

## **The Demographic Components of Fertility Decline in Addis Ababa, Ethiopia: A Decomposition Analysis\***

### **Abstract**

*The 1994 Population and Housing Census of Ethiopia reported for the first time below replacement fertility in the capital city of Addis Ababa. Subsequent studies have confirmed this finding. In this paper we present a decomposition analysis of fertility change in Addis Ababa using data from the 1984 and 1994 population censuses. We decompose the period change in age-specific and total fertility rates into three components: change in the proportion married, change in marital fertility rates, and change in non-marital fertility rates. In addition to confirming the importance of a decline in the proportion of women married and a decline in marital fertility reported in other studies, we identify a decline in non-marital fertility as a key component of fertility decline in Addis Ababa.*

### **Introduction**

The 1994 Population and Housing Census of Ethiopia provided evidence for the first time of below replacement fertility in the capital city of Addis Ababa (TFR of 1.8), and perhaps for the first time in a sub-Saharan African city (Central Statistical Authority, 1995). The finding is remarkable given that Ethiopia has one of the highest levels of national fertility in Africa and is one of the poorest countries in the world. In a thorough analysis of census and survey data collected between the late 1970s and mid-1990s Kinfu (2000) argues convincingly that the

decline to below replacement fertility in Addis Ababa is authentic and not an artifact of poor data. A special fertility survey conducted in Addis Ababa in 1995 by the Central Statistical Authority also verified the 1994 census findings of below replacement fertility (Central Statistical Authority, 1997). More recently the Ethiopia Demographic and Health Survey 2000 (DHS) found a TFR of 1.9 for Addis Ababa (Central Statistical Authority, 2001). Kinfu (2000) attributes the decline in fertility to an increase in the age at marriage and the proportion of women never married, and to a decline in marital fertility. In this paper we present a decomposition analysis of fertility change in Addis Ababa using data from the 1984 and 1994 population censuses.

We decompose the period change in age-specific and total fertility rates into three components: change in the proportion married, change in marital fertility rates, and change in non-marital fertility rates. Our analysis identifies the relative contribution of the various demographic components underlying the fertility decline in Addis Ababa. In addition to confirming the importance of changes in marriage and marital fertility, we identify change in non-marital fertility as a key component of fertility decline in Addis Ababa. Contrary to reports of rising pre-marital fertility in other sub-Saharan African countries, we find that the rise in the proportion of women not married in Addis Ababa has been accompanied by

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a decline in non-marital fertility rather than an increase. We suspect that high social and economic costs of single motherhood combined with increased use of contraception and abortion are the primary factors behind the decline in non-marital fertility.

**Data and Methods**

The data for this study come from one percent samples of the individual records from the 1984 and 1994 Population and Housing Censuses. We use questions on births in the last 12 months and current marital status to compute age-specific fertility rates by marital status, and age-specific proportions of women currently married. Currently married includes women in formal and consensual unions, and currently non-married includes separated, divorced, widowed and never married women. The Addis Ababa enumeration area for the 1994 census included a larger area than the 1984 census in accordance with the expansion of the city’s administrative boundaries. We made the two censuses comparable by including in the 1984 data women living in areas surrounding the city that later became part of the 1994 Addis Ababa enumeration area. Our analysis uses 18,591 women age 15-49 from the 1984 census, and 32,808 women age 15-49 from the 1994 census.

Table 1 presents the age-specific and total fertility rates by marital status for 1984 and 1994. During the intercensal period the total fertility rate in Addis Ababa declined from 3.06 to 1.78 children per woman, and the total marital fertility rate declined from 5.05 to 4.37. The decline in marital fertility begins at ages 25-29 and becomes more dramatic at older ages. This age pattern of fertility decline is consistent with the adoption of contraception for spacing births and stopping childbearing. Age-specific patterns of contraceptive use among currently married women reported by the 1995 Fertility Survey of Urban Addis Ababa support this interpretation. According to the survey, roughly 50 percent of married women between the ages of 20 and 34 were using contraception, as were 40 percent of married women age 35-39, and 32 percent of married women age 40-44 (Central Statistical Authority, 1997:101).

Table 1 Age-specific and Total Fertility Rates by Marital Status, 1984 and 1994, Addis Ababa, Ethiopia.

Age Group	All Women		Married Women		Unmarried Women	
	1984	1994	1984	1994	1984	1994
15-19	0.016	0.011	0.157	0.185	0.008	0.005
20-24	0.097	0.050	0.216	0.219	0.041	0.011
25-29	0.157	0.091	0.226	0.193	0.051	0.018
30-34	0.153	0.101	0.189	0.151	0.077	0.020
35-39	0.115	0.062	0.138	0.083	0.062	0.016
40-44	0.048	0.031	0.059	0.031	0.027	0.032
45-49	0.027	0.009	0.025	0.014	0.029	0.003
TFR	3.06	1.78	5.05	4.37	1.48	0.53

Source: 1% Files of the 1984 and 1994 Population and Housing Censuses of Ethiopia.

More noteworthy than the decline in marital fertility are the changes that occurred among unmarried women. During the intercensal period the total fertility rate for unmarried women dropped from 1.48 to 0.53 children per woman.

This decline is larger in both relative and absolute terms than the decline in marital fertility, and it occurred at all ages, with the exception of 40-44. The low level of non-marital fertility in Addis Ababa is exceptional by African standards and reflects the presence of strong, negative social sanctions and economic costs associated with out-of-wedlock births in combination with widespread use of contraception and/or abortion.<sup>1</sup> The Ethiopia DHS 2000 found that 36 percent of sexually active unmarried women were using modern contraception compared to only six percent of married women. These figures are for the country as a whole: the prevalence of modern contraceptive use among unmarried women in Addis Ababa is certainly even higher. Higher rates of contraceptive use among unmarried women compared to married women have also been reported for other African countries (Kirk and Pillet, 1998). Direct measures of the prevalence of induced abortions in Addis Ababa during the period covered by the two censuses are not available. However, in a study of maternal mortality conducted in Addis Ababa in 1983, Kwast et al. (1986) found that abortion was the leading cause of maternal mortality, and that close to one-half of the deaths caused by abortions were among single women.

The significant difference in the fertility rates for all women compared to married women is an indication of the importance of non-marriage in accounting for the low total fertility rate in Addis Ababa. With a total fertility rate of 4.37 in 1994, marital fertility in Addis Ababa still remains significantly above replacement levels. Table 2 presents the age-specific proportions of women currently married in the two census years. The overall proportion of women in their reproductive ages who are currently married declined by 25 percent during the intercensal period, from 0.43 in 1984 to 0.33 in 1994. The decline in marriage is concentrated in the ages 20-29 when women are at their reproductive peak. The proportion of women age 20-24 currently married dropped by 40 percent from 0.32 to 0.19, and the proportion of women age 25-29 currently married dropped by close to one-third from 0.60 to 0.42. This dramatic decline in marriage at younger ages combined with the decline in non-marital fertility has certainly played a large role in the overall decline in fertility in Addis Ababa. Based on an analysis of the Ethiopia 1990 Family and Fertility Survey and the 2000 Ethiopia DHS Sibanda et al. (2002) find that the recent decline in marriage in Addis Ababa is due to increases in the age at marriage and the proportion of women who remain unmarried, and not to a rise in marital instability. In the next section we identify the relative contribution of changes in marriage, and marital and non-marital fertility rates, to the decline in total fertility in Addis Ababa.

Table 2 . Proportion of Women Married, by Age, 1984 and 1994, Addis Ababa, Ethiopia.

Age Group	1984	1994
15-19	0.05	0.04
20-24	0.32	0.19
25-29	0.60	0.42
30-34	0.68	0.61
35-39	0.70	0.68
40-44	0.65	0.65
45-49	0.60	0.59
Total	0.43	0.33

Source: 1% Files of the 1984 and 1994 Population and Housing Censuses of Ethiopia.

**Decomposition Analysis**

We decompose the intercensal change in total fertility into three components: change in the proportion married, change in marital fertility rates, and change in non-marital fertility rates using a technique introduced by Kitagawa (1955) and later extended by Retherford and Ogawa (1978). The total fertility rate can be represented as the weighted sums of the marital ( $F_{xm}$ ) and non-marital ( $F_{xn}$ ) age-specific fertility rates where the weights are the age-specific proportions of women married ( $k_{xm}$ ) and unmarried ( $k_{xn}$ ):

$$TFR = 5 \sum_x (k_{xm} F_{xm} + k_{xn} F_{xn}) \tag{1}$$

Change in the total fertility rate from period  $t1$  to  $t2$ , which is denoted as  $\Delta TFR$ , is broken down into three components: change in the marital status composition (2a), change in marital fertility rates (2b), and change in non-marital fertility rates (2c):

$$\Delta TFR = 5 \sum_x \frac{1}{2} (F_{xm}^{(t2)} + F_{xm}^{(t1)}) (k_{xm}^{(t2)} - k_{xm}^{(t1)}) + 5 \sum_x \frac{1}{2} (F_{xn}^{(t2)} + F_{xn}^{(t1)}) (k_{xn}^{(t2)} - k_{xn}^{(t1)}) \tag{2a}$$

$$+ 5 \sum_x \frac{1}{2} (k_{xm}^{(t2)} + k_{xm}^{(t1)}) (F_{xm}^{(t2)} - F_{xm}^{(t1)}) \tag{2b}$$

$$+ 5 \sum_x \frac{1}{2} (k_{xn}^{(t2)} + k_{xn}^{(t1)}) (F_{xn}^{(t2)} - F_{xn}^{(t1)}) \tag{2c}$$

Because each of the components of change is calculated for five-year age intervals and then summed across intervals, the decomposition formula can be used to measure the principal components of change in age-specific rates as well as change in the total fertility rate.

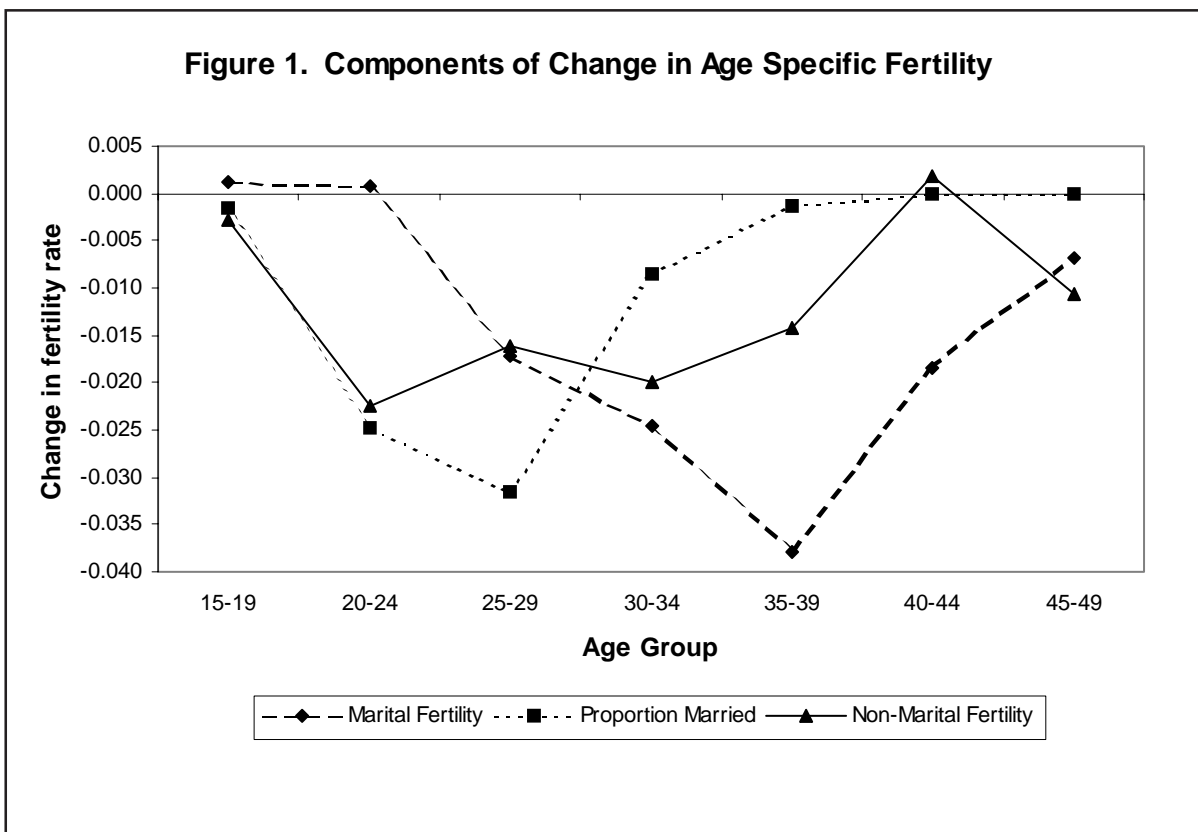
Table 3 presents the results of the decomposition of change in total fertility. The decline in marital fertility was the single most important component in the intercensal decline in total fertility, accounting for 0.51 of the 1.27 child decline, or roughly 41 percent. The decline in non-marital fertility accounted for 33 percent of the decline in total fertility, and the decline in the proportion of women married accounted for 27 percent of the decline. These results again highlight the important role played by non-marriage in bringing fertility down so low in Addis Ababa.

**Table 3** Decomposition of Change in The Total Fertility Rate from 1984 to 1994, Addis Ababa, Ethiopia.

	Change in fertility	Percent contribution to change
Change in TFR due to:		
Change in marital fertility	-0.51	40.5
Change in non-marital fertility	-0.42	33.2
Change in proportion married	-0.34	26.7
<b>Total Change in TFR</b>	<b>-1.27</b>	<b>100.0</b>

Source: 1% Files of the 1984 and 1994 Population and Housing Censuses of Ethiopia

Further insight into the fertility decline in Addis Ababa is provided by Figure 1, which presents the components of change in age-specific fertility. Fertility in the youngest age interval, 15-19 remained relatively unchanged from 1984 to 1994. At ages 20-24 a decline in the proportion of women married and a decline in non-marital fertility made roughly equal contributions to the decline in fertility. Marital fertility in this age group remained essentially unchanged during the period. However, starting at age 25-29 and moving up into the older age groups, decline in marital fertility becomes the dominant component of the decline in fertility. Between the ages of 30-34 and 40-44 change in marital fertility made the largest contribution to the decline in age-specific fertility rates. Given the tendency for marriage to rise with age (even though the overall proportion of women married has declined), the effect of a change in non-marital fertility on overall fertility rates becomes less important beyond ages 20-24. Similarly, the decline in the proportion of women married has its biggest impact on fertility rates at ages 20-24 and 25-29, but is of relatively little or no significance at older ages.



### Discussion

The age pattern of the components of change in fertility rates shown in Figure 1 illustrates how the decline in fertility in Addis Ababa is the result of the distinct, but related processes of delayed marriage, and increased control over the occurrence and timing of births inside and outside of marriage. Figure 1 also demonstrates how the relative importance of change in each of the three components varies across the reproductive age span. Factors which keep women out of unions and thus reduce the risk of childbearing are most important at younger ages, while factors which discourage additional births among women in unions are most important in changing fertility rates at older ages. The absence of any significant change in marital fertility rates at young ages (15-24), however, does not suggest that young couples were unaffected by the social and economic forces that were discouraging births among older married women and unmarried women.

The decline in the proportion of currently married women meant that young women who entered into marriage were likely to have become a more select group. For example, given the strong incentives to both delay marriage and avoid single motherhood, the proportion of young women whose marriage was the result of an unplanned pregnancy may have been greater in the more recent census than in the earlier census. A rise in the proportion of unions which resulted from a pregnancy could produce the appearance of stable age-specific fertility rates even though contraceptive use may have risen among married women in the same age groups. Survey data from 1990 and 1995 show that contraceptive use among young married women did indeed rise in Addis Ababa during the period spanned by the two surveys.<sup>2</sup> Clearly, the forces that were bringing fertility down among older married women were also encouraging younger married women to delay or avoid births as well.

What were these forces? Kinfu (2000) suggests that rising levels of women's education and labor force participation generated higher material and status aspirations which in turn increased the opportunity costs of childbearing for women. The rise in aspirations, however, occurred during a period of political upheaval and economic contraction. The combination of rising aspirations and declining opportunities provided a powerful incentive to women to delay marriage and limit childbearing. Improved child survival and access to effective methods of birth control in Addis Ababa played a key role in the marriage and fertility transition as well (Kinfu, 2000:78). Lindstrom and Berhanu (1999) also attribute the decline in marital fertility that they observed in urban areas of Ethiopia during the 1980s to the convergence of war, political repression, economic decline, and famine which ravaged the country during the 1970s and 1980s. Decline in fertility in response to economic contraction and crisis has been observed in other African cities. Antoine and Nanitelamio (1991) for instance, attribute the trend towards later marriage in urban Senegal to the material difficulties of setting up an independent household. Similarly, Kirk and Pillet (1998) suggest that economic recession and a decade of crisis may be behind the sharp rise in nonmarriage and contraceptive use in Côte d'Ivoire. The case of Addis Ababa and the other urban areas cited here may constitute yet another route to fertility decline in sub-Saharan Africa.

What sets fertility patterns in Addis Ababa off from other urban areas in Africa is that the delay in marriage and the rise in nonmarriage has not been accompanied by a rise in nonmarital births, but rather just the opposite, a decline. This finding is contrary to the expectation of an increase in out-of-wedlock births as women spend more time outside of marriage (Cohen, 1993; Gage-Brandon and Meekers, 1993; Meekers, 1994). We have suggested that increased contraceptive use and abortion are the primary means by which premarital births are being avoided. The Addis Ababa case also provides an example of an urban society in which pervasive insecurity and continued economic setbacks have not led to a breakdown in traditional reproductive patterns and the close connection between marriage and childbearing. The apparent presence of powerful economic costs and negative social sanctions against single motherhood underscore the importance of increasing the accessibility of effective contraceptive methods for women of all ages, but particularly adolescent women.

### **Notes**

<sup>1</sup> In a study of single women in three African cities, Antoine and Nanitelamio (1991) report average parities for single women aged 25-29 of 0.7 in Pikine, Senegal; 1.5 in Abidjan, Côte d'Ivoire; and 1.5 in Brazzaville, Congo.

<sup>2</sup> In the 1990, 38 percent of currently married non-pregnant women age 15-24 in Addis Ababa were using contraception compared to 44 percent of currently married women age 15-24 in 1995 (Central Statistical Authority, 1993:199; Central Statistical Authority, 1997:105).

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