An Investigation of Household Reproductive Behaviour in Pakistan

Mohammad, Irfan and Farooq, G. M. and Khan, Zubaida and Mohammad, Rafiq and Tariq, Javed Khan and Nasir, Mueen

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AN INVESTIGATION OF HOUSEHOLD REPRODUCTIVE BEHAVIOUR IN PAKISTAN

MOHAMMAD IRFAN
G.M. FAROOQ

Zubeda Khan, Mohammad Rafiq, Javaid Khan Tariq and Mueen Nasir

PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS
P.O.Box 1091, Islamabad

Project Director

Professor Syed Nawab Haider Naqvi
Director, PIDE

Project Manager

Dr. Mohammad Irfan
Chief of Research (Economics)

Project Team Members

1. Dr. Iqbal Alam, Chief of Research (Demography)
2. Mr. M. Naseem Iqbal Farooqui, Research Demographer
3. Mrs. Naushin Mahmood Qureshi, Research Demographer
4. Miss Nasreen Abbasi, Research Demographer
5. Mr. Ghulam Yasin Soomro, Research Demographer
6. Miss Zubeda Khan, Research Demographer
7. Miss Talat K. Alauddin, Research Economist
8. Mr. S. Mubashir Ali, Staff Demographer
9. Mr. H.B. Siyal, Staff Demographer
10. Mr. Khalid Hameed Sheikh, Staff Demographer
11. Mr. Ghulam Mohammad Arif, Associate Staff Economist
12. Mr. M. Javed Tariq, Associate Staff Economist
13. Mr. Ghulam Mustafa Zahid, Associate Staff Demographer
14. Miss Rashida Haq, Associate Staff Economist
15. Mr. Zafar Mueen Nasir, Associate Staff Economist
16. Mr. Sharif-ul-Haq Grewal, Research Assistant
17. Mr. Mohammad Rafiq, Senior Computer Programmer
18. Mr. Mohammad Khalid, Senior Computer Programmer
19. Mr. Furqan Ahmed Farooqui, Computer Programmer
20. Syed Tariq Ahmed, Computer Programmer
22. Mr. Javed Akbar Gil, Computer Programmer

PREFACE

The need for 'endogenizing' demographic variables in development planning is now widely recognized. The planners have to spread their analytical net wider to capture in one 'go' both the demographic and socio-economic variables. This requires an explicit recognition of the two-way link between changes in fertility on the one hand and those in labour market, wages, income distribution, consumption, savings, investment and other variables on the other. The research work done so far in Pakistan has inadequately addressed itself to this two-way linkage between demographic and socio-economic phenomena. Researchers, constrained by limitations of both data and analytical framework, have tended to study the demographic phenomenon of fertility in isolation from such related matters as labour force participation, rural-urban migration and income and expenditure patterns. These studies have failed to analyse simultaneously the demographic, production and consumption decisions of households. For instance, high fertility rates are generally attributed to biological determinants alone which can be influenced by large supplies of such clinical devices as contraceptives. Such notions about the fertility behaviour of the households have given birth to ineffective government policies. That the many population planning adventures, taking mostly the form of crash programmes, undertaken so far have foundered should not surprise anyone. Fertility, like love that sustains it, is a many-splendoured thing. It must be seen in a broader socio-economic context.

The nature of the influences of economic forces, both direct and indirect, on fertility behaviour should therefore constitute a major area of concern for social scientists and policy makers. To make a start in

this direction, the inter-linkages between such variables as fertility, labour force participation and migration and their effects on the household income and expenditure behaviour must be studied. Such a study should permit us to understand better the decision-making process of the household, which is the basic unit in both the demographic and economic analyses. Research studies of this genre have already been carried out in many other developing countries and have provided gainful insights into the determinants of household economic-demographic behaviour. However, in Pakistan the present exercise is the first of its kind.

In order to understand better the economic-demographic interface the project entitled "Studies in Population, Labour Force and Migration" has been undertaken by the Pakistan Institute of Development Economics in collaboration with the ILO and UNFPA. The project is a 'four-in-one' venture based on a national sample, the field-work for which was undertaken by the Statistics Division (formerly called Central Statistical Office, or CSO for short) covering 10,288 households. The survey generated a wealth of data on the household decision-making process concerning the behaviour of the connected foursome — viz. fertility, migration, labour force participation and income and expenditure. Every effort has been made to ensure reliability of the data. This study, which is being brought out in the form of a series of seven 'first' reports, would enhance our understanding of the behaviour of households with respect to the various ways in which they go about fulfilling their 'basic needs'. Even more important, it should lay the foundations of economic demography in Pakistan, opening up new areas of multi-disciplinary research that could not be perceived before. This study should also provide the researcher with a sufficient feel for the real world to permit formal economic-demographic modelling exercises. In this respect the present reports are truly pioneering both in intent and in purpose.

Syed Nawab Haider Naqvi

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Muhammad Irfan

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Introduction:

The premise that the rapid population growth, currently being experienced by the developing world, adversely affects the attainment of social and economic development led many governments to formulate anti-natalist policies. It has become almost conventional wisdom for governments to make selective policy interventions to influence the fertility decisions of individuals, even though there are some doubts as to its welfare-economic implications (Blandy, 1974). What remains the subject of debate (if not controversy) is the most effective means of achieving this objective.

Few observers doubt the evidence of recent declines in population growth and fertility in the developing world. Countries of the South and South East Asia region experienced an average annual population growth rate of 2% in the 1970's, as compared with 2.2% in the preceding decade. Birth rates continued to decline in the region, from an estimated 37 per-thousand in 1965-70 to 29 in 1975-80. Much of this was due to East Asian experience, with less promising results for South Asia. What remains at issue, however, is the underlying factors responsible for these declines, and how these can by "harnessed" by social and economic policy to hasten the process. There are those who maintain that strong government family planning programmes are a necessary (and some would suggest, sufficient) condition for fertility decline (Mauldin and Berelson, 1978). Other regard family planning programmes as much 'dependent' on the prevailing social

and economic conditions, as fertility itself (Demeny, 1979).[1]

From the point of view of population policy, there are two related needs regarding fertility study. First, an understanding is required of the underlying determinants of fertility. This, however, is not an end in itself. Policy makers need to translate this information into clear policy choices - to identify those fertility related factors that are most amenable to government intervention. It is probably fair comment that neither of these needs (and especially the latter) have been met by most fertility research (Ridker 1976, Miro and Potter, 1980 and Demeny, 1981).

One of the special difficulties facing fertility research is that a number of perspectives must be taken to tell the whole story, and to achieve a satisfactory level of rigour (Demeny, 1981). In logical order, the proximate determinants of fertility must first be properly understood. The Davis/Blake (1956) approach, modified more recently by Bongaarts (1978) has become accepted as the basic analytic accounting framework for fertility research. The four proximate determinants that have been shown to account for most if not all fertility variation, are marriage patterns, contraceptive use/effectiveness, prevalence of induced abortion and duration of lactational infecundability. Understanding these proximate or socio-biological determinants, paves the way for the study of more deep-seated behavioural determinants which relate to fertility decision making. Decisions on the timing and number of children born to a couple form the key to influencing final fertility outcome. A convenient theoretical

1. The contributions of Demeny (1979) and Bogue and Tsui (1979) serve to illustrate how debates on this issue can generate more heat than light.

construct used in research on fertility decision making is that of the standard consumer choice model of micro-economics. According to this approach, households, must combine time and commodities to engage in consumption activities and maximise their utilities (Becker, 1965).

Because parents derive utility directly from children, fertility decisions can be considered with this choice theoretic framework. Changes in incomes and prices will predictably influence demands, including the demand for children (T.P. Schultz, 1976). Elaborating the utility function of conventional micro-economics to accommodate the productive benefits of children and qualitative aspects, represents no major theoretical nor empirical problem (Rosenzweig and Evenson, 1977). Since children are 'time intensive' requiring considerable inputs of time especially from the mother, changes in income and wages, which affect the opportunity cost of time (and therefore of children), can have strong effects on the demand for children.

Moreover, with higher returns to education and human capital, the micre-economic theory of fertility has shown the likelihood of quantity-quality substitution, which entails the reduction in family size (quantity) to enhance the human capital of existing children (Becker and Lewis, 1973). The micro-economics of family formation and fertility decision making has been applied to fertility differences between socio-economic strata within developed countries, as well as inter-country fertility differentials and demographic 'transitions.

Most empirical enquiries into fertility decision making, whilst often involving micro-economics as the underlying theoretical framework, do not engage in rigorous tests of the theory. More often than not, multiple regression equations are specified, relying on rather ad-hoc theoretical specifications of the socio-economic variables selected to explain fertility. The influences of income (Repetto 1979, Simon 1974), family planning (Mauldin and Berelson, 1978), education (Susan Cochran) and female employment (Standing 1978) are well documented, if not entirely valid in every case.

Both the theoretically rigorous, choice-theoretic research and the more general socio-economic studies, often neglect a third perspective required in fertility research, viz the institutional environment of fertility behaviour. In most cases, studies are confined to explaining how decisions are taken within the family. But from the view point of policy and programme prescription, it is imperative that some understanding is gained of how environmental and institutional factors external to the household, alter fertility behaviour. Demeny (1981) in his review of priorities in fertility research, considers this perspective to be conspicuous by its absence from much of the fertility literature, despite its indispensable role in providing clues to the policy makers on how fertility may be indirectly influenced.

Our present concern is with fertility determinants on Pakistan. Based on the household data collected in connection with PIDE/ILO project "Studies in Population, Labour Force and Migration in Pakistan" an attempt

is made to ascertain the influence of various socio-economic variables on household fertility decision making. The analysis which follows is preliminary in nature and can be characterised as taking a general socio-economic approach.

The above mentioned (PLM) project used a two stage stratified random sample survey covering both urban and rural areas of Pakistan to collect the information. Four separate questionnaires were administered to roughly 10,300 households covered in the sample. The four questionnaire instruments - fertility, labour force, migration and income and expenditure generated comprehensive information on various dimensions of household behaviour. The questionnairas were so designed as to permit indepth analyses of household decision-making processes concerning fertility, labour force, migration, and income and expenditures. The fertility questionnaires was essentially the same as used in the Pakistan Fertility Survey (PFS),[2] which was undertaken in 1975 as part of the World Fertility Survey exercise (for details of the survey and its findings see(Population Planning Council of Pakistan, October 1976). The reason behind repeating the PFS questionnaire was to measure any changes which might have taken place over the 5-years period between 1975 and 1980 in fertility levels and preferences, and knowledge of attitude to and practice of contraception, availability of family planning of services, etc. The fertility schedule was applied only

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2. The only difference between the PFS and PLM survey questionnaire was the absence of household schedule from the latter. Information on household characteristics was designed to be obtained from the household schedule included in the migration questionnaire, which, as in cases of labour force and income-expenditure questionnaires, was addressed to the head of the household.

to eligible women in the household who were defined as ever-married and of ages 50 and below. Direct responses of about 9,000 eligible women (about one-eighth of the sample households did not report any eligible women) were obtained to the fertility questionnaire.[3] Questions were included: social and economic background characteristics of the respondent, her marriage and maternity history, additional number of children desired, ideal family size, contraceptive knowledge and use, work history and husband's background. Following the objective of determining the nature of interdepen-d dence between a household's behaviour with respect to production and to reproduction, the four data tapes on fertility, labour force, migration and income-expenditure were merged. A large number of important variables could, therefore, be extracted from the other data tapes to be added on the above mentioned fertility-related information obtained from the fertility schedule. The end result of these data processing exercises is the availability of a very rich body of data, which are currently subject of detailed investigation at PIDE. This paper is one of these exercises. In the companion papers not only fertility data discussed and compared with earlier findings but more exhaustive and comprehensive multivariate regression analyses are conducted to assess specificity of the relationship between independent variables and different measures of fertility, the dependent variables. Various fertility measures available from the survey are described below which is followed by a discussion on the choice and specification of independent variables in the next section. Regression results are presented in the third section.

3.It is perhaps worth mentioning that, given the sensitive nature of fertility questions and that the questionnaire was administered to women, only female interviewers were used. They were mostly employees of the Population Division (which is responsible for the national family planning programme) and most of them have had the experience of being enumerators in the PFS as well.

Various fertility measures are available from the survey data, such as children ever born (the cumulative fertility) sex distribution of live births as well as surviving children, number of additional children desired and ideal family size. In addition, information on the year of births occured affords construction of current fertility measures such as births during the last five years. In this paper Children Ever Born (CEB) is used as a measure of actual or realized fertility. It is the most commonly used indicator in micro-economic analysis of fertility behaviour, and is regarded as a meaningful measure for ascertaining the influence of various factors on reproduction outcomes of micro units (Farooq).

There are few problems with its use as a dependent variable. Incongruence between the temporal reference of the cumulative fertility (CEB) a life cycle phenomenon, and most of the explanatory variables which presumably capture the current status of the individuals and household, impair the validity of conclusion pertaining to strength and direction of the relationship between fertility and independent variables. Often a recourse has been made to use recent fertility (if recency can be defined and specified satisfactorily). Furthermore observed reproductive behaviour may diverge from the actual demand for children by the parents. The use of a relevant family size preference indicator as a dependent variable is considered important for capturing "demand for children" differentials among households. Both the current fertility and desired family size are analyzed in a companion paper whilst in this paper cumulative fertility is b subjected to investigation.

THE DETERMINANTS OF FERTILITY

To the extent fertility decisions are made within the context of the environment in which the household finds itself - the opportunities that exist in the labour market, schooling etc. environmental factors exogenous to the household must therefore be included in a household decision making model. In order to reckon with the changing environment, we make a distinction between the households in rural and urban areas. Both these subsets are further sub-divided. Urban metropolitan (population 400,000 and above) and urban non-metropolitan are separately analysed. This demarcation is geared to account for the dissimilarities in the job structure, life style, availability of services such as medical, educational, and other amenities of life.

Rural areas are further sub-classified along the lines whether a household falls under farming or non-farming activities. A household is identified as farm if cropped area is reported or the head of household reports his occupation as farmer or landless agricultural labourer. The rest of the households are classified as non-farm households. Notwithstanding the fact that a high degree of interlinkage exists between the two types of households, the difference in female work participation owing to cultural values, and the degree and nature of risk aversion, the prestige rank order, does exist between these two sub-groups. In order to account for the differential access to schooling, medical facilities and degree of village development, information on these variables at village level were collected seperately and added to the data.

This partitioning of the sample into four parts is an effort to understand the household decision-making in proper perspective. This approach to fertility analysis is expected to throw light on the specificity of the relationship between household or individual attributes with fertility to the set of apportunities and constraints defined by the society at large. That the characteristics of the people and households differ across these strata of the society is borne out by the mean values of various independent variables as provided in Appendix Table 1. Furthermore disentangling and partly controlling the influence of environment carries the potentials of lending deeper insight into the nature of association between fertility outcome and the micro-level variable discussed below.

As mentioned already a wide ranging information on various aspects of household behaviour is collected in the PLM survey. The available data set affords an opportunity to understand the nature of the relationship between variety of factors and fertility. This paper utilizes the information in addition to usual fertility related variables, on inter-alia, migration, children's education, female and her husband's employment and its characteristics, household income, land holdings, and nature of access to land, to understand the fertility differentials across households as evidenced by the survey. In the discussion below these variables are broadly classified into a) the proximate determinants, those which provide the accounting framework of fertility, as discussed in the introduction b) the set of variables which directly or indirectly bear upon the benefit and costs of children and c) other variable. Admittedly a neat demarcation line between different variables can hardly be drawn and even a meticulous classificatory scheme hardly succeeds in contending with border line cases.

THE PROXIMATE DETERMINANTS

Age at Marriage:

Age at marriage determines the reproductive span and potential supply of births. Completed fertility is found to decline with rising age at marriage irrespective of the development stage of the country (John C. Caldwell, Peter F. McDonald and Lado T. Ruzicka). Current age of female indexes, not only life cycle dimensions of family, but also the sub-fecundity and sterility associated with either end of female age distribution. Both these variables are used in the estimating equations, in addition the sample is stratified by age of female to capture the cohort (or vintage) effect (T.P. Schultz).

Breastfeeding:

Breastfeeding practices are often regarded as customary, but also can be explained as a choice variable (William P. Butz). Duration and intensity of breast-feeding wield their influence on child spacing and hence to some extent on total number of births through their effects on female fecundity. In the regression equation, two dummy variables are used to represent the mean duration of breast-feeding. The average number of months breast-fed is calculated only for those children who survived twenty four months or more.

Infant Mortality:

Based on the premise that higher infant or child mortality requires larger number of births to achieve a desired family size, the relationship between mortality and CEB is postulated to be positive. Effects of mortality on

subsequent fertility are enhanced if the deceased child was being breastfed. The inverse of survival ratio[1] is used to assess the effects of mortality.

Contraceptive Use:

Knowledge and use of contraception is reported to be quite low in the PLM survey. It has failed to register much improvement since 1965 when the family planning programme was officially started. The low adoption rate can partly be suspect because the possibilities exist where females may not admit the use of contraceptive more so in a milieu swayed by religious fervour. Besides this low level, it is difficult to determine the direction of causation between contraception and fertility outcome. A dummy variable denoting the use or non-use of contraceptive is used, however, in the estimating equation to gauge their influence on fertility.

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1. It must be noted that this variable is not indepenent of CEB, the dependent variable of the estimating equations.

BENEFITS AND COSTS OF CHILDREN

Parental motivations to have children often have been attributed to their perceived net benefits. Various benefits identified are the ones derived from pure consumption flows, from production flows through the work of the children and as a source of security in the old age of the parents. A decline in the net value of benefits from children has been regarded as a concomitant of transition from high to low fertility (Bulatao). Indeed, a major policy implication of Caldwell's "wealth flow theory" is to get the direction of transfer from children to parents reversed for achieving a fertility decline in the developing world.

Precise measurement of gross and net flow of transfer from children to parent is difficult and has defied efforts which employed time use surveys in anthropoligical studies. Furthermore, it is difficult to infer anything about the type of parents' motives being satisfied from an observation of the children's activity at a point in time. In addition, the magnitude of benefits to be derived by parents is to a large extent a function of their investment strategy in productive assets like children. Thus the level of income which a household enjoys, its expected variations over life time, the nature of demand for child labour in the household organization of its production, and costs of time and material inputs used up in raising the children are all important in this context.

Household Income:

Household income and wealth wields a positive influence on the number of children a couple would like to have. Many important modifications to this hypothesis have been made since Becker's original treatment of fertility as a constrained maximization problem. One major extension

was made by Willis (34), Becker and Tomes (5), and De Tray (13) in the decomposition of child services into quantity and quality and confronting the decision-making unit with this tradeoff. Therefore, because of quality desires, the observed relationship between income and quantity of children demanded may diverge from its true (i.e. positve) effect. This relationship may also reflect the effect of substitutability between private and public investment in child quality. This is further indicative of an indeterminate relationship between income and number of children demanded by a household. It also underscores the need to have a distinct variable accounting for the parental investment in the child quality which may depend on the parents' perception about the genetic endowment of the child as well as public investments in such fields as schooling, health, and sanitation which influence the quality of child and resulting in the substitution of parents' investment in the quality of children. In the estimating equation, household monthly income per adult is used to ascertain its effect on fertility, while a seperate variable to capture the parental investment is specified.

Land Ownership:

In the context of benefits and costs of children, the availability and size of land is an important variable. Given the familial and atomised nature of production, land acts as a complementary factor resulting in higher marginal productivity of children engaged as the size of the cropped area rises. That child work participation in farming communities is an important source of earning and hence functions as a pro-natalist force, appears to be a firm conclusion. This relationship may not be linear and the possibility of its acquiring a perverse sign cannot be ruled out either. The introduction of modern inputs into farming tends to substitute working hands,

besides the financing of investments of inputs like fertilizers and tractors, necessitates curtailment of family expenditure rather than having extra children to work with (Eva Mueller). Thus, under changing technological conditions, despite the unchanging familial organisation of production, the relationship between land and fertility are indeterminate a priori. Four binary variables are used in the estimating equations to ascertain the influence of land sizes on fertility decision making in rural farm household. In addition the influence of tractor on demand for children is also assessed by using a binary variable in the estimation.

Husband's Education and Occupation:

Husband's education has often been used to simulate the effect of permanent income, a more relevant variable, on the fertility outcomes. A positive association between husband's education and number of children is expected. However, if education connotes some status or distinct type of living standard, then it also carries a taste effect too. Similarly, husband's occupation reflects the relative position of the family and offspring in the social milieu. In order to maintain or improve upon that belonging to professional group
the parents/may have to invest more than the other occupational groups. Both high levels of education and occupation may, therefore, bear a negative influence on the demand of the children. In order to capture the non-linearities involved, binary variables reflecting different levels of education and occupations are used in the regression equations. In the case of rural non-farm households, usual occupation rather than standard occupational classifications are used. The latter depicts the hierarchical structure more realistically than the former, wherein, at one digit classification level, occupations experiencing a widely divergent life

style, such as primary school teachers and engineers, are lumped together. In the case of rural farm households, no occupational distinction is made because all of them belong to one occupation - farming. They are, however, distinguished on the basis of size of the cropped area and tenurial status.

Education of Mother:

The importance of wage and income changes is emphasized by economic theories of fertility. Since child bearing is intensive in mother's time, her opportunity cost of time or its correlates are expected to bear upon actual or desired family size. Both male and female wage elasticities in fertility demand equations are estimated by different researchers in a variety of ways. In some cases, this type of exercise has been confined to only working females where actual wages served as a proxy for the value of wife's time. Since this led to the exclusion of non-working females, which may be the overwhelming majority in certain settings, predicted wages from earning functions for the employed females have been used (Mincer 1976). Gronau (18) and Heckman (19) suggested different models and estimation techniques to overcome the selectivity bias, owing to non-randomness of working females, involved in the imputation of wages for all females.

In the fertility demand equations in this paper, neither the actual nor the imputed wages are used to caputre the opportunity cost of time. One reason for not using the wages (imputed) is the sensitivity of the estimated wage elasticity to the form and specification of the wage equation (Anderson). Education of females is used instead to infer the effects of mother's value of time on fertility. This variable, however, is generally regarded to be a composite one, carrying influences additional to the mother's opportunity cost of time. It may proxy tastes, wealth, and efficiency in use of contraception.

Female Work Participation:

Female work participation has been regarded as an important variable bearing upon fertility decisions because labour market participation indicates "emancipation" or alternative role identity and role "incompatibility" between work and mothers. While studies conducted in developed countries suggested an inverse association between female work and level of fertility, research on the developing world remains far from conclusive. The relationship between work participation and fertility has been found to be specific to region, location, type, and nature of job, implying that this itself is a variable depending on various conditions (Weller 1977). In addition, the classificatory scheme which dichotomises females into working and non working is inadequate (Standing) and fails to provide a meaningful check on the assumptions underlying the relationship between work and fertility. In the regression equation, however, not only female labour force participation but also the work place are used to ascertain their influence on fertility.

Sex Preference:

Son preference in the developing world is quite common. A son is regarded to be a better descendant / to maintain the lineage. As a source of security in old age, a son is usually considered/more dependable because daughters get married and may not be able to provide such support. In addition, as a producer of goods sons can be turned into working hands more easily than daughters. Proportion[1] of female children in the total is used in the estimating equation

1. Admittedly the specification is very crude, and fails to reckon the sequential mechanism of fertility decision making.

to capture the effect of son preference on fertility

Child Schooling:

Available data on child schooling, the proportion of children 5-14 years of age attending schools, are used in the interrelationship between parental investment strategies and completed or desired family size. In order to capture the effects of supply of schooling in rural areas, dummy variables are used to indicate the absence or presence of the schools. For urban areas, the supply of schools is assumed to be uniform, hence no separate variable indicating presence of schools is specified in the regression equations.

OTHER VARIABLES

Migration and Fertility:

The presumption that urban areas have lower fertility rates than rural areas engenders the view that rural-urban migration will lead to a decline in fertility. This phenomenon derives its explanation from the so-called adoption of lower family size norms by rural migrant because of changes in the cultural milieu and income wage configuration. In addition, mobility may disrupt the child-bearing process either because of separation of the spouses or unsettled conditions during early periods of migration. Lower fertility of rural out-migrants in comparison to rural- non-migrants is also associated with the selectivity of migration, the contention being that migrants differ substantially from non-migrants in various characteristics like age and education resulting in different fertility levels irrespective of spatial mobility.

Despite the fact that data on Pakistan fail to reflect that fertility levels are lower in urban areas than the rural, two variables, female residence before marriage, and the migration status of the head of household, are used in estimating equations to simulate the effects of mobility on fertility.

Out-Migration From the Household:

While the female mobility pattern has been accorded due recognition, the out-migration of other members of the household, especially children, were rarely discussed in the migration fertility nexus. This however, is important. The exodus of a working hand from the family may lead to labour shortage and/or result in higher labour productivity for the remaining members of the households. Thus, a possibility of increased role of children as workers comes into being. Through sending remittances back to the parents, the rural to urban migrants assume a role of "financial intermediary" by providing needed funds for purchase of modern inputs in agriculture (Oded-Stark). Furthermore, if the out-migrant is the husband wherein the wife is left behind, the effect on fertility appears certain. In the estimating equation, a binary variable denoting whether a household has an out-migrant or not, is used to assess its relevance.

Consumer Durables in Household:

Life styles and consumption standards are often associated with taste preferences for family size. Independent information on life style being unavailable, every household was alloted scores on the basis of consumer durable goods owned by the household. A motor car, for instance, was regarded/while a value of 4, refrigerator and television would be assigned 2. Washing and cooking machines were accredited with a score of 1. The accumulated scores of every household were used to ascertain the substitutability between consumer durables and level of fertility.

It appears imperative to discuss some of the limitations of this exercise. First of all, there is a discrepancy between the time reference of the variables used and the phenomenon to be explained. This exercise, therefore, shares all the limitations of a cross-sectional regression analysis, aiming at the explanation of life cycle phenomenon like fertility. Secondly, some of the variables are clearly choice variables in the frame-work of household decision-making. Since fertility alongwith these variables is jointly determined, the exercise runs into sumultaneity problems. Thirdly, the effects and influences of some of the variables may be parity dependent, which can hardly be taken care of by this exercise.

REGRESSION RESULTS

Regression results pertaining to different sub-groups (urban metropolitan, urban non-metropolitan, rural farm and non-farm households) are reported in Tables 1, 2, 3, and 4. Every table represents six equations. The first three equations relate to all eligible females; however, due to the inclusion of child schooling in the second and third equation, the size of the sample shrinks substantially, which can be seen from the number of observation reported at the bottom of each table. This occurs because all females who do not have children five years of age and above, had to be excluded. It must be noted that this leads to changes in the composition of the sample because all younger wives do not fulfill this requirement. The last three equations are specified by age groups of mother (15-24, 25-34 and 35-50).

Overall, the results are encouraging. More than half of the variance is explained in most of the equations which appears satisfactory given the cross-sectional nature of the data. In addition, most of the explanatory variables bear the expected signs and turn out to be consistent across different sample specifications. The relationship between fertility and explanatory variables and their variation across different sub-samples is discussed below:

Female Age and Age at Marriage:

A nonlinear relationship between female age and fertility level is yielded by the equations pertaining to all married females in rural as well as urban sub-samples. Equations for different age cohorts did not contain age squared variables, but age reflects a significant positive association. The turning points in the age-fertility relationship yielded by different equations are invariably above 50 years which is outside the observed sample. Similarly, age at marriage is significantly negatively associated with children ever born. This association is invariant across all the different sample stratifications. The size of the coefficient is larger in urban areas than in the two rural categories. Across the age cohorts, the magnitude of the coefficient displays substantial variation. A smaller coefficient of the age at marriage for the age cohort (35-50), which roughly represents those who have completed their family size, than other categories is indicative of the "catching up" phenomenon.

Female Education:

Higher levels of female education (middle and above) are found inversely related to fertility in urban metropolitan and non-metropolitan areas. The introduction of household income as an explanatory variable affects the size and significance level of the coefficients of the education variables. In the case of urban non-metropolitan areas, female education in the presence of household income turns out to be statistically non-significant (see equation 3 Table2), though still retains its negative sign. Educational variables maintain their significance in urban metropolitan but the size of the coefficient gets diminished with the addition of income to independent variables. Across

the age cohorts, the negative effect of the highest level of education appears to be significant only for high parity females in urban metropolitan areas. Educational variables are insignificant across the different age cohorts and female education hardly appears to have any significant effect on fertility in rural areas.

Female Labour Force Participation:

Female work participation did not emerge as statistically significant in any equation although in most cases the sign of the coefficient is negative. There are various reasons for the lack of any association between these two variables. Neither is there role incompatibility in the wake of pervasive self employment nor enhancement in the status which could result in different preference for family size because only few females end up having prestigeous white collar occupations. In preliminary regression exercises, the distinction between those working outside and within the home did not prove of any help. Insignificance of work participation for reproductive behaviour partly stems from the measurement problem. Most of the working females especially in rural areas are not categorized in the labour force because of inadequate concepts and nonadmission of the work participation by females themselves.

Husband's Education:

In the presence of household income and child schooling, husband's education failed to achieve a status of significant variable. While both the dummy variables reflecting levels of education have a positive (insignificant) sign in urban metropolitan areas, the highest level of education in urban nonmetropolitan areas acquires a negative sign which gets significant in the case of high parity females (see equation 6 in table 2). Rural farm

households recount the same story, suggesting that when household income and assets like land are accounted, the higher level of husband's education is associated with lower family size.

Household Income:

A very significant nonlinear relationship between household income and level of fertility emerged in urban as well as in rural areas. Across age cohorts, these results are replicated by females lying in the age cohort of 35 years or above, implying that association between completed or near completed family size and household income is stronger than in the case of younger age cohorts. The fact that the squared term of income is significant indicates that effect of income on fertility also depends on the level of income, thereby underscoring the importance of the distribution of income also. The influence of household income on fertility is therefore not only parity dependent, but also a function of the level of household income.

Land:

Land size classifications used in the regression equations pertaining to rural farm area (Table 3) reveal a significant positive relationship up until a landholding size of 20 acres. The largest size category turns insignificant. Equations across the age cohorts generally indicate a loss in significance level and also a change in the direction of association. For the higher parity females, the estimated equation suggests that a positive association between fertility and land size classification is confined to middle area size (5-20). The fertility behaviour of small area cultivators (less than 5 acres) and landless agricultural labourers is not significantly different, while households associated with largest cropped area (20+ acres) appear to have lower family size, though the coefficient is insignificant (see equation

6, table 3). The results appear plausible because value of children as producers gets higher with rising size of the farm. The negative relationship between largest size and fertility rate for the females who have roughly attained their family size is suggestive of a substitution of land for children as an old age security. Tenurial status often has been regarded as an important variable bearing upon the relationship between fertility and land. In our preliminary exercise, a rough distinction between owner and share-cropper was made to assess the influence of tenurial status on fertility. Most of the share-croppers, who can be part owners too, were associated with the lower or medium size land categories and their fertility behaviour was not found significantly different than that of the landowners falling into the same land size classification.

Tractors:

A significant negative association between ownership of a tractor and fertility level was found in rural farm households. Since income and land are controlled in the equation, the influence of a tractor finds its explanation in the reduction in the demand for labour in general and particularly that of child labour. Another plausible explanation is that with the introduction of a tractor, the household enters in a different mode and organisation of production, and thereby tends to control its fertility.

Consumer Goods:

Consumer durable scores in general turned out to be negatively associated with fertility, but conventional significance was achieved only in case of urban metropolitan areas. It is in these areas that the mean score came out to 1.73; in contrast the same was 0.05 and 0.14 in rural farm and non-farm households. One reason for the insignificance of the consumer durable scores

can be that very few households reported to have them in areas other than metropolitan. A possibility of substitution between consumer durable goods and number of children is, however reflected by metropolitan equation.

Child Schooling:

The association between child schooling as a proxy of parental investment in children and level of fertility was found to be negative. The conventional significance was, however, attained only in the case of urban metropolitan areas. It must be noted that child school enrollment, the variable used in the estimating equation, is a very rough indicator of parents' investment because the quality and associated expenditure on education are not considered. In addition, the provision of public schooling, and possibilities of children attending schools doing some work as well especially in rural areas, imply that this variable may fail to simulate the effect of parental investment.

Sex Preference:

Son preference is generally yielded by both the rural and urban subsamples. Though the variable proportion daughters in the living children, retains its significance in most cases, it appears to have some interactive effects with land and breastfeeding. Introduction of the land and breastfeeding variables in rural farm equations (see Table 3, equation 2 and 3) results in the substantial diminution of the coefficient of sex preference. In cases of rural non-farm and urban non-metropolitan areas, addition of breast-feeding variables (see Tables 2 and 4) render this variable insignificant. It is difficult to determine whether bequeath motives, in case of land for instance, and breast-feeding practices vary with the sex of the child without additional information. The matter needs further investigation.

Mortality:

Mortality represented by inverse of child survival ratio was found to be significantly positively associated with fertility. Replacement factor to achieve the desired family size is very high, especially in rural farm households, but still is less than one. It must be noted that, like few other independent variables, the direction of causation between mortality and fertility is not very clear despite the influence of biological factors. Across the successive age cohorts of married females, the coefficient is higher for the younger ages than that of females of 35-50 years, possibly because the fecundity impairment of the older age cohort incapacitates them from replacing a dead child.

Breast-Feeding:

Two binary variables, $Breastfed_1$, if mean duration of breastfeeding ranges between six months to twelve months, and $Breastfed_2$ if the mean duration is more than twelve months, were used in the regression equation. Interestingly, the results indicate that in comparison to those females who did not breastfeed at all and/or where mean duration of breastfeeding is less than six months, the fertility of the females reporting duration of breastfeeding between six to twelve months is significantly higher. The longer duration of breastfeeding (more than 12 months) exibits a negative association with number of children ever born, though the coefficient achieves significance in the equations pertaining to higher order parity females. The positive association between $Breastfed_1$ and fertility suggests that breastfeeding is curtailed when women get pregnant, hence more fecund females with shorter birth intervals[1] will fall in this group. The usual negative effect of breastfeeding is associated with longer duration. It must be noted that the information reported on duration of breastfeeding suffers from recall errors.

1. It suggests a reversal in the direction of causation too.

Contraceptive Use:

A significant positive association between contraceptive use and fertility is found for all the subsamples. Similar results obtained for countries like Nigeria and Kenya were rationalized by arguing that females engage in family planning practices only when they had large numbers of children. This was invoked by De Tray for Pakistan, too (12). In addition the quality of the data is inadequate and possibilities of substantial under-reporting can hardly be ruled out. Varieties of condoms available at chemist shops in urban areas and amount of sale disclosed by few of them in Islamabad, Karachi and Peshawar cast serious doubts about the reliability of the contraceptive use figure yielded by various surveys, including that of PLM.

Family Type:

Whether the reproductive behaviour of females differs by type of household is assessed by using a binary variable--nuclear--in the estimating equations. Females residing in nuclear households on the average have one half live births more than those living in extended family systems. The coefficients are significant both in rural and urban subsamples and for high parity females (35-50). The process of household formation and splitting is a complex phenomenon which can hardly be captured by terms like nuclear. In fact, clan relationships still maintain their hold and strength even if people have separate housing arrangements. The type of results yielded by regression estimates, however, are generally explained by the availability of more sexual freedom and greater need for children because level of security in nuclear household/than in the extended family system.
in lower

Migration and Fertility:

Out of the three variables capturing the influence of migration, only the variable representing females in urban areas having premarital residence in rural areas emerged as significantly negatively associated with fertility level in nonmetropolitan and metropolitan urban areas. Across the age cohorts, the variable is significant for middle-age cohort (25-34) in nonmetropolitan areas and high parity females (35-50) in metropolitan urban areas. The results suggest that the disruptive effect of migration was less in case of nonmetropolitan areas and high parity females adopted the norms prevailing there. Since /(small urban town) bear significant similarities with rural areas and never in fact acquire the characteristics of large / the explanation appears plausible. In case of metropolitan areas, the female probably never can adapt to the fertility norms of large urban centre. The variable pertaining to husband's, and by implication with wife's in-migration during the ten years prior to the survey is negative but does not emerge as significant. Out-migration from the household is generally negatively associated but is significantly only in the regression equations of younger and middle-age cohorts in rural areas only. For high parity females in rural areas, the coefficient of out-migrant switches sign and is significant in rural non-farm households. The precise nature of interaction between out-migration and fertility is complex but the results reveal that at lower parity its negative effect stems from the prolonged separation of spouses. Positive influence of outmigration for old age females (35-50) finds its explanation[1] in increased value of children due to labour exodus.

1. It can also be explained in terms of higher dependency load resulting in job hunt.

Community Variables:

The presence of educational institutions and health facilities are reckoned by three binary variables in rural areas. The variables for educational/fail to achieve a significant association with fertility in full samples of rural farm and non-farm households. For the oldest age cohort (35-50), the coefficient of high school is significant and positive in rural farm households, however. Hospital and dispensaries have positive influence on fertility, though the conventional significance level is achieved only in case of rural non-farm households and high parity females therein. There are few problems with the usage of these village level variables. The temporal reference is not known. Newly established schools and hospitals can hardly affect the fertility outcomes of ten years ago. Equally, it is not clear whether the very existence of these institutions in the village substantially alters the cost/benefit configuration faced by individuals. In addition, the capacity to participate or derive benefits from these services may very across individuals.

Provincial Difference:

In order to gauge the influence of the Provincial development level and cultural diversity, three binary variables -- Punjab, Sind, and Baluchistan -- are used, whereas North West Frontier Province served as the reference. The provincial distinction was made only for rural farm and non-farm areas. The provincial dummy variables emerged to be significant indicating that in comparison to the North West Prontier Frovince the fertility level is lower in all the remaining three provinces. A comparison

among the latter three provinces suggests that Baluchistan farm households appear to have the lowest fertility level. A closer perusal of the equation pertaining to the different age cohorts of the married females indicates that the difference between Baluchistan and the reference Province is mostly confined to higher parity females. This can be partly attributed to the recall lapse wherein the total live births may/have bear underreported by females in Baluchistan. This conjecture finds its support from the equations pertaining to non farm houseolds where no significant differentials emerged between Baluchistan and NWFP Province. Rural areas of both provinces are roughly similar in level of development and culture.

The rural areas of the other two provinces, Punjab and Sind, are better in terms of per capita income, per-capita land availability and other facilities than rural areas of NWFP Province. Another major distinction between NWFP and the two more developed provinces relates to incidence of outmigration which is much higher in the former than in the latter. Mechanism through which Province-level developmental variable operates is complex, nonetheless, the regression results are reflective of their importance for understanding the reproductive behaviour and these interrelationships merit further investigation.

CONCLUDING REMARKS

Given the usual caveats - the cross-sectional nature of the exercise purporting to explain a life cycle phenomenon, unclear direction of causation in certain cases, and quality of data - the results reveal some interesting tendencies. In order to reckon with the variation in environmental factors, the partitioning of sample appears rewarding. In many respects households in urban metropolitan display a distinct behaviour pattern. Parental investment in child quality (schooling) bears out a substitution of quality for quantity in fertility decision making in urban areas. Not only highly educated females but males (once household income is controlled) appeared to have a lower level of fertility than their counterparts - the less educated. Similarly consumer durables in the households tends to be significantly associated with lower fertility.

In the farm households of rural areas availability of land upto a threshold emerges out to be pronatalist. In case of large farms and for females who have roughly completed their family size there tends to be a substitution of land for children presumably as a security. The significant negative association between tractor use by the household and children born to the females is indicative of its role in labour displacement and hence effect on vlaue of children. Out migration from rural areas yields interesting results, for younger females due to seperation of spouses it acts as antinatalist but for older age cohorts (35-50) it turned out to be

pro-natalist. Admittedly drawing inference regarding the complicated interaction between migration and fertility from a cross-sectional data is hazardous. The provincial ferti .ity differential in rural areas of Pakistan, however, allude to the importance of understanding migration fertility nexus. Interestingly females in the relatively poor province, but with higher incidence of outmigration, N.W.F.P., have higher fertility than the provinces like Sind and Punjab.

Overall the results are reflective of the importance of job-structure as a contextual variable. Not only the fertility depressent effect of the oft quoted variables like females educations gets enhanced but also the child quality-quantity trade off (exhibited by child schooling coefficients) gets more obvious in urban metropolitan areas. Equally important appears to be the role of life style (as indexed by the consumer durable in the house) in fertility decision making in urban areas. It is difficult to conclude from a single data set like PLM that more job opportunities in the wage sector higher level of child schooling and modern life style has generated lower family size in major urban centres, though our findings do suggest.

Table:1

URBAN METROPOLITAN:

Estimated Regression Equations for the Determinants of Actual Fertility (CEB) Behaviour Among Ever Married Women Aged 15-50.

Explanatory Variables	Total			Age Groups		
				15-24	25-34	35-50
	1	2	3	4	5	6
Constant	-5.221	-8.214	-5.692	-1.556	-1.364	4.041
AGE	0.579***	0.555***	0.613***	.296***	0.321***	0.125***
	(10.48)	(7.52)	(8.38)	(11.07)	(11.35)	(4.94)
AGESQ	-0.006***	-0.005***	-0.006***	-	-	-
	(7.40)	(4.77)	(5.63)			
EDW1	-0.144	-0.228	-0.144	0.307[a]	-0.164[a]	-0.161
	(0.45)	(0.63)	(0.42)	(0.88)	(0.37)	(0.28)
EDWP2	-0.254	-0.264	-0.125	-0.066	-0.009	-0.469
	(1.40)	(1.23)	(0.62)	(0.48)	(0.04)	(1.17)
EDW3	-0.953***	-1.269***	-0.944***	-0.075	-0.462	
	(3.79)	(4.06)	(3.09)	(0.40)	(1.37)	
EDW4	-1.008***	-1.829***	-1.075***	-0.185	-0.819*	-1.707***
	(3.40)	(4.86)	(2.95)	(0.71)	(1.95)	(3.25)
EDH1+2	0.066	0.258	0.223	-0.030	0.089	0.448
	(0.45)	(1.49)	(1.37)	(0.22)	(0.44)	(1.58)
EDH3+4	-0.040	0.175	0.216	0.082	0.099	0.509
	(0.24)	(0.89)	(1.14)	(0.63)	(0.42)	(1.45)
SCH5-14	-	-0.404**	-0.499***	--	-0.297	-1.027***
		(2.20)	(2.86)		(1.37)	(3.29)
FLFP	-0.043	0.051	-0.102	0.136[a]	-0.175	-0.205
	(0.21)	(0.23)	(0.48)	(0.60)	(0.65)	(0.58)
INCOME	0.171***	--	0.177*	-0.038	0.058	0.444**
	(2.29)		(1.80)	(0.51)	(0.51)	(2.09)
INCOMESQ	-0.012***	--	-0.009	0.0006	-0.004	-0.034*
	(2.97)		(1.60)	(0.18)	(0.55)	(1.95)
C.GOODS	--	-0.022	-0.082**	0.001	-0.078*	-0.096
		(0.70)	(2.25)	(0.04)	(1.70)	(1.53)
SEXPREF	0.725***	0.475**	0.489**	0.320**	0.958***	0.016
	(3.88)	(1.97)	(2.14)	(2.42)	(3.47)	(0.03)

Cont'd.....

(Table 1 (Cont'd..)

Explanatory Variables						
MORT	0.789***	0.665***	0.661***	0.881***	0.943***	0.489*
	(7.31)	(3.51)	(3.69)	(8.66)	(3.24)	(1.82)
NUCLEAR	0.377***	--	0.406***	0.005	0.240	0.456*
	(3.12)		(3.00)	(0.04)	(1.42)	(1.95)
AGEMARGE	-0.224***	--	-0.220***	-0.229***	-0.284***	-0.184***
	(12.27)	--	(10.46)	(9.13)	(4.77)	(5.60)
BRSTFED1	--	0.937***	0.756***	--	0.856***	0.875**
		(4.89)	(4.17)		(4.21)	(2.29)
BRESTFED2	--	-0.082	-0.252	--	-0.486**	-0.003
		(0.45)	(1.45)		(2.33)	(0.00)
EVERUSE	0.683***	--	0.531***	0.386*	0.361*	0.642**
	(3.93)		(2.90)	(1.83)	(1.64)	(2.03)
INMIG	--	--	-0.047	-0.174	0.042	0.096
	--	--	(0.18)	(1.10)	(0.26)	(0.20)
OUTMIG	--	--	-0.062	-0.053[a]	0.224	-0.119
	--	--	(0.17)	(0.18)	(0.50)	(0.18)
RURALBF	-0.295*	--	-0.283*	-0.083	-0.097	-0.483*
	(1.93)	--	(1.64)	(0.60)	(0.43)	(1.69)
R^2	0.58	0.47	0.53	0.73	0.47	0.21
F	104.05	57.23	48.02	35.10	16.55	6.96
AV.CEB	4.62	5.53	5.53	1.46	4.50	7.00
N	1260	957	957	235	384	476

The following notes also apply to Tables 1-4.
For definition of variables see Appendix Table 1.
t statistics are given in brackets.
***Significant at the 1 per cent level; **at the 5 per cent level;

$\bar{R}^2$ is R^2 adjusted for degrees of freedom.

[a]Less than 10 observations.

Table:2

URBAN NON-METROPOLITAN: Estimated Regression Equations for the Determinants of Actual Fertility (CEB) behaviour among ever married women aged 15-50.

Explanatory Variables	Total			Age Groups		
				15-24	25-34	35+
	1	2	3	4	5	6
Constant	-5.040	-9.011	-6.605	-.629	-1.861	3.923
AGE	.533*** (11.86)	.577*** (9.43)	.638*** (10.55)	.218*** (11.15)	.317*** (10.05)	.116*** (5.33)
AGESQ	-.005*** (7.58)	-.005*** (8.13)	-.006*** (7.08)	-	-	-
EDWI	-.312 (1.04)	-.276 (0.76)	-.452 (1.35)	.176 (1.00)	-.293 (.75)	1.559[a] (2.06)
EDW2	-.147 (.81)	-.444* (1.88)	-.355 (1.61)	.262*** (2.57)	-.310 (1.08)	-.586 (1.37)
EDW3	-.204 (.71)	-.273 (.71)	-.019 (05)	-	-	-
EDW4	-.354 (.85)	-1.323** (2.03)	-.237 (.39)	.234 (1.54)	-.039 (.10)	.185 (.22)
EDH1+2	.072 (.53)	.094 (.57)	.069 (.45)	.067 (.71)	.079 (.37)	.084 (.32)
EDH3+4	-.080 (.54)	-.365** (1.97)	-.245 (1.41)	.086 (.90)	-.010 (.04)	-.604* (1.89)
SCH5-14	-	.149 (.87)	-.071 (.44)	-	.079 (.37)	-.242 (.85)
ELFP	.086 (.40)	.315 (1.24)	.111 (.47)	.029 (.18)	-.378 (1.00)	.430 (1.20)
INCOME	.207*** (3.50)	-	.281*** (3.89)	-.007 (.08)	.270 (1.23)	.685*** (4.54)
INCOMESQ	-.003 (1.33)	-	-.005** (2.05)	.003 (.25)	-.024 (.83)	-.014*** (3.56)
C.GOODS	-	.037 (.94)	-.005 (.12)	.006 (.27)	.004 (.08)	-.049 (.69)
SEXPREF	.634*** (3.52)	-	.245 (1.14)	.163 (1.47)	.445 (1.62)	.329 (.71)
MORT	1.044*** (10.61)	.837*** (6.02)	.846*** (6.57)	1.027*** (12.11)	.634*** (3.73)	1.030*** (4.97)

Cont'd.....

Cont;d.... Table 2.

Explanatory Variables	1	2	3	4	5	6
NUCLEAR	.605*** (5.18)	-	.534*** (3.99)	.041 (.46)	.554*** (3.10)	.517** (2.25)
AGEMARGE	-.226*** (12.31)	-	-.230*** (11.05)	-.211*** (11.13)	-.270*** (8.15)	-.203*** (6.58)
BRESTFED1	-	1.073*** (5.28)	.894*** (4.74)	-	.983*** (4.32)	.747* (1.85)
BRESTFED2	-	-.004 (-)	-.214 (1.25)	-	.087 (.43)	-.796** (2.14)
EVERUSE	.672 (3.29)	.242 (1.04)	.475** (2.21)	.404** (2.22)	.509* (1.90)	.555 (1.45)
INMIG	-	-	-.089 (.36)	-.127 (.96)	.0005 (-)	-.133 (.33)
OUTMIG	-	-	.024 (.11)	-.116 (.94)	-.049 (.17)	.210 (.54)
RURALBF	-.243 (2.08)	-	-.262** (1.97)	.138 (1.71)	-.296* (1.64)	-.213 (.96)
R^2	.64	.50	.58	.75	.45	.28
F	134.95	65.23	57.68	51.43	15.84	9.34
AV.CEB	4.44	5.49	5.49	1.20	4.57	5.85
N	1273	946	946	301	380	457

a) Less than 10 OBS

Table:3

RURAL FARM: Estimated Regression Equations for the Determinants of Actural Fertility (CEB) Behaviour among Ever Married Women Aged 15-50.

Explanatory Variables	Total			Age Groups		
				15-24	25-34	35-50
	1	2	3	4	5	6
Constant	-4.755	-8.034	-6.286	-.689	-2.781	1.483
AGE	.446*** (13.34)	.514*** (12.09)	.547*** (12.90)	.211*** (15.14)	.299*** (13.50)	.109*** (7.57)
AGESQ	-.004*** (8.80)	-.005*** (7.96)	-.005*** (8.62)	- -	- -	- -
EDW1-4	.087 (.36)	.131 (.47)	.206 (.77)	-.020 (.15)	-.095 (.28)	.631 (1.20)
EDH1+2	.080 (.80)	.019 (.15)	.011 (.09)	.121* (1.91)	-.068 (.47)	.077 (.39)
EDH3+4	-.333* (1.93)	-.372* (1.70)	-.241 (1.13)	-.009 (.10)	.283 (1.08)	-1.102** (2.37)
SCH5-14	- -	-.119 (.86)	-.169 (1.27)	- -	-.331* (1.77)	-.175 (.80)
FLFP	.058 (.54)	-.046 (.38)	-.063 (.54)	-.027 (.32)	-.291* (1.82)	.164 (.87)
INCOME	.249*** (3.90)	-	.182** (2.30)	-.023 (.48)	.842*** (4.60)	.724*** (3.70)
INCOMESQ	-.007*** (3.99)	-	-.005** (2.15)	.0007 (.58)	-.112*** (4.15)	-.095*** (3.50)
C.GOODS	-	-.066 (.69)	-.128 (1.33)	.012 (.14)	.009 (.08)	.001 (-)
CROPLI	-	.348** (2.33)	.272* (1.89)	-.088 (.94)	.516** (2.71)	.240 (1.05)
CROPL2	-	.263** (2.14)	.241** (2.09)	-.085 (1.23)	.053 (.34)	.379** (1.97)
CROPL3	-	.359** (2.54)	.356*** (2.61)	-.144* (1.73)	.286 (1.53)	.477** (2.16)
CROPL4	-	.059 (.38)	.074 (.49)	-.077 (.90)	.037 (.18)	-.080 (.32)

Cont'd.....

Contd..... Table 3.

Explanatory Variables	1	2	3	4	5	6
TRACTOR	-	-.334** (2.00)	-.333** (2.06)	.078 (.78)	-.134 (.59)	-.499* (1.95)
SEXPREF	1.002*** (8.66)	.520*** (3.40)	.503*** (3.43)	.196*** (2.80)	.349* (1.88)	.934*** (3.25)
MORT	.888*** (14.25)	.983*** (10.18)	.910*** (9.78)	.908*** (17.67)	.752*** (6.31)	1.104*** (7.47)
NUCLEAR	.478*** (6.01)	- -	.540*** (5.88)	-.034 (.62)	.676*** (5.38)	.561*** (3.74)
AGEMARGE	-.155*** (12.66)	- -	-.159*** (11.36)	-.185*** (13.57)	-.214*** (9.54)	-.125*** (6.28)
BRSTFED1	- (	1.168*** (7.52)	1.068*** (7.15)	- -	.871*** (4.60)	1.209*** (4.37)
BRESTFED2	-	.099 (.81)	-.060 (.51)	-	.063 (.45)	-.318 (1.33)
EVERUSE	1.014*** (3.27)	- -	.601* (1.93)	- -	.509 (1.16)	.647 (1.41)
INMIG	-	.079 (.36)	.101 (.48)	-.048 (.34)	-.008 (.03)	.520 (1.53)
OUTMIG	- -	- -	.114 (.68)	-.198** (2.20)	-.261 (.91)	.414 (1.56)
PTIMARYSH	-	.058 (.51)	.052 (.47)	.012 (.17)	-.060 (.40)	.149 (.86)
HIGHSCH	-	-	.279 (1.33)	.125 (1.07)	-.207 (.68)	.723** (2.20)
HOSPITAL	-	-	.097 (.75)	.061 (.85)	.001 (-)	.047 (.23)
RPUNJAB	-.241* (1.78)	-.465*** (2.89)	-.400** (2.51)	-.070 (.78)	-.281 (1.33)	-.440 (.96)
RSIND	-.513*** (3.49)	-.663*** (3.67)	-.678*** (3.74)	-.038 (.37)	-.613*** (2.59)	-.780*** (2.63)
RBALUCH	-.587** (2.49)	-.959*** (3.22)	-.932*** (3.23)	-.135 (.87)	-.625* (1.68)	-1.211*** (2.53)

Cont'd....

Contd ..... Table 3.

Explanatory Variables	1	2	3	4	5	6
R^2	.58	.48	.53	.73	.38	.22
F	230.23	77.43	70.46	65.96	15.47	10.44
AV.CEB	4.02	5.07	5.07	1.22	4.04	6.48
N	2624	1881	1881	615	676	986

Table: 4

RURAL NON FARM: Estimated regression equations for the determinants of actual fertility (CEB) behaviour among ever married women aged 15-50.

Explanatory Variables	Total			Age groups		
				15-24	25-34	35-50
	1	2	3	4	5	6
Constant	4.591	7.303	5.722	-.709	-2.381	3.279
AGE	.471*** (12.06)	.490*** (8.94)	.573*** (10.63)	.217*** (12.05)	.329*** (13.58)	.111*** (5.21)
AGESQ	-.004*** (7.21)	-.004*** (5.37)	-.005*** (6.85)			
EDW1-4	-.168 (.82)	-.304 (1.20)	-.357 (1.48)	.039 (.32)	-.388 (1.54)	-.427 (.79)
EDH1+2	.033 (.30)	.117 (.85)	.081 (.67)	-.083 (1.10)	.195 (1.30)	.039 (.16)
EDH3+4	.061 (.38)	.280 (1.39)	.227 (1.16)	.065 (.63)	.459** (2.17)	.466 (.44)
SCH5-14	-	-.007 (.04)	-.048 (.31)	-	-.220 (1.21)	.097 (.33)
FLFP	-.255* (1.75)	-.175 (.97)	-.149 (.88)	-.235* (1.91)	-.321 (1.62)	.121 (.40)
INCOME	-.439*** (5.40)	-	.345*** (3.63)	.076 (1.32)	.235 (1.03)	.539*** (3.08)
INCOMESQ	0.011*** (5.14)	-	-.008*** (3.48)	.002 (1.07)	-.020 (.47)	-.013*** (3.02)
C.GOODS	-	.036 (.40)	-.070 (.78)	.075 (1.13)	-.145 (1.41)	-.051 (.31)
KAMEES	-	-.116 (.70)	.085 (.55)	.120 (1.20)	.148 (.80)	.022 (.08)
SEXPREF	.843*** (5.85)	.434** (2.19)	.226 (1.20)	.205** (2.37)	.547** (2.49)	.031 (.08)
MORT	.870*** 12.70)	.622*** (5.18)	.607*** (5.33)	.885*** (16.09)	.482*** (3.25)	.738*** (3.89)
NUCLEAR	.448*** (4.53)	-	.465*** (3.95)	.191*** (2.71)	.443*** (3.27)	.409* (1.92)

Cont'd.....

Contd.... Table 4.

Explanatory Variables	1	2	3	4	5	6
AGEMARGE	-.194*** (12.50)	-	-.197*** (10.83)	-.203*** (10.86)	-.217*** (9.04)	-.168*** (5.86)
BRSTFED1	-	1.068*** (5.58)	.860*** (4.66)	-	.716*** (3.50)	1.299*** (3.35)
BRESTFED2	-	.138 (.87)	-.123 (.81)		-.273 (1.72)	.156 (.46)
EVERUSE	1.275*** (5.21)	-	.880*** (3.58)	.854** (2.23)	.710** (2.47)	.858** (2.10)
INMIG	-	-	-.296 (1.20)	.151 (1.10)	-.399 (1.60)	-.335 (.70)
OUTMIG	-	-	.156 (.81)	-.069 (.59)	-.783*** (2.93)	.654** (2.02)
PRIMARYSH	-	.119 (.79)	.002 (0.0)	-.006 (.07)	.147 (0.91)	-.275 (1.03)
HIGHSCH	-	-	-.121 (.67)	-.059 (.51)	-.060 (.28)	-.151 (.46)
HOSPITAL	-	-	.308** (2.10)	.085 (.97)	-.[illegible]7 (.32)	.629** (2.39)
RPUNJAB	-.414*** (3.02)	-.487*** (3.03)	-.361** (2.21)	.001 (0.0)	-.631*** (3.48)	-.252 (0.90)
RSIND	-.621*** (3.54)	-.539** (2.53)	-.619*** (2.98)	-.095 (.80)	-.556** (2.21)	-.863** (2.33)
RBALUCH	-.454* (1.86)	-.324 (1.03)	-.306 (1.03)	-.012 (.07)	-.107 (.31)	-.456 (.83)
$\bar{R}^2$	.58	.46	.52	.72	.40	.18
F	152.36	60.80	51.28	49.36	13.67	6.23
AV.CEB	4.11	5.15	5.15	1.31	4.21	6.68
N	1725	1217	1217	415	473	595

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APPENDIX TABLE: 1

Dictionary of Variables used in Estimation of Fertility Equations.

Variables	Definitional' notes	Urban Metro-politan		Urban Non-Metropolitan		Rural Farm		Rural Non-Farm	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
I. Endogenous Dependent Variables									
CEB	Number of live births	5.53	2.76	5.49	2.82	5.07	2.63	5.15	2.68
II. Micro Exogenous Independent Variables									
A. Age									
AGE	Age of woman in years	34.33	7.94	34.01	8.41	34.48	8.51	33.88	8.28
AGESQ	Age of woman squared	1241.78	554.94	1227.61	588.42	1261.65	595.88	1215.97	573.46
AGEMARG	Age of woman at first marriage	17.29	3.14	17.26	3.04	17.34	3.16	17.42	3.13
B. Education									
EDW1	1 if woman has some formal education(1-4 standards), 0 if otherwise	0.04	0.19	0.03	0.18				
EDW2	1 if woman has completed primary to middle level education (5-8) stds), 0 if otherwise	0.14	0.35	0.10	0.29	0.03	0.17	0.06	0.25
EDW_3	1 if woman has more than middle education or completed matric (9-10 stds.), 0 if other-wise	0.06	0.24	0.03	0.18				

Contd... Appendix Table 1.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
EDW4	I if woman has higher level education (11+stds.), o if otherwise	0.04	0.19	0.01	0.11				
EDH1 EDH2	Binaries for husband's education level constructed in same way as	0.25	0.43	0.26	0.44	0.18	0.39	0.26	0.44
EDH3 EDH4	the conrresponding women education binaries	0.37	0.48	0.29	0.34	0.06	0. 24	0.12	0.33
SCH5-14	Proportion of children aged 5-14 attending school	0.61	0.42	0.52	0.42	0.24	0.35	0.34	0.38
C.	Female Labour Force Participation								
FLFP	I if woman reported to be in labour, o if otherwise	0.10	0.29	0.07	0.26	0.15	0.35	0.12	0.33
D.	Agricultural status/land holding								
	I if owner/operator, o if otherwise	-	-	-	-	0.56	0.50	-	-
INCOME:	Income/Wealth								
	Income per adult in the household	458.77	461.85	335,87	330.90	277.20	336,93	336.69	897.59
	Type of Family								
NUCLEAR	I if woman lives in nuclear family, o if otherwise	0.60	0.49	0.57	0.50	0.58	0.49	0.58	0.49
	Sex Preference								
SEXPREF	Proportion of daughters living among total number of live births	0.48	0.27	0.48	0.28	0.47	0.29	0.47	0.29

Contd... Appendix Table 1.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
I	Infant/child Mortality								
MORT	Inverse of child survival rate	1.20	0.35	1.25	0.48	1.26	0.46	1.28	0.48
J	Contraception Use								
EVERUSE	I if woman ever practised contraception, o if other wise	0.15	0.36	0.09	0.29	0.02	0.14	0.05	0.22
E	Occupations of rural Non-Farm Household								
KAMEES	I if husbands works as kamees, o if otherwise	-	-	-	-	-	-	0.15	0.36
HNDCRFT	I if husband works in handcrafts, o if otherwise	-	-	-	-	-	-	0.03	0.17
SHOPKPR	I if husband works as shop, keeper, 0 if otherwise	-	-	-	-	-	-	0.14	0.35
INDWRK	I if husband works as industrial 0 if otherwise	-	-	-	-	-	-	0.13	0.34
LAND LORD	I if husband derives in come from land as property holdings, 0 if otherwise	-	-	-	-	-	-	0.03	0.18
	Breastfeeding								
BRESTFED1	I if woman breastfed an average of 6-12 months, 0 if otherwise	0.27	0.44	0.23	0.42	0.15	0.36	0.17	0.37

Contd..... Appendix Table 1.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Brestfeeding								
BRESTFED2	I if woman breastfed for more than 12 months, 0 if otherwise	0.49	0.50	0.56	0.50	0.65	0.48	0.63	0.48
	Migration								
INMIG	I if head of household is inmigrant, 0 if otherwise	0.06	0.24	0.07	0.25	0.04	0.20	0.05	0.22
OUTMIG	I if one or more members of household are out-migrants, 0 if otherwise	0.03	0.17	0.09	0.28	0.07	0.26	0.09	0.28
RURALBF	I if woman lived in rural area before marriage, 0 if otherwise	0.15	0.36	0.32	0.46	-	-	-	-
URBANBF	I if woman lived in urban area before marriage, 0 if otherwise	-	-	-	-	0.02	0.15	0.07	0.26
C. GOODS	Consumer durable goods score	1.73	2.48	0.90	1.86	0.05	0.47	0.14	0.66
CROPL 1	I if cropped area is between 0.1 and 5 acres					0.14	0.35	-	-
CROPL 2	1 if cropped area is between 5.01 and 12.5 acres					0.30	0.46	-	-
CROPL 3	1 if cropped area is between 12.5 and 20.0 acres					0.18	0.38	-	-
CROPL 4&5	1 if cropped area is more than 20.01 acres					0.14	0.34	-	-
TRACT	1 if owns tractor, 0 if otherwise					0.08	0.28	-	-