Shaoyang Li 邵陽李 in Hunan, and the Xiangshan Mai 香山麥 in Guangdong. These lineages were chosen primarily because the relative completeness of the vital data they recorded. Moreover, these genealogies all recorded multiple lineage branches, and they each came from a different province. They could thus serve for comparison across branches in a lineage, as well as for interprovincial comparison. This chapter is mainly concerned with demographic characteristics related to fertility and mortality in these five lineage populations. In some cases, data are arranged by birth cohorts so that changes through time can be examined. This chapter shows that demographic trends demonstrated in these genealogies can be interpreted in terms of the general social and economic conditions of the provinces studied.

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FERTILITY

When we use the vital records from a Chinese genealogy to estimate fertility, we have to keep in mind that there are some defects that certainly make the results only approximate, not exact. The first of these defects, the almost total lack of birth dates for daughters of the lineage, requires that fertility be estimated from recorded male birth only. Even in the case of male births, those who died young were usually recorded without vital data or not at all. Since Chinese genealogies did not all follow the same rules in recording sons who died young, and were often not even internally consistent in this regard (though in general those who died within three months of birth were not recorded at all), it is rather difficult to estimate a specific percentage of under-recording.¹ The problem of missing birth dates can be ameliorated to some extent by the process of family reconstitution, through which parents and children of a conjugal family are brought together with their vital dates in order to trace the parents' ages at the birth of each child. Family reconstitution is an important method that was developed by European historical demographers for the study of parish registers.² In applying the family reconstitution method to Chinese genealogical data, however, we can only use male births. If a son's date of birth is missing, it can be interpolated or extrapolated with the help of his brothers' birth dates, if these are available.³ Yet we still have to note that those not recorded at all are beyond our observation, and we do not attempt to adjust our estimates to account for them.

Moreover, because the recorded cases do not include those persons who were at reproductive ages but were not married, the genealogical data are not suitable for estimating the general fertility rate. The genealogical data may be used to estimate the marital fertility rate, but even within this limitation, there are still defects to be overcome. First, that Chinese genealogy did not record dates of marriage makes it difficult to determine the starting point of the time unit used to calculate marital fertility. Moreover, not every death date is recorded. The lack of death dates, in turn, makes it rather difficult to decide the terminus of the at-risk period in calculating marital fertility. Thus, if we begin the at-risk period with the youngest age group at

¹ 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: Academia Sinica 1978), p. 867.

² Louis Henry, *Manuel de démographie historique* (Geneva and Paris: Librairie Droz, 1967), 78-105; E. A. Wrigley (ed.), *An introduction to English historical demography from the sixteenth to the nineteenth century* (London: Weidenfeld and Nicolson, 1966), pp. 96-159.

³ Liu Ts'ui-jung, "Chinese genealogies," pp. 857-860, Liu Ts'ui-jung 劉翠溶, "Ming-Qing renkou zhi zengzhi yu qianyi 明清人口之增殖與遷移 (Growth and migration of the population in the Ming-Qing period)" in Hsu Cho-yun 許倬雲 et al. (eds.), *Zhongguo shehui jinji shi yanatao hui lunwenji* 中國社會經濟史研討會論文集 (Papers from the seminar on Chinese social and economic history), (Taipei, Center for Chinese Studies, 1983), pp. 283-286.

which male birth was recorded (fifteen to nineteen for a woman or even twenty to twenty-four for a man), then the marital fertility estimates for the lowest age group will be too low, since not everyone in the recorded population was married at those young ages. Moreover, if the observation ends with the birth of the last son (at least for those whose end of marriage cannot be dated precisely), then the estimates of marital fertility in the higher age groups will be too high, especially when there are many cases for which the end date is unknown. Here we can look at the Jiangdu Zhu lineage as example.

In Table 1, three sets of male-based fertility rates are listed for this lineage. There were 1,739 conjugal families reconstituted from the Zhu genealogy, with husbands' birth dates ranging from 1517 to 1877. Among these 1,739 families, only 813 had a known date of end of marriage. In the first panel of Table 1, the husbands with unknown dates of end of marriage were distributed according to the age at birth of last son, and thus the number remaining at each age group was derived by subtracting both the number with a known date of end of marriage in that interval *and* the number whose last son was born when they were at age in question from the number remaining at the end of the previous age interval. For example, at age 15-19, the number remaining in observation was $1739 - 0 - 1 = 1738$. In the second panel, only the cases with a known date of end of marriage were subtracted for each age interval, and the cases with an unknown date of end of marriage were assumed to have remained married until age sixty. In the third panel, proportions of cases with end of marriage date known were used to distribute the cases with end of marriage unknown into each age group, and the number remaining was calculated by subtracting both the known and unknown cases from the number remaining at the end of previous age interval. For example, at age 20-24, the number remaining in observation was $1739 - 1 - 1 = 1737$. After the number of fathers remaining in each age interval is calculated, the number of person-years may be calculated by multiplying the number of fathers remaining by five. The age-specific may then be computed by dividing the number of sons born in each age interval by the number of person-years lived in that same interval. The age-specific fertility calculated in this way indicates the average number of sons born per father per year in a particular age interval. Thus the total fertility of male births (the average number of sons per father) can be calculated by a summation of age-specific fertility rates times five. In Table 1 the total fertility rate of husbands was calculated either by including all age groups or by using only age groups from twenty to fifty-nine. The former figure does not represent marital fertility in a strict sense, since not everyone was married in the early ages of this range; for this reason, the latter figure may be preferable, though even it is not precise.

Table 1: Male-Based Fertility Rates, Zhu Lineage

Panel 1

Age	N Sons (N=3553)	N Fathers			Person- years	Age Specific Fertility
		End of Marriage (N = 813)	Birth of Last son (N = 926)	Remaining (N=1739)		
10-14	3	0	1	1739	8695	0.0003
15-19	133	1	31	1738	8690	0.0153
20-24	569	7	93	1706	8530	0.0667
25-29	799	13	165	1606	8030	0.0995
30-34	775	39	184	1428	7140	0.1085
35-39	636	68	216	1205	6025	0.1056
40-44	381	107	135	921	4605	0.0827
45-49	172	109	71	679	3395	0.0507
50-54	49	120	15	499	2495	0.0196
55-59	27	141	9	364	1820	0.0148
60+	9	208	6	214	1070	0.0084
Total fertility, ages 10-60+						2.86
Total fertility, ages 20-59						2.74

Panel 2

Age	N Sons (N=3553)	N Fathers		Person- years	Age Specific Fertility
		End of Marriage (N = 813)	Remaining (N = 1739)		
10-14	3	0	1739	8695	0.0003
15-19	133	1	1739	8695	0.0153
20-24	569	7	1738	8690	0.0655
25-29	799	13	1731	8655	0.0923
30-34	775	39	1718	8590	0.0902
35-39	636	68	1679	8395	0.0758
40-44	381	107	1611	8055	0.0473
45-49	172	109	1504	7520	0.0229
50-54	49	120	1395	6975	0.0070
55-59	27	141	1275	7375	0.0042
60+	9	208	1134	5670	0.0016
Total fertility, ages 10-60+					2.11
Total fertility, ages 20-59					2.03

Panel 3

Age	N Sons (N=3553)	N Fathers			Person- years	Age Specific Fertility
		End of Marriage (N = 813)	Birth of Last son (N = 925)	Remaining (N=1739)		
10-14	3	0	0	1739	8695	0.0003
15-19	133	1	1	1739	8695	0.0153
20-24	569	7	8	1737	8684	0.0655
25-29	799	13	15	1722	9609	0.0928
30-34	775	39	44	1694	8471	0.0915
35-39	636	68	77	1611	8054	0.0790
40-44	381	107	102	1466	7330	0.0519
45-49	172	109	124	1257	6258	0.0274
50-54	49	120	137	1024	5120	0.0096
55-59	27	141	161	767	3835	0.0070
60+	9	208	237	465	2325	0.0039
Total fertility, ages 10-60+						2.2221
Total fertility, ages 20-59						2.1235

In Table 1, the three sets of estimates derived using the different calculation methods described above yield estimates of total male fertility of husbands (average number of sons per father) from ages twenty to fifty-nine as 2.74, 2.03 and 2.12. The first estimate is highest because a larger number of husbands are excluded from observation after their last sons were born, and this exclusion causes the estimates of age-specific fertility from ages thirty upwards to be much higher than those derived using the other two methods of calculation. It is also notable that the difference between the second and third estimates is almost negligible. Moreover, even with a difference of about 0.6 between the high and low estimates, all methods of calculation yield estimates that show a rather low total fertility rate for the men of the Jiangdu Zhu lineage.

Calculated by means of the first method discussed above, the fertility of husbands and consorts (including both wives and concubines) of the five lineages are listed in Table 2.

Table 2 Fertility of Husbands and Consorts, by Lineage

	Jiangdu Zhu	Tongcheng Zhao	Wuchang Xu	Shaoyang Li	Xiangshan Mai
Husbands					
Birth years of father	1517-1877	1462-1864	1627-1912	1296-1864	1435-1869
N fathers	1,739	1,620	1,611	2,626	1,791
N Sons	3,553	3,871	3,615	6,284	4,024
Age-specific fertility rate (male births)					
10-14	0.0003	0.0010	0.0002	0.0011	0.0009
15-19	0.0153	0.0250	0.0113	0.0217	0.0065
20-24	0.0667	0.0800	0.0741	0.0760	0.0689
25-29	0.0995	0.1065	0.1132	0.1065	0.1007
30-34	0.1085	0.1198	0.1220	0.1121	0.1037
35-39	0.1056	0.1159	0.1135	0.1098	0.0911
40-44	0.0827	0.0810	0.0797	0.0788	0.0746
45-49	0.0507	0.0476	0.0444	0.0519	0.0440
50-54	0.0196	0.0184	0.0202	0.0280	0.0309
55-59	0.0148	0.0123	0.0100	0.0100	0.0210
60+	0.0084	0.0038	0.0039	0.0080	0.0180
Total fertility rate (male births)					
10-60+	2.8612	3.0580	2.9627	3.0229	2.8018
20-59	2.7409	2.9091	2.8854	2.8689	2.6752
Total fertility rate (both sexes, sex ratio = 105)					
10-60+	5.8655	6.2689	6.0635	6.1969	5.7437
20-59	5.6188	5.9637	5.9151	5.8812	5.4842

Table 2 (continued)

	Jiangdu Zhu	Tongcheng Zhao	Wuchang Xu	Shaoyang Li	Xiangshan Mai
Consorts (Wives and Concubines)					
N mothers	1,784	1,654	1,625	2,670	1,917
N Sons	3,518	3,861	3,612	6,274	3,884
Age-specific fertility rate (male births)					
10-14	0.0021	0.0019	0.0012	0.0020	0.0017
15-19	0.0298	0.0472	0.0289	0.1434	0.0222
20-24	0.1064	0.1152	0.1124	0.1163	0.1087
25-29	0.1176	0.1297	0.1293	0.1348	0.1251
30-34	0.1200	0.1300	0.1271	0.1255	0.1061
35-39	0.1170	0.1078	0.1115	0.0991	0.0820
40-44	0.0703	0.0567	0.0704	0.0567	0.0427
45-49	0.0150	0.0096	0.0132	0.0086	0.0059
Total fertility rate (male births)					
10-49	2.8404	2.9902	2.9698	2.9317	2.4728
15-49	2.8297	2.9805	2.9637	2.9216	2.4645
Total fertility rate (both sexes, sex ratio = 105)					
10-49	5.5288	6.1299	6.0881	6.0100	5.0692
15-49	5.8009	6.1100	6.0756	5.9893	5.0522

A few points should be noted here. The data used to calculate the estimates in Table 2 cover a wide time period, as indicated by the birth years of fathers (i.e., husbands) listed right below the name of each lineage. Thus these estimates provide us only a rough idea of the levels of fertility and do not indicate changes through time. There are a larger number of mothers than fathers, since many men remarried or took concubines. But it should also be noted that the total numbers of sons used to calculate the number of sons per father were not the same as the totals used to calculate sons per mother, since mothers whose vital dates were not available were not included in the calculation.

The age-specific fertility rates are estimated with male births only, but the total fertility rate is estimated including both sons and daughter on the assumption that the sex ratio at birth is the human norm of 105, the same assumption made by Telford in Chapter 3. These estimates show that the total fertility in three lineage populations over a long period averaged around six children per family. It is notable that there was not a great difference between the fertility rates of husbands and of consorts, except in the Xiangshan Mai lineage, which had a considerable larger number of consorts than husbands. This finding confirms my earlier finding that women married into elite families, where concubines were more common, had lower fertility than women married monogamously.⁴

⁴ Liu Ts'ui-jung, "Ming-Qing renkou zhi zengzhi yu qianyi", p. 301.

Following the first method described above, but with the slight difference that age ten to fourteen was not included in the estimation, a previous study of mine used data on conjugal families from fifteen lineages genealogies from Jiangsu, Zhejiang, Anhui, Hubei and Hunan to estimate age-specific fertility and total fertility rates in terms of male births. This study found that the pattern of age-specific fertility was quite similar among the fifteen lineages studied.⁵ When fertility rates were plotted against the age of parent, a lopsided bell-shaped curve emerged, revealing a pattern of natural fertility, in which there was no apparent use of birth-limitation methods to cause any sharp fertility decline after the peak. For the husband, the peak of fertility occurred at ages twenty-five to thirty-four; for the first wife, the peak was at ages twenty to twenty-nine. Moreover, the husband's curve was somewhat flatter and wider than that of the first wife, since his reproductive period was longer. The total number of sons averaged from 2.24 to 2.92 for the husband and from 2.18 to 2.95 for the first wife. These figures could be augmented to account for births of both sexes (again assuming the sex ratio at birth of 105), in which case the figures would be 4.59 and 5.99 for the husband and 4.47 and 6.05 for the first wife. It is notable that lineage in Jiangsu (the Jiangdu Zhu lineage was not included in that earlier study) were at the lower extreme, those in Hunan were at the upper, and those in Zhejiang, Anhui, and Hubei fell in between. If the lower estimate of Jiangdu Zhu fertility from Table 1 is used, it fits in with the other Jiangsu lineages studied earlier. Reasons for the difference in fertility between Jiangsu and Hunan lineages are discussed below.

One might argue that a total fertility of less than three sons, or about six children per conjugal family, seems too low for a traditional society such as Ming-Qing China. Of course, some of the aforementioned defects in genealogical recording might cause underestimates. The above estimates were derived from age-specific fertility rates, which required the data from each conjugal family to include quite complete vital dates for each member, and those families with no sons were not included in the observation. If the requirement for complete vital dates is relaxed somewhat – if only the birth date of the father is required – then more conjugal families can be taken into observation, and total fertility can be estimated simply in terms of average number of sons per father, without going through the intermediate step of calculating age-specific fertility rates. Calculated in this way, the average number of sons per family was even lower than the estimate calculated on the basis of families with complete records only. This outcome can be seen from Table 3, in which the same five lineages used in Table 2 are taken as examples. In this table, the observed data are first arranged according to birth cohorts of fathers into six fifty-year cohorts from 1548 to 1847.

⁵ Liu Ts'ui-jung, "Ming-Qing renkou zhi zengzhi yu qianyi", pp. 295-301.

Table 3 Number of Sons by Cohorts of Fathers

	1550 Cohorts (b. 1548-1597)				
	Zhu	Zhao	Xu	Li	Mai
(1)Parity of father					
n = 0	7	24	0	5	5
n = 1	21	32	1	48	7
n = 2	29	20	-	23	11
n = 3	12	9	-	19	8
n = 4	10	2	-	9	4
n = 5	5	2	-	1	1
n = 6	3	3	-	1	-
n = 7	-	1	-	-	-
n = 8	-	-	-	-	-
n = 9	-	-	-	-	-
n = 10	-	-	-	-	-
n = 11	-	-	-	-	-
(2)Total no. of sons	198	142	1	202	74
(3)No. of sons died young	0	0	0	8	1
(4)Total no. of fathers	87	93	1	106	36
(5)Total no. of consorts	118	99	2	114	48
(6)Average no. of sons per father= (2)/(4)	2.3	1.5	1.0	1.9	2.1
(7)Average no. of sons per consort=(2)/(5)	1.7	1.4	0.5	1.8	1.5
(8)% of sons died young=(3)/(2)x100	0	0	0	4.0	1.3
(9)% of remarried men=[(5)-(4)]/(4)x100	31.1	6.5	n.a.	7.5	33.3
(10) % of heirless father =(n=0)/(4)x100	7.8	25.8	0	4.7	13.8

	1600 Cohorts (b. 1598-1647)				
	Zhu	Zhao	Xu	Li	Mai
(1)Parity of father					
n = 0	55	4	0	20	14
n = 1	71	24	1	45	18
n = 2	57	16	1	38	20
n = 3	38	8	0	21	5
n = 4	22	5	0	12	5
n = 5	7	2	1	3	3
n = 6	1	0	-	4	1
n = 7	-	0	-	3	-
n = 8	-	0	-	-	-
n = 9	-	1	-	-	-
n = 10	-	-	-	-	-
n = 11	-	-	-	-	-
(2)Total no. of sons	428	119	8	291	114
(3)No. of sons died young	15	3	0	2	0
(4)Total no. of fathers	251	60	3	146	66
(5)Total no. of consorts	292	75	4	155	86
(6)Average no. of sons per father= (2)/(4)	1.7	2.0	2.7	2.0	1.7
(7)Average no. of sons per consort = (2)/(5)	1.5	1.6	2.0	1.9	1.3
(8)% of sons died young= (3)/(2)x100	3.5	2.5	0	0.7	0
(9)% of remarried men= [(5)-(4)]/(4)x100	16.3	21.7	n.a.	6.2	30.3
(10) % of heirless father =(n=0)/(4)x100	21.9	6.7	0	13.7	21.2

Table 3 (continued)

	1650 Cohorts (b. 1648-1697)				
	Zhu	Zhao	Xu	Li	Mai
(1)Parity of father					
n = 0	55	22	20	28	28
n = 1	131	52	36	49	39
n = 2	91	49	36	61	43
n = 3	38	31	30	65	30
n = 4	15	24	19	52	18
n = 5	7	8	4	26	8
n = 6	4	3	3	9	5
n = 7	1	1	-	3	1
n = 8	-	-	-	-	0
n = 9	-	-	-	-	1
n = 10	-	-	-	-	-
n = 11	-	-	-	-	-
(2)Total no. of sons	553	404	312	779	373
(3)No. of sons died young	7	7	0	12	6
(4)Total no. of fathers	342	190	148	293	173
(5)Total no. of consorts	396	224	156	311	235
(6)Average no. of sons per father= (2)/(4)	1.6	2.1	2.1	2.7	2.2
(7)Average no. of sons per Consort=(2)/(5)	1.4	1.8	2.0	2.5	1.6
(8)% of sons died young=(3)/(2)x100	1.3	1.7	0	1.5	1.6
(9)% of remarried men=[(5)-(4)]/(4)x100	15.8	17.9	5.4	6.1	35.8
(10) % of heirless father =(n=0)/(4)x100	16.1	11.6	13.5	9.6	16.2

	1700 Cohorts (b. 1698-1747)				
	Zhu	Zhao	Xu	Li	Mai
(1)Parity of father					
n = 0	71	63	63	125	96
n = 1	152	121	89	149	126
n = 2	129	126	75	172	107
n = 3	62	87	63	124	66
n = 4	22	39	34	69	43
n = 5	8	21	13	30	10
n = 6	1	7	2	13	5
n = 7	1	2	1	5	2
n = 8	-	0	-	-	1
n = 9	-	1	-	-	1
n = 10	-	-	-	-	-
n = 11	-	-	-	-	-
(2)Total no. of sons	737	960	648	1404	821
(3)No. of sons died young	14	27	3	43	18
(4)Total no. of fathers	446	467	340	687	457
(5)Total no. of consorts	498	514	357	736	596
(6)Average no. of sons per father= (2)/(4)	1.6	2.1	1.9	2.0	1.8
(7)Average no. of sons per Consort=(2)/(5)	1.5	1.9	1.8	1.9	1.4
(8)% of sons died young=(3)/(2)x100	1.9	2.8	0.5	3.1	2.2
(9)% of remarried men=[(5)-(4)]/(4)x100	11.7	10.1	5.0	7.1	30.4
(10) % of heirless father =(n=0)/(4)x100	15.9	13.5	18.5	18.2	21.0

Table 3 (continued)

	1750 Cohorts (b. 1748-1797)				
	Zhu	Zhao	Xu	Li	Mai
(1)Parity of father					
n = 0	112	163	134	169	157
n = 1	223	216	152	220	209
n = 2	165	179	148	118	185
n = 3	112	125	83	122	129
n = 4	35	75	40	81	60
n = 5	3	48	26	28	24
n = 6	0	20	2	11	10
n = 7	1	7	1	7	5
n = 8	-	-	1	-	3
n = 9	-	-	0	-	0
n = 10	-	-	1	-	0
n = 11	-	-	-	-	1
(2)Total no. of sons	1647	1658	1024	1401	1442
(3)No. of sons died young	21	200	7	41	97
(4)Total no. of fathers	664	841	588	807	781
(5)Total no. of consorts	740	961	630	888	973
(6)Average no. of sons per father= (2)/(4)	1.7	2.0	1.7	1.9	1.8
(7)Average no. of sons per Consort=(2)/(5)	1.5	1.7	1.6	1.7	1.5
(8)% of sons died young=(3)/(2)x100	1.9	12.1	0.7	2.7	6.7
(9)% of remarried men=[(5)-(4)]/(4)x100	11.4	14.3	7.1	10.0	24.6
(10) % of heirless father =(n=0)/(4)x100	16.9	19.4	22.8	20.9	20.1

	1800 Cohorts (b. 1798-1847)				
	Zhu	Zhao	Xu	Li	Mai
(1)Parity of father					
n = 0	187	214	186	224	299
n = 1	336	243	197	243	268
n = 2	198	193	157	173	199
n = 3	110	156	90	145	109
n = 4	45	88	52	90	45
n = 5	11	46	17	34	27
n = 6	4-	19	4	10	13
n = 7	-	10	2	5	2
n = 8	-	8	4	0	1
n = 9	-	1	-	1	-
n = 10	-	-	-	-	-
n = 11	-	-	-	-	-
(2)Total no. of sons	1321	1936	1144	1658	1408
(3)No. of sons died young	21	393	51	92	127
(4)Total no. of fathers	891	978	709	925	963
(5)Total no. of consorts	991	1142	792	1057	1180
(6)Average no. of sons per father= (2)/(4)	1.5	2.0	1.6	1.8	1.5
(7)Average no. of sons per Consort=(2)/(5)	1.3	1.7	1.4	1.6	1.2
(8)% of sons died young=(3)/(2)x100	1.6	20.3	4.5	5.5	9.0
(9)% of remarried men=[(5)-(4)]/(4)x100	11.2	16.8	11.7	14.3	22.5
(10) % of heirless father =(n=0)/(4)x100	21.0	21.9	26.2	24.2	31.0

Table 3 (continued)

	Total				
	Zhu	Zhao	Xu	Li	Mai
(1)Parity of father					
n = 0	487	490	403	571	597
n = 1	937	688	475	1129	667
n = 2	667	583	417	636	565
n = 3	372	416	266	496	347
n = 4	149	233	145	313	175
n = 5	41	127	61	122	73
n = 6	13	52	13	48	34
n = 7	3	21	4	23	8
n = 8	-	8	5	0	4
n = 9	-	3	0	1	2
n = 10	-	-	1	-	0
n = 11	-	-	-	-	1
(2)Total no. of sons	4287	5219	3148	6209	4224
(3)No. of sons died young	78	630	61	198	249
(4)Total no. of fathers	2669	2621	1790	2964	2473
(5)Total no. of consorts	3035	3013	1941	3261	3118
(6)Average no. of sons per father= (2)/(4)	1.6	2.0	1.8	2.0	1.7
(7)Average no. of sons per Consort=(2)/(5)	1.4	1.7	1.6	1.8	1.3
(8)% of sons died young=(3)/(2)x100	1.8	12.1	1.9	3.2	5.9
(9)% of remarried men=[(5)-(4)]/(4)x100	13.7	15.0	8.4	10.0	26.1
(10) % of heirless father =(n=0)/(4)x100	18.2	18.7	22.5	17.1	24.1

The ten rows of Table 3 are self-explanatory, except for row nine, which counts each remarriage once. Thus for example a man who had three wives would be counted as two remarriages. Thus, for example, a man who had three wives would be counted as two remarriages.

From Table 3 we may observe several facts. First, the average number of sons per family (i.e., per father) is calculated by using all sons recorded under each father, including those who were recorded as having died young. With the help of Figure 1, we can see clearly that the estimates of the average number of sons per father ranged around about two, with the exception of the 1648-1796 cohorts, where wide differences appeared among the lineages, particularly between the Shaoyang Li and Jiangdu Zhu lineages. These variations can be explained in terms of the different situations that these two areas encountered after the crisis of the Ming-Qing dynastic transition.⁶ The sparsely populated river basins in Hunan, such as Zi 資 River basin, where Shaoyang is located, had more favorable conditions for population recovery than the already densely populated Lower Yangzi River area where Jiangdu is located.

⁶ Dwight H. Perkins, *Agricultural Development in China, 1368-1968* (Edinburgh: Edinburg University Press, 1969), p. 24.

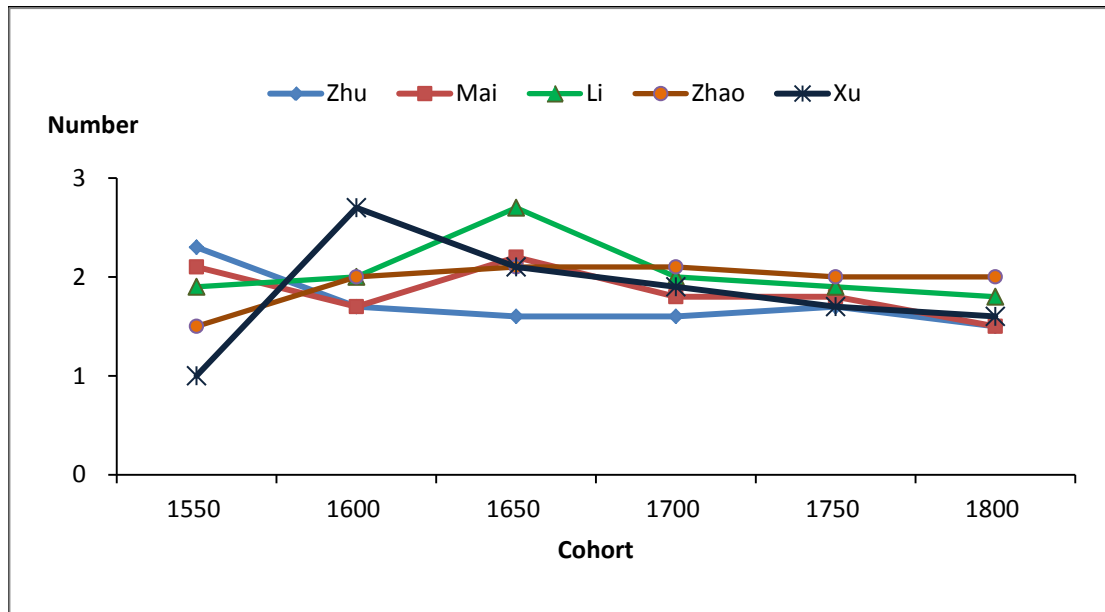


Figure 1: Average Number of Sons per Family

Although the official population registers should not be taken as accurate,⁷ we can still use the available statistics to give a general idea of relative population density in these two areas. According to these figures, the population density in Jiangsu in 1685 was 26.89 persons per square kilometer; in Hunan it was 1.36. In 1820, Yangzhou 揚州 prefecture, of which Jiangdu is a constituent county, had 201.69 persons per square kilometer, while Baoqing 寶慶 prefecture, the site of Shaoyang, had only 78.46.⁸ This comparison at least indicates that Shaoyang was much more sparsely populated than Jiangdu. Moreover, in Shaoyang, “where the Zi 資 River flows through a broad valley, cultivated land was relatively abundant.”⁹

Second, we can see variation among the lineages. Except for the 1548-1597 cohort, the Jiangdu Zhu lineage had the lowest average number of sons per father, around 1.5-1.7. Beginning with the 1598-1647 cohorts, the estimates of sons per father for the Tongcheng Zhao remained quite stable at 2.0-2.1. The estimates for the Wuchang Xu decline from 2.1 for the 1647-1697 cohorts to 1.6 for the 1798-1847 cohorts. (The 1548-1597 and 1598-1647 cohorts of this lineage can be ignored, as there were too few families in the observation.) The estimates for the Shaoyang Li first increased from 1.9 to 2.7 and then decreased to 1.8; the peak came with the

⁷ Ping-ti Ho, *Studies on the Population of China, 1368-1953* (Cambridge: Harvard University Press, 1959), 97; G. William Skinner, “Sichuan’s Population in the Nineteenth Century: Lessons from Disaggregated Data,” *Late Imperial China*, 8.1 (1987): pp. 1-79. .

⁸ Liang Fangzhong 梁方仲, *Zhongguo lidai hukou tiandi tianfu tongji* 中國歷代戶口田地田賦統計 (Statistics of household, population, cultivated land, and land taxation in China throughout the dynasties), (Shanghai: Renmin chubanshe, 1980), pp. 272-276.

⁹ Peter Perdue, *Exhausting the Earth: State and Peasant in Hunan, 1500-1850* (Cambridge: Harvard University Press, 1987), p. 46.

1648-1697 cohorts. Finally, the Xiangshan Mai followed a zigzag pattern. Their averages were not the lowest and remained stable at 1.8 for the 1698-1747 and 1748-1797 cohorts. In spite of these variations, it is quite clear that the cohorts belonging to the eighteenth century (born 1698-1797) had quite stable total fertility, whereas those born in the nineteenth century (1798-1847) showed a declining average number of sons. This fits with observations about the general trends in fertility found in other articles in this volume.

Third, because some men remarried or took concubines, there were more consorts than husbands. Thus, estimates of the average number of sons per mother were proportionately lower than those of average number of sons per father. If the average number of sons per father stays constant, then, the higher the percentage of remarriage, the lower the average number of sons per mother. As previously noted, the Xiangshan Mai lineage was particularly noteworthy in this respect, since its members had a larger number of consorts.

Fourth, it is difficult to discern trends in the number and percentage of sons who died young, as well as in percentages of men who remarried. The number of sons who died young was mostly under-recorded in the genealogies, as can be seen in Table 3. An exception was the 1798-1847 cohorts of the Tongcheng Zhao lineage, in which the sons who died young accounted for about 20%. The percentage of remarriage varied widely among cohorts and lineages. There seems to be no absolute positive correlation between a higher average number of sons per father and a higher rate of remarriage. For example, the 1648-1697 cohorts of the Shaoyang Li lineage had the highest estimated number of sons per father, but their remarriage rate was not the highest. However, a regression analysis using the fertility ratio (the number of sons per father divided by the number of sons per mother) as the dependent variable and the average number of consorts per husband as the independent variable for the data from fifty different families and lineages confirmed that the remarriage of husbands could explain about 67% of the fertility differences between the husband and the consort.¹⁰

Fifth, from the estimates of the percentage of heirless fathers (those who had daughters or who had unrecorded sons who died young but whose genealogy entries recorded no sons) it is notable that of the men born in the eighteenth and early nineteenth centuries, about one-fifth to one-fourth were heirless, and the percentage of heirless fathers seemed to be increasing. The mean percentage of sonless fathers calculated by Telford for a large number of Tongcheng lineages in 1520-1661 was

¹⁰ Liu Ts'ui-jung, "Ming-Qing jiazu de hunyin xiangtai yu shengyuli 明清家族的婚姻型態與生育率 (Marriage patterns and fertility rates in Ming-Qing lineages), in *Papers on Society and Culture of Early Modern China* (Taipei: The Institute of History and Philology, Academia Sinica, 1992), p. 7.

17.12%.¹¹ If we look at Table 5, we can see that the percentage of sonless fathers (zero sons) ranged from 17.1% to 24.1% among the five lineages investigated. These numbers suggest that the records of sonlessness in the five genealogies studied here are as complete as those used by Telford; the rates are remarkably consistent.

The frequency distribution of the number of sons listed in the first row of Table 3 can be used to calculate parity progression ratio and distribution of family size by number of male births, as shown in Tables 4 and 5, respectively.

Table 4 Parity Progression Ratios (a_x)

	Zhu	Zhao	Xu	Li	Mai
a_0	0.818	0.813	0.775	0.829	0.759
a_1	0.571	0.677	0.658	0.592	0.644
a_2	0.464	0.596	0.543	0.621	0.533
a_3	0.356	0.516	0.463	0.505	0.461
a_4	0.277	0.475	0.367	0.383	0.411
a_5	0.281	0.398	0.274	0.371	0.402
a_6	0.188	0.381	0.435	0.333	0.306
a_7	-	0.344	0.600	0.042	0.467
a_8	-	0.273	0.167	1.000	0.429
a_9	-	-	1.000	-	0.333
a_{10}	-	-	-	-	1.000

Note: For methods of calculating parity progression ratios and distribution of family size, see Roland Pressat, *Demographic Analysis* (Chicago: Aldine, Atherton, Inc., 1972), pp. 219-222. In this table, the calculations are done in terms of male births only.

Table 5 Distribution of Family Sizes

Parity	Number of sons per 1000 fathers				
	Zhu	Zhao	Xu	Li	Mai
0	182	187	225	171	241
1	351	263	265	338	270
2	250	222	233	191	228
3	140	159	149	148	141
4	56	89	81	94	71
5	15	48	34	36	29
6	5	20	7	15	14
7	1	8	3	6.7	3
8	-	3	2.4	0	2
9	-	1	0	0.3	0
10	-	-	0.6	-	0
11	-	-	-	-	1

Note: See footnote in Table 4.

¹¹ Ted A. Telford, "Fertility and Population Growth in the Lineages of Tongcheng County, 1520-1662", in Stevan Harrell (ed.), *Chinese Historical Microdemography* (Berkeley and Los Angeles: University of California Press, 1995), p. 62, Table 3.2.

The calculation of parity progression ratios provides us with an easier way to understand the manner in which different family sizes are distributed.¹² The term parity refers here to the number of sons born to a particular father. This distribution of family size calculated from the parity progression ratios of male births reveals that there were only a small number of fathers who had three sons: 140 of every 1,000 in the Jiangdu Zhu, 159 in the Tongcheng Zhao, 149 in the Wuchang Xu, 148 in the Shaoyang Li, and 141 in the Xiangshan Mai (see Table 5). Those who had four or more sons were even fewer. There was one man who had eleven sons in the Mai lineage, but he was obviously an exceptional case. In general, high-birth-order sons were quite rare. This distribution of family size based on number of sons born also gives us some hints about family structure, which is analyzed in detail in chapter 5.

MORTALITY

Mortality can be estimated by using data on persons for whom both birth and death dates are recorded in the genealogies. There are, of course, omissions in genealogical records that make it rather difficult to study the mortality of lineage populations in a satisfactory way. The most serious problem here is the aforementioned complete lack of records of infant deaths (but see Lee in chapter 7 for the Imperial lineage, which is a dramatic exception in this regard). Thus it is almost impossible to investigate infant mortality directly from the genealogical records. Moreover, vital dates, especially death dates, are usually not given for those who died young and unmarried. The fact that very few deaths below age fifteen are recorded (although there are some), in turn, makes it somewhat difficult to estimate the mortality below age fifteen or even twenty directly from genealogical data. Even when both birth and death dates are given, we usually have death dates for only about half of the males recorded in a relatively complete genealogy. As for the female population, estimates can only be made for consorts, and the available records of their deaths are often less complete than those for men. Despite these shortcomings, however, genealogical data can still tell us something about mortality in lineage populations.

By taking a certain birth cohort with recorded ages at death, distributing it into five-year age groups, and constructing a life table, which shows the mortality of a lineage population. The first life tables of a Guangdong lineage were constructed about sixty years ago by Yuan I-chin.¹³ In the past few years, I have also constructed life tables for lineage populations in Jiangsu, Zhejiang, Anhui, Jiangxi, Hubei, Hunan,

¹² Roland Pressat, *Demographic Analysis*, pp. 219-224.

¹³ Yuan I-chin, "Life Tables for a Southern Chinese Family from 1365 to 1849," *Human Biology* 3.2 (1931): pp. 157-179.

and Guangdong Provinces. My findings about the mortality of these southern lineage populations, based on these life tables, can be summarized as follows: (1) women had a higher life expectancy than men, (2) mortality levels differed slightly among lineages, and (3) mortality appeared to be increasing during the late eighteenth and early nineteenth centuries.¹⁴

In this paper, the five lineages whose fertility patterns are analyzed above will be examined for their mortality patterns; for this purpose the lineages are divided into their constituent branches (*fang* 房). The observed numbers of male deaths in each branch are listed in Table 6. The frequency distribution of deaths is arranged in five-year age groups from 15-19 to 80+. At the bottom of Table 6, mean age at death and median age at death, calculated from each set of grouped data, are also listed. The results demonstrate that even within a lineage, mortality differed slightly among branches, although the order of magnitude was about the same. Moreover, a comparison of the five lineages shows that the Shaoyang Li lineage had a higher age at death than the others.

With the data from Table 6, a life table can be constructed for each branch. The values of graduated q_x (the probability of dying at age x) and e_x (the life expectancy at age x) are listed respectively in Tables 7 and 8. The graduated values of q_x are reported here because they are derived from the observed values of q_x that are calculated from the observed number of deaths listed in Table 6. In addition, the values of R^2 are very high, indicating that the graduated values of q_x are very close to those of observed q_x . In Figure 2, the curves of q_x for some branches are depicted against those of Coale and Demeny model life tables for purposes of comparison.¹⁵

¹⁴ Liu Ts'ui-jung, "The demographic dynamics of some clans in Lower Yangtze area, ca. 1400-1900", *Academia Economic Papers*, 9.1 (1981): 115-160; Liu Ts'ui-jung, "The demography of two Chinese clans in Hsiao-shan, Chekiang, 1650-1850", in Susan B. Hanley and Arthur P. Wolf eds., *Family and Population in East Asian History* (Stanford: Stanford University Press, 1985), pp. 13-61; Liu Ts'ui-jung, "Ming Qing shiqi Changjiang xiayou diqu dushihua zhi fazhan yu renkou tezheng 明清時期長江下游地區都市化之發展與人口特徵 (Demographic aspects of urbanization in the Lower Yangtze region in China in the Ming-Qing period)", *Academic Economic Papers*, 14.2 (1986): 43-86; Liu Ts'ui-jung, "Yi Guangdong Xiangshan Xu shi wei li shilun Zhongguo jiazhu zhi chengzhang ji qi gongneng zhi fahui 以廣東香山徐氏為例試論中國家族之成長及其功能之發揮 (A discourse on growth and function of the Chinese lineage: An example of the Xu lineage of Xiangshan, Guangdong)", in *Proceedings of the Third Conference on Asian Clan Genealogies* (Taipei: United Daily News Cultural Foundation, 1987), pp. 369-416; Liu Ts'ui-jung, "Yihuang Beishan Huang shi zhi chengzhang yu shehui jingji huodong 宜黃北山黃氏之成長與社會經濟活動 (Growth of the Huang lineage in Yihuang and its socio-economic activities)", in *The Second International Conference on Sinology, section on Ming, Ch'ing, and Modern History* (Taipei: Academia Sinica, 1989), pp. 243-274.

¹⁵ The table used here are the Model West life tables provided by Coale and Demeny. Their work consists of a series of mortality tables with different levels of mortality in four regional patterns derived primarily from European demographic rates. The North, South, and East patterns all show distinct deviations from the general world experience, but the West pattern includes a large residual group of tables, mostly from Western populations but also from Taiwan and Japan, and is not characterized by any specific form of deviation from general experience. See Ansley J. Coale and

Table 6 Mortality Patterns of Lineage Males, by Age

Age	Jiangdu Zhu					Tongcheng Zhao		Wuchang Xu			
	I	II	III	IV	V	I	II	I	II	III	IV
15-19	5	3	11	6	3	12	56	11	5	14	19
20-24	10	5	12	8	7	15	56	20	11	22	34
25-29	13	11	16	10	8	31	70	27	15	29	34
30-34	22	8	17	9	12	23	98	24	17	32	48
35-39	22	13	21	23	22	28	105	31	22	42	54
40-44	21	21	38	23	36	41	131	31	19	48	65
45-49	24	21	29	22	30	56	143	41	21	45	68
50-54	25	22	50	18	39	53	157	27	22	59	62
55-59	32	33	45	27	38	56	165	44	19	45	66
60-64	26	16	38	22	38	38	149	38	23	44	70
65-69	25	13	22	12	20	46	111	30	19	47	63
70-74	10	5	20	5	14	39	81	24	19	29	53
75-79	11	9	6	7	9	21	65	13	5	23	25
80+	6	2	5	0	2	18	45	14	9	13	22
Total	252	182	330	192	278	477	1432	375	226	492	683
Mean age at death	50.29	50.41	49.95	48.07	51.45	52.07	50.44	49.86	50.08	50.18	50.67
Median age at death	50.80	51.05	51.10	47.86	51.69	52.07	50.82	49.46	49.68	50.19	50.57

Age	Shaoyang Li						Xiangshan Mai				
	I	II	III	IV	V	VI	I	II	III	IV	V
15-19	2	4	12	5	5	0	30	36	13	15	12
20-24	12	13	32	12	5	5	47	82	22	29	16
25-29	11	11	37	15	7	5	58	81	28	20	33
30-34	14	11	42	22	10	8	32	73	21	26	30
35-39	22	9	54	31	13	7	44	74	22	24	40
40-44	30	11	67	21	20	9	63	103	22	20	29
45-49	39	23	94	32	17	14	61	105	20	22	35
50-54	40	19	91	44	13	14	48	85	22	34	39
55-59	37	20	106	41	31	14	81	84	24	20	35
60-64	51	19	125	69	39	24	48	75	30	35	22
65-69	49	20	100	59	23	25	49	73	19	23	32
70-74	57	19	100	48	25	23	39	47	19	23	17
75-79	29	15	78	31	11	19	39	48	13	13	13
80+	16	12	65	37	9	19	28	36	14	9	12
Total	409	206	1003	467	228	186	662	1002	289	313	365
Mean age at death	56.92	53.73	56.27	57.46	55.43	60.32	49.14	47.73	48.49	48.14	48.02
Median age at death	58.66	54.50	57.42	59.76	57.87	62.54	48.67	46.48	48.13	49.07	47.21

Note: Name and span of observed birth years of each branch are as follows:

Zhu I: Xingyi, b. 1563-1847; Zhu II: Xinger, b. 1558-1846; Zhu III: Xingsi, b. 1514-1852;

Zhu IV: Xingliu, b. 1582-1850; Zhu V: Xingba, b. 1517-1909.

Zhao I: Dazong, b. 1462-1862; Zhao II: Xiaozong, b. 1465-1849.

Xu I: Yingqi, b. 1673-1871; Xu II: Yinglin, b. 1663-1872; Xu III: Yingzhu, b. 1593-1897;

Xu IV: Yingfeng, b. 1639-1907.

Li I: Tianrong, b. 1537-1880; Li II: tianhua, B. 1566-1879; Li III: Tiangui, b. 1516-1885;

Li IV: Xingren, b. 1519-1871; Li V: Xingyu, b. 1503-1882; Li VI: Xingzhi, b. 1511-1874.

Mai I: Linhui, b. 1428-1875; Mai II: Yilung, b. 1457-1873; Mai III: Defu, b. 1463-1846;

Mai IV: Rushi, b. 1466-1876; Mai V: Nanpu, B. 1435-1870.

Table 7 Graduated q_x of Lineage Males

Age	Jiangdu Zhu					Tongcheng Zhao		Wuchang Xu			
	I	II	III	IV	V	I	II	I	II	III	IV
15-19	0.0266	0.0188	0.0278	0.0297	0.0122	0.0207	0.0354	0.0384	0.0328	0.0338	0.0339
20-24	0.0373	0.0289	0.0385	0.0418	0.0206	0.0289	0.0453	0.0486	0.0437	0.0441	0.0438
25-29	0.0516	0.0433	0.0527	0.0584	0.0337	0.0394	0.0580	0.0616	0.0577	0.0575	0.0564
30-34	0.0705	0.0634	0.0715	0.0798	0.0533	0.0544	0.0741	0.0778	0.0754	0.0745	0.0726
35-39	0.0950	0.0906	0.0960	0.1082	0.0816	0.0738	0.0945	0.0981	0.0978	0.0961	0.0931
40-44	0.1262	0.1265	0.1276	0.1447	0.1210	0.0992	0.1203	0.1235	0.1255	0.1235	0.1191
45-49	0.1656	0.1725	0.1678	0.1912	0.1735	0.1323	0.1530	0.1553	0.1597	0.1580	0.1519
50-54	0.2142	0.2296	0.2185	0.2493	0.2408	0.1750	0.1941	0.1948	0.2013	0.2012	0.1932
55-59	0.2735	0.2986	0.2816	0.3209	0.3235	0.2294	0.2460	0.2441	0.2515	0.2552	0.2451
60-64	0.3444	0.3792	0.3593	0.4078	0.4205	0.2984	0.3112	0.3053	0.3112	0.3222	0.3101
65-69	0.4279	0.4703	0.4538	0.5116	0.5291	0.3874	0.3930	0.3812	0.3816	0.4050	0.3912
70-74	0.5245	0.5696	0.5673	0.6335	0.6444	0.4920	0.4956	0.4751	0.4635	0.5070	0.4922
75-79	0.6343	0.6738	0.7020	0.7745	0.7593	0.6238	0.6239	0.5912	0.5580	0.6318	0.6177
80+	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
R ²	0.9728	0.9594	0.9772	0.9567	0.9900	0.9686	0.9931	0.9712	0.9479	0.9895	0.9883

Age	Shaoyang Li						Xiangshan Mai				
	I	II	III	IV	V	VI	I	II	III	IV	V
15-19	0.0099	0.0315	0.0174	0.0155	0.0193	--	0.0561	0.0532	0.0643	0.0632	0.0419
20-24	0.0155	0.0383	0.0240	0.0214	0.0258	0.0256	0.0633	0.0636	0.0700	0.0695	0.0539
25-29	0.0239	0.0469	0.0330	0.0294	0.0345	0.0309	0.0723	0.0763	0.0784	0.0778	0.0689
30-34	0.0361	0.0580	0.0450	0.0403	0.0461	0.0380	0.0837	0.0918	0.0890	0.0885	0.0875
35-39	0.0535	0.0721	0.0610	0.0548	0.0617	0.0476	0.0982	0.1109	0.1027	0.1025	0.1106
40-44	0.0779	0.0907	0.0823	0.0743	0.0825	0.0606	0.1167	0.1345	0.1202	0.1207	0.1388
45-49	0.1100	0.1149	0.1105	0.1004	0.1104	0.0786	0.1406	0.1635	0.1428	0.1447	0.1732
50-54	0.1554	0.1468	0.1473	0.1349	0.1478	0.1036	0.1716	0.1996	0.1722	0.1765	0.2149
55-59	0.2133	0.1892	0.1954	0.1805	0.1979	0.1391	0.2122	0.2444	0.2107	0.2189	0.2651
60-64	0.2875	0.2459	0.2576	0.2404	0.2651	0.1900	0.2659	0.3004	0.2617	0.2762	0.3251
65-69	0.3800	0.3223	0.3378	0.3188	0.3551	0.2641	0.3377	0.3704	0.3299	0.3547	0.3962
70-74	0.4928	0.4260	0.4405	0.4209	0.4795	0.3736	0.4346	0.4584	0.4221	0.4632	0.1801
75-79	0.6270	0.5678	0.5710	0.5532	0.6380	0.5377	0.5667	0.5692	0.5480	0.6156	0.5784
80+	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
R ²	0.9587	0.9453	0.9834	0.9719	0.9721	0.9817	0.9473	0.9544	0.9582	0.9542	0.9511

Note: For graduation the formula $\log q_x = a + bx + cx^2$ is used. See Yuan I-chin, "Life Tables for a Southern Chinese Family", p. 161.

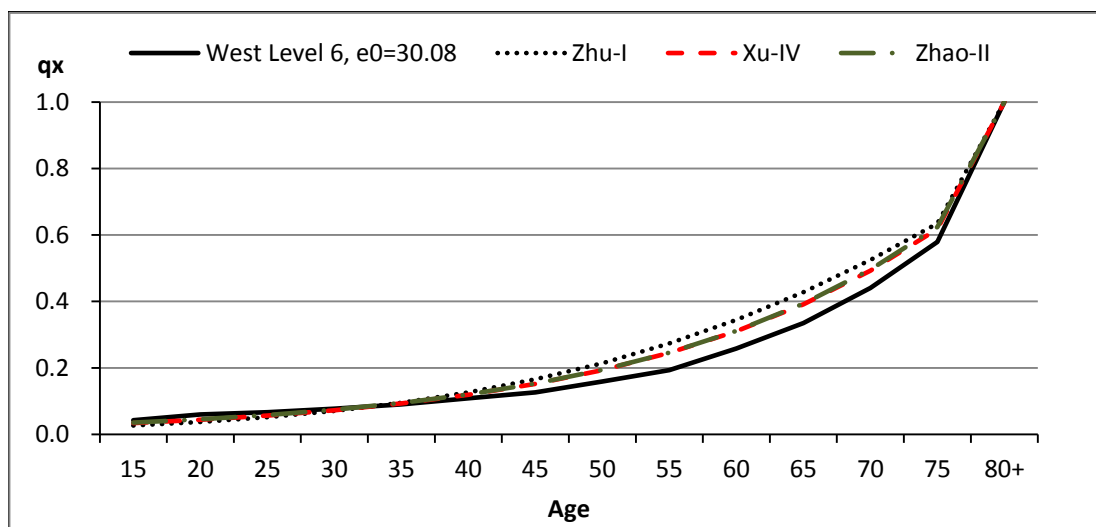
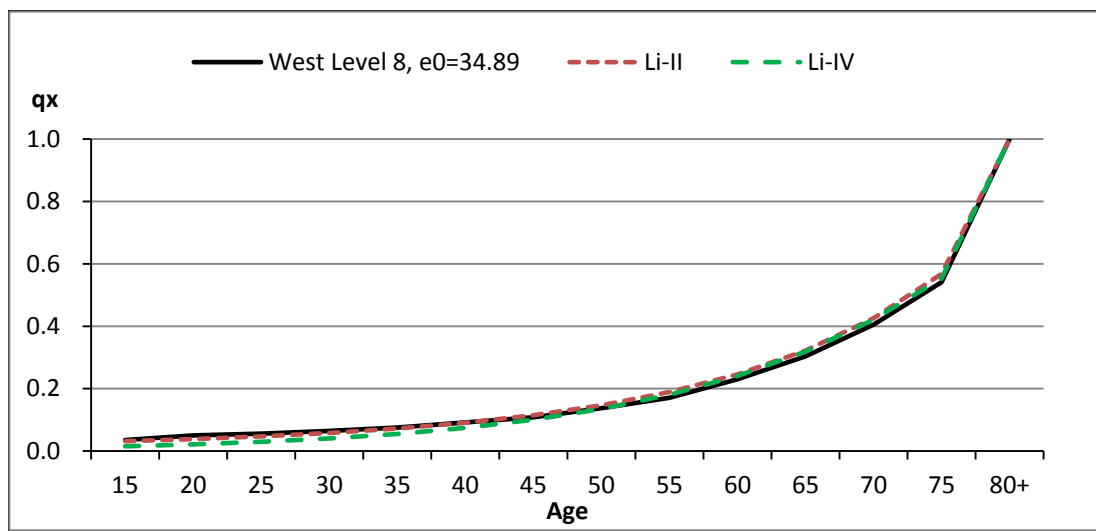
Table 8 Life Expectancy (e_x) of Lineage Adult Males

Age	Jiangdu Zhu					Tongcheng Zhao		Wuchang Xu			
	I	II	III	IV	V	I	II	I	II	III	IV
20-24	31.98	32.15	31.62	29.95	32.63	35.01	32.32	31.89	32.04	31.95	32.42
25-29	28.12	28.03	27.78	26.14	28.27	30.97	28.63	28.39	28.39	28.31	28.79
30-34	24.51	24.19	24.19	22.60	24.17	27.14	25.24	25.09	24.98	24.88	25.36
35-39	21.18	20.65	20.86	19.35	20.39	23.56	22.06	22.00	21.81	21.69	22.15
40-44	18.15	17.46	17.81	16.39	16.98	20.24	19.10	19.12	18.91	18.73	19.17
45-49	15.41	14.63	15.05	13.74	13.97	17.19	16.37	16.46	16.26	16.01	16.42
50-54	12.97	12.16	12.58	11.40	11.38	14.43	13.87	14.03	13.88	13.55	13.92
55-59	10.82	10.04	10.40	9.35	9.19	11.96	11.61	11.82	11.74	11.33	11.65
60-64	8.95	8.24	8.49	7.59	7.39	9.78	9.58	9.83	9.85	9.36	9.62
65-59	7.34	6.75	6.85	6.09	5.94	7.87	7.78	8.05	8.17	7.62	7.83
70-74	5.96	5.53	5.47	4.85	4.81	6.23	6.21	6.46	6.66	6.10	6.25
75-79	4.78	4.53	4.36	3.90	4.00	4.85	4.85	5.05	5.26	4.80	4.89
80+	3.74	3.73	3.73	3.73	3.73	3.75	3.74	3.74	3.75	3.74	3.74

Table 8 (continued)

Age	Shaoyang Li						Xiangshan Mai				
	I	II	III	IV	V	VI	I	II	III	IV	V
20-24	37.86	35.89	37.42	38.67	37.03	40.78	31.96	30.00	31.38	31.11	30.38
25-29	33.41	32.22	33.28	34.46	32.94	36.79	28.95	27.22	28.55	28.25	26.97
30-34	29.17	28.68	29.33	30.43	29.03	32.88	26.01	24.27	25.77	25.42	23.78
35-39	25.17	25.30	25.59	26.60	25.31	29.08	23.16	21.47	23.04	22.65	20.82
40-44	21.45	22.07	22.09	23.00	12.81	25.41	20.41	18.83	20.40	19.95	18.1
45-49	18.05	19.02	18.85	19.64	18.55	21.89	17.77	16.37	17.84	17.35	15.62
50-54	14.97	16.16	15.88	16.55	15.54	18.54	15.27	14.08	15.40	14.86	13.37
55-59	12.27	13.52	13.19	13.75	12.81	15.40	12.92	11.97	13.08	12.51	11.34
60-64	9.91	11.09	10.78	11.22	10.35	12.48	10.72	10.03	10.90	10.31	9.53
65-59	7.91	8.89	8.66	8.98	8.18	9.82	8.70	8.27	8.83	8.29	7.91
70-74	6.22	6.92	6.80	7.02	6.31	7.45	6.86	6.67	7.02	6.47	6.47
75-79	4.83	5.21	5.19	5.30	4.76	5.41	5.21	5.19	5.33	4.90	5.13
80+	3.75	3.76	3.76	3.77	3.75	3.79	3.75	3.74	3.75	3.75	3.74

The comparisons of mortality level of some branches with the model life tables illustrated in Figure 2 reveal several observations about the mortality of these southern lineage populations.



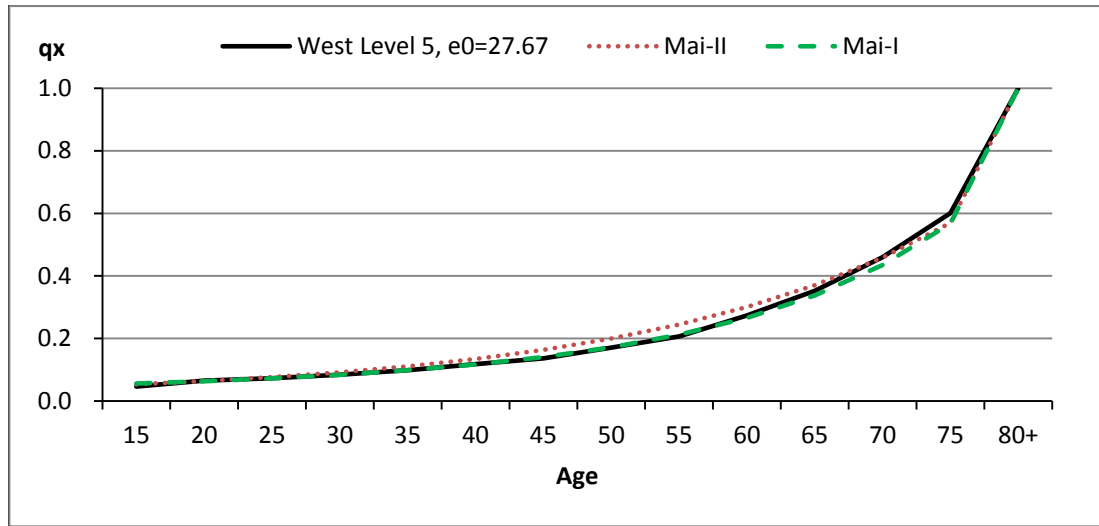


Figure 2 Mortality Levels of Lineage Males

First, the Shaoyang Li lineage in Hunan had the lowest mortality among the five lineages. Its mortality level was comparable with Model West Level 8 (life expectancy at birth = 34.89). Above age forty-five, the mortality rates of the model population and the Li lineage appear to be very close to each other; at younger ages, between fifteen and forty-five, the mortality of the Li lineage is somewhat lower than that of the model population. Second, the Xiangshan Mai lineage in Guangdong had the highest mortality of the five lineages. Its mortality level was comparable to the Model West Level 5 (life expectancy at birth = 27.67). In fact, the curve of Mai-I branch fits perfectly with that of the model population. The Mai-II, however, appears to deviate from the model population between the ages of twenty-five and sixty-five. Third, the Jiangdu Zhu lineage in Jiangsu, the Tongcheng Zhao lineage in Anhui, and the Wuchang Xu lineage in Hubei all appear to have had the same level of mortality. As shown in Figure 2, the curves of Zhi-I, Zhao-II, and Xu-IV lay above Model West Level 6 (life expectancy at birth = 30.08) at ages thirty-five and above, whereas below that age the opposite is true. The mortality level of these lineages may also be compared with the Model West level 5, as we can see from the nearly parallel curves in Figure 2.

In short, the above comparisons suggest that the mortality level of the southern lineages presented here was between levels 5 and 8 of the Model West populations. A peculiar difference between the southern lineages and the Model West populations was that the former had lower mortality rates at younger ages, between fifteen and forty-five. This peculiarity, which I also found in two Zhejiang lineages,¹⁶ is not easy to explain, but it could be due to omissions of those whose ages at death were unknown. Alternatively, the actual mortality of the Chinese populations may have

¹⁶ Liu Ts'ui-jung, "The demography of two Chinese clans in Hsiao-shan", p. 49.

been different, since Model West life tables are derived mostly from Western populations, although a few tables from Japan and Taiwan are also included. In any case, it is interesting to note that a Far-Eastern pattern of mortality, characterized by excess mortality of older men, has been found by some demographers.¹⁷ The statistics derived from these genealogies seem to conform to this pattern; this Far-Eastern pattern is a topic that requires further research.

It should be noted that the life expectancy of the lineage males listed in Table 8 demonstrates the same variation as that shown by the mean and median ages at death listed in Table 6. The branches of the Shaoyang Li lineage had a higher life expectancy above age twenty than did the branches of the other lineages. This difference could be due to the fact that the environment in which the Li lineage resided was more favorable, as discussed above with regard to fertility.

In addition to the above examples showing branches of the five lineages, an investigation of mortality by cohorts can also be performed in order to discern changes through time. Here, data from Shaoyang Li lineage will serve as an example. Table 9 shows the observed number of male deaths, arranged by five-year age grouped and by fifty-year cohorts (the 1300 cohort lumps two fifty-year cohorts in order to put together enough cases, and the 1800 cohort is limited to twenty-five years because of right-censoring in the genealogy, which was compiled in 1904).

From the distribution of deaths listed in Table 9, it is quite clear that in the early years of a lineage those deaths that were recorded tended to be at high ages. This phenomenon was also found in other lineages.¹⁸ The low mortality rate reflected in these data recorded from the early years of a lineage should not be considered as representing the real situation of the time when these cohorts were active, for the data were apparently biased by a tendency for those men who lived longer to become founders of lineages or lineage branches. In other words, a lineage would not have formed if its ancestors were all very short-lived. From the 1498-1557 cohorts on, as the number of observations become large enough and the distribution of deaths covered almost every age group, the bias toward high age at death seems to have diminished.

As for changes in mortality through time, Table 9 shows that the mean and median ages at death of the 1498-1547, 1548-1597, and 1598-1647 cohorts were at about the same level, the ages at death were somewhat older in the 1648-1697 cohorts, the ages returned to previous levels in the 1698-1747 cohorts, and decreased in the eighteenth century.

¹⁷ Noreen Goldman, "Far Eastern Pattern of Mortality", *Population Studies*, 34.1 (1980): 5-6.

¹⁸ Liu Ts'ui-jung, "Yihuang Beishan Huang shi", pp. 254-255.

Table 9 Distribution of Deaths of Shaoyang Li Males, by Cohort

Age	Mid-point	1300 (b.1298-1397)	1400 (b.1398-1447)	1450 (b.1448-1497)	1500 (b.1498-1547)	1550 (b.1548-1597)
15-19	17	0	0	0	1	0
20-24	22	0	0	0	0	0
25-29	27	0	0	1	0	1
30-34	32	0	1	1	1	1
35-39	37	0	0	1	0	4
40-44	42	0	0	0	3	2
45-49	47	0	0	0	4	4
50-54	52	0	2	3	7	11
55-59	57	0	2	2	7	10
60-64	62	1	2	9	16	30
65-69	67	3	6	7	9	19
70-74	72	3	11	7	11	8
75-79	77	6	0	4	6	6
80+	85	3	3	6	4	3
Total		16	27	41	69	99
Mean age at death		74.75	67.52	66.22	62.54	61.08
Median age at death		74.83	69.23	66.50	62.59	61.75

Age	Mid-point	1600 (b.1598-1647)	1650 (b.1648-1697)	1700 (b.1698-1747)	1750 (b.1748-1797)	1800 (b.1798-1822)
15-19	17	0	1	2	3	2
20-24	22	0	1	7	13	14
25-29	27	3	4	9	20	14
30-34	32	7	5	12	19	22
35-39	37	3	8	18	29	19
40-44	42	5	9	16	32	31
45-49	47	10	15	42	45	42
50-54	52	14	18	33	48	48
55-59	57	14	14	37	71	32
60-64	62	20	38	42	89	44
65-69	67	15	30	40	77	57
70-74	72	16	35	55	88	43
75-79	77	11	29	45	52	29
80+	85	15	26	45	36	26
Total		133	233	403	622	423
Mean age at death		61.21	63.30	60.76	58.90	56.29
Median age at death		61.63	64.58	62.04	60.74	57.05

The life tables constructed for the last four cohort groups as shown by the life expectancies listed in Table 10 also demonstrate the trend of increasing mortality in the eighteenth and nineteenth centuries, a trend that is corroborated by figures in other chapters in this volume.

Table 10 Life Expectancy (e_x) of Shaoyang Li Adult Males, by Cohort

Age	1650 (b.1648-1697)	1700 (b.1698-1747)	1750 (b.1748-1797)	1800 (b.1798-1822)
20-24	44.04	41.44	39.73	37.09
25-29	39.35	37.15	35.54	33.20
30-34	34.79	33.00	31.49	29.45
35-39	30.39	29.01	27.61	25.87
40-44	26.21	25.20	23.91	22.48
45-49	22.28	21.60	20.42	19.28
50-54	18.65	18.25	17.16	16.31
55-59	15.35	15.11	14.16	13.56
60-64	12.39	12.26	11.43	11.06
65-69	9.79	9.71	8.99	8.81
70-74	7.54	7.44	6.86	6.82
75-79	5.59	5.47	5.07	5.12
80+	3.80	3.79	3.77	3.76

Note: Life tables are constructed based on the q_x values derived from number of deaths listed in Table 8 beginning with age twenty.

Concluding Remarks

From the data on these five lineages, we can thus begin to paint a provisional picture of general trends in demographic rates in late Ming and Qing China, at least for lineage populations in the southern provinces. Fertility was moderate and mortality high in the latter half of the Ming dynasty and at the time of dynastic transition. In the first hundred years of the Qing, until 1750 or so, there was a marked increase in fertility and a concomitant decrease in mortality. Since this was a period of prosperity in most of the empire, it is not surprising that we find a high rate of population increase.

Toward the end of the eighteenth century and on into the nineteenth, however, both fertility and mortality began to turn the other way. Fertility showed a decline with the early-nineteenth-century birth cohorts, and mortality began to rise with the eighteenth-century birth cohorts, who were dying in the latter half of the eighteenth and first half of the nineteenth centuries. Many social and economic historians see a general downturn in economic conditions and in social stability during this period,¹⁹ so it is not surprising to see this reflected in the demographic rates of so many lineages in so many parts of the empire.

¹⁹ Ping-ti Ho, *Studies on the Population of China*, pp. 196-253; Dwight H. Perkins, *Agricultural Development in China*, pp. 26-29.