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Age Specific Fertility

To look at the recent age structure of births, the age group of mothers can classify children born in the past year. This tabulation enables the calculation of age specific fertility rates (ASFR), that is the average number of children born to each woman in an age group during the year. Relating fertility experience to age provides a more detailed description of fertility behavior, or family formation, and provides a control for changes in age structure for comparative purposes.

This report provides two methods for calculating and adjusting age specific fertility rates. One involves reverse survival of current births and the other involves comparing current fertility to previous fertility to check for under counting. The reverse survival method is discussed first.

Table 4.3. Adjustment of Birth in Year Prior to the Census, FSM: 1994 and 2000

Age group	1994 Census					2000 Census				
	Number of women	Reported Births	Unadjusted ASFR	Adjusted Births	Adjusted ASFR	Number of women	Reported Births	Unadjusted ASFR	Adjusted Births	Adjusted ASFR
Total	24,241	2,856	...	3,276	...	26,432	2,861	...	3,007	...
15-19	5,821	272	0.047	312	0.054	6,476	243	0.037	255	0.039
20-24	4,506	693	0.154	795	0.176	4,646	749	0.161	787	0.169
25-29	3,567	672	0.188	771	0.216	3,916	744	0.190	782	0.200
30-34	3,287	581	0.177	666	0.203	3,361	575	0.171	604	0.180
35-39	3,002	399	0.133	458	0.152	3,020	354	0.117	372	0.123
40-44	2,410	191	0.079	219	0.091	2,758	161	0.058	169	0.061
45-49	1,648	48	0.029	55	0.033	2,255	35	0.016	37	0.016
TFR	...	...	4.035	...	4.628	...	...	3.753	...	3.946

Source: 1994 FSM Census, Table P15; 2000 FSM Census, Table P2-3.
Note: Adjustment factor equals total births (reverse survival) divided by the number of women reporting a birth in the past year.

Before producing age specific rates through reverse survival, we adjusted the number of births in the past year reported by women (see Table 4.1). This type of question is often under reported and considerable care is needed to use the results. Consider the 2000 data for example, the 3,007 estimated births for the year 1999-2000 were based on reverse survival and shown in Table 4.1. Yet, as Table 4.3 shows, the total number of women reporting a birth in the past year was 2,861, considerably less than the 3,007 estimated using reverse survival.

In order to correct for the under count, an adjustment factor is calculated by dividing the estimated births from reverse survival by the reported number of births. In this case it would be 3,007 estimated births divided by 2,861 reported births resulting in an adjustment factor of 1.05 (see Table 4.3). The adjustment factor is then applied to the births to correct for the under count.

The technique used took advantage of the relative strengths of two approaches. Using the ratio of births estimated from reverse survival to the mothers reporting a birth as a correction factor retained the age specific pattern of fertility, but fixed the level of fertility based on the more plausible reverse survival estimate of births.

The fertility pattern illustrated in the last column of Table 4.3 appears very smooth. The low rates at ages 15 to 19 reflect the delay in childbearing due to a later age of marriage in 2000. Peak fertility is reached at ages 25 to 29, with 0.200 children per women, and declined steadily thereafter. While age specific fertility falls quite sharply after age 35, the slope is not sufficiently steep enough to suggest a notable use of family planning; for example, women aged 45 to 49 in year 2000 were bearing on average 0.016.

The age specific fertility rates provide too much detail to be practical for some comparisons. A very useful composite index is the total fertility rate (TFR), which effectively sums the current age specific fertility for each year of a woman's reproductive life. The TFR thus provides a measure of the average number of children a woman would bear under a given schedule by the end of her childbearing years. Computation from the age specific rates is relatively simple, involving the summing of annual age specific rates. The rates provided in Table 4.3 for year 2000 would yield a TFR of 3.9. However, compared to the P/F ratio method the TFR of 3.9 is too low.

Table 4.4. Calculation of Total Fertility Rate with P/F Ratio, FSM: 1994 and 2000.

	1994 Census						2000 Census					
Age group	Children Ever born per woman (Parity, P)	Age specific fertility rates (ASFR, F)	Summation of ASFR's multiplied by 5 (phi)	Adjust-ment of phi (F)	Parity divided by adjusted phi (P/F)	Adjusted ASFR by factor of 1.15	Children ever born per woman (Parity, P)	Age specific fertility rates (ASFR, F)	Summation of ASFR's multiplied by 5 (phi)	Adjust-ment of phi (F)	Parity divided by adjusted phi (P/F)	Adjusted ASFR by factor of 1.18
15-19	0.129	0.047	0.234	0.312	0.413	0.054	0.099	0.037	0.187	0.074	1.345	0.044
20-24	0.769	0.154	1.003	0.667	1.152	0.177	0.781	0.161	0.995	0.641	1.219	0.191
25-29	2.090	0.188	1.945	1.565	1.335	0.217	1.793	0.190	1.947	1.564	1.147	0.225
30-34	3.475	0.177	2.828	2.490	1.396	0.204	3.064	0.171	2.801	2.480	1.236	0.202
35-39	4.705	0.133	3.493	3.238	1.453	0.153	4.198	0.117	3.387	3.171	1.324	0.139
40-44	5.692	0.079	3.889	3.726	1.527	0.091	5.145	0.058	3.679	3.573	1.440	0.069
45-49	6.289	0.029	4.035	4.193	1.500	0.034	5.702	0.016	3.756	3.738	1.525	0.018
TFR	...	4.035	...	...	...	4.648	...	3.753	...	...	...	4.444

Source: 1994 and 2000 FSM Censuses, unpublished data.

The P/F ratio method of estimating fertility compares the reported historical fertility (parity) of women to the current fertility of the same women and establishes a correction factor to apply to the age specific fertility rates to calculate a more precise total fertility rate (for further discussion on this method see Brass, 1975; Brass, et al., 1968; Arriaga, 1983 and United Nations, 1983). The correction factor adjusts for under-response and poor recollection of fertility data by older women who might under report births. Once we find the difference in reported parity and fertility, we can correct for the under count. In the case of the FSM we have chosen a correction factor of 1.18, which corrects the age specific fertility rates and results in an adjusted TFR of 4.4. The correction factor was taken from averaging the P/F ratio that applied to women 20-24 and 25-29 because fertility has been declining in the FSM; thus, data for the older women did not portray an accurate picture of current fertility. (For more details on this method see United Nations Manual X "Indirect Techniques for Demographic Estimation"). The increase in the P/F value suggests that there was a growing disparity between current fertility and parity and supports our conclusion that current fertility is lower than previous fertility, or fertility is declining.

Given the fertility levels for 1999-2000, an FSM woman would bear 4.4 children on average in her lifetime, a slight decrease from the 4.6 during 1993-1994. The crude birth rates suggest declining fertility over the 15 years before the census. Adjusted age specific fertility rates also show a similar trend illustrated by the TFR falling from 8.3 in 1973 to 7.4 in 1980 and declining further to 4.4 in 2000 (see Table 4.5). The high fertility levels in 1973 were probably a reflection of changing health conditions in the FSM. In 1973 public health had brought down child mortality but women were still having large families to replace those children who potentially would not survive.

Figure 4.1 displays the changes in ASFRs over time. The reduction in the peak at ages 25 to 29 and the flattening of the curve suggests a decline in fertility. Although women aged 25 to 29 years were having fewer children they continued to bear children into the later reproductive years, implying small effects of contraceptives on fertility behavior. A reduction in the early reproductive ages can be seen in the figure; these were probably due to the delay in marriage mentioned in Chapter 3 on marital status.

Table 4.5. Age Specific Fertility Rates, FSM: 1973 to 2000

Age group	Implied 1973	Adjusted 1973	Implied 1980	Adjusted 1980	Implied 1994	Adjusted 1994	Implied 2000	Adjusted 2000
15-19	0.078	0.090	0.057	0.068	0.047	0.054	0.037	0.044
20-24	0.288	0.333	0.222	0.265	0.154	0.177	0.161	0.191
25-29	0.369	0.426	0.281	0.336	0.188	0.217	0.190	0.225
30-34	0.331	0.383	0.260	0.311	0.177	0.204	0.171	0.202
35-39	0.232	0.269	0.224	0.268	0.133	0.153	0.117	0.139
40-44	0.116	0.134	0.131	0.156	0.079	0.091	0.058	0.069
45-49	0.020	0.023	0.064	0.076	0.029	0.034	0.016	0.018
TFR	7.168	8.283	6.187	7.394	4.035	4.648	3.753	4.444
Adj. Factor	...	1.15	...	1.19	...	1.15	...	1.18

Source: 1973 and 1980 TTPI Censuses, unpublished data; 1994 and 2000 FSM Censuses, unpublished data.