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WHAT INFLUENCES PATTERNS OF WOMEN'S WORK IN RURAL BANGLADESH?

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ABSTRACT

Determinants of women's work patterns in rural households need to be identified for public policy programs that seek to improve the well-being of the rural population. Since women, who constitute more than half of the total population, are directly involved in the production of household goods, their participation in production activities may be a precondition for economic development in a country such as Bangladesh. Understanding the individual, household, market, and community factors that cause variations in women's work patterns may lead to more successful government policies in a rural economy.

A multiple logit analysis of cross-sectional women's time-use data from rural Bangladesh suggests that women's time-use patterns are not fixed by the society but are partially influenced by individual- and household-level economic constraints. This also suggests that women respond to market opportunities when such opportunities are available. Human capital variables, such as woman's education, appear to increase the probability that women will work in non-familial market jobs, and hence increase women's participation in market-oriented development activities. In contrast, market interventions which raise women's wages are shown to increase the probability of women's involvement more in familial market-oriented activities, such as handicraft production, than in non-familial non-farm activities. Government regulation aiming to curb dowry increases the probability that women will stay home. Improving the public delivery system of schooling, health, and credit, although perhaps reducing women's current involvement in more market-oriented activities such as handicraft production and market jobs, has, however, other important effects, such as raising the quality of children, and hence, the well-being of the rural population in the long run.

WHAT INFLUENCES PATTERNS OF WOMEN'S WORK IN RURAL BANGLADESH?[*]

Introduction

The objective of this paper is to identify the factors that affect rural women's time allocation to different productive activities, which in turn may shed light on the determinants of women's economic role and status in rural Bangladesh. This paper argues that women's time use and their status are not fixed by society and that women respond to market opportunities when such opportunities are available. Thus, if one can identify the community, market, household, and individual factors that determine women's productive roles in Bangladeshi households, this knowledge should lead to policy prescriptions that would affect the role of women in rural areas and also work to change female status in the household.

Although attempts are being made to adapt the economic theory of the household to the examination of the time allocation of household members in developing countries (Evenson, 1978), no systematic analysis has yet been undertaken to evaluate women's time-use patterns in determining the nature and extent of women's productive role within the household and in the society. Because the female population constitutes more than half of the total population and because their participation in development activities is important for overall economic development, the underlying factors that determine the time-use patterns of women in rural Bangladesh need to be identified for policy programs that seek to improve the well-being of the rural population. It is in this spirit that the present paper evaluates women's work in rural Bangladesh so as to infer policy options that can change women's economic status as well as the economic welfare of rural households.

The paper is organized in the following order. Section two briefly reviews the "state of the art" on the female role in household activities with particular reference to Bangladesh. Section three outlines the econometric framework of the multiple logit model that will be utilized to predict the patterns of women's work in different productive activities in Bangladesh. Section four presents survey data which will be used to test empirically the hypotheses of this paper concerning women's economic status, time allocation, and policy programs in rural Bangladesh. Section five reports the results of econometric estimates of the model. Finally, the policy prescriptions inferred from the simulated results are discussed in the concluding part of the paper.

Women's Time Allocation: State of the Art

The status of women in the Third World has become an important policy issue because, although it has changed dramatically in the western developed world, it has remained unchanged in many developing countries that have experienced moderate growth rates in the recent past. In many of these countries, growth has been distributed unevenly between sectors such as rural-urban, between regions such as irrigated-nonirrigated, and between classes such as landed-landless. The recent surges in research have contributed to the idea that growth has manifested another dimension of unevenness or inequality, which is between men and women (Buvinic et al., 1983). Women's precarious position is manifested in the "double role" they play in the household (Birdsall and McGreevey, 1983). Women not only work to generate household income, but also provide a number of unpaid services in the home such as child care, food preparation, and fetching water, which they do for the overall welfare of the family.

In many traditional societies women work mostly in non-market household activities, which some researchers (e.g., Krishna, 1983) call "quasi-productive work", while men mostly work in market activities that generate cash income. Time allocation studies from different developing countries indeed show that women work as much or even more than do men, but their work is largely in household activities (Farouk and Ali, 1975; King and Evenson, 1983). However, because of standard national accounting practices, women's efforts at home that save family expenditures on services such as food preparation, child care, etc., are ignored on the basis that these services cannot be marketed and hence have no market value (Birdsall and McGreevey, 1983). Thus, efforts are made to value women's work in home production that has no apparent market value in order to explain why women's predominant housework role is needed by the households. In evaluating the contribution of women's housework time to the household's "full income" (market income plus non-market income and leisure), several studies show that the percentage share of housework to total potential income varies from 38 to 53 percent (Kusnic and DaVanzo, 1980). In rural Bangladesh, as one study has documented, women's work accounts for more than 40 percent of the potential full income of the rural families (Chowdhury, 1984). The usual practice adopted to value women's non-market housework in calculating household's full income is to add to market income some measured income women would receive if their child care, food preparation, fetching water, cleaning clothes, etc, were valued and paid for explicitly (King and Evenson, 1983).

Although monetization of women's work at home is possible using market wages paid to women who work outside the home, such a valuation method may yield erroneous results.[1] First of all, as feminists argue, the results of the approach may reflect the influence of the existing sexual division of

labor. Thus, to the extent that sex discrimination exists in the labor market and women's wages are thereby depressed, women will devote too much time (i.e., an inefficiently large amount of time) to home production (Buvinic, 1983). Hence, valuation of women's housework based on imperfect labor market conditions does not necessarily lead to the conclusion that the value of what women do in the household constitutes a large share of the household's full income. Consequently, contrary to what some researchers have asserted (Chowdhury, 1984; Quizon, 1978), driving women away from housework and into market jobs may not reduce total family welfare; in fact, this may increase family income. Second, market wages of women working outside the home may not necessarily reflect the opportunity cost of women primarily involved in housework because of the possibility that the underlying perceived constraints for women working outside the home may be entirely different from those of women who work inside the home. This gives rise to the possibility that women working inside the home may respond differently to changes in market conditions than the women working outside the home. It follows, therefore, that the observed market wage rates may be poor indicators of why women predominantly work for the household's expenditure saving activity.

An alternative explanation of why women largely work at home is put forward by feminist writers who emphasize, "patriarchy", which in many traditional societies sets a high cultural value on house work, as the determining factor for women's time allocation decisions (Hartmann, 1976). However, sex segregation patterns in labor markets that are cultural in origin may break down in the face of changes in labor market demand (Youssef et al., 1980). Thus, in many developing countries women are increasingly found to participate in market-oriented income earning activities as development proceeds.

In the case of rural Bangladesh, sex segregation patterns in the labor market are rooted in the patriarchal system where "powerful norms of female seclusion extend to labor markets, severely limiting women's opportunities for independent income generation" (Cain et al., 1979, p.432). Even economic pressures such as poverty, according to these authors, are not greatly changing women's time-use patterns. This in turn suggests that a woman's time allocation is determined not by her choice but by the choices of her husband and the society.

However, the above argument need not be a universal one when even in rural Bangladesh, as we see shortly, there are cross-sectional variations in time-use patterns of women involved in productive activities.[2] Therefore, the more relevant issue is not simply to value what women do at home for saving the family's expenditure on activities, such as child care, food preparation, washing and cleaning, but to identify those factors that determine different patterns of women's work, including their housework role. I propose an alternative hypothesis regarding women's time-use patterns in rural Bangladesh. The hypothesis is that women's time allocation to productive activities, including "quasi-productive" housework, is not entirely determined by the society nor alone by market forces such as women's wages, but by a variety of factors, including (1) women's own endowments, such as education and earning potential, (2) family endowments, and (3) local markets and community context variables. If I can show empirically that women's time allocation is substantially explained by these individual, household, market, and community factors, then it may follow that the valuation as well as allocation of women's time are jointly determined by these economic constraints at the individual household level. The idea behind this hypothesis is that human capital as well

as household and community variables can explain cross-sectional variations in women's time-use patterns in rural Bangladesh. Having discussed the motivation that has led to this paper, let me turn now to the econometric framework that will be utilized to test these hypotheses.

Predicting Patterns of Women's Work: An Application of Multiple Logit Models

Multinomial logit models have been used for the prediction of occupation or type of job of individuals based on individual characteristics (Schmidt and Strauss, 1975) or based on characteristics of jobs (Boskin, 1974). Assume that there are k occupations and X_i is the vector of individual characteristics for individual i. The probability that the individual with characteristics, X_i, will choose the jth occupation is

$$(1) \qquad P_{ij} = \exp(\beta'_j X_i) / \sum \exp(\beta_k' X_i)$$

with some normalization such as $\beta_k = 0$, where k is the number of occupations (Maddala, 1983).

The model estimates the effects of the explanatory variables on the logg odds of the individual's occupational choice. Thus, the number of parameters to be estimated in such a model is equal to the number of individual characteristics multiplied by (k-1). The estimated parameters will measure the relative, not the absolute, importance of the vector of variables, X_i, on the log odds of the individual's occupational choice. Having estimated these parameters, however, one can calculate the absolute probability of an individual being in a particular category of work. More importantly, the estimated parameters can also be used to predict the probability that an individual with a specified set of characteristics will choose any particular occupation.

I assume that patterns of women's work in terms of their time allocation to different productive activities (including housework) can be categorized into several "occupational" groups.[3] The multinomial logit model will be applied to predict women's behavioral responses regarding their time allocation to different activities using a number of explanatory variables. These explanatory variables include individual characteristics as well as household, market, and community characteristics that the woman may take as exogenous or predetermined while allocating her time. Different reasons justify the inclusion of household, market, and community variables in the list of explanatory variables used to predict patterns of women's work in Bangladesh, and these are briefly explained below.

Individual characteristics that I treat as explanatory variables in the time allocation logit regression are woman's education and the amount of resources she brought to her marriage (e.g., dowry), which may indicate her earnings or wealth potential.[4] It is my contention that events before or at marriage of a woman may determine her current time-use pattern at home. For similar reasons, husband's education and the amount of resources the husband brought to the marriage may affect a woman's current time-use patterns. These effects may reflect, respectively, the effects of potential earning influenced by human capital endowments and wealth effects on the woman's time allocation. In addition, I include the woman's age to see if this demographic characteristic has any effect on women's time-use patterns in rural Bangladesh.

Household variables affecting women's time use include the household's one income-earning asset, livestock.[5] This variable may act as a proxy for productive household asset which may exert both a price effect (raising the marginal product or shadow "wage" of labor) and an income effect (encouraging the household to consume more of a particular good even at its certain

opportunity cost) on women's time-use in rural Bangladesh.

Market factors include observed market prices such as wages that are determined by market forces. The community factors, which include household's proximity to community services (schooling, health and banking services), may determine "implicit" (or unobserved) prices of many goods and services the household uses for home production and consumption. However, both market and "implicit" prices should be measured at a level of aggregation above the household to ensure that they are exogenous to the household's behavioral outcomes (Schultz, 1984). Market-determined prices in my study are community agricultural wage rates of three categories of labor: adult male, adult female, and child labor.[6] Inclusion of adult male wage is rationalized in that this may reflect the effect of husband's earning independent of any human capital endowment, such as husband's education, on wife's time-use. Women's community wage rates measure the opportunity cost of women's time-use in family farm activities. Child's wage rate, on the other hand, indicates the importance of the pecuniary returns to children for determining women's time-use patterns in rural Bangladesh.

Household residential characteristics that represent household accessibility to private and public services will proxy "price" variation that may be considered exogenous to the household.[7] The data in this category primarily consist of household distance(s) to the nearest health center and family planning unit, educational institution, and financial institution (bank). Women's time use patterns are thus assumed to be affected by public health delivery system, schooling system, and government credit programs for rural advancement in the sense that provision of these services changes the nature of constraints on individual household decision-making and hence women's time-use decisions.

All this means that the vector, X_i, in the equation (1) includes not only the individual characteristics of the woman, but characteristics of her husband, the household, the market, and the community as explanatory variables to predict her time-use patterns. Having discussed this multiple logit framework, let me turn now to the data I am using to estimate the model.

The Data

The data on which this paper is based is drawn from 500 sample survey questionnaires I recently (1983-84) administered in eight Upazilas[8] in Bangladesh. The sample comprises households both from farming and non-farming populations as well as landed and landless groups. The eight Upazilas were selected from regions north, east, and west of Dhaka as well as a central part of Bangladesh.[9]

Women's time allocation (housewives' only) data has been classified under two major categories, primary role and secondary role, based exclusively on the criterion of how much time a housewife spends in each activity.[10] Time-use data according to this classification gives the distribution of woman's time allocation in Table 1.

Table 1 indicates that women who named housework as their primary occupation account for 68 percent of the respondents. When asked about their time allocation to other productive activities, about 92 percent of these women said that they spend some of their time in activities which generate household income, either in kind or cash. The remaining 8 percent are primarily involved in housework and do not consider their time allocated to other productive activities as income-generating.

Table 1. Distribution of Women According to Time Allocation Patterns

Primary role	Secondary role							Total obs
	Housework	Family-farming	Self-emp. business	Handi-crafts	Poultry-raising	Non-agr. wage	Sew-ing	
Housework	26	251	8	34	6	15	2	342
Self-employed business	3	0	0	0	0	0	0	3
Salaried services	92	0	0	2	0	0	1	95
Handicrafts	30	2	0	0	0	0	0	32
Teaching	21	0	0	0	0	0	0	21
Non-agricultural casual wage work	3	0	0	0	0	0	0	3
Rice husking*	1	0	0	0	0	0	0	1
Sewing*	1	0	0	0	0	0	0	1
Total obs.	176	253	8	37	6	15	3	498

*Rice husking and sewing can be part of housework women do for their families; however, these are treated as separate income-generating activities when women do them on a commercial basis for earning income.

Table-2. Time-use Patterns of Women in Rural Bangladesh

Time-use category	Primary job	Secondary job	Obs.
1	Housework	Housework	26
2	Housework	Family farming	257
3	Housework	Family non-farming	59
4	Family non-farming	Housework	36
5	Market work (cash)	Housework	120

The time-use data in Table 1, however, may be classified under four broad categories- -housework, family farming, family non-farming, and market work for cash[11]- -with the expectation that these broader classifications may measure women's economic role in the household as reflected in their time-use patterns. Although there are a maximum of four categories of economic activities in which a woman can work, the survey questionnaire limited responses to two categories of work for each woman. Treating all secondary roles as part of housework under the categories of non-housework primary roles (which are negligible in number anyway), Table 2 reports five categories of women's time-use patterns which may be defined in terms of combinations of primary and secondary roles as stratified in the Table 1.

The categories as constructed in Table 2 do not imply an ordering, but they are organized in ascending order from exclusive housework to exclusive market work. This categorization also implies an ascending order from women's income generation (mostly in kind) from and within family activities to independent (cash) income generation from market work.

The categories as reported in Table 2 can be regrouped further by slightly rearranging work patterns. To the extent that many households in my sample are predominantly agriculturists, and they are from rural areas of Bangladesh, women who reported no work other than housework are combined with those in category 2 to form a new category of time-use pattern for women engaged in family farming in addition to the traditional housework role. Note also that housework and women's work for the family farm are not incompatible for my sample, since women's family farm activity is mostly confined within the house compound involving operations after harvests. Similarly, for a woman who

works in the family non-farming enterprises (category 3) in addition to housework, it may be difficult even for her to identify to which of the two activities—housework and non-farming income earning—she devotes more of her time, because both activities are done in the household and may be compatible. Therefore, it is logical to group 3 and 4 together under one category to form a new category of women's family non-farming time-use. Under the assumption that housework and work outside the home for cash may be incompatible, I retain the fifth category as a separate one.

Having identified three distinct time-use categories for rural housewives in Bangladesh, the problem is now to explain the probability that a woman with the specified individual, household, market, and community characteristics will be observed in a particular category of these three possibilities.[12] Table 3 reports the means and standard deviations of the dependent and independent variables.

Table 4. Means and Standard Deviations of Variables

(Sample 498)

Variable name	Mean	Standard deviation
Time-use in family farm and housework	0.56	0.50
Time-use in family non-farm and housework	0.20	0.40
Time-use in market work and housework	0.24	0.43
Age of the housewife (years)	34.55	10.31
Woman's education in years	3.86	4.54
Husband's education in years	6.15	5.10
Value of resources brought by husband('000)	40.20	69.95
Woman's Dowry ('000 Taka)	4.35	9.59
Value of livestock ('000 Taka)	4.04	3.95
Distance to the nearest school (Km)	1.37	2.42
Dist. to health and family planning (Km)	3.87	3.13
Distance to financial institution (Km)	3.27	2.75
Adult male agrl. wage rate (Taka)	17.95	2.70
Adult female agrl. wage rate (Taka)	8.40	1.45
Child (under age 15) agrl. wage rate (Taka)	9.22	2.75

Note: Agricultural wage rates are the community level wages observed during the period prior to the data collection period. Community-level wages are the wages of three categories of labors observed in the Union where the sample belong, thereby allowing wages to vary across Unions.

The Multiple Logit Results

The appropriate econometric method required to estimate such multinomial functions where the responses are more than two, and the explanatory variables are continuous, is the maximum likelihood method as discussed in Nerlove and Press (1973). The multiple logit results are shown in Table 3 below.

In general, the multiple logit results indicate that the model fits well in explaining women's time-use choices in terms of individual, household, market, and community characteristics.[13] Many of the explanatory variables in the time-use regressions have significant power in predicting the probability of a woman being in a particular group with those specified characteristics. It follows, therefore, that women's time-use patterns in rural Bangladesh are not preordained by their husbands or by society but are influenced by economic constraints.

Effects of human capital variables:

Woman's age is significant in predicting that relatively younger women are more likely to be involved in income-producing activity at home, while relatively older women do mostly housework or participate in market work for cash income.

Women's schooling seems to play an important role in determining participation of rural housewives in market work relative to family farm and family non-farm work. More specifically, the higher the education of a woman, the more likely it is that she will work outside her home for independent income generation.

Table -3. Multiple Logit Coefficients with T-statistic in Parentheses.

Exog. variables	ln(NFRM/FRM) [a]	ln(MKT/FRM) [b]	ln(MKT/NFRM) [c]
Intercept	7.2886 (3.31)*	0.214 (0.09)	-7.072 (-3.51)*
Woman's age	-.076 (-3.50)*	.006 (.23)	.082 (2.96)*
Woman's education	.017 (0.21)	.527 (5.94)*	.510 (5.76)*
Husband's education	-.096 (-1.58)*	-.167 (-2.34)*	-.071 (-0.99)
Husband's premar- riage assets	-.007 (-1.84)*	-.011 (-2.02)*	-.004 (-0.73)
Dowry to husband	.00006 (3.31)*	.00003 (1.20)	-.00003 (-1.76)*
Livestock value	-.0001 (-2.49)*	-.0003 (-4.80)*	-.0002 (-2.46)*
Distance to schooling	.332 (3.38)*	.299 (2.54)*	-.033 (-.31)
Distance to health center	.194 (1.68)*	.048 (0.35)	-.146 (-1.10)
Distance to bank	.005 (0.43)	.005 (0.35)	-.050 (-.29)
Male agricultural wage	-2.230 (-7.20)*	-1.624 (-4.91)*	.606 (1.88)*
Female agrl. wage	3.372 (6.35)*	2.685 (4.93)*	-.687 (-.91)
Child agrl. wage	.592 (2.64)*	.489 (1.92)*	-.103 (-.40)
Chi-square	515.38**		

[a] Natural log of probability of being in non-farm and homework category relative to family farm and homework category;

[b] Natural log of probability of being in market work and homework category relative to family farm and homework category;

[c] Natural log of probability of being in market work category relative to family non-farm category; results in this category are derived from the first two categories;

* refers to estimates that are significantly different from zero at a 1 percent level of significance using a two-tail test;

** Chi-square ratio is significant at a 1 percent level of significance .

Conversely, husband's education has a negative effect on a woman's work outside the home for independent income (cash) generation. Thus, the higher the level of the husband's education, the more likely that the woman will work only at family farming and housework and the less likely that she will engage in income-producing non-farm activities, either at a family enterprise or outside the home non-familial activities. The effect of the husband's education may reflect the effect of husband's earning on the woman's time-use patterns, a finding consistent with expectations (Gronau, 1977).

Effects of physical capital variables:

The effect of the husband's premarriage assets on the wife's time-use patterns has implications similar to those of the husband's education. Since assets in rural Bangladesh are mostly land, their effect on woman's time-use patterns is to increase the productivity of home production activities relative to off-farm activities. Thus, husbands who bring greater assets to their marriage have wives who allocate more of their time to homework and family farming activities.

Similarly, the effect of wife's dowry may represent the effect of wife's wealth on her time-use patterns in rural Bangladesh. However, a larger dowry increases the probability of women's working in family enterprises relative to family farming but reduces the probability of market work relative family non-farm activities. It can, thus, be interpreted as a wealth effect—women with larger dowries are less likely to engage in non-familial market activities.

The effect of livestock, which includes both draft (bullocks) and non-draft (cows, goats, sheep) animals, on women's time-uses is to increase the probability of working in housework and family farming. This may be explained as a price effect, which raises home and farm productivity of women in rural Bangladesh, so women will participate more in family farming activity if the family's farm productive resources increase.

Effects of community-context variables:

The community-context variables, which I assume measure implicit prices of goods and services households use for home and market production, seem to have significant effects on women's time-use patterns in rural Bangladesh. The effect of school distance on women's time-use patterns seems interesting, in particular its significant effects in increasing the probability of women's involvement in both family non-farm work and market work. One possible explanation is that the greater the distance to school, the higher the price of schooling for school-age children, and consequently, the lower will be children's enrollment in schools. These children in turn may help women participate either in family non-farming activity or free their time for market cash work.

The distance effect of medical health center can be regarded as a reduction of the price of children's (and mothers) health, or a reduction of price of quality of preschool children. However, since most health centers do provide family planning services, this may also imply a reduction of price of fertility regulation which is analogous to increased price of quantity of children. However, the availability of modern health services might have

increased survival rates of infants without inducing a corresponding decline in birth rates (which is possible if rural households do not know how to regulate fertility or there are incentives at the individual household level not to regulate fertility), thereby increasing the completed fertility of most rural women. This means that a woman will be preoccupied with child care as more children survive and will consequently display a higher probability of working in the home and in family enterprises, or activities that do not interfere with taking care of her children.

The effects of financial institutions in terms of financing rural income-generating activities at low interest rates seem to increase the probability of women's working in non-farm activities either at home or outside home relative to family farm work, although these effects are not significant. However, the distance effects of financial institutions may imply the effects of market centers on women's time-use patterns and thus, the increased probability of women's involvement in more market-oriented income-generating activities.

Effects of market-determined variables:

I turn next to the community wage regressors of three categories of agricultural labors.[14] The wage data in my regression is the Union-level average for each type of labor. The differences between the three categories of wage rates as documented in Table 3 clearly indicate that age-sex differences exist in the rural labor market, which is also consistent with other findings (Cain, 1977). However, the wage rates of women and child labors will be influenced by movement in the male wage rate, to the extent that they are partial substitutes for each other in production. With the knowledge of the risk of multicollinearity among these three wage variables, let me propose a tentative explanation of the wage effects.

The effects of adult male wage rate are to increase the probability of women working more for family farming than for non-farm activities both inside and outside the home. Thus, an increase in the male agricultural wage rate may imply increased farm productivity of women in family farms; so a woman may substitute for male labor on the family farm, thereby releasing the husband's time to market income earning activities. Increased agricultural wage of husbands may also imply higher income, so women do not need to work for off-farm activities (Gronau, 1977).

An increase in the female agricultural wage increases the probability of a woman's working in both family non-farm activities and market jobs relative to family farm activities. The higher the value of farm work, the more likely women are to work off-farm, a finding which may be rationalized in that an increase in the farm wage implies a corresponding increase in the non-farm wage, which in turn may induce women to be involved more in off-farm rather than farm income-producing activities. This may also imply that women's involvement in family farming as a result of increased farm productivity may be limited in Bangladesh agriculture.[15]

The effects of the child wage rate are also to increase the probability of working in family non-farm activities and market wage jobs relative to family farming activities. This finding suggests that there may be some complementarity between the labor supply of women and children, which is consistent with findings that women and children are the usual workers in rural non-farm activities in Bangladesh (BIDS, 1981).[16]

Policy Simulations

After examining the multiple logit results, it is clear that all the individual, household, market, and community-context variables do not work in the same direction in predicting the probability of women's involvement in any of three particular categories of time-use patterns. It may be important, however, for policy purposes to distinguish the factors considered exogenous to household behavioral outcomes that influence the probability of women's working in market work from the factors that interact with it in the opposite direction, i.e., keeping women away from market-oriented activities. The distinction between these two types of exogenous variables seems an important relevant issue of public policy, policy that may invoke interventions into a rural economy to promote women's participation in development activities.

More specifically, the public policy issue may be that women's participation in development activities is an important element of successful program interventions that are geared to increase the well-being of the rural population. Since women are directly involved in the production of household goods, such as children, schooling of children, health, etc., their knowledge about the factors that influence efficient household production may lead to more efficient utilization of scarce resources which in turn may increase efficiency in household production of goods. Thus, knowledge of how to ensure effective and better use of resources in household production may increase the well-being of individual households, just as information about the improved methods of cultivation can increase farm efficiency.

In Bangladesh, the policy variables of particular interest are women's education, market interventions or regulations concerning wages, dowry, and public delivery system of schooling, family planning, health care, and low-interest credit. Simulations of these variables are shown in Table 4.[17]

Table 4. Probability of Being in Particular Time-use Category When

Changes Occur in Selected Explanatory Variables

Exogenous Variable	Change from Mean	Family Farm	Family NFRM	MKT Work
Category A				
Woman's education	Increase by 1 yr.	-.0598	-.0132	.0730
Woman's wage	Increase by 10%	-.5488	.4307	.1181
Child's wage	Increase by 10%	-.1181	.0782	.0399
Category B				
Wife's dowry	Decrease by 10%	.0044	-.0037	-.0007
Distance to school	Decrease by 10%	.0098	-.0060	-.0038
Distance to health center	Decrease by 10%	.0100	-.0098	-.0002
Distance to bank	Decrease by 10%	.0024	-.0027	-.0002

Note: Category A refers to variables that influence the probability of women's involvement in more market-oriented activities, while category B refers to those influencing women's involvement in less market-oriented or more familial productive activities. Moreover, since the coefficients on bank variables are not statistically significant, the simulated results on the effects of this variable need to be qualified.

A one year increase in women's education from its mean value of 3.86 years (about 25% increase from mean level of education) increases the probability of participation in non-familial market work by 7 percent, while reducing the probability of being in the family farm by 6 percent and in the family enterprise by 1 percent. On the other hand, a 10 percent increase of a woman's wage from its mean value increases the probability of a woman's working in family enterprise by 43 percent and in market work by 12 percent, while reducing the probability of working exclusively on the family farm by 55 percent. The same percent increase in a child's wage from its mean value increases the probability of being in the family enterprise by 8 percent and in market work by 4 percent, while reducing the probability of a woman's involvement in the family farm by 12 percent. Thus, among the factors that increase the involvement of women in more market-oriented income earning activities, women's education turns out to be the single determinant that influences women's market work participation unequivocally, while the other two factors--woman's wage, and child's wage-- although influencing the women's participation in both types of market-oriented activities (familial and non-familial), has a stronger impact on participation in familial non-farming activities.

However, if one compares the effects of the woman's education and the woman's wage, the wage variable has a stronger impact in raising the probability of having a market job. A 10 percent increase in the woman's wage from its mean level increases the probability of market work by 12 percent, while a 25 percent increase in education from its mean level raises the probability of market work by only 7 percent. Moreover, it takes much longer to increase average education of women by one year than to raise the women's wage by 10% from its mean Tk. 8.40. So, from policy perspective, it is market

interventions which raise women's wages that may yield better results if the objective is simply to raise women's participation in non-familial market work.

On the other hand, a 10 percent decrease in a wife's dowry from its mean value decreases the probability of being in a family enterprise by 3 percent and in a non-familial market work by about 1 percent, while increasing the probability of being in the family farm by 4 percent. Although elimination of the dowry system by regulation from the society may be a relevant policy objective in Bangladesh, results suggest that government regulation curbing the influence of dowry, without corresponding increase in female education, may reduce women's participation in more market-oriented activities and, thus, perhaps in more market-oriented development activities.[18]

The other policy relevant variables in Bangladesh are ones that stipulate that government should provide a number of essential services such as health and family planning services, schooling, and low interest credit facilities. The simulated results on these variables, however, in terms of reducing accessibility cost perceived by the individual household, indicate that such policies would increase the probability that women work more in familial non-market activities, such as family farming, than in market-oriented activities.

A reduction in schooling costs, for example, will probably mean more enrollment of school-age children, which in turn implies that women will be more occupied with familial activities, activities which were supported by these children before this reduction of school costs was brought about. For my sample, a 10 percent reduction of schooling costs increases the probability of a woman's being in a family farm by 1 percent, while reducing correspondingly the the probability of being in familial and non-familial non-farm activities.

Thus, the policy of reducing schooling costs, although reducing women's involvement in more market-oriented activities, either familial or non-familial, can increase the quality of children through more schooling which may enhance the individual as well as social welfare over a longer time horizon. Similar arguments may also apply for policy variables involving reduction of costs for health and fertility regulation, or reduction of costs on borrowed funds.

Conclusions

An analysis of the multiple logit framework used in predicting women's time-use choices out of three distinct categories of women's work patterns in rural Bangladesh suggests that these choices are not exclusively fixed by the society but are partially influenced by woman's own endowments as well as economic constraints at the individual household level. This implies that the alternative hypothesis that the women's time allocation in rural Bangladesh is inflexibly fixed by local customs can be rejected.

If women respond to market opportunities when such opportunities are made available, and women's involvement in more market-oriented activities promotes women's participation in market-oriented development activities, simulations of several policy variables can be derived.

Human capital variables, such as woman's education, appear to contribute unequivocally to women's involvement in non-familial market jobs, and hence in more market-oriented development activities. Human capital investment in female population of rural Bangladesh may be, thus, an important policy instrument for promoting women's participation in development activities that can improve the well-being of the rural population. Market interventions

which raise women's wages, although they tend to have positive effects on women's participation in market work for cash, have greater effects on women's being in non-farm familial activities which are compatible with gainful employment of young children. Government regulation which is designed to curb the incidence of the dowry system, although desirable from a social perspective, reduces the women's involvement in market-oriented activities.

Government provision of community services such as schooling, family planning, health, and low interest credit have the prospect for increasing the women's participation in development activities, although they tend to reduce women's current involvement with market-oriented activities. Therefore, these policy variables are more relevant for achieving long run policy objectives and must be justified accordingly.

Footnotes

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1   This is precisely the Heckman type selection problem in estimating female labor supply to market activities (Heckman, 1974; 1979). The issue is to estimate earnings or wage offers for women working in the non-market sector and not in the modern sector. A common technique is to estimate earnings for the subsample of women working in the modern sector and on this basis predict a wage offer for women not working in the modern sector. This method will generate inconsistent parameter estimates if the two subsamples differ in unmeasured characteristics.

2   Data recently collected from rural Bangladesh that will be used in this paper show that women participate in a number of familial and non-familial works, thereby suggesting that women in rural areas are not necessarily confined within the four walls of their house compounds.

3   Grouping of women according to their time-use patterns may not strictly correspond to what are known as professional occupational groups. These groupings, instead, are made on the basis of women's particpation in the market-oriented activities, such as market jobs, which in turn may indicate the extent of women's participation in market-oriented development activities.

4   Woman's dowry consists of ornaments given involuntarily to a woman by her parents as a precondition of marriage and also other kinds of payments, either in kind (e.g., radio, T.V., motor cycle) or cash, to her husband at the time of her marriage.

5   One can include land as another household asset in the regression. However, because livestock and landholding tend to be related, I prefer to include livestock instead of land as a proxy for asset effects in the regression.

6   Using community wage rates bypasses the selectivity problem by assuming that every woman faces these wage rates irrespective of her ability, education, and experience, thereby implying that the rate of return on human capital investment is zero. Alternatively, one may use predicted wages based on the estimated wage offers for women working outside home. This approach may also be inconsistent, given my data characteristics.

7   Household distance(s) to these community services may be endogenous, instead of exogenous, if household's preference is involved in deciding where to live. My assumption is, however, that these decisions, such as living nearer to market center where these public services are located, are made before or at the event of marriage so that these variables are predetermined for what follows next, i.e., women's time allocation.

8   Upazilas are "upgraded" Thana administrative units covering roughly an area of 100 sq. miles consisting of several Unions. Unions in turn are collections of a number of villages.

9   The Upazilas covered under this study are respectively, Baidyerbazar (Dhaka district), Ghatail (Tangail district), Kownia and Kotwali (Rangpur district), Sherpur (Jamalpur district), Laksam (Comilla district), Ishardi (Pabna district), and Gabtali (Bogra district). For more details of data collection, see Khandker (1985).

10   This does not exclude the possibility that women do not work in more than two activities at a time. The two-way classification is done on the basis of time devoted mostly in two activities.

11   <u>Housework</u> is house chores such as cooking, cleaning, fetching water and firewood, caring for the children and the old, washing and serving food to family members. <u>Family farming</u>, for women in my sample, is post-harvest operations of crops, such as threshing, drying, winnowing, and sifting for paddy. It also includes kitchen gardening, tending domestic animals, or raising poultry on a commercial basis. <u>Family non-farming</u> includes activities such as family business, sewing, handicrafts, rice husking which are done primarily by the family at home where women work either as a partner or an unpaid family worker. <u>Market work for cash</u> include those activities that require women to work outside the home, such as teaching, non-agricultural casual wage work, and other salaried services.

12   These three patterns of women's work may reflect one important role of women, i.e., their decision-making role. Women's participation in family farming, according to definition in footnote 10, is essentially a job where a woman's access to market information or production know-how provided through a variety of government programs is limited. This work has also limited scope for women's decision-making role, since most income generated goes for self-consumption. In contrast, family enterprise, although a familial activity, may provide a greater degree of women's access to market information and hence participation in development activities, since women may be directly involved in the production process involving inputs and output flows. Market jobs, on the other hand, provide greater scope for women's participation in market-oriented development activities, and hence enable women to play an active role in household decision-making.

13   The chi-square ratio which tests the hypothesis that coefficients of all regressors except the intercept are zero provides an indirect test for rejecting the alternative hypothesis of no choice involved in women's time allocation by women.

14   Only agricultural wages and not non-agricultural wages are included on the assumption that both these wages move in the same direction. In fact, one study showed that agricultural and non-agricultural wages move in the same direction but with a lag (Papanek, 1984).

15 Women are generally involved in most of the post-harvest operations of crops, while men are involved in more core activities such as ploughing, planting, weeding, harvesting, of crop cultivation. In such a situation, it is difficult to imagine that an increase of farm productivity due to induced technological adaptation such as high-yielding variety of crops will lead to a greater demand for women's labor in farm except for limited demand generated for increased harvests.

16 BIDS reported that more than one third of all workers in the rural industries were found to be women, of which about 84 percent were unpaid family helpers. Another one third of total labor force employed in the rural industries were found to be children (BIDS, 1981).

17 The simulation is essentially done to predict the probability of being in a particular group when change occurs in one of the explanatory variables while leaving the mean values of other explanatory variables constant. This exercise is repeated for all individual explanatory variable.

18 The "Dowry Prohibition Act" recently (1984) introduced by the government has thus limited role in promoting women's participation in market-oriented development activities, unless it is effectively implemented along with an effective program that promotes female education in rural Bangladesh. So far there is no government policy specifically aimed at bridging the widening gap between education attainment of the male and female population in Bangladesh.

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