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ECONOMIC VALUE OF CHILDREN IN RURAL INDIA

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"In bringing economics to bear on procreation and children,
a new dialogue between data and theory has begun."
--Theodore W. Schultz (1974)

I. Introduction

The document that finally emerged from the deliberations at the World Population Conference held in Bucharest in August 1974 as a "World Plan of Action" gave emphasis to sovereign rights and human rights, to the international economic order, and to the reduction of mortality and recommended integration of family planning with health programs, but was unfavorable to employing disincentives to reproduction. At that Conference, India's Minister for Health and Family Planning, Karan Singh, said, "It will be difficult for many countries to accept family limitation as a goal in itself unless it is clearly linked to a more equitable distribution of world resources," and "Population policy . . . cannot be effective unless certain concomitant economic policies and social programs succeed in changing the basic determinants of high fertility. It has truly been said that the best contraceptive is development." However, in 1976 during the period of emergency rule in India, a vigorous program of compulsory sterilization was officially advocated in some States.[1] On 16 April 1976, Karan Singh, in an official statement on national population policy said, "to wait for education

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and economic development to bring about a drop in fertility is not a practical solution." As Kaval Gulhati (1977) reported "some professionals in the family planning establishment, dismayed at this new direction in India's population policy, argue (i) that India has never provided voluntary birth control services effectively on a mass scale, as, say, Korea and Taiwan have done, and (ii) that compulsory measures will be counter-productive by increasing resistance to family planning of any kind." The historic defeat of the party led by Mrs. Indira Gandhi at the general elections held in March 1977 was interpreted at least in part as a result of a "backlash" from the mass sterilization camps in the so-called "vasectomy belt" of Northern India.[2]

The adoption of policy options such as compulsory sterilizations during the period of emergency in 1976 in India and the emphasis on the supply of birth control services in the past perhaps reflected a natural but nonetheless one-sided technocratic view of what is essentially a social problem. As T. Paul Schultz (1974) observed, "it seems far simpler to promote a better birth control technology than to learn why parents want the number of children they do and be prepared to promote the desirable social and economic changes that will modify those reproductive goals. For example, expenditures on family planning that seek to lower the supply price of modern birth control technology, reducing the cost (pecuniary and subjective) of restricting fertility, is a widely approved policy response. Alternatively, expenditures on, say, public health and nutrition programs that seek to reduce child death rates, contributing to a downward shift in parent demand for numbers of births, is thought to be a counter-productive or at best a controversial policy strategy. Both sets of policy options--

the "supply" and "demand" sides--need further elaboration and quantitative study to enable decision makers to select an equitable and efficient mix of family planning and development policies for each social setting." (emphasis added)

Even though some people may believe that the crux of the population problem in low-income countries like India lies in the field of politics rather than in the field of economics[3] an attempt is made in this paper to examine some economic determinants of fertility in rural India in the belief that knowledge of factors that influence the decisions of parents with regard to the number of children they want to bear and rear is important for appropriate population policy. Fortunately in recent years, there is greater awareness among economists and policymakers in India that the households' decisions on expenditures or "investments" in human capital such as education, health, nutrition and children are important in influencing the rate and pattern of economic growth and income distribution. However, very little research work was done in extending the economic analysis to explain fertility behavior in India.[4]

Some recent studies of fertility in less developed countries revealed that children can be viewed as a productive asset at least at maturity, if not always at birth.[5] As R. G. Ridker (1976) put it, "no one would claim that children are desired solely or even primarily because of their value as productive assets, but it would be a rare case in which this consideration was entirely absent. And so long as it is present to some degree, the economic benefits and costs of children are worth investigating for they are far more capable of being influenced by policy than are most of the non-economic benefits and costs associated with children."[6]

However, it may be relevant to note that although some writers have advanced that parents in low income countries like India prefer high fertility and large family size because children are productive economic assets in agriculture and cottage industry[7], the previous research has not actually tested this hypothesis on the basis of observed micro-data.[8]

This paper presents the results of an analysis of the determinants of parent demand for children in rural India. There are two primary reasons why the analysis in this paper is restricted to rural households:

- India is predominantly rural. As per the 1971 Census of Population, 80 percent of the people live in villages of India, where the birth rate is still close to the traditional high of about 40.
- The survey data analysed in this paper do not cover urban households in India.

The data analysed in this paper are obtained from an All-India sample survey of rural households for 1970-71, known as Additional Rural Incomes Survey (ARIS), conducted by the National Council of Applied Economic Research (NCAER) with the financial support of the USAID (Contract No. AID-386-1620) and the approval of the Government of India.[9]

A brief description of the theoretical framework for the analysis of the ARIS data is given in Section II. The empirical results are duscussed in Section III and Section IV presents a summary of the main findings.

II. Economic Framework for Analysis

Unlike other fields of applied economics where the problems investigated are simple and purely economic, the study of value of children to parents in low-income countries is beset with several problems--data problems on variables relevant for the study, problems of formulating an appropriate framework for analysis of data and problems of suitable statistical techniques for analysis of data.

Perhaps the most promising analytical framework for the study of economic value of children to rural households in India is the so-called "new home economics" or "economic theory of the family". According to the proponents and exponents of this theory, each household is considered as a utility-maximizing entity in which the parental decision-makers derive satisfactions from the quantity and quality of their children as well as other consumption commodities.[10]

Recent extensions of this analytical framework provide an integrated and comparable approach to study several problems of human resources economics, such as health, education, nutrition, migration, labor force participation, savings, income, fertility and mortality. In this framework it is possible to view each variable as related to some of the other variables as endogenous or exogenous or both. For example, fertility and family size could be analyzed as dependent on wage rates and educational levels of parents and the number of children in a household could be treated as exogenous variables influencing the savings and investment behaviour, which in turn determine the household income, etc.

An attempt is made in this paper to explain the demand for children by parents in rural households in India utilizing the economic framework of household choice in a resource constrained environment. This economic framework follows the seminal work of Becker (1960, 1965) and is typically stated in terms of a single period utility function, a series of household production functions for final untraded consumption commodities and a budget constraint expressed in terms of both the time of family members and market goods. (T. Paul Schultz, 1974).

$$U = U(Z_1, Z_2, \ldots\ldots, Z_n) \tag{1}$$

$$Z_i = f_i(x_i, M_i, F_i), \text{ for } i = 1, 2, \ldots\ldots n. \tag{2}$$

$$Y = \sum_i x_i p_i = W_n N_m + W_f N_f + V \tag{3}$$

$$\Sigma M_i + N_m = \sum_i F_i + N_f = T \tag{4}$$

Where: $U(.)$ = the family utility function;
Z_i = final consumption commodity i;
f_i = production function of commodity i;
x_i = market good 1;
M_i = husband's time input in commodity i;
F_i = wife's time input in commodity i;
Y = money income;
p_i = money price of market good i;
N_m and N_f = husband and wife time allocated to market activities for money wages of W_m and W_f respectively;
V = the return on family's nonhuman wealth;
T = the total available time each spouse has to allocate between market and non-market activities.

Utility is maximized in this framework subject to technology, time and income constraints when

$$\frac{\partial U}{\partial Z_i} = \lambda\left(\pi_i \cdot \frac{\partial x_i}{\partial Z_i} + \frac{\mu_m}{\lambda} \cdot \frac{\partial M_i}{\partial Z_i} + \frac{\mu_f}{\lambda} \cdot \frac{\partial F_i}{\partial Z_i}\right), \text{for } i = 1, 2, \ldots, n,$$

where λ is the marginal utility of income, π is the shadow price of final consumption commodity and μ is the marginal utility of time. Under optimum allocation conditions, the ratios of marginal products of all inputs in each activity are equal to the ratios of their shadow prices; for example, for the male (father)

$$\frac{\partial Z_i/\partial M_i}{\partial Z_i/\partial x_i} = \frac{\mu_m/\lambda}{\pi_i} = \frac{W_m}{\pi_i}, \text{ for } i = 1, 2, \ldots, n.$$

A large number of household models can be carved out of the general household production framework by both restricting the set of commodities Z providing utility to the parental decision makers and/or by imposing restrictions on the characteristics of the household production relations [see for example, the studies contained in T. W. Schultz (1974)].

For a simple presentation of the model, assume that there are only two nonmarket commodities, the number of children C, and all other commodities, G, and that both production functions are linear homogeneous and independent of each other.

The full price of the i^{th} commodity is

$$Z_i \pi_i = M_i W_m + F_i W_f + p_i x_i \quad ; \quad i = C, G. \tag{5}$$

Full income, I, of the household is then defined as

$$I = \pi_c C + \pi_g G = TW_f + TW_m + V; \tag{6}$$

the full price elasticity of demand for the j^{th} commodity is

$$\eta_j \pi_j = \frac{dZ_j}{d\pi_j} \cdot \frac{\pi_j}{Z_j}$$

and the full income elasticity of demand for the j^{th} commodity is

$$\eta_{JI} = \frac{dZ_j}{d_I} \cdot \frac{I}{Z_j}$$

The income elasticity is positive, if j is not an inferior commodity. The own-price elasticity, holding income constant, must be negative. The elasticity of demand for children with respect to nonhuman wealth V, is

$$\eta_{CV} = \frac{V}{C} \frac{dC}{dV} = \eta_{CI}, \tag{7}$$

and if children are not an inferior commodity, as seems plausible for rural households in India, this expression should be positive in sign.

The shares of the total cost of the i^{th} commodity accounted for by time inputs of the husband and wife are

$$S_{mi} = \frac{M_i W_m}{Z_i \pi_i} \quad \text{and} \quad S_{fi} = \frac{F_i W_f}{Z_i \pi_i} \quad \text{respectively}$$

Following Ben-Porath (1974), the elasticity of demand for children with respect to a change in the husband's or wife's wages can be expressed in terms of these value shares, the shares of full income earned in the market by each spouse, and the compensated (holding full income constant) price and income elasticities of demand for children.

$$\eta_{CW_m} = \frac{W_m}{C} \cdot \frac{\partial C}{\partial W_m} = \eta_{C\pi C} (S_{mC} - S_{mG}) + \frac{N_m W_m}{I} \eta_{CI} \tag{8}$$

$$\eta_{CW_f} = \frac{W_f}{C} \cdot \frac{\partial C}{W_f} = \eta_{C\pi_C} (S_{fC} - S_{fG}) + \frac{N_f W_f}{I} \eta_{CI} \tag{9}$$

Let us now assume that the market wage is a function of education (10)

$$W_i = g_i (E_i) \qquad \text{where} \quad \frac{\partial W_i}{\partial E_i} > 0, \qquad i = f, m \tag{10}$$

Education affects the number of children in this theoretical framework, through its effects on full prices and on full income. In elasticity terms,

$$\eta_{CE_i} = \eta_{W_i E_i} \left| \eta_{C\pi_C} (S_{iC} - S_{iG}) + \frac{N_i W_i}{I} \eta_{CI} \right| \quad \text{for } i = f, m. \tag{11}$$

As T. Paul Schultz (1974) pointed out, it is not unreasonable to assume that $N_m W_m > N_f W_f$, since both male wages and market hours worked tend to exceed those of females. The positive income effect associated with a change in male wages will, therefore, usually exceed that associated with a change in female wages, but the price effects are more complex. If it is assumed that the difference between the female time intensity of children and that of other nonmarket goods equals or exceeds the difference between the male time intensity of children and that of other nonmarket goods, or, in other words, that

$$(S_{fc} - S_{fg}) > (S_{mC} - S_{mG}),$$

then the relative magnitudes of the income effect prevails and

$$\eta_{CW_m} > \eta_{CW_f} \quad \text{and} \quad \eta_{CE_m} > \eta_{CE_f} \tag{12}$$

Some economists may object to the analysis of fertility behavior within the above stated theoretical framework because of

the absence of a well-organized market in children (e.g., Leibenstein 1975). As Ben - Porath (1975) stated:

. . . The most prevalent objection to the analysis of fertility via a model of consumer or household choice is that fertility is not subject to rational behavior by many or most people, particularly in traditional societies. To the extent that fertility in traditional societies is lower than the biological maximum, this is a result of taboos and mores regulating marriage, celibacy, sexual relations, etc., rather than an expression of any rational policy to restrict family size." However, as T. W. Schultz (1974) pointed out, "The difficulty here is not that economic theory is pointless in explaining fertility behavior in the low-income countries. On the contrary, in principle basic economic thinking is fully applicable to the poor as it is to the rich countries. As a case in point, I (T. W. Schultz 1964) have long argued that the theory of the firm is analytically as powerful in the allocation of resources of poor, small, illiterate farmers in the less-developed countries as it is in determining the allocative efficiency of farmers, say, in Iowa. The usefulness of this theory is now widely recognized because of many recent successful applications. The same argument holds for a fully developed theory of the household."

Although the relevance or appropriativeness of the economic models for fertility analysis formulated on the basis of the theory of allocation of time is still debatable, an attempt is made in this paper to use this as a framework for the analysis of fertility behavior in rural India.[11]

In this first attempt of analysis of the analysis of the new set of micro-data, it is felt not unreasonable to estimate an unrestricted reduced form equation obtained by ordinary least squares (OLS) in which fertility is regressed on all exogenous variables that are thought to affect directly or indirectly reproduction. It may be relevant to note that T. Paul Schultz (1974) pointed out, "These estimates of the combined direct and indirect effects are consistent; that is, they would tend to the true parameter values in the existing population if the sample were sufficiently large and the model correctly specified. These estimates of the reduced form equation, however, are less efficient (i.e., they have greater variance) than those solved from estimates of the entire system of structural equations. Without knowledge of the complete model, its limitation and restrictions, this may nonetheless be a good unbiased first approximation." (See Paul Schultz, 1974, and W. P. Butz 1972, for a discussion of the guidelines of statistical analysis of this problem in economic demography.)

The variables that enter the regression analysis of determinants of fertility in rural households in India and the empirical results obtained are discussed in the next section.

III. Empirical Results

A preliminary analysis of the data on the fertility behavior of rural households in India revealed that it would improve our knowledge if all households are partitioned into two distinct groups--those who are landed and those who are landless. Conceptually, class structure of a society (and the behavior of households within society are) influenced by a number of factors--economic, social and political. Social anthropologists in India have till recently given greater emphasis to the "caste structure" or, to the distinction between varna and jati in their village studies. However, there is growing concensus among social anthropologists in an agrarian society like India, that land undoubtedly provides an important basis for social cleavages.[12] It may also be relevant to note, in this context, that unfortunately the ARIS data analysed in this paper does not have information on the religion or caste of the parents. Therefore, it is felt that, both from the analytical and policy view points, the economic value of children in rural India should be studied separately for cultivating households (landed households) and non-cultivating households (landless households). Partitioning of all rural households into those who are cultivators and those who are not will allow the measurement of the impact of agricultural development programs on fertility and the natalist consequences of the so-called "green revolution". A priori, one could hypothesize that agricultural development would increase the marginal productivity of labour, including that of children, employed in agriculture and hence the economic value of children would increase and thus have a positive effect on the demand for children by parents who are cultivators. In this context, it would

be interesting to analyse the fertility behavior of farm households and non-farm households separately.

The variables used in the regression analysis of fertility (the number of children-ever-born per women) in landed and landless households of rural India are defined and their sample means and standard deviations listed in Table 1.

Landed households (parents) are distinguished from landless households (parents) in the analysis by the characteristic that in the former at least one household member combines part of his (her) time with the land cultivated by the household (GCA) along with other farm assets used in production (FARMAST) for purposes of generating (farm) income. Therefore, for the landed households, the effect of the size of the cultivated area (GCA) and FARMAST, on the demand for children is estimated. These exogenous variables are expected to show positive (wealth) effects on fertility.

Four levels of schooling variables for womens' education are used in the regression equations: (1) illiterate or literate with no formal schooling (WED_1); (2) some but no more than primary schooling (WED_2) (3) schooling above primary but below matric (WED_3); and (4) matriculation and above (WED_4) to capture potential non-linear schooling effects, as found by Ben-Porath (1974) for Israel. However, for men's educational level only a single dummy variable for all educational categories above illiteracy was used in the regression analysis, because it was found that alternative measures similar to women's education did not produce any significant difference in the sum of squares of residuals explained by the regression equation. Theoretically, women's education variables are

Table 1

Means and Standard Deviations of Variables Used in Regressions for Different Age Cohorts of Women in Landed and Landless Households in Rural India

Variables	Definition	Women in Landed Households				Women in Landed Households			
		35-39	40-44	45-49	35-49	35-39	40-44	45-49	35-49
CEB_{71}	Children Ever Born in 1971 (i.e., as on June 30, 1971)	4.4226 (1.9423)	4.7927 (2.1558)	4.9252 (2.4034)	4.6868 (2.1636)	4.2727 (2.1803)	4.4602 (2.3156)	4.9160 (2.5293)	4.5049 (2.3362)
WED_2	Education Level of Women =1 if primary or below =0 otherwise	0.0785 (0.2690)	0.0364 (0.1873)	0.0436 (0.2042)	0.0549 (0.2278)	0.1313 (0.3377)	0.0682 (0.2521)	0.1145 (0.3189)	0.1050 (0.3065)
WED_3	Education Level of Women =1 if above primary but below matric =0 otherwise	0.0439 (0.2048)	0.0252 (0.1567)	0.0218 (0.1461)	0.0315 (0.1747)	0.0354 (0.1847)	0.0398 (0.1954)	0.0382 (0.1916)	0.0376 (0.1903)
WED_4	Education Level of Women =1 if matric and above =0 otherwise	0.0139 (0.1169)	0.0140 (0.1175)	0.0093 (0.9622)	0.0126 (0.1115)	0.0404 (0.1969)	0.0114 (0.1060)	0.0229 (0.1496)	0.0257 (0.1584)
MED	Education Level of Husband =1 if primary or above =0 otherwise	0.6374 (0.4807)	0.6779 (0.4673)	0.7726 (0.4192)	0.6895 (0.4627)	0.6313 (0.4824)	0.6307 (0.4826)	0.7099 (0.4538)	0.6515 (0.4765)
IADP	If Parents Live in the Intensive Agricultural Development Program District = 1 Otherwise = 0	0.1871 (0.3899)	0.2381 (0.4259)	0.2399 (0.4270)	0.2187 (0.4134)	0.2727 (0.4454)	0.2273 (0.4191)	0.2595 (0.4384)	0.2535 (0.4350)
AGEW	Age of the Woman in Completed Years as on June 30, 1971	36.35 (1.40)	40.87 (1.29)	46.29 (1.41)	40.67 (4.28)	36.06 (1.35)	40.91 (1.32)	46.29 (1.48)	40.41 (4.29)
NORTH	If the parents live in the Northern Region[a] = 1 Otherwise = 0	0.3626 (0.4807)	0.3417 (0.4743)	0.3209 (0.4668)	0.3438 (0.4750)	0.2374 (0.4255)	0.3125 (0.4635)	0.3130 (0.4637)	0.2832 (0.4505)
SOUTH	If the parents live in the Southern Region[b] = 1 Otherwise = 0	0.2217 (0.4154)	0.2689 (0.4434)	0.2150 (0.4108)	0.2349 (0.4240)	0.3990 (0.4897)	0.3011 (0.4587)	0.3359 (0.4723)	0.3485 (0.4765)
EAST	If the parents live in the Eastern Region[c] = 1 Otherwise = 0	0.1755 (0.3804)	0.1513 (0.3583)	0.1745 (0.3795)	0.1674 (0.3733)	0.1465 (0.3536)	0.1818 (0.3857)	0.1603 (0.3669)	0.1624 (0.3688)
GCA	Gross Area Cultivated by the household in Hectares	5.2791 (4.9935)	4.7685 (4.5412)	4.7346 (4.8347)	4.9577 (4.8130)	0	0	0	0
FARMAST	Value of Farm Implements, Including tractor owned by the household, in thousand Rupees	1.8869 (3.4510)	1.4233 (2.5294)	2.3129 (4.3253)	1.8610 (3.4962)	0	0	0	0
DIST.	Distance of the village in which parents live to the nearest town, in kilometers	28.46 (107.00)	21.42 (54.79)	25.61 (78.77)	25.37 (85.00)	27.76 (100.81)	28.72 (105.67)	33.92 (122.88)	29.69 (108.62)
EDIN	If there is an Educational Institution in the village where the parents live = 1 otherwise = 0	0.8961 (0.3052)	0.8992 (0.3011)	0.9533 (0.2111)	0.9136 (0.2810)	0.9495 (0.2190)	0.9375 (0.2421)	0.9618 (0.1916)	0.9485 (0.2210)
RFAC	If there is a Registered Factory in the village or neighboring village = 1 Otherwise = 0	0.0580 (0.2196)	0.0504 (0.2188)	0.0373 (0.1897)	0.0468 (0.2112)	0.1515 (0.3585)	0.0966 (0.2954)	0.1145 (9.3184)	0.1228 (0.3282)
LVSK	Value of livestock owned by the household, in thousand Rs.	0.8956 (1.4137)	0.8841 (1.4526)	1.0375 (1.5469)	0.9329 (1.4672)	0.1315 (0.5236)	0.1680 (0.7555)	0.1086 (0.4225)	0.1383 (0.5944)
HCEN	If a health center exists in the village where the parents live = 1 Otherwise = 0	0.2309 (0.4214)	0.1569 (0.3637)	0.2617 (0.4396)	0.2160 (0.4115)	0.4545 (0.4979)	0.3864 (0.4869)	0.4427 (0.4967)	0.4277 (0.4947)
ELEC	If the household used electricity = 1 Otherwise = 0	0.3002 (0.4584)	0.2409 (0.4276)	0.2835 (0.4507)	0.2763 (0.4472)	0.5202 (0.4996)	0.4489 (0.4974)	0.5038 (0.5000)	0.4911 (0.4999)
CDRT	Child Death Rate = Number of Children Dead / No. of Children Ever Born	0.0797 (0.1613)	0.0869 (0.1574)	0.0852 (0.1531)	0.0836 (0.1610)	0.0705 (0.1614)	0.1033 (0.2011)	0.1202 (0.1902)	0.0948 (0.1847)
Number of Observations		433	357	321	1111	198	176	131	505

Sources: Additional Rural Incomes Survey, Third Round, 1970-71, National Council of Applied Economic Research, New Delhi

Note: [a]Haryana, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Punjab, Uttar Pradesh

[b]Andhra Pradesh, Kerala, Mysore (Karnataka), Tamil Nadu [c]Assam, Bihar, Orissa, West Bengal.

The Western region consisting of Gujarat Maharashtra, and Rajasthan states is omitted from the regression equations. The standard deviations of the variables are reported in parentheses beneath the means. The values are unweighted.

expected to be negatively associated with the fertility and the men's education (representing the income effect) is expected to be positively associated with the number of children-ever-born per women.

In addition to the empirical testing of the hypothesis relating to the effects of the education of women and men on the fertility (the number of children-ever-born per women) in the theoretical framework described in the previous section, the ARIS data enables us to establish the relationship between fertility and child mortality. Although the theory of household choice does not indicate the nature of the relationship between fertility and child mortality, one could expect a priori that the relationship would be positive. (See for the empirical evidence T. P. Schultz (1974) DaVanzo 1970; Harman, 1970; Nerlove and Schultz, 1970; Rutstein 1971.)

As T. Paul Schultz (1974) pointed out, "If we assume that parents are motivated to bear children to accrue benefits from their mature surviving offspring, the effects of child mortality on desired fertility can be divided into two partially offsetting effects: (1) the demand for survivors and (2) the derived demand for births. Child mortality decreases the number of survivors demanded by increasing the expected cost per survivor; it increases the derived demand for births by increasing the number of births required to obtain a survivor. The final derived demand for births will respond positively to the incidence of child mortality only if the product of the relative change in expected cost per survivor and the price elasticity of demand per survivor is less than unity (in absolute value). In the event that the family reduces its completed fertility (i.e., birth) as the incidence of child mortality declines,

this tendency toward demographic stability within the family may be interpreted as evidence that parents' demand for surviving children is relatively price inelastic. (O'Hara, 1972; Ben-Porath and Welch, 1972). . . . Multiple regression analyses based on both individual and grouped data indicate that the relationship between fertility and child mortality is positive and statistically significant in such varied environments and periods as Bangladesh (1951-1961), Puerto Rico (1950-1960); Taiwan (1964-1969), Chile (1960), and the Philippines (1968)." In the present analysis of ARIS data, the child mortality variable is defined as the ratio of the number of children dead to the number of children-ever-born per women. From an analysis of a time series of cross-sections T. Paul Schultz, (1972) found that aggregate cross-sectional estimates of the responsiveness of fertility to child mortality may be biased upward. However, the nature of the response is nonetheless important to be investigated for rural India.

In order to measure the effect of the new agricultural development programs on fertility of women in rural India, the IADP variable is included in the regression equations. A priori, one could expect a positive association between IADP and fertility variables, assuming that other factors remain the same.

The value of livestock of the household (LVSK) variable is expected to reflect the economic contribution of children because herding of cattle is one of the important tasks performed by children in rural India. and therefore it could be positively associated with fertility.

The analysis reported in this paper includes, in addition to the above

mentioned variables, some variables representing the community characteristics for which sample survey data are available, such as the existence of a factory in the village where the parents live (RFAC), the existence of a health center in the village (HCEN), the presence of an educational institution in the village (EDIN), the use of electricity (ELEC) and the distance of the village in which parents live to the nearest urban center (DIST)

The RFAC variable is expected to measure the effect of the availability of non-agricultural job opportunities for children and therefore a priori expected to have a positive influence on the demand for children.

The effect of the presence of a health center (HCEN variable) on the fertility is difficult to predict when we are controlling for the effect of child mortality along with other factors. If the parents take advantage of this institutional facility to acquire knowledge and use of contraceptive methods to limit the family size this may have negative effect whereas if it improves the health of children by reducing the sickness and loss of work it may improve the productivity of children in rural areas and thus have a positive effect on the demand for children.

The existence of an educational institution (EDIN variable), although it does not reflect the quality of schooling the children can get in the village, does reflect the opportunities for improving the productivity of children and thus increasing their economic value in the long run. Whether this variable has any effect or not on the demand for children in rural India will be of some empirical interest with policy implications.

The effect of the use of electricity (ELEC variable) in rural areas on the demand for children is also difficult to predict. This variable could be positively associated with fertility, if the use of electricity is for irrigation which increases the productivity of labor, including that of children employed on the farm.

The DIST variable is used here as a proxy for the cost of migration and better employment opportunities in urban areas. One could therefore expect that if the distance between the place of residence and the nearest urban center increases, it will have a negative impact on the demand for children, other things remaining the same.

AGEW (age of the woman in completed years), is used in the regression equations to control the effect of biological factors, since the women in the sample may be still in the child-bearing period.

Table 2 shows the OLS estimates of the regressions on children-ever born per women in the cultivator households and noncultivator households separately for women in the age groups of 35-39 years, 40-44 years, 45-49 years and for the pooled sample of 35-49 age group.

The women's education variables are generally negatively associated with the fertility, controlling for the effect of other variables, although not statistically significant in some cases. For the women in landed households in the age group of 35-39, higher level of schooling (WED_4) turned out to be statistically significant at 0.01 level and negative. The regression analysis for the pooled sample of women in landed households in the 35-49 age group shows that the negative effect of women's educational level on fertility increases as the level of education goes up. In other words, if women in the landed households are educated beyond primary level, there will be a statistically significant negative effect on their fertility, other things remaining the same.

For the women in landless households, the influence of women's education variables on their fertility turned out to be statistically not significant at ten per cent level, although they have negative signs generally

Table 2

Regressions on Children-Ever-Born per Ever Married Woman by Age in 1971 in Landed and Landless Households in Rural India

Explanatory Variable	Landed Households				Landless Households			
	Age Group			Pooled	Age Group			Pooled
	35-39	40-44	45-49	35-49	35-39	40-44	45-49	35-49
WED_2	0.3718	-0.397	-0.987	-0.247	-0.488	0.417	-1.029	-0.165
	(1.08)	(-0.64)	(-1.57)	(-0.89)	(-1.03)	(0.58)	(-1.32)	(-0.48)
WED_3	-0.082	-0.754	-1.575	-0.599	-1.252	-0.032	-1.260	-0.431
	(-0.18)	(-1.02)	(-1.81)	(-1.66)	(-1.57)	(-0.04)	(-1.06)	(-0.82)
WED_4	-2.393	-0.902	-0.670	-1.442	-0.636	0.739	-2.212	-0.464
	(-3.06)	(-0.94)	(-0.51)	(-2.57)	(-0.81)	(0.43)	(-1.46)	(-0.72)
(a)	3.68	0.68	1.83	3.10	1.10	0.17	1.30	0.39
MED	0.6526	1.0559	1.3075	0.9526	1.383	1.000	1.418	1.193
	(3.33)	(4.33)	(4.29)	(6.90)	(4.17)	(2.75)	(2.70)	(5.36)
CDRT	0.760	2.538	4.491	2.389	4.166	4.225	2.098	3.643
	(1.32)	(3.85)	(5.42)	(6.15)	(4.63)	(4.89)	(1.70)	(6.74)
AGEW	0.178	0.118	-0.123	0.036	0.258	-0.043	-0.286	0.031
	(2.77)	(1.38)	(-1.39)	(2.49)	(2.41)	(-0.33)	(-1.88)	(1.37)
LVSK	-0.079	0.261	0.090	-0.0005	-0.113	0.048	0.900	0.171
	(-0.81)	(1.61)	(0.75)	(-0.01)	(-0.40)	(0.17)	(1.72)	(1.01)
GCA	0.0515	0.0486	0.0280	0.0482	-	-	-	-
	(2.82)	(1.96)	(1.06)	(3.72)				
IADP	0.2756	0.2128	0.0313	0.1069	-0.422	-0.201	-0.136	-0.234
	(1.16)	(0.78)	(0.10)	(0.69)	(-1.23)	(-0.50)	(-0.26)	(-1.01)
HCEN	0.5308	0.7027	0.0903	0.4562	0.091	0.300	1.022	0.411
	(2.35)	(2.18)	(0.30)	(2.87)	(0.27)	(0.73)	(1.82)	(1.76)
EDIN	-0.326	0.121	0.234	0.033	-0.569	0.751	-1.366	-0.104
	(-1.06)	(0.33)	(0.39)	(0.15)	(-0.84)	(1.08)	(-1.17)	(-0.23)
RFAC	0.8438	0.977	-0.978	0.515	-0.058	-0.066	-0.970	-0.398
	(2.02)	(1.91)	(-1.44)	(1.73)	(-0.13)	(-0 11)	(-1.34)	(-1.26)
ELEC	-0.488	-0.445	-0.402	-0.436	0.307	-0.500	0.789	0.068
	(-2.39)	(-1.67)	(-1.36)	(-3.02)	(0.91)	(-1.32)	(1.56)	(0.31)
DIST	-0.0003	0.0006	-0.0013	-0.0007	-0.0030	-0.0019	-0.0004	-0.0021
	(-0.41)	(0.32)	(-0.82)	(-0.90)	(-2.13)	(-1.05)	(-0.24)	(-2.34)
FARMAST	0.0718	-0.186	0.0351	0.0284	-	-	-	-
	(1.79)	(-1.98)	(0.81)	(1.03)				
INTERCEPT	-2.624	-1.347	8.950	2.071	-5.503	4.615	17.634	2.201
	-1.10	(-0.38)	(2.14)	(3.35)	(-1.39)	(0.86)	(2.52)	(2.1)
R^2	0.1265	0.1476	0.1951	0.1183	0.2389	0.2028	0.1803	0.1634
F Statistic DF (n_1, n_2)	4.03 (15,417)	3.94 (15,341)	4.93 (15,305)	9.80 (15,1095)	4.44 (13,183)	3.17 (13,162)	1.98 (13,117)	7.38 (13,491)
SEE	1.850	2.037	2.212	2.046	1.973	2.155	2.423	2.167
$\bar{R}^2$	0.0951	0.1101	0.1555	0.1063	0.1851	0.1389	0.0892	0.1413

Note: t-statistics are reported in parentheses beneath regression coefficients.

(a) F-statistic for the set of coefficients of women's education with $(3, n_2)$ degrees of freedom.

and the coefficients in Table 2 for pooled sample of 35-49 age group in particular exhibited an increasing tendency as the level of education increased. These results could perhaps be interpreted to show that the opportunity cost of the mother's time in bearing and rearing children in landed households is relatively more important than in the landless households. This finding suggests that, ceteris paribus, increasing the women's education would reduce the fertility for landed households.

The men's education variable turned out to be statistically significant and positive in both landed and landless households for all age cohorts. Thus, the hypothesis that the growth in men's education, which may be considered as a proxy for income, is associated with increased demand for children, other things remaining the same, is not rejected by these data.

Child mortality (CDRT) is found to be positively associated with cohort fertility in both landed households and landless households. It may be of some interest to note that in Table 2, the size of the coefficient of CDRT increases as the cohort ages in the landed households, whereas there is no such tendency to be observed for women in the landless households. The coefficient of CDRT for women in the landless households in the age groups of 35-39 and 40-44 years appear to be relatively large indicating perhaps a relatively quicker response to adjust fertility for the incidence of child mortality in landless households compared to landed households.

As one might expect, the AGEW turned out to be significantly positive for women in the age group of 35-39 years in both landed and landless households. However, for the women in older age groups, this variable turned out to be either negative or not statistically different from zero.

The livestock variable (LVSK) is an important factor affecting the demand for children only in the case of women in the age group of 45-49 years in landless households.

IADP turned out to be positively associated with fertility of women in landed households and has a negative sign for its coefficient in the case of women in landless households. However, the regression coefficients of the variable turned out to be statistically not significantly different from zero and hence one may have to interpret that this factor is not very important in influencing the decisions of the parents as yet in rural India.

The presence of a health center in the village (HCEN) has positive influence on the demand for children whereas the existence of an educational institution (EDIN) has no influence since its coefficient turned out to be significantly not different from zero.

The electricity variable (ELEC) has a significant negative impact on demand for children for the landed households in rural India, whereas it has no statistically significant effect for landless households.

The distance variable (DIST) turned out to be negatively associated, as expected, with the demand for children--however, it is significant only for the landless households. This is perhaps not surprising because the migration factor or value of employment opportunities for children in urban areas is relatively more important for landless parents compared to those who have landed interests in the village.

The farm assets (FARMAST) variable turned out to be statistically significant and positive for women in the younger age cohort (35-39) but negative in the case of women in the 40-44 age group and not significant for women in the 45-49 age group. These results are difficult to interpret. One could speculate that the investment in farm assets is a complementary good which increases the productivity of children on the farm only when the parents are relatively young, whereas it becomes a substitute for children for women in the age group of 40-44 years.

An attempt is made to include in the regression equations presented in Table 3 dummy variables for the Regions (North, South, East, West) in which the parents live in order to test whether there are any significant regional differences associated with the socio-cultural factors that affect the demand for children in rural India. The regression coefficients for the regions turned out to be statistically significant and negative. In the case of landless households particularly, the negative coefficient for the Southern Region turned out to be relatively larger indicating that fertility would decline relatively more in South India compared to other regions, if all other things remain the same. This finding is consistent with the fact that in Kerala State in the South, the birth rate started to decline relatively earlier than in other states of India.[13]

The estimated elasticities of fertility with respect to the central variables are reported in Table 4. These estimates appear to be reasonably consistent with the estimates of elasticities of fertility obtained by other researchers for developing countries.[14] It is interesting to note that the elasticity of fertility with respect to the size of land culti-

Table 3

Regressions on Children-Ever-Born for Married Woman of Different Age Cohorts in Landed and Landless Households in Rural India (With Regional Dummy Variables)

Explanatory Variable	Landed Households				Landless Households			
	Age Group			Pooled	Age Group			Pooled
	35-39	40-44	45-49	35-49	35-39	40-44	45-49	35-49
WED_2	0.5242	-0.463	-0.918	-0.162	-0.393	0.929	-0.584	0.115
	(1.51)	(-0.79)	(-1.50)	(-0.59)	(-0.80)	(1.26)	(-0.74)	(0.33)
WED_3	0.1219	-0.605	-1.473	-0.394	-1.074	0.092	-0.978	-0.189
	(0.27)	(-0.81)	(-1.72)	(-1.10)	(-1.32)	(0.10)	(-0.82)	(-0.36)
WED_4	-2.096	-0.891	-0.339	-1.171	-0.428	0.302	-2.090	-0.237
	(-2.67)	(-0.94)	(-0.267)	(-2.10)	(-0.53	(0.17	(-1.40)	(-0.37)
(a)	3.43	0.62	1.61	1.82	0.68	0.54	0.85	0.15
MED	0.6619	1.0067	1.3219	0.9350	1.3826	0.9515	1.0994	1.1017
	(3.40)	(4.16)	(4.44)	(6.87)	(4.12)	(2.61)	(2.04)	(4.94)
CDRT	0.612	2.105	3.844	2.071	3.968	3.776	1.849	3.280
	(1.06)	(3.14)	(4.63)	(5.32)	(4.26)	(4.26)	(1.51)	(5.95)
AGEW	0.1542	0.1193	-0.096	0.0334	0.2628	-0.087	-0.245	0.033
	(2.39)	(1.37)	(-1.09)	(2.32)	(2.45)	(-0.68)	(-1.59)	(1.45)
LVSK	-0.096	0.2983	0.160	0.0112	-0.165	0.058	1.054	0.173
	(-0.97)	(1.82)	(1.29)	(0.17)	(-0.59)	(0.21)	(2.04)	(1.04)
GCA	0.0442	0.0367	0.0119	0.0386	-	-	-	-
	(2.36)	(1.47)	(0.44)	(2.95)	-	-	-	-
IADP	0.2754	0.3231	0.1007	0.1542	-0.342	-0.122	-0.025	-0.120
	(1.16)	(1.18)	(0.33)	(1.00)	(-0.98)	(-0.30)	(-0.05)	(-0.52)
HCEN	0.4779	0.7194	-0.103	0.3652	0.0989	0.2545	0.9807	0.4045
	(2.09)	(2.22)	(-0.34)	(2.29)	(0.30)	(0.63)	(1.75)	(1.77)
EDIN	-0.264	-0.064	0.058	-0.017	-0.780	0.512	-1.561	-0.356
	(-0.82)	(-0.17)	(0.09)	(-0.76)	(-1.15)	(0.73)	(-1.35)	(-0.80)
RFAC	0.8513	1.1471	-0.835	0.6284	-0.055	-0.101	-0.996	-0.393
	(2.04)	(2.22)	(-1.25)	(2.12)	(-0.12)	(-0.17)	(-1.38)	(-1.25)
ELEC	-0.340	-0.444	-0.228	-0.333	0.626	-0.100	1.204	0.446
	(-1.55)	(-1.59)	(-0.75)	(-2.2)	(1.71)	(-0.25)	(2.31)	(1.89)
DIST	-0.0001	0.0008	-0.0008	-0.0005	-0.0028	-0.0017	-0.0009	-0.0021
	(-0.16)	(0.41)	(-0.53)	(-0.66)	(-2.03)	(-0.94)	(-0.48)	(-2.33)
FARMAST	0.0765	-0.203	0.0237	0.0258	-	-	-	-
	(1.90)	(-2.15)	(0.54)	(0.94)	-	-	-	-
NORTH	-0.162	-0.790	-1.190	-0.620	-0.749	-0.489	-1.084	-0.728
	(-0.64)	(-2.53)	(-3.42)	(-3.62)	(-1.69)	(-0.98)	(-1.64)	(-2.50)
SOUTH	-0.766	-0.774	-1.278	-0.940	-0.991	-1.434	-1.824	-1.389
	(-2.67)	(-2.37)	(-3.40)	(-5.03)	(-2.21)	(-2.69)	(-2.66)	(-4.61)
EAST	-0.261	-1.155	-1.376	-0.895	-0.520	-0.646	-1.083	-0.729
	(-0.92)	(-3.10)	(-3.59)	(-4.55)	(-1.06)	(-1.18)	(-1.39)	(-2.23)
(b)	2.59	3.94	6.61	10.93	1.75	2.61	2.37	7.10
INTERCEPT	-1.550	-0.501	8.879	2.858	-5.028	7.215	17.025	3.028
	(-0.64)	(-0.14)	(2.12)	(4.54)	(-1.28)	(1.35)	(2.44)	(3.02)
R^2	0.1426	0.1764	0.2447	0.1441	0.2604	0.2403	0.2284	0.1984
F Statistic	3.82	4.02	5.44	10.21	3.98	3.14	2.11	7.55
DF (n_1, n_2,)	(18,414)	(18,338)	(18,302)	(18,1092)	(16,181)	(16,159)	(16,114)	(16,488)
SEE	1.839	2.012	2.153	2.019	1.961	2.124	2.382	2.128
$\bar{R}^2$	0.1053	0.1325	0.1997	0.1300	0.1950	0.1638	0.1201	0.1721

Note: t statistics are reported in parentheses beneath regression coefficients

(a) F-statistic for the set of coefficients of women's education with (3, n_2) degrees of freedom

(b) F-statistic for the set of coefficients of Regions- North, South, East with (3, n_2) degrees of freedom

Table 4

Estimates of Elasticities of Demand for Children in Rural India
(With Respect to Central Variables in the Regression Equations of Table 2)

Explanatory Variable	Landed Households				Landless Households			
	35-39	40-44	45-49	Pooled 35-49	35-39	40-44	45-49	Pooled 35-49
Women's Education								
WED_2	0.0066	-0.0029	-0.0087	-0.0029	-0.0150	0.0064	-0.0240	-0.0038
WED_3	-0.0008	-0.0040	-0.0070	-0.0040	-0.0104	-0.0003	-0.0098	-0.0036
WED_4	-0.0075	-0.0026	-0.0013	-0.0039	-0.0060	0.0019	-0.0103	-0.0026
Men's Education	0.0941	0.1493	0.2051	0.1401	0.2043	0.1414	0.2047	0.1726
Mortality	0.0137	0.0460	0.0777	0.0426	0.0688	0.0978	0.0513	0.0767
Size of Land Cultivated	0.0615	0.0484	0.0269	0.0510	-	-	-	-

Note: Elasticity coefficients are estimated at the point of means. The elasticities with respect to the education dummy variables will have to be interpreted carefully.

vated appear to decline as cohort ages for women in landed households.

IV. Summing Up

The main objective of this study is to estimate the nature of influence of parental educational level, landholdings, child mortality and community level indicators of socio-economic development on fertility (i.e., the number of children-ever-born per women) of married women in rural India. Analysis of the sample survey data (third round of ARIS conducted by the NCAER, New Delhi for 1970-71) is performed separately for women in the landed households (i.e., farming families) and for women in the landless households (i.e., non-cultivators), because landownership and cultivation is assumed to increase the price of time of mothers and increase the opportunity value of child labor. Classification of households by caste or religion, potentially important for the study, was not possible due to lack of relevant data in the ARIS data files.

The results of analysis presented in this paper reveal that, controlling for the effect of other variables,

(a) husband's education increases the fertility--which is interpreted in the theoretical framework for analysis as the income effect on demand for children;

(b) wife's education reduces the fertility for the landed households --which may be interpreted in the theoretical framework of the analysis to show that for the women in landed households education increases the value of their time in allocative management of farm resources;

(c) the size of land cultivated by the household increases the fertility showing a positive wealth effect on the demand for children by the landed households; and

(d) the fertility is generally higher in those rural households, whether they are cultivators or non-cultivators, that experience higher child mortality rates indicating that a reduction in child mortality levels will reduce the fertility of women in rural India.

Most village level variables turned out to be not statistically significant in accounting for fertility differences, although landed households in the IADP villages had somewhat higher fertility and households in the Southern region of India exhibited notably lower fertility, controlling for the effect of other individual household characteristics. The existence of a factory in the village had a significant positive impact on the demand for children for the landed households and turned out to be not significant for landless households.

The distance from the village to the nearest urban center representing the cost of migration or obtaining employment opportunities in urban areas had the anticipated negative association with fertility--but it is statistically significant for the landless households only.

In conclusion, it may be noted that the results of a limited exercise presented in this paper demonstrated the usefulness of the economic framework for analysis which suggests that parents in rural India, in deciding the number of births they will have, do respond to the advantages and disadvantages of having children. Too little

of the research work published on household decision-making in India is based on primary data. Testing of many of the findings reported here and the related issues in the economic framework of household behavior will provide useful insights for formulating appropriate policies in India.

FOOTNOTES

1. Implementation of the family planning program, under the Indian constitution, is largely the responsibility of the state governments. The tardy progress made in this field is partly because public apporval and acceptance of this are largely missing, while the policies and programs are prepared from the top by the central government. See, for an elaboration of this, V. Jagannadham (1973).

2. See, for example, a report by Kasturi Rangan in the New York Times, Sunday, August 21, 1977, Page E 3, which clearly states that "India's states were allotted impossibly high sterilization targets and failure to meet them resulted in demotions or dismissals. Chief state ministers vied with each other to please the "prince", as the son of Mrs. Indira Gandhi, came to be known, and ordered involuntary sterilization. Riots in which police gun fire killed several hundred persons, ensued in Haryana, Delhi, Uttar Pradesh, and Bihar states. Several hundred more persons, according to official reports, died of infections after sterilization operations. Due to censorship, news of deaths was suppressed. Opposition to the sterilization program was a factor in Mrs. Gandhi's defeat last March."

3. See, for example, Paul Demeny (1976) who stated that "the economic theory of fertility presented by Professor Paul Schultz had a potentially important role to play in clarifying the central issues of population policy, even though the crux of the problem lay in the field of politics rather than in the field of pure theory of econometrics." (emphasis added).

4. See, for example, a survey article on "Demographic Research in India: 1947-1965" by Ashish Bose in Ashish Bose et. al. (1974). Also S. N. Agarwala (1973) S. Chandrasekhar (1972) S. P. Jain (1964), and Vasaria and Jain (1976).

5. See T. Paul Schultz (1977) for an elaboration of this view.

6. The value of children is a topic on which theorizing bout fertility from different academic viewpoints has begun to converge in recent years. See J. T. Fawcett et. al. (1974), F. Arnold et. al. (1975), B. Berelson (1972), E. Mueller (1976) and R. G. Repetto (1976).

7. See, for example, M. Mamdani (1972) and M. Nag (1972). Also, Paul J. Isenman and H. W. Singer (1977) argued that "In very poor countries, children, who become net positive economic assets at a young age, are the best insurance against a disastrous reduction in family earnings through disability or old age."

8. Rosenzweig and Evenson (Econometrica, July 1977) in their paper originally presented at the Third World Congress of the Econometric Society, Toronto, Canada, utilized the district level data on fertility, schooling and economic contribution of children in rural India. Most other previous studies of fertility in India, including those by R. B. Anker (1973); K. Dandekar (1967); V.M. Dandekar and K. Dandekar (1953); N. V. Sovani and K. Dandekar (1955); C. Chandrasekharan and M.V. George (1962); E. D. Driver (1963); P. B. Gupta and C. R. Malakar (1963); H. Loebner and E. Driver (1973); S. B. Mukherjee (1961); J. R. Rele (1963); J. N. Sinha (1957); M. L. Srivatsava (1969); G. S. Sahota and C. K. Sahota (1975); and G. B. Saxena (1969) have had a limited geographi-

cal scope in terms of their data base and with the exception of the Studies of Sahota and Sahota (1975) and Rosenzweig and Evenson (1977) previous studies of fertility are not based on any economic theoretical framework.

9. See M. T. R. Sarma et. al. (1975) for the sampling design, concepts and definitions used in the ARIS and M.T.R. Sarma (1976) for an analysis of the effects of children on selected items of consumption expenditure based on the ARIS data. Funds for additional coding of the data were provided by Resources for the Future, Inc.

10. The origins of this economic approach may be found in Becker (1960), Mincer (1963), Becker (1965), and elaborations in Willis (1974), Ben-Porath and Welch (1972), T. P. Schultz (1973,1974), T. W. Schultz (1973) Becker and Lewis (1974), DeTray (1974), Nerlove (1974), Michael (1974) and Pollack and Wachter (1975) and Rosenzweig (1977). Some critical comments and assessments of this theoretical framework may be found in Griliches (1974), Namboodiri (1972), Okun (1960), Duesenberry (1960), Easterlin (1975), S.H. Cochrane (1975), Blake (1968), Tobin (1974), Liebenstein (1974). Also, it may be relevant to note that Simon Kuznets (1969) stated that he would be inclined "to assign rather limited weight to the purely economic variables for several reasons: the decisions on birth rates are long-term, knowledge needed for the economic calculus is limited; and in less developed countries the effects of different social institutions and life patterns minimize eocnomic weights relative to sheer survival." Yoram Ben-Porath (1975) after a careful assessment of the re ent work in the micro-economics of fertility concludes that "as a framework it has encouraged systematic treatment of data connecting fertility and in improving the thinking about the determination of family size." Also, as T. W. Schultz (1974) pointed

out, a general theory of household decision-making is equally applicable to explain the fertility behaviour in low-income countries as it is in rich countries.

11. For many general economists in India who have only recently accepted human capital theory as not entirely useless but consider the economics of suicide or prostitution as a frivolous and not entirely respectable stretching of the discipline, the economics of fertility, as Yoram Ben-Porath (1975) put it, may still be in the grey area. Therefore it may be relevant for them as well as others to note that, although very little research work was done in India in extending economics to the study of fertility behaviour, interest among economists in developed countries has been revived by Leibenstein (1957), Becker (1960, 1965) Easterlin (1968, 1969, 1975) and T. W. Schultz (1974) who rendered a monumental service to the profession by bringing out a collection of recent studies in the economics of the family. Excellent surveys and evaluation of the studies on economics of fertility may be found in T. Paul Schultz (1973, 1974, 1976), H. Leibenstein (1974) and J. Simon (1974).

12. See Andre Beteille (1974), Studies in Agrarian Social Structure, Oxford University Press, Delhi 1974.

13. See U.N. (1975) Poverty, Unemployment and Development Policy: A Case Study of Selected Issues with Reference to Kerala, United Nations Publication, Sales No. E.75.IV.11, pp. 133-145.

14. See T. Paul Schultz, (1974) for a summary of the analytical results obtained for other developing countries.

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