

# Are More Children a Blessing? Determinants of the Demand for Children in Jimma, Ethiopia

Bedassa Tadesse<sup>1</sup> and Sisay Asefa<sup>2</sup>

*"Blessed are those that have 24 children: 12 boys and 12 girls"---Traditional Oromo blessing*

## Abstracts

Based on data from a cross-section of urban households in Southwestern Ethiopia, in this paper, we examine some endogenous household characteristics that could be targeted through market-based policy measure(s). We use a count data model and the theory of consumer behavior to first identify some important socio-economic determinants of the demand for children. Then, we simulate the average number of children desired by a woman of median household characteristics and the extent to which an exogenously set population policy goal of lower fertility can be achieved. Finally, we present the extent by which market based policy measures could help reduce the desired number of children. The results of the study show that measures such as formal expansion of paternal and maternal education, altering the economic value of children, increasing household income, and delaying the marriage age are important. We also find institutional approaches that require "faith-based initiatives" relevant. An important policy implication that can be drawn from this result is the need to target such socio-economic variables in designing and implementing population policy measures in Ethiopia and other African nations with similar demographic features.

JEL: D12, J13, O12

## I. INTRODUCTION

Ethiopia adopted its national population policy in 1993. Like many other African nations, the policy emphasizes the provision of family planning and contraceptive services. The policy explicitly states a target of four children per woman to be achieved by the year 2015, down from the total fertility rate (TFR) of about eight children per women in rural areas and six children per women in urban areas when the policy was formulated in 1993. In a country where having as many as 24 children is considered as a blessing from God, achieving such a policy goal seems a daunting task (refer the blessing in quotation). Empirical works conducted elsewhere, following the approaches pioneered by Becker (1960) and Esterlin (1975), find that the macro consequence of population size abstracts much from individual household socioeconomic behavior. Thus, the success of a national population policy will depend, albeit the approach, on identifying those factors that determine the number of children desired, understanding the dynamics of fertility at household levels and designing strategies based on market forces that govern household fertility behavior and choices.

Consumer's choice theory based studies on household demographic behavior in Africa, particularly on those factors that affect households' demand for children and fertility pattern in Ethiopia are very rare. A few of the reports available indicate that high TFR varying from five children in urban areas to about nine children among women in rural areas prevail in the

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<sup>1</sup> [Bedassa.Tadesse@wmich.edu](mailto:Bedassa.Tadesse@wmich.edu) and <sup>2</sup> [Sisay.Asefa@wmich.edu](mailto:Sisay.Asefa@wmich.edu), Department of Economics, Western Michigan University (WMU), Kalamazoo, MI-49008, USA

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country (Gorecki and Tesfaye, 1993). Life expectancy is about 53 years. Infant mortality rate is about 103 per 1000. There is limited health services (only 46 percent of the population) coverage and literacy rate is only 36 percent (UNFPA, 1998). Contraceptive prevalence rate is less than four percent (Shigu, 1994).

Although Ethiopia's population policy emphasis expansion of family planning services, it also recognizes the importance of empirical research to identify key complementary policy variables. To this end, it stresses the need for identifying appropriate strategies to tackle the problem by taking into account the dynamics and complexity of the social, economical, cultural and institutional factors across regions, residence settings and household units. This study is an attempt in this direction. With such a goal in perspective, it analyses the microeconomic determinants of the demand for children for households in Jimma town of the Western Oromiya Zonal administration. Based on a model in which households endogenously make fertility decision and factors that are commonly over looked by related population policies elsewhere in Africa, we attempt to present some important empirical evidences. Our working hypotheses are the following: (i) *Ceteris paribus*, improving the income of households can play a significant role in reducing the total number of children desired. (ii) In the absence of well-developed capital and labor markets that reflect the true opportunity cost of child bearing, social institutions can be of immense relevance for intervention, and (iii) As a key factor affecting household's ability to process information, both paternal and maternal education can play an important role in reducing the desired number of children and therefore fertility levels.

The rest of the paper is organized as follows: Part II presents a brief review of the empirical regularities. Part III provides discussion of the data and description of the empirical model. Part IV presents empirical results and simulations. The final part presents conclusion and policy implications.

## **II. A REVIEW OF LITERATURE**

Several empirical studies show that diverse factors (socioeconomic and cultural, psychological values and traditional customs) at various levels determine fertility. Most of these studies follow either the Baker's (1960) approach, commonly referred as the 'household demand model' or the 'synthesis model' of fertility proposed by Easterlin (1975). In the household demand model, emphasis is placed on the impact of prices and income on the demand for children among utility maximizing households. Results from such models emphasize the role of income, price and substitution effects in fertility decision behavior.

In the synthesis model, the economists' household demand model is synthesized with the demographers' and sociologists' approaches of modeling the supply of children. Given the costs of the family planning services and couples' preferences to use or not use contraceptive measures, this approach pays explicit attention to the supply of births among utility maximizing households in the form of birth production function. The results from the synthesis model therefore, provide an alternative interpretation of empirical results viewed as price or income effects in the household demand model.

Beyond the empirical approach and interpretation of the results, however, no conceptual distinction seems to exist between the two approaches. Examining empirical findings from either approaches Boulier (1985) maintains that substantial amount of fertility decline in

developing countries has not been explained by observed price and income changes. According to Birdsall (1998), neither do empirical studies of fertility in developing countries that used the synthesis model indicate significant differences in the tastes for children across households. However, economists and sociologists in general, have long attributed fertility decline to economic development (Bongaarts, 1993).

While such an assertion rests on the assumption that fertility declines are brought about by changes in the demand for children, based on the opportunity cost of labor time for childcare, the quantity quality trade-off, child-investment theory and empirical associations between fertility rate and measures of standard of living, micro-economic research by Mincer and Polachek (1974), Schulz (1973) and Backer (1965), list other determinants of the family preferences for children. Among the studies that examined the problem in developing countries the works of Al-Qudsi, (1998) in Arab countries, Fairlamb (1991) in South Africa, Singh and Schuh, (1986) in rural Brazil, Nguyen-Dinh (1997) in Vietnam, and Cochrane et al., (1990) in Egypt also provide typical examples and variables.

Evidence from these studies show that education of women, participation in the formal labor market and contraceptive use have negative impacts on the fertility level; income, child mortality and parent's preferences for sons positively affect fertility. Al-Qudsi (1998) shows that the demand for children is price and income inelastic. Cochrane et al (1990) on other hand, finds the existence of positive relationships between income and fertility resulting from either the positive effect of income on the demand for children or effect of income on the health and thereby biological supply of children. Her study in Egypt and Fairlamb's (1991) work on the informal sector in South Africa further substantiate the notion that among poor households, children are viewed as economic assets. Under conditions of abject poverty, inadequate and uncertain public and private market provisions for the well being of the elderly, children can be viewed as an old-age security (Rendall and Bachieva, 1998). According to Schoen et al (1998), the "social resource" value of children is a deriving factor that favors high fertility desire.

The extent to which these regularities from developing countries complement the facts in Ethiopia and help formulate appropriate strategies for harmonizing economic and population growths of the country is a matter of empirical evaluation. Asmare, et al (1994) reports that households in the vicinity of Jimma in South Western Ethiopia desire more than the number of children they actually have. An important feature of development in the area is that land and capital markets are underdeveloped. Means of asset accumulation other than children are limited. Labor markets are thin.

Consequently, assistance from children, contacts and kinship can matter as a form employment and social insurance. Cultural and social factors, therefore, can be more important over the opportunity cost of raising a child. For instance, using the housing and population census data from the central Shewa region of Ethiopia, Berhanu(1993) attributes much of the fertility differentials between women of urban and rural residences to differences in their socio-economic and demographic characteristics. In his analysis of the fertility behavior of the elites in Ethiopia, Zewoldi (1993) finds the lowest number of children desired (3.57 per woman) among lawyers and the highest among Muslim religious leaders (8.43 per woman). On the other hand, based on the analysis of female labor force participation and fertility in Akakai-a sub-Urban industrial town in Ethiopia, Gurmu(1994)

reports relatively lower fertility among women that participate in the formal labor force than those that work in the informal sector. However, he finds no definite relationship between female labor force status and fertility in the case of women that did not participate in the labor market.

In an attempt to obtain further insight on the role of these diverse social and economic factors in modeling the fertility behavior of households, this study makes two assumptions. First, fertility behavior is taken as rational and can be reflected by the desired number of children. That is, in making subsequent fertility choices, parents do take into account the costs and benefits of having children. Second, as has been emphasized by the household demand model, it is assumed that fertility is one of the household economic decisions, which depends on social, cultural, institutional and economic factors. Therefore, a number of public policy interventions may be justified to alter fertility decisions.

### III. THE DATA AND THE EMPIRICAL MODEL

#### 3.1 The data

The data used in the present study comes from randomly selected households in the city of Jimma in southwestern Ethiopia. A capital of Jimma zone in the Southwestern Ethiopia and the second largest city in the regional administration, the city is home to about 32, 000 inhabitants. With the aim of understanding the importance of some socioeconomic differentials on household preferences for children, a cross section of 238 sample households were randomly selected, and a house-to-house survey was conducted in June 1998. Responses on their attitudes on the desired number of children, current fertility status and related socioeconomic characteristics were collected. Some 17 households were, however, discarded due to missing or incomplete information on many variables of interest.

#### 3.2. The Empirical model

Consider households decision on the number of children (N) that they desire as a rational behavior in which households take into account their resource limitations and purchasing power. Following Kremer and Chen (2000), the problem to maximize utility from children (N) and the consumption goods (X) facing the households can be represented in a quasi-linear form as follows.

$$\begin{aligned} \text{Max}U &= U(N - G)^\gamma \exp(X)^{1-\gamma} \\ \text{Subject to} \quad & W\pi(N-G) + X \leq W \end{aligned} \dots\dots\dots(1)$$

Where  $\gamma$  denote the weights associated with the satisfaction derived from children and consequently  $1-\gamma$  the weight associated with the utility from consumption of other goods. We use institutional, cultural and traditional factors affecting this weight as a proxy to capture this effect in our model. W is wage per unit of time and  $\pi$  is the fraction of household's time spent on raising children.  $W\pi$  is thus the time cost of raising children born to the household and is represented by series of household socio-economic variables in the empirical model that follows. G could be taken as the number of children that will be born to the household irrespective of their resource constraints, for example, because of traditional, cultural, and societal values. Solving for X from the constraint, substituting for the value of X in the objective function and taking logs, we get:

$$\ln U = \gamma \ln (N-G) + 1-\gamma (W(1-N\pi)) \dots\dots\dots(2).$$

Differentiating equation (2) it is possible to solve for N. The resulting N is discrete and takes a value of 0 when G is not binding and the weight  $\gamma$  associated with children is 0. Otherwise, it takes values 1,2, ..., N. Therefore, we follow Cameron and Trivedi (1998) and apply a Poisson-stopped binomial results to compute the number of successes ( $N_i=N(t)$ ) in a Poisson distribution. Equating  $N_i$  to the total number of children desired by households that takes only non-negative integer values and on the assumption that the occurrences of births are independent over time, we estimate a Poisson regression model. The conditional mean ( $\lambda_i$ ) and variance ( $\omega_i$ ) parameters of the model were first derived as a function of a vector of covariates ( $\mathbf{X}_i$ ) in the form

$$E(N_i / \mathbf{X}_i) = \lambda_i = \omega_i = \exp(\mathbf{X}_i' \boldsymbol{\beta}) \quad \dots\dots\dots(3)$$

for  $N_i = 0, 1, 2, \dots, m$  and the model was estimated as :

$$Pr ob(N = N_i) = \frac{\exp(-\lambda_i) \lambda_i^{N_i}}{N_i!} \quad \dots\dots\dots(4)$$

$\boldsymbol{\beta}$  is a vector of unknown parameters to be estimated by the method of the Maximum likelihood (MLE) and  $\mathbf{X}_i$  is a matrix of exogenous variables comprising log transformed household income (level and quadratic form), current age of the wife and her age at marriage. Also included in  $\mathbf{X}_i$  are the maternal and paternal education levels measured in school years, gender composition of children already born, proxy variable for wealth and dummy coded indicator variables on labor market participation of the wife, religion and ethnicity of the household head, and expectation of economic support from children. Dummy coded status variable for controlling the differences in the desired number of children between those who already have a child and those who do not is also included. Detailed description of the variables in the model are provided in Table-1

Using the variables of interest, we derive the maximum likelihood estimates of the parameters. Then, the effect of a unit change in each explanatory variable on the conditional mean of the desired number of children (the marginal effects) is evaluated at the average of the individual responses.

### 3.3. Variable definition and a priori expectation

Definition of the variables used in the model, relative frequency of the count dependent variable and the a priori expectations following the literature, are presented in Table 1. Based on the household demand and synthesis models, human capital values (education of the couples), women's participation in labor market, and delayed age at marriage are hypothesized to have negative impact on the number of children desired, and thus total fertility.

Empirical studies have established that for a utility maximizing rational household, children are normal goods. Thus, with a rise in household income levels, it is expected that the demand for children would increase. Beyond certain threshold level, however, income could have a negative impact making its impact non-linear. Similarly, it is expected that wealth and age of the wife would have a positive impact on the demand for children.

In economies like Ethiopia where thin or missing labor and capital markets are pervasive, family attitudes and values on the number of children, among other things, could depend on the economic values of children to the household, the religious belief of the household, ethnicity and societal values and ranking associated with the gender composition of children.

**Table 1: Variable definition and summary statistics**

Variable	Variable definition	Mean	Standard Deviation	A Priori Expectation										
TNCD	Total number of children desired	4.995	2.681											
INCME	Annual income in Ethiopian Birr	526.108	404.589	+										
INCMSQ	Squared annual income in Ethiopian Birr	439,742.262	771,000.240	-										
AGMGE	Age of wife at marriage in years	19.588	5.445	-										
WIFAGE	Current age of wife in years	33.271	5.936	+										
WIFEDN	Education level of the wife in school years	5.013	5.261	-										
EMPWIF	Employment status of the wife, 1 if employed	0.310	0.231	-										
HSTYPE	House type (proxy for wealth), 1 if Villa	0.203	0.403	+										
HBNEDN	Education level of the husband in school years	8.493	5.312	-										
PRMALE	Proportion of males among alive children	0.513	0.310	+/-										
RELGHN	Religion of the household head, 1 if Moslem	0.190	0.393	+/-										
ETNCHD	Ethnicity of the household head, 1 if Oromo	0.289	0.454	+/-										
HCHILD	Self replacement dummy, 1 if at least two children	0.724	0.2597	-										
ESUPFCD	Expects support from Children, dummy, 1 if Yes	0.842	0.3659	+										
<b><i>Actual and relative frequency of the count dependent variable (total number of children desired)</i></b>														
Count	0	1	2	3	4	5	6	7	8	9	10	11	12	13+
Frequency	5	2	22	23	68	29	27	13	11	3	11	2	3	2
Relative frequency	.022	.009	.099	.104	.307	.131	.122	.058	.049	.013	.049	.009	.013	.009

The study area provides typical mix of the diversity in religion, ethnicity and gender preferences in Ethiopia. However, lack of generality in available evidences and observations about the effect of these variables on the expected number of children desired restrains the formulation of a specific a priori expectation. Taking the search for self-replacement as a rational motive of couples for having an offspring, it is presumed that households that achieved this goal on the average would desire smaller number of children than those who did not.

#### IV. THE EMPIRICAL RESULTS

##### 4.1. Descriptive characteristics

Descriptive characteristics of the variables used are presented Table 1. We observe that 43 percent of females nine percent of males in the sample are illiterates with no formal education. Among those who went to school, a woman and her husband on average attained five and eight years of schooling, respectively. About 70 percent of the women in the area do not participate in the formal labor market. A woman in the study area gets married on average between 19 and 20 years of age. Among those who formed a family, more than 90 percent have replaced themselves by giving birth to a child. About 51 percent of all children born are male. About 19 percent of the respondents are Moslems and 30 percent of them are ethnic Oromo, the main ethnic population in the area.

The average age of a woman in the sample stands at 33 years and ranges from 16 – 45 years. About 20 percent of the population own and live in a house that characterizes relatively wealthy spouses in the area and the median annual household income is about 526.11 Birr.

On average, a respondent wants to have five children in her lifetime. This varied from less than three percent who indicated no desire for having children to nearly one-percent who desired as many as 13 or more children. While 54 percent of the households preferred a number that lie with in the upper limits (four children) of the fertility levels stipulated in the population policy of the country, nearly 36 percent of the households have preferences with in the current average fertility level of seven children per woman. The total number of children demanded by almost 10 percent of the population ranges from eight to 13 children.

Table 2 presents additional comparative statistics on some variables of interest. The table shows that as family size increases, the age of the household head and the wife tends to rise and both the wife and the husband get less educated. On the average, the proportion of female-headed households is relatively larger among the small and large family size categories.

On the other hand, as the family size increases, the household economic status tends to decline: the average household income falls, and the proportion of households that live in rented houses increase. This weak economic condition of the households tends to reinforce the economic value of children to their parents. This can be observed from the fact that with increase in family size, the concern for old age security in terms of the expectations on economic support from children shows a sharp rise. On average, about 70 percent of the households in the sample currently receive support from their children and more than 84 percent expect to receive economic assistance from their children at old ages. The presence of strong inter-generational economic ties between children and parents can also be seen from the fact that with increase in family size the proportion of households who takes care of their living elderly parents also increase. Over all, nearly 42 percent of the households in the sample provide some form of economic support to their elderly parents.

**Table 2: Some Socio-Economic Characteristics of the Households**

Family Size N=221	Demographic Features			Education Levels		Economic Status		Old-Age Security	
	Sex of Head (1 if female; 0 otherwise)	Age of HH Head(Years)	Age of Wife (years)	HH Head (School Years)	Wife (School years)	Annual HH Income (Birr)	House Status (1, if owned; 0, otherwise)	Expect Support from Children (1 if Yes;0 if No)	Supporting Elderly Parents (1 if Yes;0 if No)
Small (No Children)	0.3125	37.25	28.31	10.87	5.12	571.37	.5625	---	0.185
Medium (1-3)	0.2736	39.94	31.62	9.22	5.98	565.18	.6321	0.849	0.613
Large (4-7)	0.3218	49.04	35.37	7.59	4.05	486.16	.3793	0.839	0.4943
Very Large (8-10)	0.0833	52.25	39.16	5.33	3.25	410.16	.1667	0.917	0.6667

\*HH = Household

#### 4.2. Results from the Poisson regression model:

Table 3 presents the estimated coefficients, marginal (mean) effects, and the elasticity of the variables used to explain the expected mean number of children desired. With a pseudo R-square value of 25.8 percent and G-Squared statistic of 233.37 computed based on the deviance of the residuals as motivated by Cameron and Windmeijer (1996), the Poisson model used appears to be a good fit to explain the data. More than two-thirds of the variables included in the model were found significant. All variables, but one for which the a priori expectations on the signs were defined, have shown the expected signs.

##### a) Income, education and labor market participation

In line with the evidence from fertility studies based on the household demand and synthesis models, the results of the present study shows that children are “normal goods” with inelastic income elasticity of demand. It also reveals the number of children desired is a positive function of household income (INCME) with inelastic (0.897) demand. Because of the net income effect (as postulated by the household demand model) and the increased fecundity or supply of births, the demand initially rises as household income increases. In the long run however, after a higher threshold income level (INCMSQ) is attained, the effect of education and employment starts to offset the income effect making the demand to significantly decline.

**Table 3: Poisson ML Estimates of the Coefficients, Marginal Effects and Elasticity of the Number of Children Desired by Households in Jimma, Ethiopia.**

Variable	Coefficients (Standard errors)	Marginal Effects	Elasticity
Ln(INCME)	0.9784(0.3375)***	4.8877	0.9784
Ln(INCME)SQ	-0.0805(0.0304)***	-0.4021	-0.0805
Ln(AGMGE)	-0.0161(0.00751)**	-0.0807	0.0161
Ln(WFAGE)	0.1485(0.4055)	0.7420	0.1485
WFEDCN	-0.0106(0.0052)**	-0.0531	-0.0531
EMPWIF	-0.0616(0.0848)	-0.3080	-0.0429
HSTYPE	0.1929(0.0762)***	0.9640	0.0392
HBNEDN	-0.0203(0.0086)***	-0.1016	-0.1728
PRMALE	-0.0623(0.1037)	-0.3116	-0.0318
RELGNH	0.1456(0.08512)*	0.7276	0.0276
ETNCHD	-0.0877(0.0761)	-0.4381	-0.0253
ESUPFCD	0.0613(0.0323)**	0.3082	0.0256
HCHILD	0.5718(0.1654)***	2.8569	0.5318
Constant	-1.5888(1.3029)		
	-Log Likelihood	483.36	
	Conditional Mean ( $\lambda$ )	4.995	
	Chi-Squared	67.33	
	Degrees of freedom	13.00	
	G-Squared	233.38	
	R-Squared, Pseudo	0.258	
	N	221	

*Figures in parentheses are standard errors. \*\*\*, \*\*, \* Denote significance at  $p < 0.01$ ,  $p < 0.05$ , and  $p < 0.10$ , respectively. For variables that are not log-transformed, elasticity values are computed at mean of the respective variables.*

The effect of income on the desired number of children is, thus, non-linear. Among all the variables considered, the absolute marginal (mean) effect of income on the households' desire for children is the largest.

Alternatively, when we estimate the same model (not reported here) by using per capita income instead of the household income, all the other variables maintained their significance levels and signs. Reflecting the trade-offs between fertility and economic status of the household, the per capita income variable showed a highly significant ( $p < 0.05$ ) negative coefficient of 0.0058. Thus, what is important in effectively achieving the desired policy objective of reducing fertility at this stage may not be the expansion of family planning programs or contraceptive measures as emphasized in the policy but changing the income position of the households. Therefore, designing public policy intervention programs for creating market driven employment opportunities that would help households to increase their current income position is necessary. One such strategy could be to encourage women's participation in the labor market. In spite of the a priori expected sign, the coefficient of women's employment (EMPWIF) in the present study is not significant enough to support the hypothesis that working women would desire smaller number of children relative to non-working women. This may be because labor markets in the area are generally thin and the opportunity cost of having an additional child may not significantly differ between working and non-working women.

The result also provides strong evidence on the negative impact of the increases in the level of schooling attained by both paternal (HBNEEN) and maternal (WIFEDN) partners on the demand for children. With a mean effect of 0.05 children, the results show that, a 20 percent increase (additional two school years) in the maternal education from the current mean five years of schooling will reduce the expected number of children desired by one. This could be because even in the absence of attractive labor market opportunities, education can change attitudes, values and beliefs of families towards those that are compatible with a small family norm and demand in which the utility from child "quantity" is discounted more than the utility from child "quality". An interesting inference that can be made from the results on the paternal education (HBNEEN) in the present study is that the desired number of children among women significantly declines as the education level of their husband's increase. Investment provisions designed for raising labor market participation and education levels of both the men and women, and thereby increasing opportunities for improvements in the income level of households are therefore imperative.

If public intervention programs such as family planning are to be followed as is being stressed in the Ethiopia's population policy, the significance of paternal and maternal schooling should be taken as an indicative for designing effective information, education and communication (IEC) components that address both males (husbands) and females. In the absence of either of such provisions the transition from the current high total fertility level of seven children per woman to lower fertility level of four in just 15 years as perceived by the population policy of Ethiopia may be unlikely to be attained.

Consistent with the findings of Kinfu (1996) on poverty and demographic characteristics in Direedawa, the second largest city in Ethiopia, the result from the present study also shows that wealthier households (HSTYPE) desire to have more children. This may be because among wealthier households the tradeoff between child quantity and child quality is minimal. As wealth provides buffer to income shocks, wealthier households not only have the capacity to raise more children even at high costs, but also the ability to pay for better education, health and nutrition.

**b) Economic value of children, gender composition, age of mothers and ethnicity**

In line with the findings of Hilawi (1995) in Northern Ethiopia, this study also finds that households that expect economic support from their children at latter ages, on average desire to have more number of children with a factor of 0.0613 than those who expect no economic support from their children. In an environment of least developed labor and capital markets, it is rational for households to consider having more children as a safety net and old-age security. If effective transition to lower fertility is to be sought from the population policy, strategies involving public and private investments in employment and income creating programs are, therefore, important. Such measures help not only to lower the economic value of children, but also to create conducive situation to alter the attitude towards high fertility.

Evidence on the effects of other three variables included in the model on the demand for children are not strong enough to support the a priori expected hypothesized. These variables include age of a woman (WFAGE) taken as a proxy for periods of exposure to the risk of pregnancy and potential child bearing, gender composition of children (PRMALE) already born and the ethnic background of the household head (ETHNHD).

**c) Age at marriage, religion and the pro-creation motive**

The result on the three other socio-economic variables, namely the age at marriage for women, the religion of the household head, and the self-replacement motive are as a priori expected. They clearly establish the importance of postponing the age at marriage, and the need for some kind of faith based. After controlling for the effect of important social and economic variables, higher age at marriage is associated with lower desired number of children. The desired number of children declines by a margin of 0.086 for each additional year the age of girls at marriage is postponed. Households headed by followers of Moslem religion desire to have significantly more children (almost one child at the mean) than couples from other, mainly Christian religion denominations. For a smooth transition to lower fertility levels stipulated by the population policy of the country, recognizing these differences in the religion denominations and age at marriage, interventions based on some kind of faith based initiatives may be relevant. Thus emphasis should be given to both social and religious institutions for bringing the desired behavioral changes favoring lower fertility.

Contrary to the a priori expected hypothesis, the study reveals that households at their self-replacement fertility level of two children (HCHILD), on average desire significantly larger number of children than those that have already exceeded this level. Given this result, initiative like “the policy of two children per couple” is certainly less attractive. This may be because households are discounting higher fertility levels by the risk of poor health services and the prevalent more than 120 per 1000 infant mortality rates in the country.

Therefore, measures targeting the expansion of community health services such as clinics, health stations, health education services that would help reduce infant mortality should be taken as an integral part of the effort to harmonize the economic and population growth of the country.

### 4.3. Policy measures and simulated demand

Based on the conditional mean desired number of children obtained from the model fitted, in this section we evaluate the probability that the TFR would be within the range stipulated by the population policy goal of Ethiopia. We examine this for a typical woman of median sample characteristics. The typical median household was found as a 34 years old woman, who attained three years of schooling, married at age 21 to a man with eight years of schooling, and a median annual household income of 467.2 Ethiopian Birr. It is assumed that the woman does not participate in the labor market, lives in a house that does not characterize a wealthy family, had two children, currently expects to receive economic support from children in later ages, and is a Moslem ethnic Oromo.

Given the characteristics in our sample, the result of the simulation shows that there is a 17.6 percent probability that a woman from such a typical household in the study area would demand only about four additional children in her lifetime. While the likelihood that such a household would desire less than four children is about 19.5 percent, there is a 10.4 percent probability that it would be within the current TFR of seven children.

**Table 4: Simulated likelihood of number of children desired by a typical household.**

Total Number of Children Desired	Average Likelihood (Percent)
0	0.67
1	3.40
2	8.50
3	7.00
4	17.60
5	17.50
6	14.60
7	10.40
8	6.50

Based on the parameters from the model, the break down of the probability estimates for the different number of children desired by a median household is provided in Table 4. The results presented in the table clearly show that the likelihood of the current high fertility rate of seven or eight children to remain intact is high. The probability that a typical woman would tend to have one, two or three children is lower than that of five or six children. Accordingly, it can be concluded that unless appropriate measures to tackle the problem are designed based on the identified key determinants of the demand function for children, the transition to lower fertility as perceived in the policy is less likely.

## **V. SUMMARY AND CONCLUSION**

This paper has examined some socioeconomic variables that can play key roles in influencing the demand for children among 221 randomly selected households from Jimma town in southwestern Ethiopia. The findings indicate that significant reductions in the number of children desired can be achieved by increasing the educational level of women, increasing the female's age at marriage, and enhancing either the income earning capacity or employment or the income level of households.

After controlling for the effect of some socioeconomic differentials, we find that Moslem families prefer to have significantly more children than those from Christian and other religious denominations in the area of the study. In the absence of well-developed labor and capital markets that reflect the true opportunity cost of child bearing and rearing, this result provides strong support for using intervention mechanisms that involve faith based social institutions. However, further studies identifying the specific factors that are endogenous to the religious denomination is important.

Since fertility among married households is a matter of joint decision, we find that education of males (husbands) and females as an important measure for reducing the demand for children and thereby fertility levels among married women. The importance of education lies on its ability to enhance the income earning capacities of households in general, and the leverage in the bargaining power of the female in her attempts to make decisions over her fertility.

The policy implications of our findings are the following: (i) lowering population growth rates through the target of fertility reduction, as a single goal by itself is more likely to be less effective; (ii) it would be important to focus on the approaches and incentives that involve the goal of improving the quality of life: raising income levels of households and thereby changing the perceptions on the economic value of children. This can, for example, involve expanding the education of females and males, and the development of labor and capital markets; (iii) household's decision on the number of desired children is based on wide range of important socioeconomic factors such as education, age at marriage, the religion, their income levels, and self-replacement motives. Therefore, increasing access to contraceptive measures by expanding the availability of family planning program services envisaged in the population policy of Ethiopia and other African nations with similar demographic features may not be enough for couples to change their behavior toward having less children and to reduce fertility.

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