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Socio-economic Determinants of Desired Fertility in Bangladesh

Abstract

In the demographic literature the most widely examined question is: what determines an individual's desired family size? Examination of both historical and recent data suggests that socio-economic variables have played a major role in determining the desired family size. This article investigates determinants of desired family size in Bangladesh by using multivariate techniques. Findings suggest that female education has a moderate negative effect and male education has a strong positive effect on desired family size. Furthermore, participation in paid employment sector have little effect on desired family size. Ownership of agricultural land has strong positive effect and ownership of valuable household durables has a negative effect on desired family size. The majority of the respondents who desired no additional children at the time of baseline survey become pregnant within three years.

Introduction

IN the demographic literature the most widely examined question is: what determines an individual's desired family size? Examination of both historical and recent data suggests that socio-economic variables have played a major role in determining the number of children desired by an individual couple (Teitelbaum 1975; Caldwell 1981). Consequently socio-economic variables have been repeatedly used in the literature to estimate desired family size (Brazzell 1984; Cain 1985; Shaikh & Becker 1985; Shaha 1975). Moreover, several authors have suggested statistical models to identify relationships between socio-economic variables and desired family size (Farooq and Summons 1985; Easterlin and Crimmins 1985). In Bangladesh, factors most often studied in relation to fertility are religion, employment, social class, education, occupation, landownership, and family income (Alaud-din and Faruquee 1983; Amin 1979; World Bank 1980; Chaudhary 1978). This article attempts to investigate socio-economic determinants of desired family size in Bangladesh by using multivariate techniques. In addition, consistencies between future intentions on additional family size and actual fertility behaviour in three years period after a baseline survey have been examined.

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Sample Design and Method of Data Collection

The information utilized in this article was collected as a part of research component of the MCH-FP Extension Project of the International Center for Diarrhoeal Disease Research, Bangladesh (Phillips *et al.* 1984; Mozumder *et al.* 1985). A multi-stage systematic sampling procedure was used to draw sample households. All ever married women below 50 years of age who were residing in the sample households were interviewed to collect information on economic status, fertility, nuptiality, infant and child mortality and contraceptive use. In addition, information on vital events collected by the ongoing longitudinal registration system provided additional information on fertility.

Statistical Model

The statistical model proposed in this article describes desired complete family size (DCFS) as a function of several socio-economic and demographic variables. Except for two variables, age and religion, the model includes variables which determine the demand for children as suggested in micro-economic theories of fertility (Schultz 1981; Becker 1981). The model can be described as follows:

$$D = a + BiXi$$

where

- D = desired complete family size;
- X_1 = wife's education;
- X_2 = wife's occupation;
- X_3 = husband's education;
- X_4 = husband's occupation;
- X_5 = wife's religion;
- X_6 = household's land ownership;
- X_7 = ownership of valuable household items;
- X_8 = wife's age;
- B_i 's are regression coefficients;
- e is the error term.

The variables included in the above model are described in the following manner.

Desired complete family size (DCFS): The variable is constructed by adding the total number of surviving children to the number of additional children desired at the time of the baseline survey. Although majority of the respondents have provided numeric answers, few qualitative answers were also recorded. Particularly, many of these respondents answered that they had no specific desired family size in mind, and that the number of children they want depends on God's will. The following steps are taken to convert these qualitative answers to numeric values:

- (1) "Do not want or not so happy if next child is born" answers are considered no desire for additional children.

- (2) "Do not want and unhappy if next child is born" answers are also considered no desire for additional children.
- (3) "Don't know/God knows but not so happy" and "Don't know/God knows but unhappy if next child is born" answers are considered no desire for additional children.
- (4) "Don't know/God knows but happy if next child is born" is taken as desire for an additional child, and one child is added to the surviving number of children.

The above described classification criteria converted all non-numeric answers into numeric values. To explore the validity of the classification criteria, the analysis is also to be performed separately by excluding the respondents who provided qualitative answers. In addition, to reduce the measurement errors, the analysis is restricted to currently and once married women.

Wife's education (WYSCOL): A continuous variable, ranging from 0 to 16, of completed number of years studied in formal school. Those who have not attended any formal school are considered not educated.

Wife's occupation (WOCUP): A two-category variable coded unity if a woman is engaged in paid employment sector, zero otherwise.

Husband's education (HYSCOL): A continuous variable, analogous to the female education variable.

Husband's occupation (HOCUP): A two-category variable coded as unity if a husband is engaged in paid employment outside the agricultural sector, zero otherwise.

Religion (RELG): A two category variable coded unity if a woman is non-Muslim, zero otherwise.

Ownership of agricultural land (ALOWD): A continuous variable, measures the amount of agricultural land owned by a household in acres.

Ownership of valuable goods (VGOODS): A two-category variable coded unity if household members' own either a bicycle or radio, zero otherwise.

Wife's age (AGE): Age of the respondent in completed years at the time of the survey.

Results

The mean values, standard deviations, and hypothesized direction of the relationship between dependent variable and each of the predictors are presented in Table 1. In general, it is expected that DCFS will be lower among women who have better socio-economic status as measured by education, occupation and family income. The results show that mean number of years of formal school attended by the respondents and their husbands is approximately 1.3 and 2.6 years respectively. The mean age of the respondents is approximately 30 years, and 15 percent of them are non-Muslims. Approximately 11 percent of the respondents are engaged in paid employment outside the home and little over 17 percent of their husbands work in economic activities outside the agricultural sector.

Table 2 presents zero order correlation coefficients between the dependent and each of the independent variables as well as among the independent variables. The correlation coefficients between the dependent variable and each of the independent variables suggest that at the bivariate level, with two exceptions (husband's education and wife's occupation),

the predictors are expectedly related to DCFS. As expected, respondent's age has the highest correlation with DCFS. Among the independent variables, correlations are generally low.

TABLE 1: MEAN AND STANDARD DEVIATION OF THE VARIABLES EMPLOYED IN MULTIPLE REGRESSION ANALYSIS

<i>Variable</i>	<i>Variable Name</i>	<i>Hypothesized Sign</i>	<i>Mean</i>	<i>Standard deviation</i>
Wife education	WYSCOL	(-)	1.28	2.337
Wife occupation	WOCUP	(-)	0.11	0.313
Husband education	HYSCOL	(-)	2.60	3.635
Husband occupation	HOCUP	(-)	0.17	0.375
Religion	RELG	(-)	0.15	0.353
Land ownership	ALOWD	(+)	1.75	3.123
Valuable goods	VGOODS	(-)	0.28	0.449
Respondent's age	AGE	(+)	30.20	8.946
Number of cases	5,465			

The highest correlation is observed between the two education variables, i.e., between wife's education and husband's education as 0.52. Out of 28 correlation coefficients, 17 of them have values less than or equal to 0.10, which suggests a low degree of multicollinearity.

TABLE 2: CORRELATION MATRIX OF DEPENDENT AND INDEPENDENT VARIABLES

<i>Variable</i>	<i>WYSCOL</i>	<i>WOCUP</i>	<i>RELG</i>	<i>HYSCOL</i>	<i>HOCUP</i>	<i>ALOWD</i>	<i>VGOODS</i>	<i>AGE</i>	<i>DCFS</i>
WYSCOL	1.00								
WOCUP	-0.05	1.00							
RELG	0.07	0.02	1.00						
HYSCOL	0.52	-0.07	0.10	1.00					
HOCUP	0.24	-0.05	-0.02	0.36	1.00				
ALOWD	0.24	-0.11	-0.04	0.21	-0.05	1.00			
VGOODS	0.30	-0.06	0.05	0.30	0.18	0.30	1.00		
AGE	-0.18	0.03	0.02	-0.30	-0.03	0.03	-0.03	1.00	
DCFS	-0.13	0.00	-0.07	0.01	-0.01	0.06	-0.03	0.67	1.00

The results of multiple regression analysis are presented in Table 3, which includes regression coefficients (metric), rank order of standardized regression coefficients, and the

adjusted squared multiple regression coefficient. The results suggest that age has the largest standardized regression coefficient and hence the highest relative importance in predicting DCFS. Similarly, religion has the second highest value, followed by husband's education, ownership of agricultural land, wife's education, ownership of valuable household items, wife's occupation and husband's occupation.

Findings suggest that in the full sample approximately 46 per cent of the variation in DCFS is jointly explained by the predictors included in the proposed statistical model. The hypothesized relationships between DCFS and each of the predictors hold in every case, except for husband's education and husband's occupation. Contrary to a prior expectations, both husband's education and husband's occupation have positive effects on DCFS. Out of eight predictors, five have shown statistically significant relationships with DCFS: wife's education, religion, husband's education, ownership of agricultural land and wife's age. Although wife's occupation and ownership of valuable household items have the hypothesized signs, the relationships with DCFS are not statistically significant,

TABLE 3: RESULTS OF MULTIPLE REGRESSION ANALYSIS OF DESIRED COMPLETE FAMILY SIZE

Variable	Metric Coefficient		
	Full Sample	Below 30 years	Over 30 years
Constant term	-0.255	-0.052	1.082
WYSCOL	-0.025** (5)	-0.020** (3)	-0.028
WOCUP	-0.101*	-0.138** (5)	-0.100
HYSCOL	0.023*** (3)	0.006	0.041*** (3)
HOCUP	0.021	0.042	0.092
RELG	-0.426*** (2)	-0.285*** (2)	-0.587*** (2)
ALOWD	0.021*** (4)	-0.015*** (4)	0.033*** (4)
VGOODS	0.075	-0.003	-0.135
AGE	0.146*** (1)	0.133*** (1)	0.111*** (1)
R^2 (adjusted)	0.464	0.210	0.137
Number of cases	5,465	2,838	2,627

*** Significant at 1 percent level.

** Significant at 5 percent level.

* Significant at 10 percent level.

Rank order of standardized coefficient in brackets.

Empirical findings from several countries suggest that higher education tends to lower fertility (Chaudhary 1977; Cochrane 1979; Strout 1984; Jain and Nag 1985). Therefore, one would expect that male and female education would have negative effects on fertility. But in this sample, husband's education shows a significant positive effect on DCFS. As expected, wife's education has a negative effect on DCFS. There has been no clearly identified reason for the positive effect of husband's education on DCFS. The finding is even more surprising since at the bivariate level, husband's education and occupation are positively correlated indicating that educated husbands are engaged in jobs outside the agricultural sector. The findings from *Bangladesh Retrospective Survey of Fertility and Mortality* (1977) also suggested positive association between husbands' education and desired family size (Population Bureau 1977). It is observed that husband's employment in non-agricultural sector has an insignificant positive effect on DCFS. Although female work experience outside the home has a depressing effect on DCFS, the magnitude of the relationship is not statistically significant. In other words, wife's employment does not appear to have any significant effect on desired family size. Moreover, wife's occupation is negatively correlated with wife's education, perhaps because highly educated women are not engaged in economic activities. In rural Bangladesh, poor women are generally engaged in jobs nearer to their home, and in most cases, nature of their work activities does not compete with childbearing.

The results suggest that the desired complete family size is smaller among non-Muslim women. In the study areas, all non-Muslims are Hindus. Thus, it is observed that when the effects of other predictors are taken into consideration, DCFS of Hindu women is approximately 0.4 children smaller than that of Muslim women. Several authors have also found that Hindu women have lower fertility in Bangladesh than Muslim women both nationally and regionally (Chaudhary 1971; Rob 1987).

Ownership of cultivable land has a positive effect on DCFS and the relationship is statistically significant. Furthermore, ownership of valuable household items has a negative effect on DCFS, but the relationship is not statistically significant. Similar findings are also reported from other studies conducted in Bangladesh (Chaudhary 1971; Rob 1987; Ministry of Health & Population Control 1978). For example, the *Bangladesh Fertility Survey* (BFS) reported that those who own a radio or a boat tend to have higher fertility than those who do not.

Table 3 also presents the results for two age cohorts separately. Although the predictive power of the fitted equation has declined considerably, the regression results are not largely different from the earlier findings. The fitted equation explained approximately 21 per cent and 14 per cent of the variation in the younger and the older age cohorts respectively. In the younger age cohort, wife's education and occupation have statistically significant negative effect on DCFS. In contrast, both wife's education and occupation have insignificant negative effects on DCFS in the older age cohort. Husband's education shows a significant positive relationship with DCFS in the older age cohort, but virtually no effect in the younger age cohort. Religion, ownership of agricultural land and wife's age showed consistent relationships with DCFS in both age cohorts. The results suggest that wife's age and ownership of agricultural land have significant positive effects and religion has strong negative effects on DCFS in both age cohorts.

In the earlier analysis, the dependent variable, (DCFS), is constructed by converting qualitative answers to numeric values. The most common qualitative answer in response to the question, "how many additional children do you desire?"—is "it's up to God". Table 4 presents the results of regression analysis after excluding 'up to God' answers from the original sample. The fitted equation accounts for approximately the same amount variation in DCFS in the restricted sample as it did in the original sample. With respect to regression coefficients, the magnitude and direction remained approximately the same. For example, husband's education and ownership of agricultural land showed strong positive effects, whereas wife's education and religion have strong negative effects on DCFS. Furthermore, husband's occupation, wife's occupation and ownership of valuable household goods have statistically insignificant effects on DCFS.

TABLE 4: RESULTS OF MULTIPLE REGRESSION ANALYSIS OF DESIRED COMPLETE FAMILY SIZE, EXCLUDING 'UP TO GOD' ANSWERS

<i>Variable</i>	<i>Metric coefficient</i>	<i>Standard Coefficient</i>
Constant term	-0.063	
WYSCOL	-0.039*** (0.0112)	-0.049
WOCUP	-0.104 (0.0704)	-0.017
HYSCOL	0.024*** (0.0074)	0.046
HOCUP	0.016 (0.630)	0.003
RELG	-0.440*** (0.589)	-0.085
ALOWD	0.21*** (0.0074)	0.034
VGOODS	-0.065 (0.0529)	-0.015
AGE	0.136*** (0.0025)	0.638
R ² (adjusted)	0.430	
Number of cases	4,530	

*** Significant at 1 percent level; Standard error in brackets.

Fertility Behaviour in the following Three Years

In this section consistency between the desired complete family size expressed at the time of the baseline survey and the actual fertility behaviour of respondents in the followup

three years has been examined. Utilizing the information collected at the time of the baseline survey, the respondents are classified into three groups as follows:

- (1) Desired complete family size (DCFS) > Number of living children (NLC);
- (2) Desired complete family size (DCFS) = Number of living children (NLC);
- (3) Desired complete family size (DCFS) < Number of living children (NLC).

Since the desired complete family size is constructed by adding the number of additional children desired at the time of the baseline survey with the number of surviving children, the desired complete family size cannot be smaller than the number of living children. Therefore, the respondents are actually classified into two groups as DCFS > NLC and DCFS = NLC. In addition, the respondents are also grouped according to age cohorts. The younger age cohort includes the respondents who were under 30 years at the time of the baseline survey. Similarly, the respondents aged between 30-49 years at the time of the baseline survey belong to the older age cohort. Table 5 presents the percentage distribution of the respondents according to the desired family size classification, age cohort and information on pregnancy status collected in the following three years period.

TABLE 5: PERCENTAGE DISTRIBUTION OF THE WOMEN ACCORDING TO DESIRED COMPLETE FAMILY SIZE CLASSIFICATION, PREGNANCY STATUS AND AGE COHORT

<i>Category</i>	<i>Pregnancy Status</i>	<i>Younger Age Cohort</i>	<i>Older Age Cohort</i>	<i>Total</i>
DCFS > NLC	Yes	79.0 (1387)	64.5 (191)	76.9 (1578)
	No	21.0 (369)	35.5 (105)	23.1 (474)
	Sub-total	100.0 (1756)	100.0 (296)	100.0 (2052)
DCFS = NLC	Yes	64.2 (686)	47.5 (678)	54.7 (1364)
	No	35.8 (383)	52.5 (748)	45.3 (1131)
	Sub-total	100.0 (1069)	100.0 (1426)	100.0 (2495)
Est DCFS > NLC	Yes	74.1 (1785)	46.1 (392)	66.7 (2177)
	No	25.9 (626)	53.9 (459)	33.3 (1085)
	Sub-total	100.0 (2411)	100.0 (851)	100.0 (3262)
Est DCFS < NLC	Yes	69.6 (288)	54.8 (477)	59.5 (765)
	No	30.4 (126)	45.2 (394)	40.5 (520)
	Sub-total	100.0 (414)	100.0 (871)	100.0 (1285)

* Figures in brackets are the total number of women observed.

Results suggest that in the DCFS > NLC group, approximately 77 percent of the respondents become pregnant at least once in the following three years after the baseline survey. As expected, the respondents in the younger age cohort have higher pregnancy rate compared to the older age cohort. In the younger age cohort, approximately 79 percent of the respondents have at least one pregnancy termination during three years following the baseline survey, against 64.5 percent in the older age cohort. The odd ratio is calculated as 2.07, which indicates that the odds on pregnancy are twice among the women in the younger age cohort than among the women in the older age cohort. In the second group, where DCFS = NLC, approximately 55 percent of the respondents become pregnant in the subsequent three years from the time of the baseline survey. As observed in the DCFS > NLC group, the younger women have the higher odds on pregnancy compared to the older women. The odd ratio is calculated as 1.98 in this group. Thus, it is observed that a great majority of the respondents whose expressed desired complete family size equals to the number of living children also had a child in the three years period following the baseline survey.

In addition, estimated desired complete family size is used to classify the respondents into two groups. The results suggest that in the first group, where est. DCFS > NLC, approximately 67 percent of the respondents have a pregnancy termination in the three years period following the baseline survey. Similarly, 60 percent of the respondents in the est. DCFS < NLC group also become pregnant during the same time period. In other words, when estimated desired fertility equation is utilized, results remain virtually the same. It is observed that the majority of the women who expressed no desire for an additional child also gave a birth in the three years period following the baseline survey.

Summary and Conclusion

To summarize, socio-economic and demographic variables included in the regression model show similar patterns of relations with desired fertility in the original sample as well as in the restricted sample. Findings suggest that wife's education has a negative effect on desired family size, i.e. educated women desired smaller family size. In contrast, husband's education has a positive effect on desired family size but the relationship varies according to age groups. Female employment outside the home has little effect on desired complete family size. This finding is not unexpected in Bangladesh, where few women work outside their home. Moreover, when women are employed, they tend to work closer to their home and the nature of their jobs allows them to take care of their children at the work place. Similarly, male employment in paid employment sector outside agriculture has an insignificant effect on desired family size. The wealth variable, measured by ownership of agricultural land has a strong positive effect, whereas ownership of valuable household items has an insignificant negative effect on desired family size. The positive relationship between desired family size and ownership of agricultural land is probably an income effect as suggested in microeconomic theories of fertility. Two demographic variables, age and religion, have strong influence on desired family size.

Findings suggest that the majority of the respondents who desired no additional children at the time of baseline survey become pregnant within three years. Is it due to non availability of family planning services or lack of motivation to control fertility? Policy makers should try to find out the answer and design programme accordingly.

Acknowledgements

The research was conducted as a part of the author's doctoral dissertation. An earlier version of this article has been read and commented upon by Professor George Simmons of the University of Michigan and Dr M. A. Koenig of the Population Council. The author gratefully appreciates their generous contributions. The author is also indebted to the ICDDR, Bangladesh for permitting access to their MCH-FP Extension project data. The views expressed in this article are entirely the author's and do not reflect the views of the institution where the author is currently employed and the ICDDR, Bangladesh.

References

- Alauddin, M. and Faruque, R., 1983, *Population and Family Planning in Bangladesh: A Survey of the Research*, World Bank Staff Working Papers No. 557, Washington, D.C. Amin, R., 1979, *Factors Differentiating Fertility in Bangladesh*. *PHD. dissertation*, Catholic University, Washington D.C.
- Becker, G. S., 1981, *A Treatise on the Family*, Harvard University Press, Cambridge, Massachusetts. Brazzell, T. F., 1984, *Female Employment and Fertility in Developing Countries*. Project Paper for the Fertility Determinants Group, Indiana University, Bloomington, Indiana.
- Cain, M. T., 1985, On the relationship between landholding and fertility. *Population Studies*, 39: 5-16. Caldwell, J. C., 1981, The mechanisms of demographic change in historical perspective. *Population Studies*, 35: 5-27. Chaudhury, R. H., 1971, Differential fertility by religious groups in East Pakistan. *Social Biology*, 18: 188-91. Chaudhury, R. H., 1977, Education and fertility in Bangladesh. *Bangladesh Development Studies*, 5: 81-110. Chaudhury, R. H., 1978, Female status and fertility behavior in a metropolitan urban area of Bangladesh. *Population Studies*, 32: 261-74. Cochrane, S. H., 1979, *Fertility and Education: What Do We Really Know?* Baltimore, Johns Hopkins University Press. Easterlin, R. A. and Crimmins, E. M., 1985, *The Fertility Revolution: A Supply-Demand Analysis*, Chicago, The University of Chicago Press. Fatooh, G. M. and Simmons, G. B., 1985, *Fertility in Developing Countries: An Economic Perspective on Research and Policy Issues*, New York, St Martin's Press. Jain, A. K. and Nag, M., 1985, *Female Primary Education and Fertility in India*, Center for Policy Studies Working Paper No. 114, The Population Council, New York. Ministry of Health and Population Control, 1978, *World-Fertility Survey—Bangladesh Fertility Survey 1975* (First Report), Dhaka. Mozumder, K. A., Rob, A. K. U., Hossain, M. B. and Phillips, J. F., 1985, A Comprehensive Overview of Rules and Field Procedures of the Demographic Data Component of the Sample Registration System. International Center for Diarrhoeal Disease Research, Bangladesh, Dhaka. Phillips, J. F., Simmons, R., Simmons, G. B. and Md Yunus, 1984, Transferring health and family planning services innovations to the public sector. An experiment in organization development in Bangladesh. *Studies in Family Planning*, 15:62-73.

- Population Bureau and Census Commission, 1977, *Report on the 1974 Bangladesh Retrospective Survey of Fertility and Mortality*, Ministry of Planning. Rob, A. K. U., 1987, Regional Variations and Determinants of Fertility in Bangladesh. *Ph. D. dissertation*, Department of Population Planning and International Health, University of Michigan., Ann Arbor. Schultz, T. P., 1981, *Economics of Population*, Addison-Wesley, London. Shaha, N. M., 1975, Female labor force participation and fertility desires in Pakistan: An empirical investigation. *The Pakistan Development Review*, 14: 185-208. Shaikh, K., and Becker, S., 1985, Socioeconomic status and fertility in rural Bangladesh. *Journal of Biosocial Science*, 17: 81-89. Strout, T., 1984, *Some Relations Between Educational Attainment and Fertility in the Developing World: A Review of the Literature*. Project Paper for the Fertility Determinants Group, Indiana University, Bloomington, Indiana. Teitelbaum, M. S., 1975, Relevance of demographic transition theory for developing countries. *Science*, 188: 420-25. World Bank, 1980, *Fertility and its Regulation in Bangladesh*, World Bank Staff Working Paper No. 383, Washington, D.C.