POSITIVE EXTERNALITIES TO INVESTMENTS IN EDUCATION: THE CASE OF FERTITLITY AND CONTRACEPTIVE USE

Daniel Assefa[*]

Abstract

Despite the fact that there has been a growing recognition of the role of education in economic growth, studies on the channels of effect are minimal. There are a number of positive externalities associated with investments in education. This study argues that education has a positive externality on economic growth through its reduction effect of human fertility. The study employs descriptive and econometric analyses to show that in general education has an increasing effect on the use of contraceptives and a reducing effect on fertility. However, the level of schooling for this type of relation is far beyond what is advocated for primary education. While it was found that women's education was more important than their male counterparts in exerting such effects, most of the fertility reducing effect of education did come through delaying age at marriage.

1. INTRODUCTION

The literature on the economics of education traces the recognition of the role of education in development to the days of Plato, from his statement on education's role of producing "reasonable men". The trace continues to Adam Smith, classical and neo-classical traditions until Alfred Marshal who emphasized, "The most valuable of all capital is that invested in human beings." Other authors associate the 1960's with the birth of the economics of education by referring to the pioneering works of Schultz (1961), Denison (1963), Becker (1964) and others.

Individuals/parents, firms and governments invest resources in educational development with various motivations. The rationale behind such investments lies in the multifaceted benefits of education. If we concentrate on looking at where the benefits of education go, there are internal and external uses of investments in education. The internal uses of education refer to those benefits that accrue to the

holder. The external uses refer to benefits that go to the neighbouring and distant beneficiaries from the education of the holder.

Seen from another angle, we can identify three types of uses of education. Firstly, education is consumption good. Like any other consumption good, education gives its holder a direct utility such as social power, psychic satisfaction, etc. Secondly, education can serve as an investment spending which brings productive returns, which are impossible or difficult to acquire without some level of education. The human capital, the screening and credentialism theories of education economics have the investment role of education as their background. Thirdly, education is a public good. It shares the characteristics of public goods such as non-excludability and non-rivalry.

These multifaceted uses of education partly explain the reason why education has captured the attention of those engaged in development studies in the last few decades. Nevertheless, in most studies the focus of analysis of the impacts of education has been on rate of return calculations, which refer to earning differentials, associated with various levels of education of individuals. It was rate of return approach that took much of the attention of economists in the 1960's. Later, with the rise of convergence and growth accounting theories researchers have tried to study the relationship between stock of knowledge-education and level of economic growth of countries. Though interesting findings were made in those studies, in most of the cases the channels in which education affected economic growth has not been discussed very well.

There are a number of ways in which education can potentially affect economic growth. For instance, education can raise both allocative and productive efficiency of workers through specific or general skills acquired. It can also improve the individual's health and hence work hours. Education can raise contraception use and lower fertility to allow women more time for work and improve their health status and even the nutrition and health condition of their children, ultimately raising productivity. It can also raise good governance both at micro and macro levels, ultimately affecting economic growth. Hence, the question as to how education affects economic growth needs to be answered. The answer will give insights into possible roles of education as an instrument in addressing specific developmental problems.

One possible way of addressing such problems is to single out and study the impact of education on intermediate factors in the relationship between education and economic growth, such as fertility, health, nutrition, governance, etc. Within this tradition, this study particularly looks at the impact of women's education on contraceptive use and fertility. The study also tries to shed some light on the channels in which education affects fertility and contraceptive use in a typical urban area of a developing country. In addition the study has made it a complementary objective to show the relative strength of women's education over their male counterparts in

affecting the variables of concern.

Data Source and Research Methodology

The data used in the study is basically a primary one. Secondary sources have also been used to complement the primary survey data. The major secondary sources used include: various publications of the Central Statistics Authority (Fertility Survey of Urban Addis Ababa 1995, Report on the 1998 Health and Nutrition Survey, the 1994 Population and Housing Census of Ethiopia: result for Addis Ababa Analytical Report), publications of the Ministry of Health (Health and Health Related Indicators 1990 and 1991) and the publications of the Ministry of Education (Annual Educational Statistics).

For the acquisition of primary information a comprehensive women's questionnaire was designed incorporating socio-economic background variables and knowledge, attitude and practice variables with regards to reproductive health issues. The socio-economic background information includes religion, ethnic group, age, marital status, education, occupation, income and wealth proxies (ownership of consumer durables such as vehicle, refrigerator, video cassette recorder, materials used in the make of the house) of the respondent and the spouse as appropriate. The questions on fertility and contraception included number of children born to each woman, desired family size, desire for additional child, number of children died, knowledge and use or non-use of specific contraception methods and facilities, reasons for non-use of contraceptives and intent to use. The data were collected in two urban areas, namely, Addis Ababa and Debre Berhan.

An a priori decision was made to work on four Woredas in Addis Ababa which were chosen using systematic random sampling method. Out of the 28 Woredas in Addis, Woredas 4, 11, 18 and 25 were chosen after selecting the number four from the random table and the rest based on a sampling width of seven. Then from each Woreda, four Kebeles were selected using geographic stratified random sampling. Finally, a total of 600 women aged 15-49 were selected and interviewed from all the Kebeles. Each Woreda and Kebele was sampled with slight proportionate differences in population size. Regarding Debre Berhan, out of the total nine Kebeles five were chosen using stratified random sampling method making a sample of 500 women of reproductive age group. Hence, the total size of the sample for the two places makes up 1,100 women of reproductive age.

After recruiting 12 female enumerators aged 25-35 years who had at least high school education, a one-day training was given to them and their area supervisors on the objective and nature of the questions to help them get acquainted with the questionnaire. Then a test survey was conducted with the above-discussed objectives and to check if there were any pitfalls on the question set. The test survey covered 50 women from each site. Based on the feedback collected from the overall

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process of conducting the test survey slight modifications were made to the question set.

2. CONCEPTUAL AND EMPIRICAL FRAMEWORK OF ANALYSIS

The main task of this study is to see the impacts of women's education on selected variables of reproductive health. Reproductive Health refers to a wide range of health variables like Knowledge, Attitude and Practice of Fertility, Family Planning, HIV/Aids and other Sexually Transmitted Diseases, Maternal and Child Health Care Services.

The specific variables selected in this study are fertility and contraceptive use of women. Various approaches have been used in similar studies to meet related objectives. The conceptual and empirical framework for fertility and contraception used in this study is the one adopted from the approaches followed by Ainsworth, Beegle, and Andrew (1996). Slight modifications have been made on it making use of other approaches in similar studies as well. The following part discuses the conceptual framework and then the techniques used in constructing the empirical framework.

The Fertility Model

Ainsworth et.al (1996) have found four major channels in which women's schooling affects fertility. First, by raising the opportunity cost of women's time in rearing children, schooling raises the "price" of children (who are time intensive) as well as the wage that women can earn in the work force. The wage benefits of schooling may also induce women to get more schooling, thereby delaying the chance of child bearing. Second, women with more schooling may develop higher aspirations for their own children's schooling. These desires may lead them to focus more on the quality than the "quantity" of children. Thirdly, women with more schooling are likely to be more effective in producing healthy children, which lowers child mortality. As the probability of death of a child declines, couples find that they can have fewer children to reach a target number of surviving children. Schultz (1994) found that fully half of the effect of female schooling in lowering fertility was operating through its effect in lowering child mortality. Fourth, educated women can learn about and use contraceptives more effectively than uneducated women, reducing the number of unwanted pregnancies.

On the other side, there are arguments that indicate that female schooling can indirectly raise fertility by improving maternal health, reducing pathological sterility, and reducing the duration of breast-feeding and its contraceptive benefits. Female education can also facilitate fertility decline by increasing the bargaining power of

women, allowing them greater control over their destiny.

Ruseett quoted in Ainsworth *et al.* (1996) approach the issue in two ways. The first is the "new home economics." This approach treats the child both as a product (investment) and as consumer good. Fertility is the result of rational economic choice within the household. In this view, children are seen as goods both intrinsically and for economic benefits they bring. These benefits occur when children are old enough to begin to work. Since children are "goods", the demand for them ought to increase as parents' ability to pay for them increases. Since high-income families tend to have better-educated wives, the opportunity cost of bearing and caring for children increases with income.

Educated women also tend to marry at older age; on simple biological grounds, we should expect them to bear fewer children. The model of fertility determinants regresses measures of cumulative fertility on a set of independent socio-economic and exogenous factors that are assumed to be exogenous to fertility decisions but that influence either the demand for or supply of children.

It has been common to consider a sub-sample of women with a specific marital status, especially those who are ever married either to analyse determinants of fertility or to see education's impact. This kind of analysis has a serious problem of selectivity bias in that it ignores education's impact of delaying marriage and considering women with a relatively higher chance or risk of pregnancy. In counties like Ethiopia where it is very common to see child bearing to occur predominantly in wedlock, the bias of such approach is very high. In contrast, this study has adopted the approach of considering all the sampled women irrespective of their marital status. However, the easier to estimate technique of OLS would not be appropriate for such models in that censorship[1] problem would prevail. The common way out of such problems is the use of Tobit models. Hence, a standard Tobit Model will be used for estimation. We will also be using separate regressions to the two sub samples of women as appropriate.

The variables incorporated in the estimated model are listed below.

$$FER = f(CONST, AGE, AGE^2, REL, ETH, EMP, WLTH, INC, MAR, EDU, EDUH)^{[2]}$$

CONST = Constant

AGE = Age of the woman in completed years

AGE2 = Age of the women in quadratic form to capture the effects of

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[1] The censorship is that significant proportions of women are never married and hence most probably have never given birth such that a good number of zeros will be observed in the dependent variable. In such a situation the use of OLS will be biased and inconsistent "Censored" is different from "truncated" regressions in that in the case of the later both the explanatory and dependent variables will not be observed

[2] The signs under the specific variables show the expected direction of relationship

biological factors affecting the supply of births

REL = Religious affiliation of the woman
ETH = Ethnic group of the woman
EMP = Employment status of the woman
WLTH = Wealth proxied by levels of ownership of consumer durables and the make of the house
INC = Income
MAR = Marital Status
EDU = Education of the woman taken in various specification
EDUH = Education of the husband in completed years of schooling

The Contraceptive Use Model

The Contraceptive use model is a binary choice model that has a dichotomous as its dependent variable in which the base or the reference value is taken as non-use of contraception.

The functional expression can be stated as follows:

$$CONd = f(REL, ETH, SRVG, MAR, EDU, EDUH, REGd)$$

SRVG = Number of surviving children
REGd = Region dummy

3. LITERATURE REVIEW

Theoretical Literature

Fertility

Discussing the multifaceted nature of education Teresa (1994) identifies three key dimensions of education and subsequently explores their potential implication for fertility behaviour. Education, as a "source" of knowledge, imparts literacy skills, enables people to process a wide range of information and stimulates cognitive changes that shape an individual's interaction with the surrounding world. Education, as a "vehicle" of socio-economic advancement, opens up economic opportunities and social mobility. Education, as a "transformer" of attitudes, can, for example, lead to crucial transformations in aspirations and eventually to questioning traditional beliefs and authority structures. Participation in school may bolster a girl's self-esteem, feeling of effectiveness and sense of control over her destiny, despite a home environment and society that foster compliance with subordinate role. It proceeds to

exhibit potential paths of influence of education on women's reproductive desires and behaviour.

Schooling increases reliance on scientific explanations to make sense of the world, inspires wider perspectives, and provides greater awareness of alternative life styles. The school experience not only enhances women's informed fertility choices, but also provides them with greater competence to interact with various complex institutions, maximizing their ability to benefit from a range of services including family planning.

Education is negatively associated with fertility partly because of its linkage to social status and economic success. Education is linked to wealth and hence to the ability to 'afford" more children. Higher consumption goals and higher educational aspirations for children usually lead to the decision to have a small family, in order to allocate more resources to each child. Education enhances women's opportunities to pursue wage-earning activities; this is likely to require some tradeoffs concerning domestic and childbearing roles.

The recognition of reproductive behaviours normatively bounded and the increasing awareness of the role of ideatoral factors in fertility processes have led to a growing interest in examining education as a catalyst of normative change. Education also influences a sense of trust in science and technology, which is indispensable for the use of modern contraception. Le Vine has shown that education changes the perceptions of mothers regarding the amount of personal attention required by young children. Thus, by redefining the maternal role as more time intensive, education can act as an important deterrent to high fertility.

Generally speaking, schooling as a social institution provides theoretical and practical knowledge, credentials for employment, an expanded social network, and socialization in modern values. The cognitive, economic and attitudinal assets acquired during the "formative" period will shape women's reproductive decisions later in their lives. Some linkages are direct and explicit. Literacy, for example, conditions access to information, and, thus, it is clearly instrumental for informed fertility choices. Also by enhancing the access to a satisfying and financially rewarding job, education raises the opportunity costs of children. The connection between attitudinal change and fertility is more subtle and requires explanations that are more psychological; however, it is equally crucial. A shift away from "fatalistic" acceptance of reproductive outcomes is essential for creating a willingness to plan fertility and a pedagogical nurturing style, for placing a limit on the number of children that can be satisfactorily brought up, and a more balanced power distribution within the family provides women with true control over choices in reproduction.

Therefore, in summary, according to Teresa quoted in Ainsworth et al. (1996), educational assets can be grouped as:

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Knowledge

>Exposure to mass media
>Awareness of source of modern contraception
>Correct understanding of the ovulatory cycle

Socio-economic position

>Husband's education
>Urban/rural residence
>Household appliances

Attitudes

>Degree of "fatalism" measured by reluctance to use contraception when no additional birth is wanted
>Degree of "control" over reproductive process, measured by parity at first of use of contraception

In a study to look at the impact of women's education on fertility in India (UN 1993) four types/groups of variables were hypothesized as to how women's education affected fertility: Supply of births, demand for children, fertility regulation and its costs. The extent of regulation is determined by motivation for fertility regulation defined as the difference between the supply of and the demand for children, and costs of regulation. The costs of regulation include attitudes of others and self-method and source awareness, and inter spousal communication.

The supply side factors are mainly biological capability factors, like age at marriage, breast-feeding, postpartum amenorrhoea, postpartum abstinence, birth intervals and child mortality.

The demand side factors conjunctured are preference for sons, support by sons in childhood, support by daughters in childhood, expected support by sons in the future, costs of children, economic self-reliance and desired family size. Costs of regulation include attitude of others and self, method of awareness and inter spousal communication. The fertility regulation variable includes contraceptive prevalence and duration of use. By making use of the above division, three levels of effects were identified. Firstly, effect of education on intervening variables; secondly, effect of intervening variable on fertility; thirdly, effect of education on fertility through intervening variable.

An implicit assumption in such conceptualisation is the relationship between women's education and their status. For instance, the association with current work status and

with women's role in domestic decision making is of great importance. In the household, depending on the nature of the society, age and education play greater roles in levels of autonomy on decision-making. More generally education is related to social-economic status, and mass media exposure.

The argument commonly advanced with respect to women's education suggests that it is linked with three major changes in their orientation towards children. First, education shifts women's priorities away from large numbers of sons for labour provision as children and economic and residential support as adults towards a concern for higher "quality", that is better-educated and more costly children. Secondly, better-educated women are more capable of tending for themselves economically, relying on their own savings and income for economic security in emergencies and old age. Thirdly, the need for sons to legitimise a woman's position in her husband's home diminishes, since women who are more educated can derive prestige from non-domestic sources.

Contraception

According to Ainsworth et al. (1996) contraceptive use is directly related to the demand for children. Therefore, all factors leading educated women to have fewer children should result in a positive relation between education and contraceptive use. Educated women have information about the availability, correct use, side effects, and costs and so on, which makes them likely to use contraceptives. In addition, the possibility that education can be correlated to income implies that in cases where contraceptives are not available for lower prices, educated women have an advantage of affordability over the non-educated ones. This is not to say that only woman's education matters in proxying the household income. It also assumes that educated women on average marry either educated or better off business owner husbands, which implies high income. Educated women can also be assumed more effective users of contraceptives than their non-educated counterparts.

Empirical Literature

Fertility

The above stated study by Ainsworth et al. used a household demographic survey conducted in fourteen Sub-Saharan African countries. First identified the four channels it posited women's schooling affected fertility as wage effects, higher demand for child schooling, lower child mortality and a more effective use of contraception. It suggested that female schooling could indirectly raise fertility by improving maternal health, reducing pathological sterility and reducing the duration of breast-feeding and its contraceptive benefits. Female education is also thought to facilitate fertility decline by increasing the bargaining power of women, allowing them greater control over their destiny and improving husband wife communication.

The OLS regression results predicated that the relation between female schooling and fertility was non-linear. When a quadratic specification of female schooling (schooling and schooling squared) was used, it was found that at low levels of schooling the relation between female schooling and fertility was weak or non-existent, but that with the completion of primary schooling the relation was clearly negative. This makes sense, since it is obvious that full primary schooling could result in basic literacy and numeracy or could substantially alter the opportunity costs of women's time. In the linear specification, the number of years of female schooling was significant and negatively related to cumulative fertility. In level of schooling, specification of lower primary schooling (one to three years) was related to cumulative fertility in twelve countries and has a positive relation in two. In half of the countries women in the samples with four to six years of schooling had from 0.2 to 0.4 fewer children ever born, compared to women with no schooling, and in the other half there was no relationship. On average controlling for covariates, women in the samples with seven to ten years of schooling had from 0.2 to 0.7 fewer children ever born and women with eleven years of schooling or more had 0.8 to 1.8 fewer children ever born, compared with women with no schooling.

Commenting on the non-linear relationship and the absence of any kind of relationship between female schooling and cumulative fertility, the authors gave several reasons. A positive relation would imply that even one year of primary schooling is sufficient to induce a quite large change in behaviours and that indirectly affects fertility. Another explanation was that the small group of women who completed only a few years of schooling are those who become pregnant, whose families wanted them to get married, or who simply could not keep up and therefore stopped their schooling. The absence of any kind of relationship was explained as a possible effect of exclusion of variables like household income. Because if incomes rise, parents want more children; holding wages and other prices constant, higher incomes should be associated with higher fertility. If there is a strong association between schooled women and higher incomes, and if income is not properly controlled for, then the schooling coefficient on women's schooling underestimates the negative relation with fertility. On the other hand, the authors found that there was strong negative association between women's higher secondary schooling and cumulative fertility.

Another study on the impacts of women's education on fertility in India (UN 1993) developed a model in which education affects fertility directly and through intermediary factors. Fertility was taken as the number of children ever born to every respondent; i.e., the number of live births she has had. Then the relevant socio-economic, cultural and demographic explanatory variables were taken. To see the direct effect of education on fertility, mean number of children ever born by level of education and age group/cohort was studied. The average woman aged 15 – 49 had 3.1 births. Women with primary education had born about as many children as uneducated women, 3.4 and 3.3 births, respectively. It was only among women with

middle school education that a significant down turn in fertility was observed, an effect that becomes more prominent among women who had secondary or higher schooling (2.4 and 1.9 births respectively). In addition, there was a distinct age–specific pattern in the relationship with education. Among young women, the relationship was nearly flat, and the differential between uneducated women and those with secondary school education is only 0.6 births. This shifted to a moderate inverse relationship among older women, where the corresponding differential is over one birth.

Based on their hypothesis that female education affects the number of children a woman is capable of having through a variety of inadvertent intervening factors, inadvertent in that they are not undertaken for controlling fertility, they identified supply side factors. These supply side factors include age at marriage and duration of marriage; the duration of breast-feeding; postpartum amenorrhoea and abstinence (following the birth of the last child); the duration of natural first and second birth intervals; and the extent of child mortality.

They found that women's education had the most powerful effect on age at marriage for both cohorts. The extent of infant and child mortality and such natural fertility factors as the duration of breast-feeding and postpartum amenorrhoea and the length of natural birth intervals were less influenced by education. In addition, while its effect through child survival is to reduce fertility intents, through these other natural fertility factors, its effect is to increase fertility. So, education was shown to have affected the supply of births both positively and negatively. The positive effects worked through shorter duration of breast-feeding, postpartum amenorrhoea and birth intervals while the negative effects worked through delayed age of marriage and better child survival. On balance, however, the fertility enhancing effects of education were not as strong as the fertility reducing. The family size preferences of younger women were somewhat lower than those of older women (3.2 compared to 3.6 children). This is attributable to lower family size desires among young women with no education or only a primary school education, rather than uniform differential at all educational levels.

The available evidence for the developing world indicates that the fertility enhancing effects of education are strong in societies that are in the early stages of the fertility transition but, as the process continues, those effects are gradually overtaken by the fertility reducing effects, which are characteristics of modern societies. For example, an analysis of the relationship between education and fertility in over 30 developing countries concluded that the more developed of those countries often revealed a negative association, where as the less developed countries were likely to exhibit a curvilinear or positive association (UN 1992). There is also evidence from India that the pattern of the relationship between education and fertility is dynamic over the course of fertility transition. Sometimes at an early stage, it becomes ambiguous or positive. Due to the involvement of social and economic factors in the relationship,

one has to consider the specific socio-economic and demographic context of an area before drawing conclusions on the direction and magnitude of the relationship that can prevail between education and fertility.

Contraceptive Use

Ainsworth *et al.* (1996) tested the relationship between education and modern contraceptive use in fourteen Sub-Saharan African countries where demographic and health surveys were conducted. Female schooling was found to greatly raise the likelihood of contraceptive use even among women with primary schooling only. However, the relationship was non-linear. Women with higher levels of schooling were increasingly more likely to use contraceptives. An important finding was that often the marginal relationship between an additional year of female schooling and contraceptive use is greatest at the primary schooling level. Again, understanding why this was observed in some countries and not others, and the relation of these results to the availability of contraception, could lead to new policy insights.

The relative impact of male and female schooling was also tested. The result was that husband's schooling is associated with higher contraceptive use in only half of the fourteen countries. In cases where men's schooling was statistically significant, it generally exerted a smaller influence than female schooling.

An Egyptian case study Hill *et al.* (1990) using the Egyptian Fertility Survey tested for the relationship in urban Egypt, rural Egypt and total Egypt by adding on the relevant specific background socio-economic variables. The estimation technique they used was two-stage least squares. After running the regressions and complementing them with the appropriate descriptive statistics some conclusions were drawn. A positive income or wealth effect (which can be correlated with education level in urban areas and with land in rural area) represented a positive correlation with fertility. Husband's education emerged as a significant variable in determining his desired family size and should negatively affect in rural areas, whereas in urban Egypt his wife's education was significant and negatively related to his desired family size. The analysis detecting number of contraceptives known suggests that a major channel through which husband education affected fertility was contraceptive knowledge.

The spouse's knowledge of contraception proved to be the most important variable in determining family size. The study suggests that the expansion of IEC (Information, Education and Communication) Programme focusing on husbands raises contraceptive use. Discussing the underpinnings of this knowledge of contraceptives, the authors argue that economic development as reflected by the education of husband and wife, their educational aspirations for their daughters, and wife's age at marriage affect fertility. These factors were particularly important when the number of contraceptive methods known is omitted from the regression equations. Thus economic development (by which they practically meant educational development,

because it is the major factor that raises parents, aspiration of their children's education, that increases income level, that delays women's age at marriage) was concluded to be essential for reducing family size (fertility) by raising the knowledge of contraceptive use.

In relation to the literature on Ethiopia, Gebreselassie (1996) used data drawn from a household sample survey of 55 urban centres in Ethiopia, undertaken by the Ministry of Labour and Social Affairs to study the adolescent fertility and employment status of urban youth in 1990. The urban centres considered were Addis Ababa, Dire Dawa, Jimma, Bahirdar and Harar. Most of the youth in the survey were reported to have some knowledge of contraceptive use. The most widely (90%) known contraceptive method among sexually active male respondents was condom, while pill was the most widely known (87%) among females. There was a wide discrepancy between knowledge and the actual use of contraception. The survey revealed that 37% of the employed youth were users compared to 24.9% of the unemployed and 17% of the students. It was also reported that 23% of the users said that their parents attained high education while 48% said their parents attained low education. Regarding their level of education 4.9%, 13.1% and 82% of the users were with no, low and high education, respectively.

The author concludes that the findings of the study suggested that knowledge and actual use of contraceptives are related to education, directly or through employment status variables. The logit regression analysis gave results that educational level of the respondents shows the contrasting patterns, in terms of probability of contraceptive use among better educated and less educated youths. Youths with high level of education (54%) are more likely to use contraceptives than those with no education (47%).

The problem with such statistical approach is that the statistics do not provide us with sufficient information on the separate effects of the variables involved in determining the use or non-use of contraceptives. For instance, it was reported that educational level and employment status were among the factors that brought difference between the use and non-use of contraceptives. However, the channel in which employment affected the decision was not separated.

Dilnesaw (1995) argues that as a woman who does not know about contraception is not expected to use any type of contraceptive method, the level of awareness of contraception and the sources of where one can obtain them are essential preconditions for contraceptive use. In addition, in the survey conducted in the town of Nazareth with this idea, it was observed that 93.5 per cent of the total women have heard of at least one method. The most widely known method was pill (93 per cent) followed by condom (70 per cent) and Rhythm Method (72.1 per cent). Out of the total women who had knowledge of at least one method of contraception, 53.1 per cent had heard from a government health centre, followed by friends and the Radio.

The majority were able to identify the sources where modern contraceptive method could be obtained.

Concerning self and husband's attitude, 54 per cent of the women approved of the use of contraception while 16 per cent had unfavourable attitude towards such practice. Less than half of the sampled women reported that either their husbands disapprove of the practice of contraception, or they were not sure about their husband's attitude.

Overall, 32 per cent of the women reported that they had communications with their husbands very often, 20.9 per cent said sometimes and 46.3 per cent said never at all. Among the currently married women of reproductive age interviewed, 44-5 per cent reported to have ever used contraceptive method. The remaining 55.5 per cent had never used any form of contraception. The study also tried to look at use and non-use of contraceptives against such socio-economic variables as education, occupation, income, ethnicity, religion, childhood residence, husband's education and husband's occupation. With regard to education, it was observed that among the illiterates 8.1 per cent had never used, contraceptives.. Among the various education groups, the group with higher proportion of users over the non-users was the secondary and tertiary level (79.2 per cent). The implication for conclusion is that keeping all other factors aside, the non-use of contraceptives declines significantly as one goes from the illiterate group to the primary and to junior secondary and most significantly to the secondary and tertiary level. This kind of analysis is never reliable, for there is a potential problem of endogeniety. Education can mean anything like social or economic status on the one hand, and development of affirmative action on the other.

Even if the order is the same for husband's education, the size pattern of decline is different; for instance, as we go from the illiterate to the primary education level, the size of the non-users goes from 81.7 per cent to 78.2 per cent; from junior to senior and tertiary (57.6 to 33.9); while the case with women's education was 80.1 per cent to 55.2 per cent and 45.1 per cent to 20.8 per cent respectively.

On the other hand, in the running of a multivariate analysis two sets of variables were used for a logistic estimation. The first group was demographic variables and the second was family planning service accessibility and attitudinal variables. Among the first group of variables, age and fertility intentions of women (desire for more children) were the two important factors that emerged from the multivariate analysis in affecting contraceptive use. Ever use of contraceptives among women in the middle age group (25-34) was found to be statistically different from the younger age group and the relationship was highly significant. The multivariate estimate showed that women in the middle age group have the odds of contraceptive use that are 2.5 times higher than younger age group, other factors held constant. The estimates of the coefficients for women belonging to the age group of 35 to 49 also show increased

likelihood of contraception use among older women. It was also mentioned that the findings of relatively higher ever use of contraception for middle age women than the younger women may be attributed to the fact that the former either have achieved or are on the verge of achieving their desired family size. On the contrary, the latter are still in the early stage of their life and have not yet achieved their desired family size. The decreased chance of contraceptive use in the age group 35 - 39 as compared to the middle age group might be because the older women are likely to have traditional outlook towards modern contraceptives and some may feel that they are infecund as a result they will be more reluctant to use contraceptive methods.

There was positive and significant association between women's education and contraceptive use. Education increases knowledge about contraceptive methods and family planning outlets, and brings about favourable attitudinal changes towards contraceptive use. Educated women have better exposure to modern ideas and family planning information and are more likely to accept the idea of small family size than illiterate women are. Concerning income, no level of income was significant at all. Husband's occupation had statistically significant impact on contraceptive use. Women whose husbands belong to professional and administrative occupation were found to have higher ever use of contraception, and the result was statistically significant. Women's ethnic and religious affiliations were found to be unrelated to their contraceptive behaviour. Among the women in different ethnic groups the variation in ever use of contraception was quite small.

Another study was by Daniel Sahileyesus (1995) on the determinants of contraceptive non-use and unmet need among married women in urban Ethiopia (Addis Ababa).The data set used in this study is the one for the fertility survey of Addis Ababa 1991. Contraceptives knowledge seems universal among all as well as currently married women. 93 per cent and 93.6 per cent of all and currently married women respectively can name at least a method of family planning either spontaneously or after being probed. In spite of the high level of awareness, a very low level of family planning use was observed. Of all the women surveyed 27.3 per cent had ever used, while only 15.5 per cent were current users of contraception. Among the currently married women, 24.2 per cent were practicing family planning method. The highest percentage of current users (56.5 per cent) belong to the 25-34 age group. Most of the currently married current users had primary level of education (53.1 per cent) followed by those with junior secondary education (40.1 per cent). Among the current users 55 per cent were not currently employed.

Regarding intent, among the never users three quarter responded that they have no plan to use family planning in the future. The currently married non-users who did not indicate any intention to use family planning in the future constitute 44 per cent of all currently married women. In terms of educational background 89.3 per cent of the illiterate responded that they had no intention while 75.0 per cent were reported to have no intention among those with primary education. Among the secondary and

tertiary level group, 37 per cent and 6 per cent responded no intention respectively. The conclusion was that both for ever-use and intent to use education played a strong determining role for raising contraception level. Regarding reasons for non-use among never users, 35 per cent mentioned fatalist reason followed by other reasons, which can possibly mean infrequent sex and the like (19 per cent) and fear of side effects (13.4 per cent). Total unmet need as well as unmet need for limiting and spacing is greater among women with primary level of education.

Thus, the implication the unmet need is highest among women with low level of education. Almost three quarters of the unmet need was observed among women with a primary level of education and unmet need declined as education level of women improved. To estimate the effects of different demographic and socio-economic varieties on a women contraceptive non-use a logistic regression model was used. The model defined loses of contraceptive non-use and unmet need for currently married women along with different demographic and socio-economic characteristics. The major independent variables included were number of surviving children and preferred family size, age, education, childhood residence, employment status and region. Age was segmented into three broad groups, and the 15-24 group was used as reference group. Similarly, for education, the non-educated group was a reference, rural for childhood residence, not working for employment, or orthodox and protestant Christians combined for religion.

The logistic' regression shows that there is a negative relationship between age and women's contraceptive use. The relation was said slightly significant at 5% level for the 35-49 age group and non-significant for 25-34 age group. The odds of a woman's contraceptive non-use in the 35-49 age group is 0.6573 times lower compared to the youngest age group of 15-24. As the age of women increased, they tend to use contraceptives or contraceptive non-use is relatively higher in the younger age groups.

The number of children surviving has negative relationship with contraceptive non-use and it is highly significant at P<0.001 level. . That is, an increase of surviving children reduces the log odds of being a contraceptive non-user by a factor 0.1518. Thus as women have more surviving children they tend to switch to the status of contraceptive user. An increase in the family size preference of women increases the odds of contraceptive non-use by 1.0447 times than the odds of contraceptive use. This means women with larger ideal family size want to stay in . the class of contraceptive non-users.

Surprisingly, the study did not give any comment on the education variable except displaying the regression result table. However, in the table, even if nothing was mentioned about significance, one can see that while primary and tertiary education exhibited a negative relationship, junior secondary schooling was positive. It is plausible to presume that nothing was mentioned on this variable because it was not

significant at the given level of significance. The employment dummy as well shows a negative relationship.

In general, in the literature there is consensus on the effects education brings on contraceptive use. However, there is a gap of knowledge especially in the Addis Ababa case in separately accounting for the factors involved in determining contraceptive use.

4. DESCRIPTIVE STATISTICS

Socio-economic Background

Religion

The four dominant religious groups in the overall sample are Orthodox, Muslim, Protestant and others (Catholic, other Christians, non-believers) with percentages 86, 7, 6.2, and 0.5 respectively. In terms of cites, there is only a slight difference in the percentage figures, otherwise the order of dominance is just the same in both Addis Ababa and Debre Berhan.

Table 1: Description of the Sample by Religious Affiliation	
Religion	%
Orthodox	85.1
Muslim	7.4
Protestant	6.1
Others	1.4
Total	100.00

Ethnic Groups

Amhara, Oromo, Guragie, Tigre and the others constitute 70%, 11%, 10%, 5% and 4% of the overall sample. The dominant ethnic groups in Addis Ababa were found to be Amhara (56%), Oromo (16.4%), Guragie (16.3%), Tigrie (6.4%) and others (4.6%). The case in Debre Berhan is that Amhara (85%), Oromo (3.6%), Tigre (3.2%), Guragie (2.5%) and others (2.0%).

Marital Status

Only four types of marital status groups were considered in this survey; namely,

single or never married, currently married, divorced and widowed. The currently married group includes all types of "living together" from the informal to the formal (legal). From the overall sample, singles constituted 49% while currently married, divorced and widowed were 43%, 7% and 1% respectively. The proportion order is quite the same in both Addis and Debre Berhan with the latter having a slightly higher percentage of singles over currently married.

Table 2: Description of the Sample by Marital Status

Martial Status	%
Single	52.5
Currently Married	31.5
Divorced/Widowed	8.7
Total	100.00

Current Age, Age at Marriage, Age at First Birth

The effort to collect information on various age variables had helped in minimizing the common "age misreporting and understating" problems usually observed in such surveys.

Using the standard narrow age grouping of 15-24, 25-34, 35-49 we notice that the majority of the women fall in the first bracket (52%), followed by the second (29%) and the third (19%). The same order applies to the two cites except that the Debre Berhan sample has a slightly higher proportion of the younger cohort.

Table 3: Description of the sample by age group

Age Group	%
15-24	49.6
25-34	26.9
35-49	23.
Total	100.00

Concerning age at first marriage, as taken out of all those ever married, those who got married under 16 years of age were 29% in all the sample cases. The majority got married between 16-20 years of age in both places (45% for Addis and 49% for Debre Berhan). Those who got married between the ages 21 and 30 were 25% in Addis and 21% in Debre Berhan.

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Out of all the women who ever had live birth, the majority had their live birth at the age bracket 18-25 (64% for the overall sample, 63.4% for Addis and 66.5% for Debre Berhan) followed by the under 18 age group at first birth (Addis taking 25.9% then Debre Berhan 27.4%). At least Addis has 3% of all the women who have ever given birth at (or even after) the age of 30 years. Those who were between 26-30 at first birth constituted 7.5% in Addis and 6.1% in Debre Berhan.

Income and Wealth

The general assumption that education of the husband and even of the wife and their employment status tell the economic position of the individuals in the society may not work all the time. This depends on the society's view towards education, the size and behavior of the labour market and social structure. As a result, we chose to separately see education, income, wealth, and occupation. Among all those currently married in Addis Ababa, husbands in the category of Top Management constituted 9.5%, skilled/professional group were 50%, petty trade 15%, and unskilled 14%. The case in Debre Berhan is a little different. Husbands with unskilled job were 42.3%, those in the skilled/professional job were 36.6% and those in petty trade were 11%. Therefore, in the overall sample skilled/professional, unskilled and petty trade categories constitute 44%, 26% and 13.6% respectively.

Regarding the employment situation of women out of the overall sample 48.9% were currently working. Those currently working women cover 66.61% in Addis and 66.06% in Debre Berhan of all women of reproductive age group sampled.

Most studies in the area of fertility do not consider income due to the complexity associated with measuring it. There are three possible alternatives to capture the income variable. The first option is to take the household income as a whole and apply it to every qualifying woman in the household regardless of whether she is working or not. The second is to take the incomes of only those working and leave as zero income for the non-working ones. The third is to take expenditure per woman. The first approach is not plausible in that it overstates the economic status of the unemployed women but living with the employed ones or those living with their husbands and those that are not. The problem with the second one is that it understates the economic status of the currently unemployed women. Despite its difficulty, taking expenditure is the most plausible alternative.

In this survey, I followed an approach, which can be identified as an extension of the third alternative. I assumed that income is equal to expenditure and per capita income is equal to per capita expenditure. Therefore, in terms of per capita income the majority of the women in Debre Berhan (59.4%) have a per capita income of under Birr100.00 per month, followed by the monthly per capita income bracket of Br.101-300 (25%). In Addis the under Br 101 group is 32.5% followed by 101-300 group (35.1%) and the 301-700 group (20.6%).

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Six types of ownership of consumer durables were used to proxy wealth. Ownership of at least a car, refrigerator, VCR, TV set, Radio and none of all, taking on values from the highest to the lowest level of proxy respectively. In this regard, the majority of the sampled observations had Radio (53.6%), then at least VCR (19.4%) down to none (18%). In Addis those having Radio (45%), VCR and others (23%) and none (19%) are the major categories. The case in Debre Berhan is that Radio (64%), none (16.6%), then VCR (14%).

Fertility and Education

As can be seen from the table, among respondents who have never given birth those who completed secondary school constitute the major group (59-7 per cent) followed by the junior secondary (15.6) and the primary (13.9 per cent). Among the parity of 1-3. the majority fall in senior secondary group (14.9 per cent) followed by the primary (28.7 per cent).

Table 4: Description of Levels of Fertility by Corresponding Levels of Education

	Children Ever Born			
Education	0	1-3	4-6	Above 7
Never Attended	4.7	6.8	10.2	11.0
Non Formal	2.3	6.5	16.0	39.0
Primary	13.9	28.7	45.8	39.0
Jun. Secondary	15.0	12.6	10.0	4.9
Sen. Secondary	59.7	41.9	17.0	4.9
Tertiary	4.4	3.5	1.0	2.2
Total	100.00	100.00	100.00	100.00

The order changes when we go to the parity 4-6 in that the majority fall in the primary bracket (45.8 per cent), then the senior (17.0 per cent) and the non-formal group. This trend goes to pick in the above 7 children per woman group where we have the highest group of women in the primary and the non-formal groups equally (39 per cent). Before rushing to the conclusion that the higher the education level the lower the parity we should further look at the fertility cohort to see if this result is a reflection of a trend that older cohorts have lower education and hence higher fertility not because of the impacts of education but because of life cycle processes.

An equal number of women in both the younger and older age group (37.1 per cent) have never attended school. Among the senior secondary school group the younger cohort constitute the biggest size (66.4 per cent) from the older cohort (5.5 per cent).

Table 5: Description of Children Ever Born by Age Cohort

Age	Children Ever Born			
	0	1-3	4-6	Above 7
15-24	79.5	28.4	2.5	2.45
25-34	15.9	53.5	33.9	2.45
35-49	4.6	18.1	63.6	95.1
Total	100.00	100.00	100.00	100.00

Table 6: Description of Children Ever Born by Education and Age Cohort

Age	Education					
	Never Attended	Non Formal	Primary	Junior Secondary	Secondary	Tertiary
15-24	37.1	14.9	31.8	63.9	66.4	32.4
25-34	25.8	25.4	33.1	23.3	28.1	51.4
35-49	37.1	59.7	35.1	12.8	5.5	16.2
Total	100.00	100.00	100.00	100.00	100.00	100.00

Contraception

The majority of the women surveyed have heard of at least one type of contraception (90.5 per cent). Among those who heard about modern contraception, those who mentioned that they know pills and others dominate followed by condom, injectable and loop.

The main source of information was reported to have been government health centres. With the objective of identifying the relative effectiveness between electronic and print media, respondents were asked whether they got the information from electronic media (TV, Radio, etc.) or print media (pamphlets, posters, magazines, brochures, etc.). According to the survey results, next to clinics, electronic medium was the most powerful source of information on contraception methods in both Addis Ababa and Debre Berhan.

Out of all the women who reported to have known modern contraception, 34.5 per cent mentioned that they have used at least one type of contraception method. The percentage is lower for Addis (30.5 per cent) than Debre Berhan (37.1 per cent). Similarly, non-use is higher in Addis Ababa (69.5 per cent). The major five widely used contraception types were pills (42.5 per cent), injectable (27.9 per cent), condom (19.7 per cent), natural method (8.3 per cent) and loop (6.0 per cent) for the overall sample. The government health centres as in other studies have been shown to be the predominant source of supply of contraception (78 per cent for overall

sample, 73.5 per cent for Addis and 84.6 per cent for Debre Berhan). The private sources including clinics and pharmacies accounted for 82 per cent of the total supply whilst the NGO sector accounted for 0.9 per cent. The contribution of NGO sources in Debre Berhan is nil while it is 0.9 per cent for Addis Ababa.

Asked if they are getting it free or not, 82 per cent of all the users said they get it free. Those who are not getting contraception free are slightly higher in Addis (21.1 per cent) than in Debre Berhan. Those who are getting it free were further asked if they are willing to pay for the contraception they are currently using and 91.5 per cent reported willingness, which is an important determinant on the use or non-use of contraception followed, by partner's knowledge, spousal communication and approval or disapproval. Answering to a question of partner's knowledge of the current use of contraception by the woman, 94.6 per cent reported that partners know that the respondent is using contraception and 94.6 per cent said partners approved of the use of contraception.

On the other hand, among those women who reported non-use of contraception, the majority said their reason for non-use of contraception was no or infrequent sex (68 per cent), followed by "want children" (10.8 per cent), other reasons including "have reached menopause already" (8 per cent) and "health concerns" (7.1 per cent).

The current non-users were asked if they intend to use contraception in the future and 45 per cent said they would in the future, 37.8 per cent said they cannot intend to use and 17.8 per cent said they "can't tell now." Those who have intention to use were further asked when they will start to use; the majority said they have not decided (92.6 per cent), followed by "when I get married" (37.8 per cent). However, 6 per cent of the women have plans to start to use contraception after two years. Among the nonusers 85.7 per cent reported they never discuss about contraceptives with partners while out of those who discuss about contraceptive with partners, 20.7 per cent mentioned partner disapproves the use of contraception.

5. DISCUSSION ON REGRESSION RESULTS

Fertility

In the fertility Tobit regression, we have two equations. The first one has the variable education in linear forms where each year of completing school is considered. In the second equation education has entered the model by level rather than by year. The levels considered are primary, junior secondary, secondary and tertiary. They are all dummies. The reference category adopted while introducing these dummies is the "no education" and "non formal schooling" categories.

As expected, cumulative fertility, which was defined as the number of children ever born to each woman, rises by 0.35 for an additional year in the age of the woman. This is obvious in that women who have gone far in terms of their reproductive cycle year would on average have higher cumulative fertility. On the other hand the AGE 2 variable which was entered to appreciate the effect of declining biological capacity of the supply of births is significant and negatively related to fertility. Other than this, income was found to be very significant in positively affecting fertility while wealth was not significant at all. Most studies in this area do no include income as explanatory variable partly because current income will be weaker to explain a fertility decision made years back and at times education can serve as a proxy for income.

Table 7: Tobit Estimation Results for Fertility Model

	Equation (1)		Equation (2)	
	Coefficient	S.E	Coefficient	S.E
CONST.	-7.756	0.015	-7.899	0.934
AGE	0.352*	0.056	0.347*	0.056
AGE2	-0.002*	0.001	-0.002*	0.001
EDU	-0.133*	0.022		
EDUP			-0.086	0.277
EDUJ			-0.874*	0.346
EDUS			-1.275*	0.282
EDUt			-1.986*	0.555
INC	0.001*	0.000	0.001*	0.000
WLTH	-0.053	0.077	-0.055	0.777
MARc	2.596*	0.213	2.565*	0.213
REGd	-0.021	0.187	0.001	0.213
S.E (1)	2.250	0.076	1.567	0.000
S.E (1)			2.246	0.076
Obs	1,002		1,002	
P>dinz	0.000	0.000		
Loglikehihod	-1.220.350		-1,218.901	

* Significant at 5%.

An interesting result is that of the Marital Status dummy. The dummy takes a value of one if the woman is currently married and zero otherwise (meaning either single or widowed or divorced though the latter two groups have a very small share). Keeping all other things constant, being currently married increases the number of children born to a woman by almost three children. Not only the high significance and the fairly large coefficient of this variable but also the very fact that the size of women out of wedlock has been growing over the last few years, would lead us to look carefully the strength of being currently married in explaining, fertility differentials. In our sample, the mean age of woman at marriage is lower than the mean current age of single women. Out of all women who have ever given birth, only 3 per cent are in the

"never married" category and 9.4 per cent are in the "not currently married" category. In addition, the mean parity among the "single" but "ever given birth" category is only 1.9 per cent while if we widen the domain to all singles the parity would be a figure roughly equal to zero.

The preceding analysis gives us a clue as to why the dummy has a strong explanatory power on fertility. Social and economic factors dictating decision to get into conjugation can possibly account for the ultimate cause behind the strength of the marital status dummy.

The dummy variable for regions REGd is not significant either equations, meaning there is no appreciable difference in fertility weather a woman is in Addis or in Debre Berhan.

Coming to the variable of our major concern, education in its linear specification is negatively related to fertility. An additional year of schooling would result in a decline in fertility by 0.133. For the second specification, however, only the primary school level dummy is not a significant determinant of fertility while junior secondary, secondary and tertiary levels of education have a strong decreasing impact on fertility. In a third specification we introduced dummies for each level of schooling completed (after deciding on the no and one formal education to be the reference category). Dummies before grade eight did not show any significant relationship with education. However, the dummies depicting completed level of education beyond grade eight were playing a decreasing effect on fertility.

It is also interesting to note that the relationship between fertility and contraception use is significant and positive in general. However, when we restrict the estimation to women with parity of four and above, the relationship turns out to be negative and significant. A probable explanation to this kind of relationship is that it is the women who are potentially fecund and at the risk of pregnancy that use contraception and hence a positive correlation. However if the number of children per woman goes beyond four on average, women tend to use contraception to avoid pregnancy. In addition, this screens out those women who have never used contraception.

What we can say on the relationship between education and fertility is that education generally leads to a decline in fertility. The channels in which it affected fertility can be learnt from the strong correlation between education and marital status and age at marriage. As a passing note to see the relative strength of women's education over husbands', an effort of including EDUH was made. However, the regression was showing a misspecification problem. Not only was EDUH not significant; it also disturbed the other variables when it was entered into the estimated model.

The Contraceptive Use Model

The data was also used to test the relative importance of education in determining

contraceptive use. Three separate equations were estimated: one for linear specification of education, where the husband education (EDUH) variable is included; another one for level of education; and a third one where dummies for each year of education completed are used.

According to the estimation results using the first equation SRVG (Number of children surviving, MAR,(DUMMY) for being currently married or not)and EDU (education of the woman by linear specification) were found to be significant at 5 per cent level of significance.

As expected the coefficient for SRVG is negative implying that for an additional surviving child per woman, the probability of loss of odds ratio declines. The implication of this is that women who have lost children might avoid the use of contraception in order to compensate the loss of the child. This result is consistent with the finding in Daniel (1995). Another significant variable with a positive coefficient is MAR.

Whether a woman is currently married or not has a significant impact upon the use of contraceptives. The positive relationship implies that currently married women who are exposed to the risk of pregnancy are more likely to use contraceptives than those who are not currently married.

Regarding the variable of major concern in this study, which is education, we see that husbands' education has no significant impact in determining contraceptive use. Rather the woman's education was a very significant determinant. In a rural setting, it might not be difficult to get results where husband's education would be important in that he brings the idea of the use from somewhere else. However, in urban setting where the women are exposed to developed facilities it is not the knowledge or general understanding about contraception that determines the use, but rather it is the biological responsibility that dictates the use or non-use of contraception. As a result, we notice that woman education is a significant determinant on the use of contraceptives.

Taking the "no and non-formal" education category as a reference group, we introduced variables for primary, secondary and tertiary levels. Among this group, only secondary education proved to be significant at 5 per cent level of significance, while the primary and tertiary levels were significant only at 10 per cent level.

It is generally worthy of emphasizing the fact that education was a significant determinant at whatever level of education (despite the significance level of difference across educational levels). However, a further scrutinizing is required as to what brought the difference in the strength of the effect of education. It may be the case that a significant proportion of the currently married, especially those who are at the stage of completing their reproductive cycle, are mainly primary schoolers that they may not use contraception. With regards to the tertiary level one possible explanation

is that due to long years spent in schooling, women in that group get married late and so much so that by the time they get married, they have gone very far in terms of their reproductive cycle. Therefore, the strength of their likelihood of contraceptive use declines compared to the secondary schoolers.

Table 8: Logistic Estimation Results of Contraceptive Use Model

VARIABLE	Equation 1		Equation 2	
	COEF	ODDS RATIO	COEF	ODDS RATIO
CONST	-1.114		-0.952	-
REL	0.193	1.213	0.155	1.168
ETH	0.032	1.032	0.024	1.025
SRUG	-0.127*	0.880	-0.117*	0.889
MARc	0.758*	2.135	0.883*	2.418
EDU	0.089*	1.093		
EDUh	0.018	1.018		
EDUp			0.472**	1.603
EDUs			1.019*	2.770
EDUt			1.121**	3.069
REGd	-0.163	0.849	-0.271	0.763
No. of observations	427		459	
Prob > chiz=	0.0000		0.0000	
Log likelihood	-273.646		-296.394	

*significant at 5% level of significance
** Significant at 10% level of significance

In the third specification, where we used dummies for each year of schooling completed by the woman, grade one, grade four, grade six, grade nine, grade ten and grade twelve were the significant grades in determining the use of contraception. The most significant of all was grade twelve. The possible explanation for this result could be the fact that a significant number of the sampled women were twelve complete and grade twelve is customarily the major exit point for schooling and an entry to conjugal commitments. Another interesting result is that a significant number of women reported that their source of information for contraception was schooling and it is mainly at this level that they know about it.

6. CONCLUSION AND RECOMMENDATIONS

Conclusion

In this study, two major areas of reproductive health were considered; namely, fertility and contraceptive use. The choice of these two variables is made based on the expectation that these are the variables on which one of the strong effects of education operates.

In this study, fertility is defined as the number of children ever born to each woman of reproductive age (15-49 years). Education was posited to affect fertility directly and through a wide and efficient use of contraceptives. Demographic and socio-economic proximate determinants of fertility and contraceptive use were also identified.

A survey of the literature on the impact of education on fertility by and large showed that education negatively affects fertility in most cases. However, the relationship is highly volatile in that availability of family planning facilities, cultural make up and demographic composition frequently intervene.

Using the primary data collected for the purpose of this study in urban Addis and Debre Berhan education was shown to affect fertility directly and through intermediary factors. The direct effects were tested for various specifications for linear relationships for level and for each year of completed schooling. The linear specification has generally shown a significant effect while in the level specification, it was secondary and above secondary education which exhibited a significant decline in fertility. Similarly, it took a completion of at least grade eight schooling to bring in a decline in fertility.

Concerning the indirect effect, education was observed affecting fertility indirectly by raising contraceptive use and delaying age at marriage. We also showed that the marital status of women has the strongest impact on fertility. Cultural forces explain this more in that most of the fertility decisions are made within wedlock. Even then, education's role of delaying the decision to get married is also important.

Recommendations

Based on both the descriptive and empirical analysis employed in the previous sections and specifically based on those variables, which turned out to be significant in the study, the following recommendations are given.

First: As education in general proved to be an important determinant of fertility and contraceptive use, government decision on education investments should in general consider these benefits of education in addition to its other benefits. This should continue to be an important policy objective even in the long run as long as rapid population growth continues to be a challenge for economic growth.

Second: Despite the belief that led to the growing emphasis of government's education policy in favour of primary schooling, secondary education has been found to have the dominant impact upon contraceptive use over primary education. One of the factors operating behind this is that secondary schooling is the major source of knowledge of contraception and physiology to a large proportion of women. Hence, there has to be at least a widespread family planning programme for women only with

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primary schooling or a policy that encourages women to continue high school study should be in place.

Third: As currently married women were found to be higher users of contraception and having higher fertility, marital status continues to be a major source of fertility. Therefore, studies should be put in place to investigate the sociological and economic factors working behind this variable in addition to education, which was shown to have an effect of delaying marriage in this study.

Fourth: The relative importance of women's education over that of husband's in determining fertility and contraceptive use calls for an affirmative action towards favouring women's education over men for its strong external effect of reducing fertility and improving health status.

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