Fertility Transition Driven by Poverty the Case of Addis Ababa (Ethiopia)

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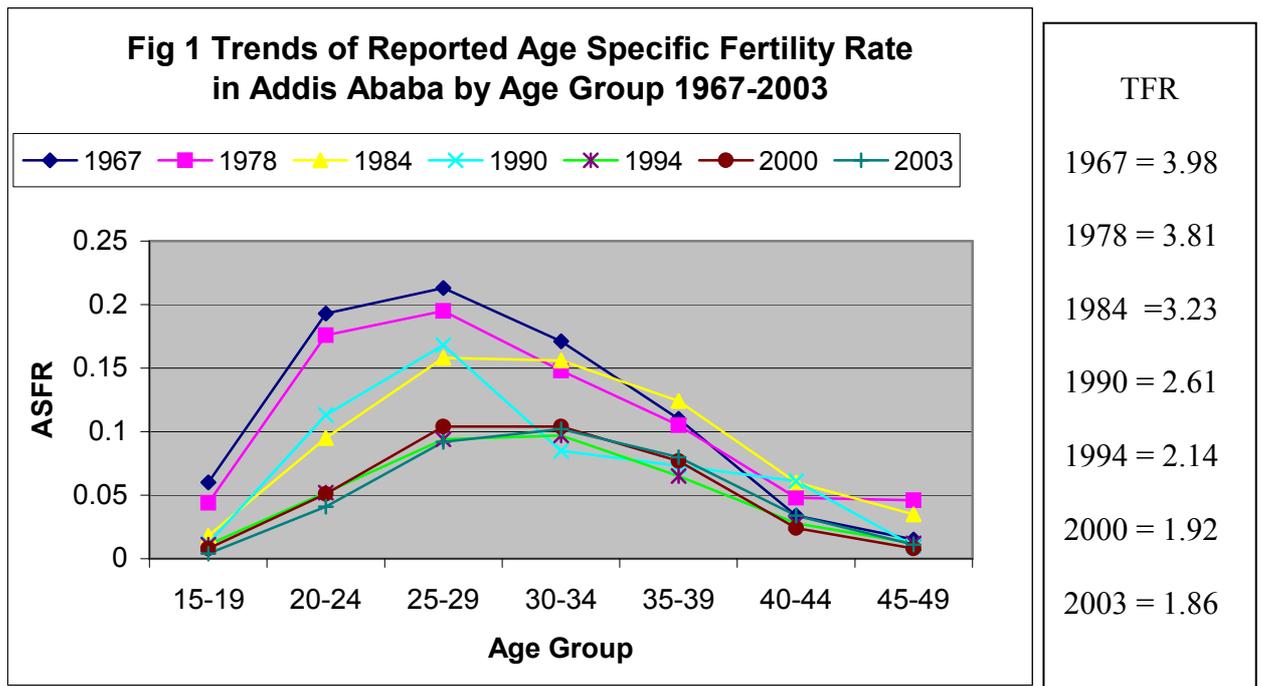University College London

Introduction

Unlike the classical demographic research that are aimed at indicating levels, trends and differentials of fertility (Cohen, 1993), studies undertaken by anthropologist pay much attention to the rationales behind the changing reproductive behavior of a given society including the possible effects of adaptation to ecology, social and economic conditions (Kaplan, 1994, Abernethy, 1992, Lesthaeghe, 1989a). The main purpose of this paper is, therefore, to investigate the rationale behind the below- replacement level fertility in Addis Ababa, and explain how and why it has declined extensively over the last couples of decades. Special attention, nonetheless, is given to the impact of accessible income on fertility differentials, that is spacing between consecutive births, using multivariate event history analysis. Analysis of the qualitative data collected on issues related to timing of births are also undertaken to substantiate statistical results or indicate departures between verbally told realities and results obtained through manipulation of quantitative data.

Fertility Levels and Trends

Compulsory vital registration system that yields complete and periodic birth statistics of a given population at any time is not yet adopted for the city of Addis Ababa, the study area, and the national at large. Interested individuals and parents who wish to produce birth certificates for different purposes such as traveling abroad, getting admission of their children to some of the private schools in the city etc. actually visit the Civil Registration Office located under the Bureau of Labor and Social Affairs of the City Government of Addis Ababa. Apart from being incomplete in its coverage and content, information compiled by the Civil Registration Office lacks coherence and focus. Any person born at any time in the past could obtain a birth certificate upon production of valid identification card from *Kebele administration* offices or any other document actually requested to issue the birth certificate. Data gathered through demographic sample surveys and population census is, therefore, the only reliable and better source of information to undertake fertility and related studies in Ethiopia.

The Dictionary of Demography [Pressat, 1985: 223] defines fertility as a measure of 'the production of live birth' or 'a child that is born alive'. Of different measures used to indicate the fertility level of a given population, total fertility rate, which is a hypothetical measure of the number of children that a woman would give in her lifetime on the basis of the prevailing fertility schedule, is the most commonly used. Following such standard application of fertility measure, the total fertility rate for the city of Addis Ababa are presented in Fig 1 to indicate levels and trends of fertility in the past and at the time of the survey.

As shown Fig 1, there is a sharp decline in the age specific fertility rate of the city almost for each age group between 1967, data compiled in the first ever tried demographic sample survey in the history of Ethiopia, and 2003, fertility information compiled through detailed life history calendar for the current study. Inconsistencies and some sort of fluctuations are, however, observed for the results set in the 1990 Family and Fertility Survey, which could be due to a relatively small number of cases in the samples taken for the 30-34 age group and then after. Despite this, a sharp decline in fertility is observed for women in their early (15-24 years) and peak reproductive ages (25-34 years) for each of the study periods. A decline in fertility has also been observed for women in their late reproductive age (i.e. 35-49 years) though the magnitude is not as huge as it is for the other two broad age groups.

Fig 1 Trends of Reported Age Specific Fertility Rate in Addis Ababa by Age Group 1967-2003

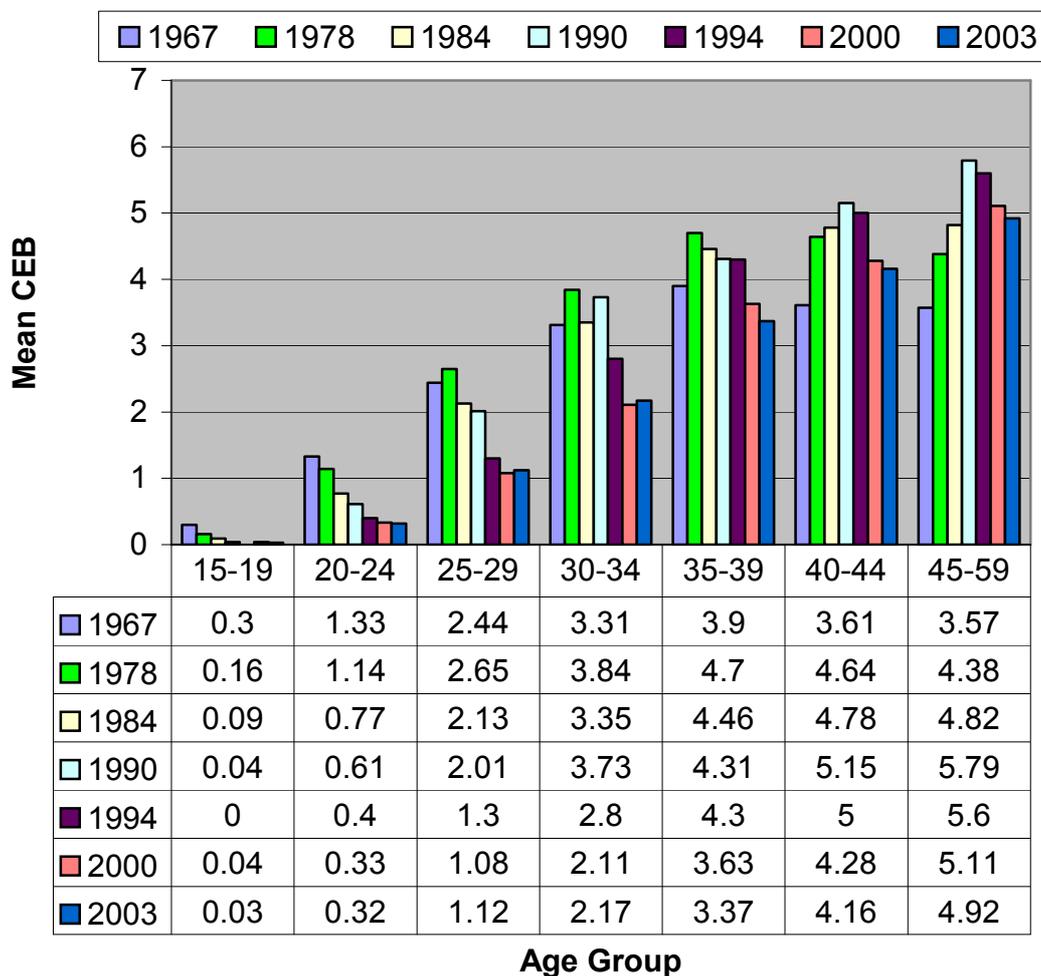| TFR |
| --- |
| 1967 = 3.98 |
| 1978 = 3.81 |
| 1984 = 3.23 |
| 1990 = 2.61 |
| 1994 = 2.14 |
| 2000 = 1.92 |
| 2003 = 1.86 |

Sources: for 1967-1994 [CSA, 1997];
              for 2000 and 2003 computed by author from respective data sets.

As indicated above, the total fertility rate of the city has consistently declined from about 4 children per woman in 1967 to 3.23 children in 1984, and further declined to 1.92 children in 2000. Data generated for the current study has also estimated the total fertility rate of the city at 1.86 children per women; a slightly lower than a figure obtained for the 2000 DHS survey in the country. Assuming that the life history calendar is robust enough in generating information on births taking place among women of reproductive ages, it is possible to conclude that fertility in the city is still below the replacement level with a slight decline during the interval between the two surveys undertaken in the 21st century.

Mean number of children ever born observed during the period 1967 to 2003 (Fig 2) has also indicated that there is a sharp decline in average parity for women in their early reproductive age (i.e. 15 to 24 years). A tendency of increased average parity among women in their late child bearing age (age 40 and above) until 1990 could probably be due to the effects of shifting in age at birth towards later ages during the early period of fertility transition in the city. The declining trend in average parity in all age groups after 1994, however, is an indicator of genuine fertility decline in the city in a more stable and consistent way.

Fig 2 Trends in Mean Number of Children Ever Born in Addis Ababa by Age Group

	15-19	20-24	25-29	30-34	35-39	40-44	45-59
1967	0.3	1.33	2.44	3.31	3.9	3.61	3.57
1978	0.16	1.14	2.65	3.84	4.7	4.64	4.38
1984	0.09	0.77	2.13	3.35	4.46	4.78	4.82
1990	0.04	0.61	2.01	3.73	4.31	5.15	5.79
1994	0	0.4	1.3	2.8	4.3	5	5.6
2000	0.04	0.33	1.08	2.11	3.63	4.28	5.11
2003	0.03	0.32	1.12	2.17	3.37	4.16	4.92

Age Group

Sources: for 1967-1994 [CSA, 1997];
             for 2000 and 2003 computed by author from respective data sets.

Does Accessible Income Level Affect Fertility?

Demographic transition theory developed in the 1950s on the basis of experiences from the Western and industrialized countries documented an inverse relationship between fertility and income (Caldwell, 1976, Willis, 1974). By then, medical technologies assisting to regulate fertility were not developed, and all attempts made to regulate fertility had their own financial and psychosocial costs. Consequently, initiatives to reduce fertility were taken in most of the cases by those women who are economically better-off, well educated and engaged in professional works as child bearing and rearing had severe effects on their day-to-day activities (Cohen, 1993). They are forced to look for alternatives ways of fertility regulation since there are conflicts between their roles as a mother and worker, in addition to the high opportunity cost of child bearing (Oppong, 1983, Standing, 1983). According to Willis (1974), costs of raising children is getting higher in the industrialized world due to the

increased demand of a newly born child. Constraints of time to look after children have also motivated couples to limit their family size. Fertility decline in the West, more or less, has occurred in periods of technological advancement and improvement in the general well being of the society. High propensity to achieve better life and the competition to achieve such standard of living make most of the women in the developed countries to trade off between the quality and quantity of children (De Tray, 1974).

Contrary to the fertility transition observed in the industrialized countries, studies undertaken in sub-Saharan Africa and the former socialist countries of Eastern Europe including former Soviet Union indicated that fertility transition is led by the consequences of economic crisis [see Chapter I for details]. In Argentina, too, fertility rates were found to be higher among those who either experienced or expected good economic prospects and vice versa [Tapinos, 1997]. Fertility transition in the developing countries are observed in periods when there is a strong association between declines in real income and reduced fertility rates across countries (Lockwood, 1995, Lesthaeghe, 1989b, National Research Council, 1993) This is in line with the argument of the parental investment and kin support theories that are derived from evolutionary life history theory, a branch of evolutionary theory, that suggests a positive relationship between wealth and fertility.

Despite the controversies between the two sets of theories, the conditions under which economic resources affect human fertility are less understood in the context of developing countries like Ethiopia. To my knowledge, very few studies has attempted to address the effects of accessible income at individual level taking the prevailing situations in developing countries where fertility transition occurred under economic stress (Garcia, 2000). Studies undertaken across countries (e.g. the economic reversals of sub-Saharan Africa) do not tell much on how and why individual behavior is changing towards small family norm.

In this paper, attempts are made to investigate the effects of accessible income on birth spacing, both through the timing of first birth and intervals between consecutive births. Occupation of respondents that have significant implication for the position of woman in the society is also considered as an indicator of the relationship between fertility and socio-economic status. By virtue of entering each of these and other variables as time-varying covariates in event history modeling, attempts are also made to assess demographic changes at exact or nearby the occurrences of an event for each of the women. The change in the income as well as occupational status of a woman from time to time gives me an opportunity of observing results obtained under different socio-economic conditions.

Hazard regression techniques (event history analysis) are employed to analyze data collected using the life history calendar. Controlling for the effects of some of the confounding variables attempts are made to deploy the impact of accessible income and occupational status of individual woman on timing of first birth, and the interval between first and second births. This study is limited to analysis of the first two births due to the fact that number of births rapidly decline as birth order increases, and results obtained from higher order births would have sever limitations in manifesting the reproductive behavior of the study population to which the average number of children ever born is less than two children per woman [see also the National Research Council: 1993a].

Data and Methods

Before going into the application of the main model, the average length of the interval between age 13 and first birth as well as the interval between first and second births were estimated using the Kaplan Meier survival function that is based on uni-variate life table techniques. Even though it is a crude measure of variability in the length of birth intervals, it has a very rough indication for understanding of results to be obtained through the application of sophisticated models. SPSS 10.1 is actually used to undertake analysis related with survival function.

The main analysis, however, was done through the application of discrete-time methods of event history analysis using logistic regression to fit the multivariate model. PROC LOGISTIC in SAS v.8 was run while applying the technique. The outcome results are used to directly assess the effects of socio-economic status of respondents on the timing of first and second births. The model provides estimates of coefficients, standard errors and odds ratios to predict the possible effects of each of the variables in relation to the omitted category serving as a reference group.

In order to assess the assumptions of proportional hazard, interaction terms between each of the covariates were checked. Non-significant interaction terms were removed from the final model while those with significant values were included in the model.

Data Input

While analyzing the timing of the first birth, all respondents (i.e. 2976 women) were included in the first model irrespective of their maternal and other characteristics (see Table 1). The data set for the first model encompasses both women who had given birth at least to one child and those who had not yet experienced any birth at the time of the survey (censored events). As shown in Fig 3, the cumulative proportion of women who had not given birth to a child in the late fertility age (i.e. among women born during 1953 to 62) is very small indicating that childlessness in Addis Ababa is almost non-existent in that cohort.

Fig 3   Kaplan-Meier plot of the Yearly Probability of Giving Birth to First Child among All Women Residing in Addis Ababa by Maternal Cohort: 2003
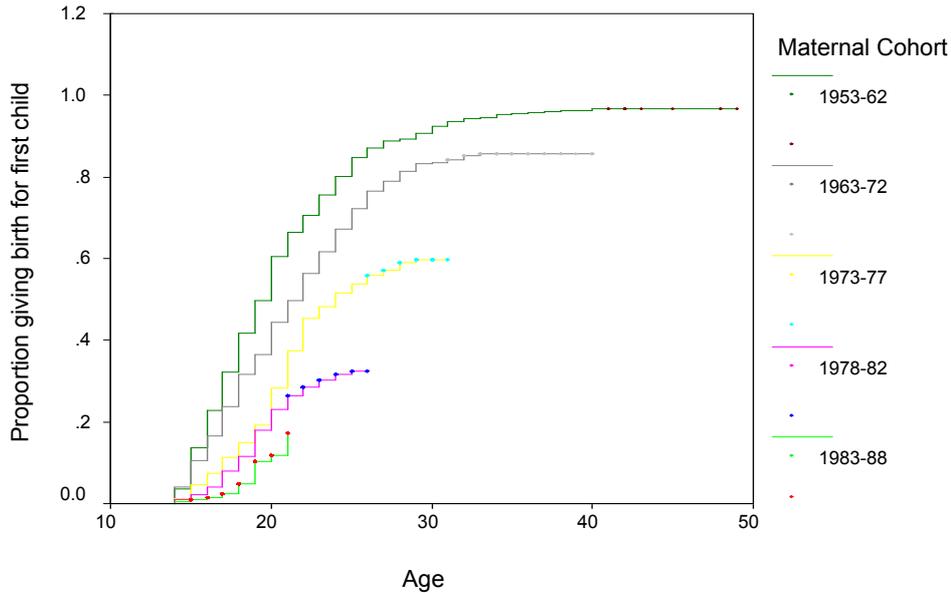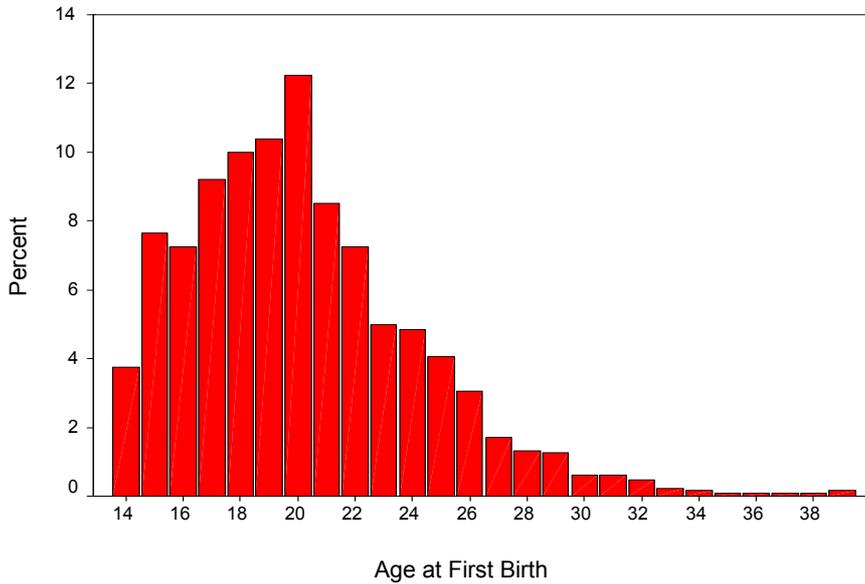
Source: survey data, 2003

As timing of first birth extended between age 14 and 39 years (Fig 4), none of the women were excluded from the sample. The rationale for not excluding some of the women who had not have any birth say by age 40 or above is due to the fact that it is not uncommon to find some women who deliberately avoid marriage and child birth in a population that experiences low fertility. In cities like Addis Ababa where medical services are relatively accessible by the national standard, the likelihood that a woman has not given birth due to the effects of sterility is very low. Only live births were considered in this study. Stillbirths are excluded since it is very difficulty to collect accurate data in retrospective survey of such type due to underreporting of cases. Memory lapse may not allow most of the women, particularly those in late fertility age, to exactly report on timing of the event and its duration to determine whether it is fetal death or stillbirth (Pressat, 1985)

In Addis Ababa, a woman can use either family planning methods or abortion services to delay or completely avoid pregnancies. As long as different mechanisms of fertility regulations are widely available, and the city is observed to experiencing the below-replacement fertility level for more than a decade, inclusion of all women irrespective of their parity at any given age is acceptable and convincing.

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Fig 4   Bar Chart Indicating Percentage Distribution of Age at First Birth in Addis Ababa
between 1968-2003

Source: survey data, 2003

Dependent Variables

In urban areas, the risk of pregnancy does not necessarily start upon marriage (Barker and Rich, 1992). A decision was, therefore, made to take age 13 as the starting point of the interval since it is a year less than the age in which the first birth is reported by some of the respondents included in the survey. About 4 percent of the women reported to have their first child by age 14 (see Fig 4). As shown in Fig 5, the reported mean age at first marriage and first birth during each calendar year is nearly the same. About 16 percent of all births were recorded to take place before first marriage while births taking place within periods less than six months of the reported date of first marriage are 10.2 percent of all births (data not shown). As there is strong evidence that premarital sex is common in the city, and the ideal assumption that states couples enter marriage in a childless state and all conception is taking place after union have already been violated, there is no ground to presume that risks of pregnancy initiate upon marriage

Fig 5 Secular Trends in Mean Age at First Marriage and Birth, Addis Ababa: 1963-2002
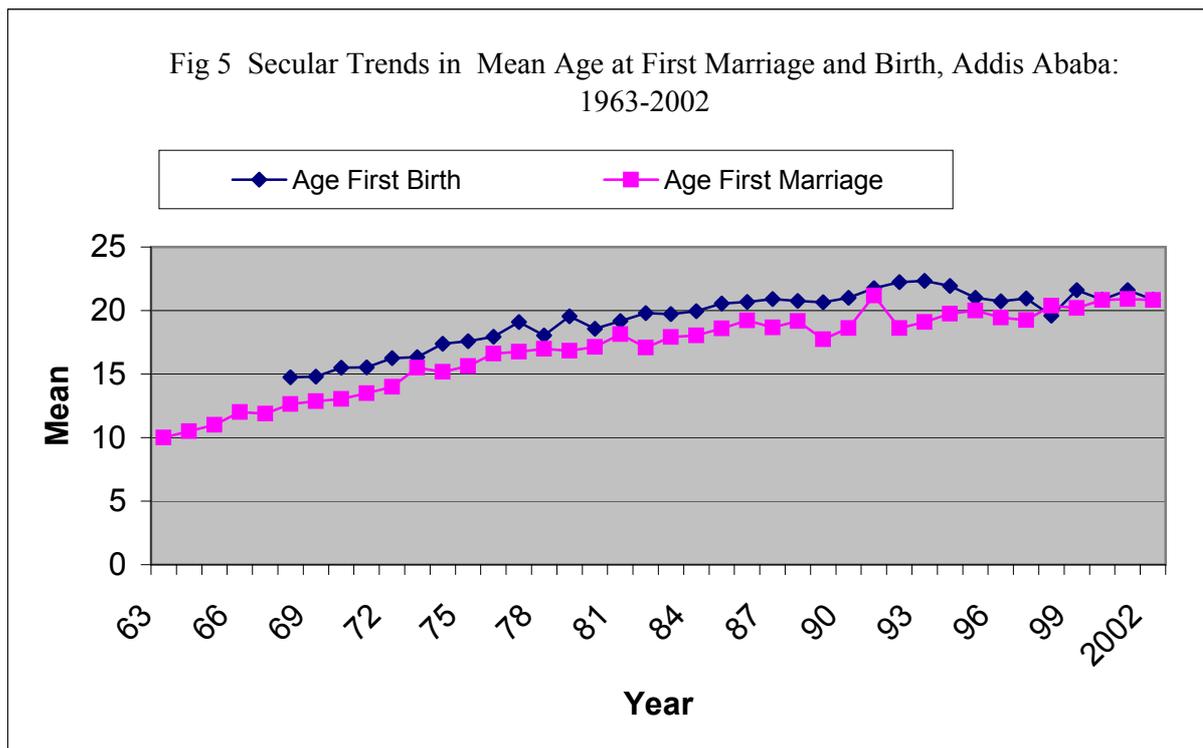
Source: survey data, 2003

For the second model, the data is confined to only those who have given birth to at least to one child. A total of 1,282 women are included in the model (Table 6.2) and analysis is made for the interval between first and second births. None of the women who reported to have a child are excluded for not having their second birth by the time of the survey. The biggest advantage of survival analysis over cross sectional study is its ability to include all woman who are exposed to a given set of risk irrespective of the occurrence of an event during the time under observation (Blossfeld and Rohwer, 1995).

Independent Variables

The following socio-economic and demographic variables are included as control variables in the analysis of multivariate modeling.

A. Demographic Variables:

As fertility in the city has shown tremendous decline over time (Fig 1 and Fig 3), **maternal age cohorts** are classified into five different broader age groups and included into the analysis of the model that takes timing of first birth into account. In the second model that treats interval between first and second birth, **age at first birth,** which is classified into three subgroups: less than 18, 18-21 and 22 and above, is included. Inclusion of birth cohorts is basically to capture the effects of societal traditions on timing of first birth among the younger generation as the world is moving towards small family norm (Cohen, 1993). Age at first birth is included in the second model as risk is better assessed from the beginning of the interval to the occurrence of an event or censoring of the case. The cutting points are made arbitrarily on the rationale to indicate cohort and age effects taking the magnitude of sample

size in each of the categories into account. If diffusion of new ideas were to penetrate into the city environment and access to family planning services are getting improved over time, there would be a significant fertility decline among the younger generation. Age at first birth, on the other hand, is expected to inversely relate to the timing of second birth as long as older women are assumed to maximize reproductive success and would like to catch up with time they have spent without having children (Suchindran and Koo, 1992).

Migration status of each of the respondent women is also included in the model to assess the possible effect of migratory movement on the reproductive behavior of natives and those who moved in to the city at different age in their lifetime. Migration is expected to diminish the reproductive chances of new arrivals to the city through disruptive (physiological and psychological) effects of movement; and adaptive effects, i.e., narrowing timing of childbirth when the migrants are accustomed to the new environment. In order to assess the possible effects of migration on timing of first and second births, respondents are classified into three major categories: non-migrants, those who were born and grew up in the city; childhood migrants, those who moved to the city while they are in their childhood era (i.e. before they reach age 13[1]), as well as young migrants: those who migrate to the city after spending their childhood age elsewhere outside Addis Ababa. The rationale is due to the fact that an individual's behaviour is mainly influenced by the socio-cultural system that he/she exposed to during childhood age (i.e. up to age 12) (also see (Central Statistical Authority, 1993). Childhood migrants are, therefore, assumed to represent long-term migrants who adapted to the city environment by the time they exposed to the risk of pregnancy while the latter are assumed to represent recent migrants who have been subject to all the possible effects of migration on fertility as their timing of move to the city overlaps with their exposure to the risk of pregnancy. It is entered as a fixed variable since its effect shall be assessed from the beginning of the interval.

The **period before and after** the year in which **a national population policy** was promulgated (time varying) is also taken as one of the control variables to which variation in fertility level of the city could be assessed. The National Population Policy of Ethiopia is adopted in July 1993, and all births occurred prior to this year were categorized as pre-policy period while the remaining were coded as post-policy era. The rationale to include this variable in the model as a time varying co-variate is to assess the effects of the population policy that aimed at reducing fertility rate within the context of Addis Ababa. With the official launching of the policy, a lot of local and international NGOs providing family planning services have got permission to operate in areas of reproductive health and related issues. In addition, importation of contraceptive supplies as well as advertisement of different family planning methods has been possible then after. The policy has also paved ways for the removal of certain barriers on contraceptive use though no measure has yet been taken to legalize abortion in the country.

The **marital status** (time varying) of a woman has also been included both in the first and second models to control for the effects of marriage on fertility. In non-contraception society, a married woman is expected to be at high risk of pregnancy due to her exposure to regular sexual intercourse as long as the marriage is intact. This assumption of marriage-fertility interrelationship could, however, be interrupted if 'modernity' breaks through the traditional norms and values, and proliferation of sex outside marriage as well as marriage without having children is possible through wider applications of modern fertility regulation schemes.

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[1] The Central Statistical Authority has taken places of residence in which a woman had mainly lived up to age 12 as childhood place of residence in the 1990 Family and Fertility survey.

In societies where fertility is highly controlled, getting married does not necessarily lead to immediate birth of a child. A dichotomy of never and ever-married status of a woman is used in the first model with the anticipation that child birth shortly follows marriage. Attempts made to further classify the ever-married category into currently married and dissolved marriage was not possible due to small number of cases in the later group. As far as the second model is concerned, marital status is classified as being in union and not in union since most of those who reported to have at least one child (91.5 percent of them) were those who have been ever married.

Sex and survival status of the first child (time varying) are included in the second model since preference for son and death of a child are believed to hasten the timing of the next pregnancy. In traditional societies where giving birth to male children enhances the status of a woman in a family and parents expect much support from male children than daughters, timing of next pregnancy could vary according to sex of the previous child [Cain, 1984; Pong, 1994]. In non-contraceptive population and in areas where access to health services are very limited, the physiological, insurance and replacement effects of child death are expected to shorten the interval between consecutive births [Mensch, 1985; Rahman, 1998]. The immediate response of child loss on fertility could be high among societies that promote high fertility norm and children have greater economic, social as well as psychological values. A dichotomous variable indicating the sex of a child, and its survival status during a given year of observation are included in the second model to respectively indicate the effects of sex preference and child loss experience on timing of the second birth.

B. Socio-Economic Variables:

Educational attainment of a woman, which is expected to have an inverse relationship with fertility, is included in both of the models. Categorization of such variables is done in such a way that it reflects variation in the level of respondent's knowledge in making decisions with regard to not only timing of reproduction and contraceptive use but also number of years required to complete such level of schooling if it is done without interruption. Taking the school system in Ethiopia, educational attainment of respondents was classified as illiterate (no education), primary (grades 1-6), secondary (grades 7-12) and higher (any sort of vocational and college level training after completing high school education). Education is expected to have an inverse relationship with timing of childbirth.

Ethnicity, which is expected to reflect socio-cultural impacts on timing of childbirth, is included in all of the models being categorized as Amhara, Oromo and all others, with greater proportion of Tigray and Gurages in the combined group. Amhara and Oromo are the first two major ethnic groups in Addis Ababa even though the Oromos dominate at the national level. If traditional norms and values are to affect the reproductive behavior of city residents and extended family members or ethnic related issues are to involve in decision-makings with regard to number and timing of births, there would be variation in the interval between births across ethnic belongingness.

Religion, which is expected to create variation in fertility due to different outlooks and opinions on application of birth control methods and termination of pregnancy, is not included in this model. The majority of the city residents (84.5 percent) belong to the Ethiopian Orthodox Christian Church while the remaining belong to Muslim, Protestant and Catholic religious groups. It was not possible to put all of them in same category for the diverse outlook that each of them has on use of contraceptives and timing of marriage. Moreover, a

significant correlation was observed between the Amhara and Orthodox Christianity. Religion was, therefore, dropped from all sort of multivariate analysis in this study.

Occupational status of a woman (time varying) is compiled from the detailed work history information collected in the life history calendar. Even though attempts were made to follow the ILO classification pattern, scanty distribution of cases in some of the categories would not allow proceeding with such classification. In order to give meaningful analysis that could indicate socio-economic status of the respondent women, occupational status was classified into six categories: in-school, unemployed/unknown, domestic servants, manual and unskilled worker, as well as skilled and semi-skilled worker**.** The later two categories of occupational status were coded on the basis of basic skills required to undertake a given job. Manual and unskilled job refers to any job that someone can take without necessarily going through any sort of formal and informal training while the skilled and semi-skilled work encompasses all sorts of job that need some orientation or formal training before accepting employment offer in the field or start operating the task. Further consultation is also made to the 1999 National Labour Force Survey Manual developed by the Central Statistical Authority in splitting the work status into the two groups (Central Statistical Authority, 2000b). Literature on work and fertility interrelationship states that women engaged in more professional and highly paying jobs usually postpone timing of childbirth due to role conflict between working outside home and child rearing, as well as income foregone due to child birth (Oppong, 1983, Standing, 1983). Studies on the interrelationship between marriage and fertility, on the other hand, states that fertility is higher among married women who would like to demonstrate their continued commitment to the marriage and guarantee a continuous flow of resources from their husband (National Research Council, 1993c).

Accessible income level (time varying) is measured as the combination of the predicted monthly wage and salary earned by a woman and her partner (if she is married) during a given year of observation. It is limited to salary/wage earnings since income from other sources apart from monthly wage or salary is quite low in Addis Ababa. Nationalization of private property during the 1974 Ethiopian Revolution has made most of the city residents dependent on periodic income generated through fixed wages and salaries. The data for this variable is, therefore, created by assigning monetary values equivalent to the work status of a woman and her partner during a given year using unpublished preliminary results of the Earning Predication and Assessment Survey of Addis Ababa jointly conducted by the Central Statistical Authority (CSA) and Central Personnel Agency (CPA) in 1999. The study was conducted to compile information aimed at narrowing the gap between monthly payments offered by government offices, those engaged in private business, employed by private and/or non-governmental organizations, international agencies and the like (Central Statistical Authority and Central Personnel Agency, 2000). Having assessed the pay difference for each of the occupations in the city, the survey document proposed a starting and finishing salary scales to be adopted by the government as a new pay scale, and the Government of Ethiopia adopted the proposal in 2001. Since the new salary scale more or less reflects the average amount currently earned by each individual engaged in different occupation in government offices, non-government organizations and private sectors, the starting salary scale allocated for a given occupation is taken as a proxy measure of monthly earnings of a respondent and her spouse (if she is married during a given year). It was possible to compile detailed information on the occupational status of each woman on yearly basis using the life history calendar. Detailed marriage history information also yielded the occupation of each of a marriage partner to a particular woman. It is, therefore, possible to fit accessible income to a woman into the model as time-varying covariate.

In Addis Ababa, a woman is expected to have a baby after securing sufficient resources of her own or her partner to bring up the child. Offspring are permitted to stay with their parents for unlimited period of time until they get married or secure own source of income to lead independent life. They are, however, not welcome to have babies while they are dependents irrespective of parental wealth status. Due to such strong restriction of accessing parental resources to bring up children before securing own income, illegitimate births among unemployed and unmarried girls is very low in the city. Abortion is preferred to having illegitimate child due to the relatively lower costs of fertility regulation than costs of raising children.

On the basis of The World Bank's [1993] suggestion of setting a threshold poverty line of a dollar per day in Ethiopia (which is equivalent to 250 birr a month at the time of the survey), accessible income level is classified into four categories: no reported income (unemployed and unmarried girls who rely on their parent or someone else's income), low income (those who have access to less than a dollar per day or 250 birr a month), medium income (those who have access to an amount between one and three dollars a day or 250 to 799 birr a month) and high income (more than 3 dollars a day or 800 and more birr a month). Life history theory suggests that available resources, including that of spouse's, are determinants of reproductive decision (Betzig, 1988) .

Residential Area (*kebele*), which is the lowest administrative unit in urban structure of Ethiopia, is also included in the models to assess the possible variation in reproductive behavior of respondents by their location of residence in the city. If there were differences in pattern and structure of residential neighborhoods, there will be variation in timing of childbirth by *kebeles*. Adding this variable to the model helps to assess whether fertility rate in the city is unanimously similar or vary according to residential locations.

Since detailed work history data collected for each of the respondent woman and their marriage partner(s) is used to generate information on occupational status as well as accessible income level, two separate models were fit in parallel to assess the effects of each of the variables on timing of first and second births. While fitting the model, accessible income level, occupational status, marital status, policy period and survival status of the first child are made to vary from year to year. The remaining variables, however, were kept constant. Migration status is entered as a constant variable so long as the prime objective of this study was to assess the impact of moving into the city on their reproductive behavior rather than assessing the impact of place of residence on fertility. As mentioned earlier, childhood migrants are expected to reflect the impact of long-term migration on fertility behavior while that of young migrants is hoped to indicate how migration affects fertility in periods closer to the occurrence of an event: birth of a child, marriage or divorce.

Timing of the First Birth

Traditionally women are expected to bear and rear children (Boserup, 1970, Wood, 1994, De Jong et al., 1996). A daughter is trained on how to look after kids and undertake domestic chores from the very beginning. Her role as a mother and caregiver is defined in traditional norms and values that promote high fertility. With the expansion of urbanization and modernization, the role of a woman as a mother and subordinate to their marriage partner is, however, subject to change. In big cities where elements of traditional culture is getting eroded and the psychosocial penalty for not having a child is very low, proportion of

unmarried and childless women increases at later ages (De Jong and Sell, 1977, Morgan, 1991). Why do women postpone timing of birth, and the effect of such shifting on the overall fertility level of the study population are the golden questions of the current study. Caldwell *et al* [1992] suggested that age at first birth could be postponed due to delayed marriages being affected by increased female education. Lesthaghe *et al [*1989], on the other hand, related such a shift to behavioral change towards family formation, particularly the increased age at first marriage for men. Evidences suggesting a tendency of retreating from marriage both among men and women due to economic stress are well documented among black Americans (Lawsen and Thompson, 1995, McLaughlin and Linchter, 1997). In societies where female education in tertiary level and work for paid job after schooling is very limited, the impact of female education on timing of birth would not go far beyond inhibiting pregnancy while they are in the school system. However, if children are to go to schooling and the direct as well as indirect costs of children's education is getting higher, education could lead to further fertility reduction through increasing costs of raising children (Gould, 1993). For instance, all respondents categorized under unemployed/unknown occupation were neither married, attending schools nor engaged in any kind of jobs by the time of the survey. The rationale for delayed births in the city could thus be attributed to limited chances of marriage and resources required to invest on the newly born child. In the context of Addis Ababa, late marriage and low fertility could be the concomitant effects of poverty than any of the development forces that are observed in industrialized countries like Japan (Retherford et al., 2001) and Western Europe (Oppong, 1983).

Uni-variate Analysis

As shown in Table 1, mean age at first birth is about 20 years. Much variation on timing of first birth is not observed by socio-demographic variables as the data implies the status quo at the time of the survey only for those who experienced child bearing. Proportion of women who have not yet given birth to a child, however, varies across the socio-demographic variables. Most of the young, unmarried and unemployed women that have limited access to resources have not yet entered into motherhood status. Results of multivariate analysis is hoped to depict the variation as survival analysis technique has the potential to include all women exposed to the risk of pregnancy irrespective of their motherhood status and indicate their yearly risk of childbirth.

Table 1   Sample Size, Percentage Distribution of Women Who had given Birth to at least One Child and Mean Age at First Birth to all Variables included in the Interval between Age 13 and First Birth Model, Addis Ababa: 2003

Variable	Number of women at time of the survey	Percentage of Women Born at least One Child	Mean Age at First Birth
Migration Status			
Non-migrant	1177	36.4	20.3
Childhood Migrant	571	44.1	20.0
Young Migrant	1228	48.9	20.1
Mother's Birth Cohort			
1983-88	1020	5.6	18.7
1978-82	672	29.9	18.9
1973-77	419	58.0	20.5
1963-72	492	85.4	20.7
1953-62	373	96.8	20.3
Residential Area			
Kebele 212	178	53.9	22.7
Kebele 217	195	50.8	21.1
Kebele 449	195	46.7	19.2
Kebele 506	157	44.6	19.3
Kebele 512	235	42.6	19.3
Kebele 1529	196	41.8	20.7
Kebele 1117	619	43.3	19.7
Kebele 1719	278	33.8	19.3
Kebele 1725	758	41.7	20.4
Kebele 1833	159	39.6	19.4
Education			
Illiterate	624	53.0	18.8
Primary	510	37.5	18.7
Secondary	1575	37.3	20.4
Higher	267	64.4	23.4
Ethnicity			
Amhara	1841	42.4	20.1
Oromo	507	41.6	19.6
Others	628	46.3	20.6
Marital Status (time varying)			
Never Married	1514	7.2	20.4
Ever Married	1462	80.2	20.1
Occupational Status (time varying)			
In-school	398	0.5	17.5
Unemployed/unknown	521	15.9	19.8
Domestic servant	510	24.7	18.5
Housewife	598	76.8	20.0
Manual and Unskilled	520	64.0	19.4
Skilled and Semi-Skilled	429	65.0	22.2

Table 1: (cont'd)

Accessible Income Level (time varying)			
No reported income	908	9.4	19.7
Less than 250 birr	1022	35.2	19.1
250-799 birr	462	64.1	19.9
800+ birr	584	92.6	21.0
Total	2976	43.1	20.1

Source: Survey data, 2003

A simulation model built by Mauldin and Berelson (1978) using data compiled from 94 developing countries showed that a threshold level of 80 percent single women among those aged 15-19 years is associated with a crude birth rate of less than 35 per 1000, while delayed marriage contributed to about 40 percent of the fertility decline. In the current study, proportion never married aged 15-19 is over 90 percent while those never married by age group 30-34 were about a quarter. Mean ages at first marriage and first birth have also shown a consistently increasing trend over years (Fig 5). Looking at the data at face value, the decline in fertility rate of Addis Ababa inclines towards shifting of age at first marriage and birth rather than adopting a habit of childlessness, which is common in the Western World due to high rate of non-marital living arrangements that end partnerships before transition to parenthood. (Mulder, 2003).

Multivariate Analysis

The multivariate analyses in which the impact of poverty on timing of first birth assessed was fitted using a hazard regression model after controlling for other factors that could affect occurrences of the event. Table 2 shows the result of the analysis using a discrete logistic regression model of the effect of accessible income, which was entered as a time varying covariate, and other socio-demographic variables. The regression model was run using 1,282 first birth events taking place among 2,976 women included in the study.

In order to test the assumptions of proportional hazards, interaction terms between each covariate and time (length of exposure since age 13) was checked, and non-significant interactions terms were removed from the final model. As suggested by Wood (1994), the model indicates that there is a curvilinear relationship with age (years passed since age 13). Odd ratios are greater than unity for age (i.e. years) and the values for age squared (year^2) are less than a unity.

As indicated in Fig 3, there is strong evidence that the yearly risk of first birth is lower among the younger cohorts. It has also been shown that women born prior to the 1970s have higher yearly risks of giving birth to first child while those born towards the end of 1970s and then after have lower yearly risks. Women belonging to the birth cohort of 1950s gave birth to the first child earlier than their immediate followers. Same trend is also observed for others when compared to their immediate younger age cohorts. Probabilities of giving birth to the first child progressively declined among the younger age cohorts, and results are statistically significant for all categories of the variable both in the occupational and accessible income level models (Table 2) indicating that fertility in the city has been consistently declining in the past.

Table 2 Parameter estimates, with standard errors and odd ratios, for occupational status and accessible income level models of interval from age 13 to first birth: Addis Ababa, 2003

Variable	Occupational status model			Accessible income level model		
	Estimate	SE	Odds ratio	Estimate	SE	Odds ratio
Intercept	-3.05	0.18***	-	-2.31	0.17***	-
Migration Status						
Non-migrant	-	-	**1.00**	-	-	**1.00**
Childhood migrant	-0.04	0.09	**0.96**	0.04	0.10	**1.04**
Young migrant	-0.09	0.08	**0.92**	-0.05	0.08	**0.95**
Mother's birth cohort						
1983-88	-0.82	0.17**	**0.44**	-1.12	0.17**	**0.33**
1978-82	-0.35	0.11*	**0.70**	-0.37	0.11**	**0.69**
1973-77	-	-	**1.00**	-	-	**1.00**
1972-63	0.37	0.11**	**1.44**	0.48	0.11**	**1.62**
1962-53	0.44	0.12**	**1.55**	0.58	0.12**	**1.78**
Residential Area						
Kebele 212	0.04	0.12	**1.04**	0.02	0.12	**1.02**
Kebele 217	-0.12	0.13	**0.88**	-0.03	0.13	**0.97**
Kebele 449	0.01	0.13	**1.01**	-0.08	0.14	**0.93**
Kebele 506	0.15	0.15	**1.16**	0.02	0.15	**1.02**
Kebele 512	-0.20	0.13	**0.82**	-0.07	0.13	**0.93**
Kebele 1529	0.05	0.14	**1.05**	-0.04	0.14	**0.96**
Kebele 1117	0.04	0.09	**1.04**	0.00	0.10	**1.00**
Kebele 1719	-0.18	0.13	**0.84**	-0.39	0.13*	**0.68**
Kebele 1725	-	-	**1.00**	-	-	**1.00**
Kebele 1833	-0.28	0.19	**0.75**	-0.30	0.19	**0.73**
Ethnicity						
Amhara	-	-	**1.00**	-	-	**1.00**
Oromo	0.01	0.09	**1.01**	0.08	0.09	**1.07**
Others	-0.04	0.08	**0.96**	-0.05	0.08	**0.95**
Policy period						
Pre-policy	-	-	**1.00**	-	-	**1.00**
Post-policy	-0.16	0.12	**0.86**	-0.06	0.12	**0.94**
Occupational status						
In-school	-2.61	0.16***	**0.07**			
No work (unemployed)	-1.16	0.12***	**0.31**			
Domestic servant	-1.24	0.17***	**0.29**			
Manual and unskilled works	0.00	0.13	**1.00**			
Skilled and semi-skilled	-	-	**1.00**			
Housewife	1.11	0.09***	**3.06**			
Education						
Illiterate				0.29	0.09**	**1.33**
Primary				0.22	0.10*	**1.24**
Secondary				-	-	**1.00**
Higher				-0.25	0.10*	**0.78**

Table 2: (cont'd)

|						
Marital Status						
Never Married				-4.39	0.27***	
Ever married				-	-	
Never married * year				0.17	0.03***	
Accessible Income Level						
No-income reported				-2.12	0.11***	**0.11**
Low (less than 250 birr)				-1.06	0.10**	**0.35**
Medium (250- 799 birr)				-	-	**1.00**
High (800+ birr)				0.62	0.08***	**1.87**
Year	0.23	0.02***	**1.26**	0.22	0.03***	**1.24**
Year²	-0.01	0.00***	**0.99**	-0.01	0.00***	**0.99**
Total years of observation	25,720					
Total births	1,282					

Note: Reference category has odd ratio of 1.00
†p<0.10, *p<0.05,   ** p<0.01,   *** p<0.001

Family Life Education that was introduced in the high school and college level curricula and reproductive health clubs established in most of the high schools in the city since the adoption of the National Population Policy in 1993 are believed to play great roles in moulding the attitude of the young generation towards small family, and the mechanisms to attain it (National Office of Population, 1999, Ezra and Gebreselassie, 1998). The diffusion of Western culture and ideology among the young residents of the city who aspire to lead improved life despite sever economic hardship shall not also be ignored. As suggested by Cleland and Wilson [1987] fertility could decline as a result of ideational changes and the spread of new ideas. By virtue of susceptibility to accept new ideas and aspirations to lead better life, small family norm could easily get acceptance among the young generation.

As shown in Table 2, women who have not engaged in any kind of work (i.e. who were attending school and depend upon on some one else (their parents or others) to earn their living and domestic workers were observed to have statistically lower risks of giving birth to first child (Table 2). Attending school is in a position to reduce the yearly risk of birth by 93 percent while the difficulty of accessing resources due to neither getting married nor engaging in any kind of work to be self supportive reduces the risk of yearly birth by 69 percent. Dropping out of school and never engaging in nay kind work does not necessarily lead to giving birth to a child. Domestic servants who are supposed to work most of the days during the week are also found to postpone timing of first marriage In addition to time constraints to look after their children, women with young children are not welcome to serve as domestic servants since they put additional burden on the household consumption of the employers (Fig 6). The yearly risk of giving birth to a child among housewives (that is, women who have not engaged in any kind of job but married and look after their houses), is found to be two times higher than those engaged in a relatively high status job (skilled and semi-skilled work). No difference in the yearly risks of birth was, however, observed among women engaged in manual/unskilled works and those engaged in the skilled and semi-skilled works.

Fig 6   Kaplan-Meier plot of the yearly probability of giving birth to first child among all women residing in Addis Ababa by occupational status: 2003
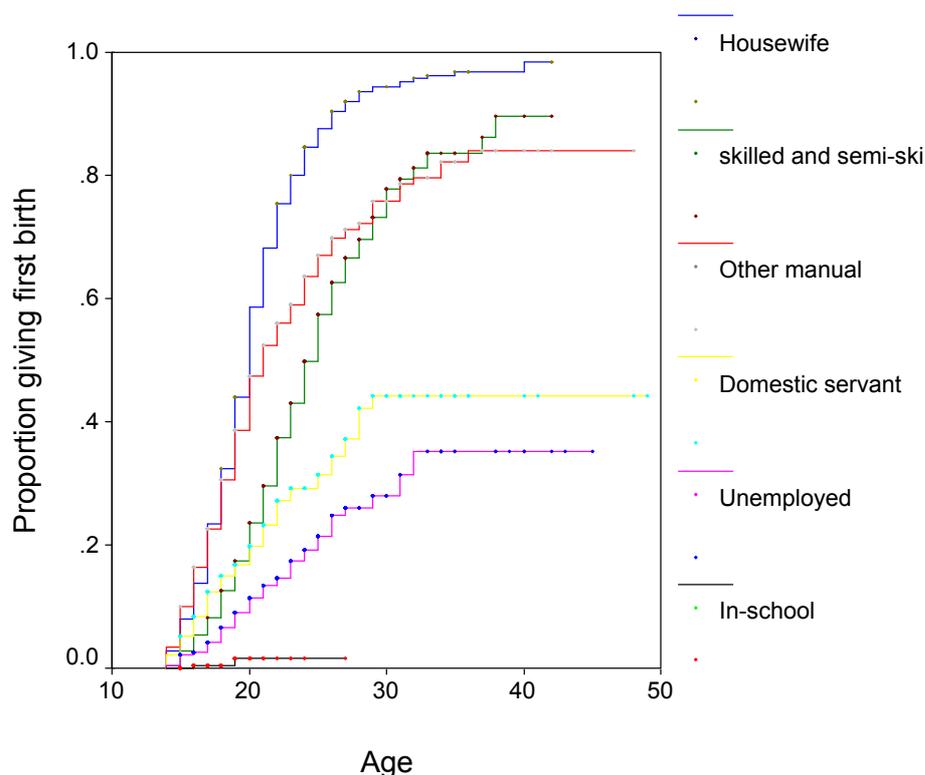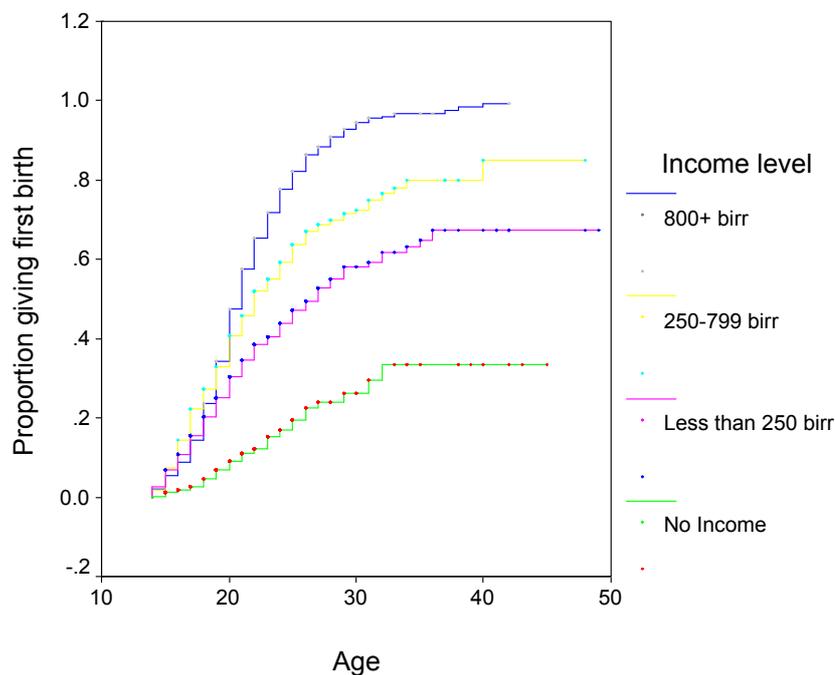

Source: survey data, 2003

Table 2 indicates that educational level of respondents is inversely related to timing of first birth. Women with no education have higher risks of first birth while those attaining post secondary education have lower risks of child bearing and the differences are statistically significant. Never attending school increases the risk of childbirth by 33 percent while obtaining post-secondary level education reduces the risk by 22 percent. Women attaining primary level education were also observed to have nearly the same risk of childbearing as those women without any schooling. The effect of education on timing of first birth is basically due to the duration of stay in the school system before marriage or childbirth and the positive attitude it actually creates towards contraceptive use [Cleland and Wilson, 1987].

Never married is associated with a less likelihood of giving birth to a child, and there is a significant interaction between the never married and length of exposure (time since age 13). The positive coefficient in this interaction indicates that for women who have not married at early ages, there is a greater risk of giving birth to a child as age increases. This could be due to a deliberate measure taken by some women, as they got older without getting married or an indicator of failure of premarital births to serve as a coercive measure leading to a formal union.

In the accessible income level model where marital status is introduced to control for the possible effects of marriage on the likelihood of giving birth to first child, income level is found to have a strong positive relationship with timing of first birth (Table 2). According to the results of the multivariate regression model, women who have access to less than 250 birr a month or a dollar per day has a significantly lower risk of first birth per year while those

accessing more than 800 birr a month or three US dollars a day have a statistically significant higher risks. The yearly risk of first birth is also very low among those who do not have access to any income (reported no income during the year of observation). The probability of having first birth is lower by about 91 and 65 percent among those who do not have any income and less than 250 birr a month, respectively, while such risks are almost double among the rich when compared to those earning a medium level income (i.e. 250-799 birr a month or an amount equivalent to one to three US dollars a day). According to the results of this study, timing of first birth is a direct function of accessible income level to a woman. As accessible income to a woman decreases, the yearly risk of first birth also diminishes (Fig 7).

Fig 7   Kaplan-Meier plot of the yearly probability of giving birth to first child among all women residing in Addis Ababa by accessible income level: 2003

Source: survey data, 2003

Cost of living in Addis Ababa has shown a tremendous increase since mid 1970s. Cost of living, according to the pricing index compiled by the National Bank of Ethiopia (1963= 100), has increased by five folds in a period of about one generation (1966 to 1996) while it is doubtful that salaries and wages have been tripled to adjust for the inflation. In line with the argument of Boserup [1985], the huge gap between expected and earned income in the city could lead to fertility reduction in the city due to the consequences of dissatisfaction and pessimism over future prospects. A woman with meager financial resources could postpone timing of first birth fearing lack of sufficient fund to bring up a newly born baby. Studies undertaken in Paraguay (McCarthy, 1984 as cited in Bitzig, 1988], for instance, indicated that 38 percent of all live births to sampled woman are terminated mainly due to lack of parental investment. The tendency to control fertility due to economic difficulties is high in urban areas where income support system is non-existent, unemployment rate is high and life in the future is full of pessimism (Lesthaeghe, 1989b, Cohen, 1993).

Migration status of respondents has not shown any difference in timing of first birth. The fact that migrants are moving to Addis Ababa in search for better opportunities but face economic difficulties to cope up with life in the city appears to remove the possible impact of migration on fertility. Migrants seem to adapt to the small family norm actually practiced in the city due to the impacts of economic hardship rather than undergoing any fertility decline due to their move to the city. The disruptive effect that is supposed to affect the fertility behaviour of recent migrants is in a position to be overcome by the economic stress promoting low fertility in the city. It seems that physical movement affects the reproductive behaviour of migrants in societies where conditions of living are stable and residents at places of destination have prosperity in their future life. At the moment, nothing seems to specifically affect the reproductive behaviour of migrants to the city in a different way apart from the economic hardship depressing everybody residing over there irrespective of duration of residence. Ethnic belongingness and the period before and after the adoption of the national population policy do not also show any effect on timing of first birth.

Ethiopia being a country that experienced socialism that eradicates structural differences between groups and imposing 'economic equality' by nationalizing private properties, fertility differentials are not observed by residential area (i.e. *kebele* level) except kebele 1719 where the yearly risk of first birth among women residing there is significantly lower than the one taken as a reference category. In most of the cases, residents of this *kebele* are composed of government officials and employees of the NGOs that have strong connection with people living aboard. The intention to emigrate at some point in the future is suspected to deter their fertility behaviour than any of the variations due to local administration and neighbourhood effects. As the possibility of obtaining entry visa to Europe or the US with dependent children is perceived to be low, most of them may wish to delay timing of childbirth.

Analysis of Inter-birth Interval

Uni-variate Analysis

Mean length of inter-birth-interval (i.e. the interval between first and second child), as well as percentage of woman with closed birth intervals are shown in Table 3. The overall length of second birth interval is about 40 months ranging between 32 months among women experiencing child loss to 54 months for those categorized as unemployed or unknown work status. Variation in the duration of inter birth interval is quite small for some of the variables (such as sex and survival status of the index child) included in the model. On the whole, more than three-fourth (78 percent) of the women have had their third child while it is limited to only half (51.3 percent) of the women who had access to low income [Table 3]. If economic factors are to affect timing of birth and number of children, it is not surprising to find low fertility rate in Addis Ababa as long as 40 percent of the households are living below the threshold poverty line (i.e. one US dollar a day) (Kebede, 2002).

Table 3: Sample Size, Percentage Distribution of Women Who have given Birth to the Second Child and Mean Length of Interval between First and Second Births, Addis Ababa: 2003

Variable	Number of women at time of the survey	Percentage of Closed birth interval	Mean Length of IBIs (months)
Migration Status			
Non-migrant	429	73.4	35.8
Childhood Migrant	252	81.0	42.4
Young Migrant	601	80.0	40.5
Age at First Birth			
Before 18 Years	357	84.3	46.0
18-21 Years	620	73.7	37.1
22 and more Years	305	79.6	35.6
Maternal Birth Cohort			
1983-88	57	8.8	19.6
1878-82	201	46.8	32.1
1973-77	243	74.5	34.4
1963-72	420	89.0	42.5
1953-62	361	95.8	40.9
Residential Area			
Kebele 212	94	77.7	36.6
Kebele 217	99	76.8	39.5
Kebele 449	91	79.1	36.2
Kebele 506	70	74.3	41.2
Kebele 512	100	78.0	42.8
Kebele 1529	83	78.3	38.2
Kebele 1117	268	74.6	42.9
Kebele 1719	94	78.7	36.2
Kebele 1725	317	82.3	38.8
Kebele 1833	62	74.2	37.4
Education			
Illiterate	337	81.3	45.6
Primary	184	76.1	39.1
Secondary	589	73.6	36.4
Higher	172	87.8	37.2
Ethnicity			
Amhara	780	76.9	40.6
Oromo	211	75.4	40.6
Others	291	82.8	35.6
Marital Status (time varying)			
Not in-union	471	62.8	47.0
In-union	811	86.8	36.2
Sex of First Child			
Male	651	78.2	41.6
Female	631	77.8	37.1
Survival Status of First Child (time varying)			
Alive	1183	78.0	40.1
Dead	99	77.8	31.4

Table 3: (cont'd)

|			
Occupational Status (time varying)			
Unemployed (no-work)	85	69.4	53.9
Domestic servant	126	42.9	51.9
Manual and Unskilled	333	79.0	42.7
Skilled and Semi-Skilled	279	89.2	36.8
Housewife	459	81.7	34.7
Accessible Income Level (time varying)			
No reported income	89	68.5	53.1
Low	359	60.7	50.6
Medium	295	86.1	37.2
High	539	86.6	33.6
Total	**1282**	**78.0**	**39.4**

Multi-variate Analysis

Results of a discrete time logistic regression model fitted to assess the effect of poverty on inter-birth-interval is given in Table 3. The model was built using 1,000 second- birth events taking place among 1,282 women who reported to have given birth to at least one child. As already indicated, interaction terms between each of the covariates and time (years passed between first and second births or censoring of the case was checked and significant interaction terms were included in the model.

Similar to the results obtained in the previous model, accessible income level to a respondent woman is found having a strong positive relationship with fertility after controlling for the effects of marital union and other confounding factors (Table 2) The higher income the woman could access the more chances she has to give birth to the second child and vice versa. In explicit terms, giving birth to a child is higher by 32 percent among better off women while it is lower by 48 and 35 percent among women accessing low and no income, respectively, when compared to those in the middle income level, and results are statistically significant. Because of much confidence on resources to invest on children, women who have access to better income tend to shorten the interval between consecutive births and maximize their fertility while those with unknown and meager economic resources tend elongate timing to second birth (Fig 8).

Longer inter-birth-interval among women with low or unreported income could be due to deliberate postponement of childbirth through use of family planning methods and/or termination of pregnancy, longer duration of breast-feeding because of financial scarcity to purchase supplementary food that would have reduced timing and intensity of lactation amonehorrea as well as nutritional deficiency of the respondent woman to conceive at her earliest possible.

Fig 8   Kaplan-Meier plot of the yearly probability of giving birth to second child among all women residing in Addis Ababa by accessible income level: 2003
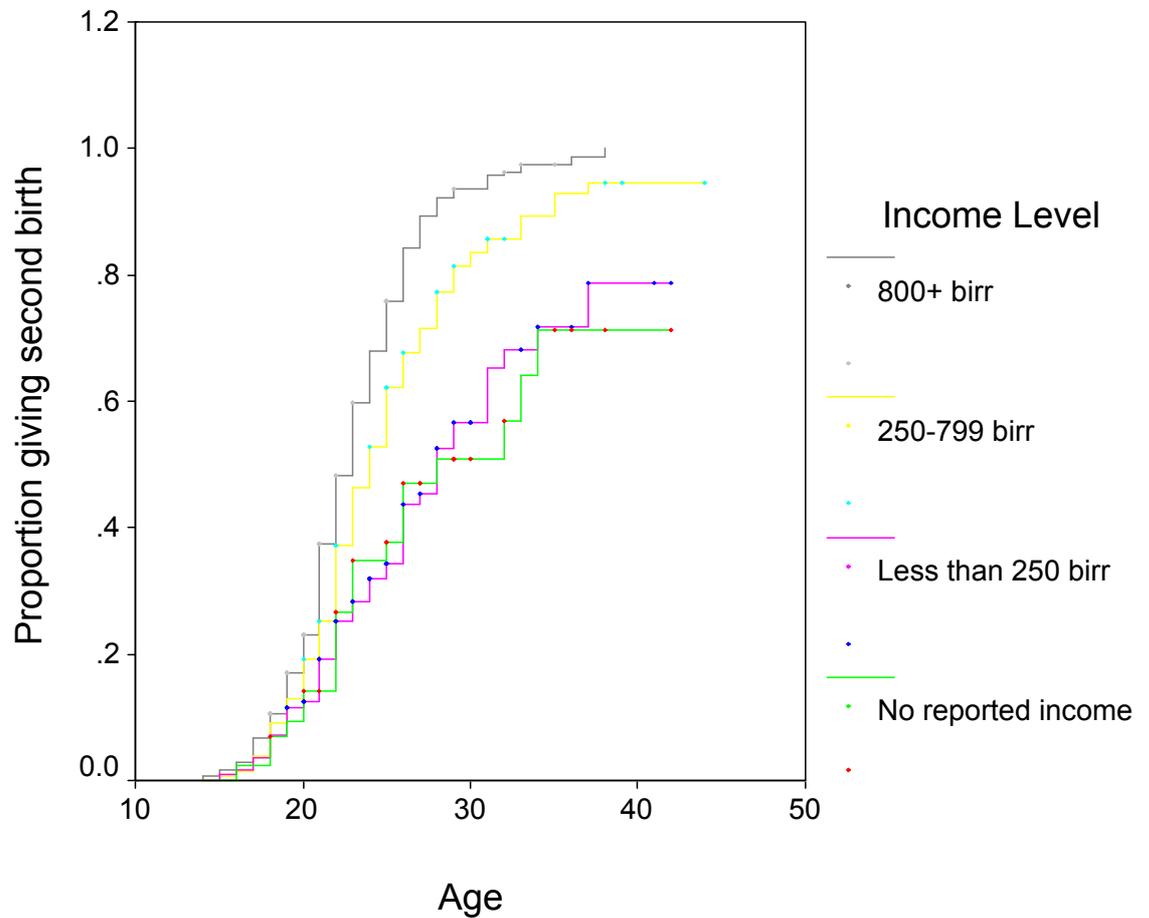
Source: survey data, 2003

Marital dissolution is associated with a longer birth interval and there is a significant interaction between the marital dissolution and the time between first and second births, or censoring of an event. The negative coefficient in this interaction indicates that for women whose marriage dissolved early, the earlier the marriage dissolves during the interval the lower the risk of giving birth to a child. A positive coefficient for the interaction Not-in-union * year^2, on the other hand, indicates that this effect has a curvilinear relationship with time, possibly an effect of sexual abstinence due to frequent dispute before the marriage is formally dissolved or a long term illness before death of a marriage partner. Udlry (1966), for instance, argued that couples with serious marital discord have fewer children even prior to the dissolution as discord reduces the frequency of sexual intercourse.

Table 4 Parameter estimates, with standard errors and odd ratios, for occupational status and accessible income level models of first to second births: Addis Ababa, 2003

Variable	Occupational status model			Accessible income level model		
	Estimate	SE	Odds ratio	Estimate	SE	Odds ratio
Intercept	-1.88	0.19***	-	-2.55	0.20***	-
Migration Status						
Non-migrant	-	-	**1.00**	-	-	**1.00**
Childhood migrant	-0.04	0.11	**0.96**	-0.08	0.11	**0.93**
Young migrant	-0.09	0.09	**0.91**	-0.02	0.10	**0.98**
Mother's birth cohort						
1983-88	-1.18	0.47*	**0.31**	-1.12	0.47*	**0.33**
1978-82	-0.24	0.15†	**0.78**	-0.21	0.15	**0.81**
1973-77	-	-	**1.00**	-	-	**1.00**
1972-63	-0.06	0.13	**0.94**	-0.01	0.13	**0.99**
1962-53	0.19	0.12	**1.21**	0.20	0.15	**1.22**
Age at first birth						
Before 18 years	-0.00	0.09	**1.00**	0.14	0.10	**1.14**
18 - 21 years	-	-	**1.00**	-	-	**1.00**
22 and more years	0.08	0.10	**1.08**	-0.01	0.10	**1.01**
Education						
Illiterate	0.07	0.12	**1.07**	0.15	0.11	**1.14**
Primary	-0.12	0.12	**0.89**	-0.01	0.12	**0.99**
Secondary	-	-	**1.00**	-	-	**1.00**
Higher	-0.23	0.12	**0.79**	-0.08	0.12	**0.88**
Ethnicity						
Amhara	-	-	**1.00**	-	-	**1.00**
Oromo	-0.08	0.10	**0.92**	-0.10	0.10	**0.90**
Others	0.26	0.09*	**1.30**	0.18	0.09*	**1.20**
Policy period						
Pre-policy	-	-	**1.00**	-	-	**1.00**
Post-policy	-0.18	0.12	**0.84**	-0.11	0.13	**0.90**
Has son						
Yes	-	-	**1.00**	-	-	**1.00**
No	0.09	0.07	**1.10**	0.09	0.08	**1.10**
Survival Status of Previous child						
Alive	-	-	**1.00**	-	-	**1.00**
Dead	0.23	0.17	**1.26**	0.34	017†	**1.40**
Residential Area						
Kebele 212	0.09	0.16	**1.10**	0.03	0.16	**1.03**
Kebele 217	-0.00	0.15	**0.99**	-0.07	0.16	**0.93**
Kebele 449	-0.02	0.16	**0.98**	-0.06	0.16	**0.94**
Kebele 506	-0.22	0.18	**0.80**	-0.24	0.18	**0.79**
Kebele 512	-0.15	0.15	**0.85**	-0.02	0.16	**0.98**
Kebele 1529	0.08	0.16	**1.09**	0.09	0.17	**1.09**
Kebele 1117	0.04	0.15	**1.04**	-0.04	0.16	**0.96**
Kebele 1719	-0.28	0.11*	**0.76**	-0.31	0.11**	**0.74**
Kebele 1725	-	-	**1.00**	-	-	**1.00**
Kebele 1833	0.07	0.18	**1.07**	0.05	0.19	**1.05**

Table 4 (cont'd)

Occupational status						
No reported work	-0.98	0.16***	**0.38**			
Domestic worker	-1.30	0.20***	**0.27**			
Manual + unskilled	-0.24	0.15†	**0.78**			
Skilled+ semi-skilled	-	-	**1.00**			
Housewife	0.32	0.10*	**1.38**			
Marital status						
In-union				-	-	
Not in-union				-0.49	0.25**	
Not in-union * Year				-0.28	0.09**	
Not in-union * Year^2				0.02	0.01**	
Accessible Income Level						
No reported income				-0.43	0.16**	**0.65**
Low (less than 250 birr)				-0.66	0.12***	**0.52**
Medium (250-799 birr)				-	-	**1.00**
High (800+ birr)				0.29	0.13**	**1.34**
Year	0.38	0.04***	**1.46**	0.59	0.05***	**1.80**
Year^2	-0.03	0.00***	**0.97**	-0.04	0.00***	**0.96**
Total years of observation	*5,912*					
Total births	*1,282*					

Note: Reference category has odd ratio of 1.00

†p<0.10,   *p<0.05,   ** p<0.01,   *** p<0.001

Interestingly, respondents belonging to the minority ethnic groups of which Tigreans and Gurages make up the greater proportion were found to have high likelihood of giving birth to the second child (P< 0.05) as compared to the Amhara ethnic group, which comprises over 50 percent of the city population. The Oromos, the second largest ethnic group in the city, have less chances of giving birth to a child although the results are not statistically different from the reference group. The prevailing ethnic based political system in the country that takes population size into account in budgetary allocation and parliamentary seats both in the federal and regional states seem to motivate members of the minority ethnic groups to increase their fertility.

Similar to the results obtained for the first model, women engaged in domestic work and those without any work were observed to have statistically significant lower chances of giving birth to the second child (Table 4). women had also lower chances of giving birth to the second child, but the difference is marginal. The former reduces the probability of giving birth to the second child by 45 percent while the later reduces it only by 17 percent. The low fertility rate among women in the low status occupational group has strong implication for the positive relationship between income and fertility as long as women facing economic hardship take up such a job as a last resorting survival strategy in the city.

Contrary to our expectation, educational level has not shown any significant difference among the respondents with different educational background. The relationship, however, is in the expected direction. Probabilities of giving birth to the second child reduce as educational level increases. In the Western world, education affected fertility since most of the women spend a longer period of their youth age in school to attain further education and work for paid

employment in the formal labor market even after schooling (Cohen, 1993, Jaenichen U, 1992) Marriage is usually delayed for the aforementioned reasons and does also childbearing. Unlike this, in Addis Ababa timing of first marriage and childbirth after schooling does not extend much as employed women with better income have higher chances of getting married than those who are not employed and engaged in manual and unskilled jobs. There is a noticeable competition among males over women that have high status jobs and contribute to the household income. Working outside home does not necessarily affect their intention to have children in shorter intervals as long as employed baby-sitter at relatively low wage is in a position to reduce the opportunity cost of child bearing and conflict between mothering and working outside home. The general conclusion in demographic literature that states that high educational attainment leads to a longer birth interval is not supported in this study. If contraceptive use is widely accepted by non-educated woman and those who have low level of education, the effect of education of fertility could be limited to its inhibition of getting pregnant while they are in the school system (Cleland, 1993). Brass and Jolly (1993) as well as Rutenbergue and Diamond (1993) also reported no effect of education on fertility in Kenya and Botswana. In urban areas where contraceptive and abortion services are readily available for everyone and the penalty for delayed marriage as well as childlessness is nearly non-existent, the impact of education on fertility would be negligible.

Age at first birth, moreover, is not found having any impact on timing of the second child. Woman who delayed timing of their first child were not observed taking initiative of having the second child within a shorter period of time. It is a very good indicator of behavioral change towards small family norm in the city. Traditional norms and values prevailing high fertility rate in the continent seem to be less coercive in dictating women to have more births in her life time. Had these cultural ruminants are active and pressing in the city, women who have had their first child at later ages could have had the second delivery at their earliest possible to maximize their reproductive success. When the economic conditions are not permitting to have many births, the influences of cultural norms and values are also diminishing (Lockwood, 1995).

Neither the sex nor the survival status of the first child seems to exert any influence on the timing of the second birth. Women who have not given birth to the male child and those who lost their first child did not rush to have another child. Results for each of these variables are in the expected direction though not statistically significant. The less economic return from children may reduce the sexual preference of parents while relatively better access to health services minimize the hoarding effects of having another child as a substitute immediately upon the death of the index child.

Discussion

Evidence for the impact of poverty leading towards fertility control in the city
Global evidences on family planning programs reveal that the demand for contraceptive use in developing countries is increasing from time to time (Bongaarts and Johnson, 2002) despite declining in real income of the population and worsening of the living situations over there. As documented in a number of studies (Juarez F, 2001, Shapiro and Tambashe, 1997, Lockwood, 1995, Caldwell et al., 1992, Robibson and Harbinson, 1995) fertility has declined in most of the African countries particularly in urban centers due to increased use of family planning methods and females' education. Induced abortion as a supplement to modern contraception in reducing fertility has also been indicated in Kinshasa, Zaire (Shapiro and Tambashe, 1997) and Abidjan, Cote d'Ivoire (Guillaume, 2003).

Fertility behavior, according to Daugherty [1995) is a social behavior that is shaped within the context and the decision-making power of individuals and couples. It is a behavior that is being adapted in response the social, ecological and environmental situation in which the concerned population is living. Similarly, in Addis Ababa, the rationale behind fertility regulation either through abortion or family planning methods has tended towards limiting the number of children in accordance with one's economic ability. The poor in the city have developed a general understanding of paying much attention to fewer children in order to cope up with the constraints of financial resources in the city. A response obtained from a 29 years old, currently married non-working woman but accessing 656 birr a month (i.e. about 2 dollar a day) that

> "The haves usually have more [babies] while the have not's limit their family
> size due to economic reasons"

could explicitly verify the positive relationship between fertility and income in the city. Explaining how poverty and fear of future life is exerting pressure on the attitude of city residents on large family size, a 22 years old unmarried and unemployed girl said

> "My economic situation will determine my family size. If I get rich, I will
> have more children … If not, I will not go for more than two."

Given the highest impact of poverty on the livelihood of population in the city, social-cultural factors that were exerting heavy pressure upon couples to bear and rear children have also been eroded. A decision on how many children and when to have them has become a personal decision of a given individual depending upon his economic capacity. For instance, response obtained during focus group discussion in the city revealed that using family planning methods in the city is not a luxury but a necessity. One has to plan for the number and timing of childbirth very consciously. Even if they fail to realize, their pocket will later or sooner make them consider the case.

Evidenced from the study area have also indicated that contraceptive use and abortion services have important roles in reducing fertility rate in the city. Contraceptive prevalence rate among currently married non-pregnant women included in the sample is 46.5 percent. Further analysis of the current contraceptive data by accessible income level reveals that a greater proportion of women with low income are using contraceptives and experiencing abortion in the past than those who are better of. Slightly more than half (51.5 percent) of women in the low-income group use contraceptive at the moment while current contraceptive use among better-off women is only 44.5 percent and that of medium income group is 48.5 percent. In Ethiopia, family planning services have largely been available without any fee (World Bank, 1998). Any woman can obtain contraceptive supplies for free or at a relatively cheaper price if she wants to avoid unwanted and unplanned pregnancies.

A greater proportion of the poor women, however, are observed to use traditional methods (18.5 percent of them), which is not very effective in protecting them against pregnancy. Failure in any of the traditional family planning methods seems to be taken care by terminating pregnancies. The proportion of poor women experiencing abortion in their lifetime is also higher (i.e. 18.1 percent. Same experience among better off women is relatively lower (only 14.2 per cent). Nearly one-in-five (i.e.17.2 percent) women of the reproductive age reported to undergo abortion once in their lifetime. This figure, however, is

suspected to be low due to the legal, religious and social connotation in reporting about the incidence without fear. Hailu (2003) also reported an abortion incidence of 6.2 percent among female residents of Addis Ababa in the early childbearing age (15-24 years). The result is comparable with 6.5 percent reported in this study for the same age group (Table 6.5). Proportion of women ever experiencing abortion is estimated at 30.5 percent among women visiting clinics for prenatal care in Abidjan, Cote d'Ivoire (Guillaume, 2003).

Trade-off between quality and quantity of children in Addis Ababa
Kaplan and Lancaster (2000) who extended the life history theory and the economics of the family to explain how quality-quantity trade-offs leads to low fertility behavior stated that a fertility decline in a given society begins when parents perceive the benefits and costs of child schooling. Knodel (1990) also observed the importance of parental perception of costs of child education in fertility transition of Thailand. The relevance of increased cost child schooling in reducing fertility is also well documented in the works of Caldwell (1982) as well as Becker and Lewis (1973).

According to responses obtained from most of the in-depth interviews, fatalistic view that says "Children grow up on their fate, and let's have as many children as God let us having" is no more considerate among residents of the city. Per the overall summary of the qualitative information gathered through focus group discussion and in-depth interviews, residents of Addis Ababa irrespective of their socio- economic status have good understanding and positive attitude towards limiting family size as well as capitalizing on schooling of children. A 32 year old, petty trader, mother of two children explained her decision to minimize the family size by saying that

> "I have two children. I do not want any more. … because I do not want my children face the difficulties I ever encountered… They shall get better education to widen their employment opportunities."

Child schooling and costs associated with it have been mentioned several times as one of the important reasons dictating fertility decline in the city. Further investigation on the issue revealed that parents in Addis Ababa are highly concerned about schooling of their children due to the fact that internal efficiency of the educational system in the city is quite low[2] and success of their children depends on either sending them to private school or hiring a part-time tutor to coach each of the child after schooling.

Until the end of the 2003, education was free in Ethiopia at all level. However, tuition fee is introduced for college and high school level education at the beginning of 2004. Though education is free at primary and secondary levels, some amount of fee is occasionally paid for school uniform, classroom maintenance, registration, textbook services, extra curricula activities and the like. Unlike elsewhere in the country, each of the children living in Addis Ababa needs to be provided with some amount of money to pay for his/her day-ticket bus or taxi fare while going to and from school. The total amount required to send a child for schooling is not easily affordable by most of the families whose income is very limited. Studies undertaken on food consumption and poverty in urban Ethiopia revealed that expenditure on food items constitutes about 63 percent of the household budget (Tadesse, 1996).

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[2] According to the World Bank Report of 1998, the teacher-student ratio in Addis Ababa (i.e. government schools) is 1:51, very high than the national average of 1:33 [The World Bank, 1998: xix].

Despite variation in success rate in educational attainment due to differences in the amount of time and resources invested on each of the children, the relevance of trading-off between quality and quantity of children seems to be well recognized in Addis Ababa. High unemployment rate in the city that forced most of the children to continuously residing with their parents even after schooling due to financial self-insufficiency is a major concern to trade-off between quality and quantity of children. The desire to invest on few children to get them better education and success in their future career is not only a practice limited among the well educated and better-off families, but also a compelling survival strategy and the best mechanism of ensuring reduced familial burden in the long run among poor residents of the city.

A study undertaken in Thailand on the effects of economic crisis on desire for children and marriage has revealed that economic crisis had dampened marriage desires of young unmarried women in Thailand (Tsuya and Chayovan, 2002). According to the results of this study, girls whose mothers experienced economic hardship are subject to extreme emotional depression and have fewer initiatives to get married. If the same situation holds true in Addis Ababa, it is possible to argue that economic crisis is in a position to bring about fertility decline through time by changing the behaviour of the young generation who are partly survivors of the prevailing economic shock. The tremendous increase in timing of age at first birth among the young generation (Fig 6.8) could, therefore, be the direct consequences of attitudinal change of those in their early and peak fertility age towards family formation and childbirth because of fear about the future due to the consequences of economic crisis in the country for over three decades.

Evidence for limited kin support in the city

Even though detailed analysis in not made in this study due to limited data on this particular issue, the extent of kin support in Addis Ababa is basically limited to occasional provision of financial support during holidays, timing of great illness or death of a family member. For instance, kin members usually contribute to save the life of a child if parents could not afford to pay for medication or to process the burial ceremony. In addition, interested individuals occasionally make contributions to poor families to meet their financial needs during major holidays, specifically New Year, Christmas and Easter. Supports received from kin relatives only during such occasions and emergency periods are, however, not in a position to encourage the poor to have as many children as they could. A complaints heard from a 28 years old, poor migrant, widow and mother of two children indicates the insignificant role of kin support in promoting fertility in the city:

> "It is very difficult to count on kin relatives in Addis Ababa. They may provide
> some amount of money during holidays. What is basically needed to bring up a
> child is a regular income to cover daily expenses. … My immediate problem is
> how to earn our daily bread not how to enjoy a big feast".

Support provided by kin relatives during emergency period such as illness of a child, on the other hand, plays significant role in reducing the extent of child death among the poor who could have otherwise motivated to have more children to secure few survivors.

Contrary to the situation in West African societies (e.g. Sierra Leone (Bledsoe and Isiugo-Abanihe, 1989)), child fostering is not very common in Addis Ababa. Resources do not follow

from rich to poor households aiming at reducing cost of child raising but in exchange for labor. For instance, residents of Addis Ababa welcome to foster-in girls more often than boys since the former contributes much to household activities than the later. Given the increased cost of child schooling in the city, kin relatives are less willing to accept child fosterage unless there is a mechanism of compensating expenses incurred with labor contributions of the child. Since the heavy workload imposed on a fostered-in child has significant impact on child's success in schooling, poor households residing in Addis Ababa rarely foster-out their offspring. The conflicting interest between biological parents and kin relatives reduced the relevance of child fosterage in promoting high fertility norm. Sending children to rural areas is not common as there is no economic tie between rural and residents of Addis Ababa. Nationalization of rural land makes urban residents to completely rely on their earnings from their activities within the city. Fostered-in children, if any, are usually in-migrants from the countryside who prefer living in the city to staying in the countryside. Child fostering, therefore, is not a widely used strategy to relieve economic burden among residents of Addis Ababa. There is a signal that parents from rural areas send their children to the city to live either with relatives or work as domestic servants to reduce familial burden.

In addition, urbanization and elements of modernization are also in a position to eradicate traditional norms and values that distribute resources among members of the kin relatives. Residents of Addis Ababa are mostly blamed for not sharing resources among kin relatives. A poor woman, 32, married and mother of three children, expressed her complaints by saying

> My sister who married to a rich businessman in the city is living in a modern villa house that they bought in a sub-urban city known as 'Bole' [a place where better-off people prefer to live]. They have a couple of extra rooms to accommodate my husband and me if they wish. That is, however, unthinkable. I tried to get their goodwill but failed . … We do not have access to any of their resources. They built an expensive wall of rock fence actually not only to protect their property against robbery but also to deprive us getting inside…This is a new culture actually developed among the rich [residents of Addis Ababa]. Our grandparents used to welcome relatives at any time and provide them with some of the things they need….The tradition is still is active among us [the poor]."

As indicated by Turkey (1988), kin support has impact on fertility if it helps to share costs of child raising and relieve the financial burden of families in desperate need of economic support. Providing emotional and moral support does not have much impact on fertility. Commenting on how the support among the poor could not affect their fertility, a 32 years old wealthier woman of three children said:

> Kin support is not meaningful among the poor…. Every poor person wants to receive. What does that imply for child raising then?

Why fertility rate is high in rural Ethiopia despite severe economic crisis in the country?

One of the reasons for high fertility rate in rural Ethiopia, and its continuation to remain high is believed to be the effect of rural land distribution and redistribution per family size since the 1974 Ethiopian Revolution (PMAC, 1975; Kinfu 2001). In Ethiopia, where land is publicly owned and government is responsible to determine who shall own the land, family size is the only way to either claim for additional plot of land or to retain the existing holding.

On the basis of such logical argument, reducing family size is tantamount to risking the amount of land to claim at any time in the future. Fertility reduction in rural Ethiopia is, thus, partly a function of possibilities of changing the land policy or providing the peasants with great assurance that his/her holding is granting irrespective of family size.

Studies undertaken on fertility decline in sub-Saharan Africa and other Asian countrieson issues related with economic crisis have also demonstrated that the tempo of fertility decline is quite high in urban areas than in rural communities. Differences in accessibility and availability of reproductive health services and the extent to which poverty is striking the standard of living of urban and rural population is mentioned as causes of variation in taking an immediate response to the economic crisis (National Research Council, 1993). In urban areas where contraceptive supplies and abortion services are relatively better available, there is a high likelihood that women suffering from economic stress are taking up contraceptives more often than before. Such opportunity, however, is very limited among rural population.

Limited family planning services and ineffectiveness of the program has also reduced the magnitude of poverty response to fertility decline in rural Ethiopia. Ezra (1997), for example, indicated that the demand for family planning in drought prone communities of Northern Ethiopia is higher though access to the actual service is limited due to logistic constraints. According to him, degradation of resources has compelled them to realize the disadvantage of having a large number of children, and there is a signal for fertility decline.

If contraceptive supplies are made available to the rural population, fertility could decline to some extent though it may not reach at the replacement level due to the possible effects of traditional norms and values over there. The relatively high economic and social values of children in rural areas, as well as kin support in sharing the low costs of raising children (i.e. feeding regularly and providing them with clothing occasionally) are believed to dictate having more children. On the basis of a simulation model developed by Sinding et al (1994) that demonstrates that satisfying unmet need of 15 percent would reduce fertility rate by about one point in developing countries excluding China, where unmet need is nearly nonexistent, meeting the prevailing 35 percent of unmet need of family planning in rural Ethiopia might reduce fertility from the current 5.9 children per woman to about 4 children. This, however, depends on the effectiveness of the family planning program currently running in the country through the support of different international and humanitarian agencies. Variation in way of life among residents of Addis Ababa and that of rural population is, nonetheless, the major cause of difference in the magnitude of the effect of poverty on fertility. Fertility could decline in response to economic hardship if and only if it exerts a pressure to trade-off between quality and quantity of children.

Summary

This analysis has demonstrated evidences of positive relationship between timing of firs t and second births as well as level of accessible income to a woman in Addis Ababa. Fertility transition in the city tends to mainly occur in response to poverty exacerbated by economic crisis in the country over a longer period of time. The difficulty of providing children with basic necessities not luxury items is the driving force behind fertility decline in the city. Findings are in line with predictions of evolutionary theory that human behavior is adaptive to the ecology in which they are living. Economically better-off women had shorter birth interval while those under economic stress tend to elongate timing of their first and second

births. This is basically a great challenge to the general conclusion set in demographic transition theory that states that fertility decline is only possible in response to development forces. Had tremendous development efforts such as industrialization and transformation of socio-economic conditions are required to on set fertility transition, fertility decline in African and some of the Asian countries would have not been possible at all (Lockwood, 1995, Orubuloye, 1995). In the context of Addis Ababa, fertility has generally declined due to factors associated with poverty particularly increased cost of marriage, child schooling, lack of state welfare or weakening of the kin support system, attitudinal changes towards quality rather than quantity of children, as well as frustration and pessimism about future life. Concern about investment on children's education is prominently reported as the major deterring factor to have as many children as they wish having. Poverty is really playing significant role in reducing fertility both through delaying timing of marriage and postponing timing of first as well as second births even after getting married. Women who do not have access to better income are observed quitting the marital relationship (see Chapter V) in addition to postponing timing of births. Spacing between births is a strategy serving dual purposes: buying more time to acquire resources to bring up a child(ren) and reducing familial commitment and burden to abandon the marriage.

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