Married Women's Labor Supply Decision: The Factors Behind

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Abstract

The study analyses the factors that influence married women's decision to participate in the labor force. A logistic regression has been run with a sample of 470 married females currently residing in the Dhaka City. The results show that self-education, training, own view regarding women employment, and presence of a senior working female member in the family influence a woman's market participating decision positively. On the contrary, husband's education, age gap with husband, number of children of pre-school age affect negatively her working decision. Results of the study have important implications for government policies toward women's empowerment by providing a greater access to education and training, childcare leave laws, flexible work conditions etc.

1. Introduction

A democratic society, truly speaking, is very keen to afford its citizens equal opportunities in respect of political, social and economic aspects to the best of their aptitudes and desires. However, since historically the world is more or less imperfect in the attainment of its cherished idealistic goals, even if a woman has got legally the same rights as those of a man, she is often rendered unable to enjoy those rights because of social, psychological and economic inhibitions. Notwithstanding the increased presence of women in the workforce in recent times, its pace is still sluggish; impediments are still there to deny women equal access.

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A crucial event in an individual's life is no doubt marriage. Marriage being the foundation of the creation of a family, the family is bound up with all crises and transitions of life. It has serious implications for decisions taken in the subsequent days of one's life. Marriage increases a man's working hours and decreases those of a woman[1]. Since a woman's status is usually independent of a successful career, she is more likely to fulfill social and cultural expectations. That is why most of the working women's careers are auxiliary to their husbands' higher rewarding and socially recognized pursuits.

It is important to analyze married women's labor force participation and associated factors since their cohorts constitute a large portion of potential workers. Previous studies on this issue have identified several factors affecting married women's labor supply decision. This paper is certainly a sprout as it makes a distinction between the determinants of the market wage rate and the determinants of the shadow price of household production and emphasizes the latter (common determinants are considered). Along with the conventional factors, this paper introduces two new factors - age gap with husband and the presence of senior "working female" in the family. Again, it explicitly stresses the significance of performing household work by the woman herself on her working decision.

The theoretical basis for the present paper is discussed in section 2. Section 3 describes the data set. In section 4, the variables are described and the methodology is specified. Section 5 reports the regression results as well as their interpretations. Section 6 concludes the paper.

2. Theoretical Masonry

2.1 Theoretical Perspective: The literature

Intrinsically marriage and labor supply have a very close connection to each other. Marriage can be regarded pragmatically as the begetter of household production. Two potential fields of labor of a married woman are (1) to work in household production (HP) and (2) to work as paid labor. She has to take a decision about the allocation of her available time between these two options.

Decisions as to married women's labor supply are often made on a family basis rather than on purely individualistic considerations[2]. Traditional familistic concerns

1 It is often argued that though married women tend to earn less themselves they improve their overall standard of living through shared income.

2 Their working decision doesn't reflect psychological emancipation since it is neither a choice nor an affirmation of the right to work but an obligation or a means to survive. The extent of emancipation may rise with the women's economic self sufficiency (Safilios-Rothschild, 1977).

are usually found to have determined their working decision. There is a large volume of literature on female labor force participation (LFP) providing economic rationales concerning women's labor supply and marriage. Various studies have identified several factors affecting women's labor supply decision. Mincer's (1962) classic endeavor identified women's own market wage, husband's wage, and the number of children as the crucial factors. Becker (1973) considered education as one of the prime factors. Oppenheimer (1994) considered the impact of attitudes toward women working outside the home. Own wage, husband's wage, and education were found to affect LFP of married women positively while the number of children was exerting a negative influence. In three different studies, Kim (1972) introduced a new factor named cross substitution implying the husband's earning capacity relative to that of the wife's. The study also considered the conventional factors like other family income, home wage (used as a proxy for child care burden), attitude toward propriety of women working, husband's attitude toward wife's working, and two market factors - unemployment rate in the local labor market and the index of demand for female labor in the local area. Own attitude towards female employment and husband's attitude towards her working were found to be positively related to labor supply while family income less own wage, home wage and cross substitution were affecting negatively. Juhn and Murphy (1999) also found relatively less LFP rate for women with high earning husbands. Edwards and Roberts (1993) found urbanization, level of education and reduction in fertility affecting women's LFP positively.

The gist of exchange theories and bargaining theories of marriage is that people trade a set of attributes for a spouse's set of attributes. According to Wallace and Wolf (1991), individuals will obtain the best returns to their market value if both the partners are endowed with desirable attributes. A lackluster individual may be willing to pay a price in exchange for a desirable attribute in a mate. This price is termed as "a compensating differential in marriage" (Grossbard -Shechtman and Fu, 2001). Women usually marry men older then them. Since earning is positively allied to age and men often earn more (compared to women), spousal income is higher for most women than men causing a disincentive for married women to take part in labor market activities. Moreover, the husband may respond positively to an increase in wage by working more while the "family income effect" is likely to reduce the wife's labor supply (if it was positive before the increase). A more recent explanation is that with a much younger wife, the husband must compensate his wife highly for her household production compared to a man who is his wife's age-mate. Again, wives receiving a higher compensation are less likely to participate in the labor force. Grossbard-Shechtman and Neuman (1988) introduced this idea and found empirical support in the case of a particular cohort of married Israeli women. The household specialization model emphasizes the

allocation of time and effort between market and non-market activities and it may be preferable to have one spouse to be devoted to the marketplace full time, rather than both devoting halftime (Mulligan and Rubinstein, 2002). The problem of dual job search for couples in smaller labor markets is the focal point of Robert Frank's (1978) theory of differential overqualification. According to him, husbands usually optimize their individual job search first and their wives are "tied movers/stayers" as their job search is undertaken under the condition that their husbands' job search is optimized. This leads to a higher risk of a mismatch between formal qualification and job requirements. The theory is yet to get strong empirical support (Buchel and Battu 2003) and it is not clear whether that risk is high enough to create a significant disincentive for married women's labor supply in practice. However, lower average earnings may discourage women from participating in the labor force.

Women are believed to be (Becker, 1985) bestowed with a natural ability to bear and rear progenies, which may enlarge the value of their non-market time relative to men. Many have recognized the potential importance of gender role attitudes (Juhn and Murphy, 1997 and Mulligan, 1998). In some instances, fertility decline was emphasized (perhaps in response to contraceptive technological progress). Goldin and Katz (2000) concluded that women's control over fertility directly reduced the costs to them of engaging in long-term career investments. For Latin America, Moreno and Singh (1996) discovered that increased contraceptive use was accounting for the greatest decline in fertility. Fertility reduction expands available time (even if labor market conditions are not improved), increasing the rate of LFP. Sweet (1973), Bowen and Finegan (1969) argued that the presence and age of the children affect married female's labor supply decision. Alternatively, to put differently, the cost (value) of childcare is a determinant of mothers' decision to participate in paid labor market activities (Heckman 1974, Blau and Robbins 1988). Heckman and Willis (1977) found that reduction in the number of births per women affects labor supply decision positively. However, at the individual level, work and fertility may be positively related when women work because of the insufficiency of their husbands' income in relation to the number of children. Societies in which womanhood is valued highly in terms of the number and/or sex of children as well as in terms of the mothering role, she is likely to be driven by the spur of a moral obligation to her family though even in this kind of societies, working women tend to reduce the incompatibility of two roles by having few children[3]. Again women's often observed high work commitment depresses fertility (Safilios-Rothschild, 1972).

[3] The role incompatibility hypothesis states that for a woman the working and mother roles are incompatible. This may not be true because of : (1) cheap labor of maids (2) mother substitutes (female relatives).

There are two sorts of substitutes for paid employment-leisure and household work, and there always exists a trade-off between leisure and labor. Again, though not a formal employment, reduction in household work releases some hours of the day worthy of being used elsewhere for reward. Since household production is still mostly characterized by the bevy of ladies, increasing availability of household appliances is likely to encourage women to work in the marketplace (Long, 1958).

Rising educational attainment increases the economic costs of not working outside the home and usually alters women's tastes for market work (Bianachi and Spain, 1986). In Suzanne, Edwards and Ureta (2001), years of schooling explained about 30% of the increase in female LFP. Saw (1990) also recognized the influence of rising level of education and changes in attitudes along with other socio-cultural factors for Singapore.

Locomotion in the world of psychics for a while reveals that women tend to weigh the impact of a decision would have on the people involved. Women believe morality is connected to responsibility in relationships and they always assume a connection between self and others (C. Gilligan, 1980)[4]. They are more likely to prefer win-win solutions or perhaps win-lose solutions[5]. Hence, her decision may benefit everybody involved, including herself, or may do good to everyone involved at the expense of her sacrifice. Here the offering often takes the form of non-participation in the labor market.

In Bangladesh, a number of studies have identified several factors. Chaudhury (1976) marked the importance of age of the youngest child, residential background, family type, family size, husband's education, husband's occupation and of husband's income. Majumdar (1988) indicated childcare (which depends on age of the youngest child, number of children) as the single most important reason for keeping women at home. Majumdar (1992) stressed on family income before women's labor supply, education and on husband's occupation. In a later study, Majumdar and Mahmud (1994) considered factors like: age of the youngest child, marital status, household income, household size, education level of the head, migration status of household and the number of their earners, average education level, mean wage rate, and average daily hours of worked supplied by workers. The last study was on females--both married and unmarried--and stood the only of the four attempting standard econometric approach.

4 C. Gilligan, a Harvard psychologist.

5 In the past, women approach was labeled as evasive and wishy-washy.

2.2 A Simple Model of Married Women's Labor Supply Decision [6]:

A married woman has three options: labor force participation, leisure, and work in marriage (or household production,). Her labor force participation depends positively on the wage offered (except very high wages) and negatively on the value of leisure as well as on the value of household production.

The total time available in a day is hours. Let the woman can spend this limited time by working in the paid labor force or by engaging in household production and by resting . We define leisure as the residual of the total time available, and labor supply (either in the labor market or in household production or in both),

$$L = 24 - l - h \tag{1}$$

$$L > 0, h \geq 0, l \geq 0, and, h = l \neq 0.$$

We assume that is the wage rate in the labor market and that the hourly return on hp is y . y is a quasi wage. It can be interpreted as the hourly imputed value on household production by the woman or by the decision-maker. y is likely to rise with family restriction regarding labor market participation, likely to be positively connected to child care or may fall with a rise in "family income without the women's contribution". The value of y (the importance of household production) depends on the factors affecting the labor force participation decision. The stronger are the positive factors, the lower is the weight on y . We also consider a non-labor income, m , which depends on income transfers (unconditional on hp), savings or any windfall income. Hence the total income of a woman is,

$$Y = wl + hy + m \tag{2}$$

Since at any moment of time w and y are given for a woman,

$$Y = Y(l,h) \quad \text{and} \quad L = (l,h) \tag{3}$$

We consider a utility function defined on income y and leisure L .That is, let

$$U = U(Y,L) \tag{4}$$

Let the utility function is of the Cobb-Douglas form,

$$\begin{aligned} U &= Y^{\alpha} L^{1-\alpha} \\ &= [Y(l,h)]^{\alpha} [L(h,l)]^{1-\alpha} \\ &= \left[(wl + hy + m)^{\alpha} (24 - h - l)^{1-\alpha}\right] \end{aligned} \tag{5}$$

6 This model is based on Grossbard-Shechtman & Fu (2001) and on Alba & Esguerra (1998).

Here I and are choice variables. Differentiating (5) with respect to I and h and setting the expressions to zero,

$$\frac{\partial U}{\partial l} = (wl + hy + m)^{\alpha}(1-\alpha)(24-h-l) \quad {}^{1-\alpha-1}(-1) + (24-h-l)^{1-\alpha}\alpha(wl+hy+m)^{\alpha-1}w = 0$$

$$\Rightarrow \quad (wl + hy + m)^{\alpha}(1-\alpha)(24-h-l)^{-\alpha} = (24-h-l)^{1-\alpha}\alpha(wl+hy+m)^{\alpha-1}w \tag{6}$$

$$\frac{\partial U}{\partial h} = (wl + hy + m)^{\alpha}(1-\alpha)(24-h-l)^{1-\alpha-1}(-1) + (24-h-l)^{1-\alpha}\alpha(wl+hy+m)^{\alpha-1}y = 0$$

$$\Rightarrow \quad (wl + hy + m)^{\alpha}(1-\alpha)(24-h-l)^{-\alpha} = (24-h-l)^{1-\alpha}\alpha(wl+hy+m)^{\alpha-1}y \tag{7}$$

Dividing (6) by (7),

$$1 = \frac{w}{y} \tag{8}$$

$$\Rightarrow w = y$$

A woman will participate in the labor market or in the HP depending on whether w exceeds y or not. If the hourly return on HP (y) is increased, the inducement is relatively stronger in favor of household production (or staying at home).

In the neo-classical framework of labor supply, a woman's decision regarding LFP depends on a comparison of the marginal benefit (MB) and the marginal cost (MC) of having a job. The MB of having a job is the market wage rate and the MC is the value of the woman's time spent in non-market activities (y). y is the shadow price of time or shadow wage. It measures the value the woman places on marginal units of her time in HP. An individual's potential market wage rate is determined by personal characteristics, such as schooling, work experience, and health status, and by characteristics of the labor market in which she is located (rural/urban, region, industrial mix). The shadow price of a married woman's time depends on husband's income (or other family income, more broadly), household assets, the woman's education level, the number of children, and the ages of children. This paper attempts to emphasize the factors affecting the quasi wage or the shadow price of the married women's time spent on HP.

However, we can put the matter differently in a very simple way. Let the utility (or welfare) is maximized at the family level. The decision for a woman to participate in the labor force will depend on the utility generated by two states: a. when the woman is working in the market (state 1), b. when the woman is not

working in the market (state 2).

U_1 =Utility (net of any disutility) in state 1 (when the woman is involved in directly income generating activities) for the family.

U_2 =Utility (net of any disutility) in state 2 (when the woman is not involved in any such activities) for the family.

The family chooses the state yielding the highest utility level (U*)

$$U^* = \max(U_1, U_2)$$.

If , the woman of that family will work for pay.

3. Sifting the Sample

Data were collected randomly from divers locations of Dhaka City. In all, 470 married women (spouse present) aged between 18 to 57 years were interviewed using identical questionnaires. Among them, 270 females were not involved in "directly income generating" activities while the remaining women were members of the labor force.

35.5% of the non-working women were not working due to family resistance. Then came the fact of inadequate education or training (31.1%) which was followed by self-unwillingness (24.1%). Assisting the family manifested itself as the prime reason for working as it accounts for more than half of the cases (56.9%). So, women chiefly work for economic reasons[7] . 80.5% of the working women began their working career in Dhaka City. Around half of the working women are employed in the private sector, while the public sector makes room only for a quarter of them. This probably reflects the dilatoriness of the public sector in creating suitable and sufficient employment opportunities for women. The proportion of women enjoying the freedom of spending is substantially (by 31 percentage point) higher for the working group. This can be regarded as an indication of the higher degree of independent decision making power possessed as well as exercised by working women.

The highest proportion of the non-working women fall in the 31-35 age group and this is also true for their working counterparts (34.78% and 23%, respectively). The data also reveal that among the working women the younger people have a

[7] Economic reasons include: principal bread earners, add to family income etc. Non-economic reasons include: to use spare time, to use education, to attain independence etc. (Chaudhury, 1976).

higher proportion. The two lower age groups (18-25, 26-30) constitute about 22.43% of the non-working women while for working women this rate is 37%. On an average, working women are a little younger than the other group.

Regarding self-education, 86.2% of the non-working women are with not more than 12 years of schooling where as 54.5% of the working women are with schooling exceeding 12 years. The average years of schooling are higher for working women by 3.08 years. For the working group, 63.5% of their husbands have more than 12 years of schooling while 62.1% of husbands of the other group have schooling of less than 12 years. A working woman's husband has a mean education of 12.83 years (higher than his counterpart). Working husbands' wives are less likely to be driven by the economic reasons compared to the wives of "out of work" husbands to participate in the labor force. The data also points out this fact; a higher proportion of the working wives are with "out of work" husbands (8.5% compared to 4%).

27.8% of the fathers of non-working women have no education. Working women have a lower proportion of fathers with this attribute (16.5%). On average, fathers of working women are more educated (measured in terms of years of schooling). In addition, 30.7% of the first group fathers have at least 11 years of schooling compared to 49% of the second group. Around half of the mothers of working women fall in the category of no education. For working women this proportion is much lower (34.5%). 94.5% of the mothers of the first group have 10 years of schooling at best. For their counterpart, it is 87%.

Non-working women are married to men relatively more old in comparison with working women. The first group finds 56.3% of its members in the 0-5-age gap class contrasting to 58.5% of the latter group. 18.5% of the non-working women are at least 9 years younger than their husbands while for working women this rate is only 6%.

The number of children per non-working woman is 2.67. This figure is 1.71 for working women. So, non-working women tend to have more children. The age of the youngest child is less than five years for 49% of working women compared to 41.5% of non-working women. Besides, 28.5% of the non-working women's youngest child is at least 10 years old. For working women this rate is lower (23.5%). 44.5% of working female have no children whose age is between six and eighteen years. 27.5% of working mothers have one child and 22.5% have two children with this attribute. 28.1% of non-working women have two children in 6-18 age group followed by 24.4% with one child and 20.7% with no child falling in this class.

The mean family income less own income, (FILOI), is higher for non-working class. The FILOI group containing the highest number of working women (30%)

is the group with FILOI not exceeding 5 thousand. The 6-10 FILOI group contains 27% of them. For non-working women, 6-10 class contains 34.8% of them, followed by 21.9% in the 0-5 class.

Training is likely to enhance the probability of being in the labor force. In this sample, 36% of the working women have some kinds of training compared to 15.2% of the non-working women.

Notion about working women may influence a woman's labor supply decision. Among the non-working women, 77.8% hold the view that female workers are not bad while the rest are indifferent or hold the opposite view. For working women, those rates are 92.5% and 7.5%, respectively. Again, 31.5% of the working women have senior female working family members while this proportion is 14.8% for the non-working class. Moreover, it is often believed that the working women are less likely to perform their household works since they devote a fraction of their available (fixed) time to the paid labor force. The sample ratifies this conception. 88.5% of the non-working women are found to accomplish their household activities themselves. On the contrary, 67% of the working women were carrying out the household functions of their own.

In our sample, 45.5% of the non-working women are residing in Dhaka for at least the last 20 years while 50% of the working women are components of this set. If the attribute "permanent address" is considered, the working women are found to have a relatively larger proportion permanently residing in Dhaka (50.5% compared to 43.3%).

4. Shaping the Model and Methodology

The dependent variable is dichotomous. We divide the group of married women into two swarms, the bisector being their working status. If she is engaged in "directly income generating activities" the dependent variable takes the value of one and we term the woman as a working woman or a participant in the labor force. We do not make any distinction between "full-time" labor force participants or occasional labor force participants or moonlighters.

This study makes an endeavor at finding out the directions and extent of impacts of factors sprung from the woman herself as well as her family.

We express a married woman's working decision as,

W= f(AGE, AGE2, SEDN, HEDN, FEDN, MEDN, FILOI, AGE GAP, C, L SIX, BSE, SC, FP, T, NAWW, EWM, HHW, HI, PADR).

So, her decision regarding work for pay is determined jointly by economic, demographic and social factors (that affects her formation of expectations and views about herself).

Table 1 : The variables.

Variable name	Description
W	Whether involved in "directly income generating" activities (i.e. works) or not. W = 1 if works and 0 otherwise.
AGE	Age of the married woman in years.
AGE2	Square of her age.
SEDN	Education of the woman (measured in years of schooling).
HEDN	Education of the husband (measured in years of schooling).
FEDN	Father's education (measured in years of schooling).
MEDN	Mother's education (measured in years of schooling).
FILIOI	Family income less own income.
AGE GAP	Age gap with her husband in years.
C	Number of children.
L SIX	Number of children aging less than six years.
BSE	Number of children between six and eighteen years.
SC	Age of the youngest child
FP	Whether any method of family planning is followed. 1 if yes and 0 otherwise.
T	Whether took training or not. T=1 if yes and 0 otherwise.
NAWW	Notion about working women. Naww =1if good and 0 otherwise.
EWM	Whether there is any senior working female in the family or not. Ewm =1 if yes and 0 otherwise.
HHW	Whether performs household works by herself or not. Hhw =1 if yes and 0 otherwise.
HI	Whether husband earns or not. Hi=1 if earns and 0 otherwise.
PADR	Whether the permanent address is in Dhaka or not. Padr =1 if in Dhaka and 0 otherwise.

It is often assumed that the younger women have a greater likelihood of being in the labor force since there exists a higher probability that they are more endowed with required qualities compared to aged women. There is also a possibility that in addition to the AGE variable, a nonlinear transformation of the variable would be able to capture the whole effect of age on the working decision. We consider a simple nonlinear transformation of AGE, AGE2 (the square of AGE).

In formal sector employment certain level of education is the most common requirement. Hence, only the educated female can enter such kind of job market. If we regard education as an investment then higher educated women are likely to be more eager to join the labor force. Again if education is a significant

determinant of own wage, then remaining unemployed becomes relatively expensive providing with an incentive for LFP. In addition, education may change the woman's traditional (often negative) view about working women that will decrease the likelihood of not working.

The husband's education level may also affect her working decision. However, the effect is perhaps multifaceted. Because if husband's education is a significant determinant of family income as well as his working status, it may affect his wife's working decision negatively. Since husbands usually have a higher education level as well as higher income (or earning opportunities), it may be preferable for the husband to be specialized in labor market activities and for the wife to specialize in household production where she has a comparative advantage relative to her husband. On the other hand, highly educated husbands are assumed to possess a broad-minded view about women employment and are less likely to be affected by social and religious taboos. Such a husband may allow or encourage his wife to work for pay. In addition, to identify the effect of parental education, two continuous variables, FEDN (representing father's education) and MEDN (representing mother's education) are considered.

Around half of the working women were working to support their families. Hence, family income without the wife's contribution is an important determinant of a married woman's working decision. FILOI is likely to affect a woman's labor force participation negatively. The lower the FILOI, the higher the need of additional income for a family and the greater is the chance that the unemployed members of the family will work for pay. A significant portion of these unemployed family members is from the fair sex.

For aught I know, none of the previous studies has given importance to a married women's age gap with her husband. But in our society it can be an indicator of male dominance in decision making. The higher the age gap the greater the dependence on husband (economic and psychological) and the lower the independence in decision making. In our country, still the sterner sex looks askance at working wives and often the husband's decision goes against his wife's labor force participation. Though some of the previous studies considered husband's age as a determinant, none of them has explicitly stated the possible significance of the age gap with husband.

The number of children is likely to affect the mother's working decision negatively. The value of childcare is an important determinant of the mother's working decision. The number of children aging less than six years is positively related to the value/cost of childcare and affects the mother's labor market participation adversely. However, the extent of this negative effect may be (partially or fully) offset (at the individual level) by the existence of maids or

mother substitutes (often female relatives). The age of the youngest child may also be an important factor affecting a mother's decision to work for pay. The mother's time in childcare is highly productive in the presence of newborns and infants and this implies a higher shadow wage. Again, the higher the number of children in the 6-18 age group, the lower the possibility that the mother will work outside the home. There is likely to exist a positive association between working women and family planning as working women often go for a planned family for convenience.

Training before entering the job market can be regarded as an investment. It increases the ability and skill of potential workers. Thus, training enhances the probability of working or the possibility of a better job or a higher reward (education also plays a similar role). If a woman decides to train herself in some specific fields, she is more likely to join the labor market.

In our socio cultural context, the women's own view regarding the working women is important since a large portion of the women is not working outside home because they have a deep-rooted bad impression about working women. The previous studies have hardly given adequate attention to this factor though many of them have emphasized the husband's view.

If a family has a current or ex-working woman, it is easier for the junior females of that family to enter the labor market since family restrictions, social mores and taboos have already become relatively lax there.

Household production is almost entirely carried out by women. It consumes a significant proportion of a woman's available time. It is rare for husbands to aid in domestic tasks, even if the wife is also working. However, increasing availability of household appliances usually inspires women to work outside for pay. In our country household appliance are yet to be widely in use. This is true for urban areas too. Nevertheless, many of the urban families (especially those living in Dhaka City) employ maids of all work or charwomen that substantially reduce women's burden of household work acting as substitutes of household appliances.

In this study, only the married women staying with their husbands are considered. If a husband earns, the wife is less forced by economic reasons to work in the marketplace (regardless of whether his earning is sufficient or not) while if the husband is unemployed, it is most likely that the wife will work (also the grown-up children may come forward to take the responsibility).

Among the women currently staying in Dhaka the domiciled are likely to have a higher labor force participation rate than the sojourners. The underlying reason is that, often the urban dwellers are well equipped (with socio-economic, political as

well as cultural aspects and expediencies) and better informed. Therefore, the length of the residing period in Dhaka may exert influence in favor of working. To deliberate upon the matter under disposal we glance at the attribute "permanent address".

Use of a dichotomous dependent variable in OLS regression violates the assumptions of normality and homoscedasticity[8] . The R2 value is generally lower and the regression model will allow estimates below 0 and above 1. In addition, multiple linear regression does not handle non-linear relationships. So, we need a probability model with these features: (1) probability never steps outside the 0-1 interval. (2) relationship between probability and the explanatory variables is non-linear. The logistic regression (giving rise to logit model) has these attractive features [9]. First we create a model that includes all potential predictor variables and then form a parsimonious model keeping only the significantly useful variables. We use the method of backward stepwise regression.

5. Estimating the Logistic Regression and Interpreting the Results:

The method of maximum likelihood estimation (MLE) is applied to estimate the coefficients of the logit model. The statistical properties for the maximum likelihood estimator are established for "large" samples (asymptotically).

To test for the omitted variables a likelihood ratio test is conducted. We define H0: the coefficients of all the omitted variables in the parsimonious model are simultaneously zero. H1: the null is not true. LR[q] = -2LL (constrained model, k-q) - (-2LL (unconstrained model, k)) = 474.427 - 469.144 = 5.283 < =12.5916. Hence the null is not rejected and the omitted variable bias is unlikely here. Wald statistics were consulted to search for independent variables with low explanatory power. In the parsimonious model all the variables are significant (10% is the highest level of significance considered). To avoid the problem of errors in functional forms different functional forms were tried and the parsimonious model was chosen consulting the Wald statistics and model chi-square statistics for overall model fit. Again since the estimation converged in 4 iterations we need not worry about the multicollinearity problem. Moreover no standardized residuals greater than 2.58 (they are outliers at the .01 level that is the customary level) were found.

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8 When a dichotomy is used as a dependent, the values can only be 0 or 1, making the residuals low for the portions of the regression line near Y=0 and Y=1, but high in the middle.

9 Some may raise the issue of disproportionate sampling. Nevertheless, even with unequal sampling rates the usual logit model can be in use without any change. The unequal sampling rates for two groups do not affect the estimation of the coefficients of the explanatory variables, only the constant term is affected which can be refined (if necessary).

The model chi-square = 166.667 with df = 13. It is statistically significant [sig. (p)=0]. So the null is rejected and information on the independent variables allow for better prediction than could be made without their inclusion. The Hosmer-Lemeshow statistic is 7.534 with df = 8. It is highly insignificant (significant at 48% level) implying that the model has a good predictive power.

The McFadden's R2 is .259972 illustrating a moderate association between married women working/non-working and the independent variables. For a logit model, this value is large enough to consider the equation significant. The adjusted McFadden's R^2 for the model is .28025. Again, for the parsimonious model the Cox and Snell measure is .299 and the Nagelkerke's R-Square is .401. The proportion correctly classified, also known as the count R^2 = .753 and the adjusted count R^2 is .42. For the parsimonious model AIC is 1.0689.

However, goodness-of-fit is not usually as important as statistical and economical significance of the explanatory variables. We need to know whether an independent variable is significantly related to the dependent variable. For this purpose, a Z test or the Wald chi-square can be used. (The Wald statistics are given in the appendix, Table A2).

An interpretation of the logit coefficient which is usually more intuitive (especially for dummy independent variables) is the odds ratio (Table 2). The odds ratio is greater than 1.0 for variables: AGE, SEDN, T, EWM and NAWW. The odds ratio is less than 1.0 for variables AGE2, HEDN, FILOI, AGE GAP, L SIX, BSE, HI and HHW. The odds ratio for the SEDN coefficient is 1.199 with a 95% confidence interval of [1.088, 1.320]. This suggests that a one-unit change in self-education would make the event more than 1 time as likely to occur (the odds is increased by (1.199-1)*100=19.9%. The odds ratio for the FILOI coefficient is .934 with a 95% confidence interval of [.904, .964]. This suggests that a one-unit change in the family income less own income leads to the event less likely to occur. The odds is decreased by (1-.934)*100=6.6%. The odds ratio for the T coefficient is 2.271 with a 95% confidence interval of [1.358, 3.796]. This suggests that those who have technical education or training are 2.271 times as likely to be in the workforce (the odds is increased by 127.1%).

Odds ratios asymmetrically vary from 0 to 1 on the negative side and 1 to infinity on the positive side. This asymmetry is a drawback to using the odds ratio as a measure of strength of relationship. However, we can apply a mathematical transformation to achieve symmetry. This is done by transforming the odds ratio by taking its natural log (log base e) (Table 3). A logit is the natural log of an odds ratio (both contain the same information). Logits vary symmetrically from 0 to minus infinity on the negative side and from 0 to plus infinity on the positive side. A positive logit means the independent variable has the effect of increasing the

Table 2 : Regression results (odds ratio)

Predictor variable	General Model			Parsimonious Model		
	Odds Ratio	95% CI for odds ratio		Odds ratio	95% CI for odds ratio	
		Lower	Upper		Lower	Upper
Constant	.101			.098		
AGE	1.253	963	1.630	1.262	.978	1.629
AGE2	.997	994	1.001	.997	.993	1.001
SEDN	1.173	1.060	1.298	1.199	1.088	1.320
HEDN	.899	815	.993	888	.808	.977
FEDN	966	.898	1.040			
MEDN	1.064	.986	1.149			
FILOI	931	.900	.962	.934	.904	.964
AGE GAP	.919	.840	1.006	.922	844	1.007
C	.907	.629	1.309			
L SIX	.613	.351	1.073	.617	.411	.926
BSE	546	.358	.833	.521	.396	.686
SC	.979	.916	1.047			
FP	1.132	.675	1.897			
HI	.352	.130	.952	.374	.139	1.004
T	2.193	1.305	3.685	2.271	1.358	3.796
EWM	1.997	1.146	3.481	2.121	1.227	3.666
HHW	399	.219	.728	.390	.215	.709
NAWW	3.432	1.642	7.174	3.068	1.507	6.247
PADR	108	1.672	7.267			

odds that the dependent variable equals a given value (usually 1 for binary dependents). A negative logit means the independent variable has the effect of decreasing the odds that the dependent variable equals the given value. Even in the case where there are multiple independents, the logit for a given independent variable can be interpreted the same way. However, these need not to be considered causal effects (Eliason & Massoglia, 2003).

The sign of an estimated coefficient gives the direction of the effect of a change in the explanatory variable on the probability of an observation at one. The independent variables: AGE, SEDN, T, EWM, NAWW all have positive coefficients. This implies that if a married woman is of a higher age or if she has more years of schooling or if her family contains a senior working female member or if she has a positive attitude toward working women, for her the probability of being in the labor force rises. The independent variables: HEDN, FILOI, AGE GAP, L SIX, BSE, HHW, HI, AGE2 all have negative coefficients. This implies that if a married woman has a more educated husband or if the age gap with her

Table 3 : Regression results (log-odds)

Predictor variable		General Model
Parsimonious Model		
Constant	-2.291(.295)	-2.325(.273)
AGE	225(.093)*	.233(.073)*
AGE2	-.003(.177)	-.003(.094)*
SEDN	.159(.002)***	.181(.000)***
HEDN	-.106(.035)**	.119(.014)**
FEDN	-.034(.363)	
MEDN	.062(.108)	
FILOI	-.072(.00)***	-.069(.000)***
AGE GAP	-.084(.068)*	-.081(.071)*
C	-.097(.603)	
L SIX	-.489(.086)*	-.483(.020)**
BSE	-.605(.005)***	-.652(.000)***
SC	-.021(.542)	
FP	.124(.639)	
HI	-1.045(.040)**	-.984(.051)*
T	785(.003)**	.820(.002)**
EWM	.692(.015)**	.752(.007)***
HHW	-.918(.003)***	-.941(.002)***
NAWW	1.233(.001)*	1.121(.002)***
PADR	.312(.310)	
-2loglikeihood(intercept)	641.094	641.094
-2loglikeihood(full)	469.144	474.427
Omnibus tests of model coefficient	χ^2 =171.950, df=19(.000)	χ^2 =166.667, df=13(.000)
Cox and Snell R2	.302	.299
Nagelkerke R2	.412	.401
Hosmer-Lemeshow test	χ^2 =6.991, df=8 (.538)	χ^2 =7.534, df=8(.48)
McFadden's R2	.2682	.259972
Adjusted McFadden's R2	.2978	.2805
Count R2	.762	.753
Adjusted Count R2	.4407	.42
Akaike's Information Criterion	1.08328	1.0689

Note: p values are in the parentheses. *Significant at 10% level. **Significant at 5% level. ***Significant at 1% level

husband is greater or if she has more children in the <6 or in the 6-18 age groups or if her household works are performed by herself or if the husband is earning for

the family or if her age rises at higher levels, her probability to be in the non-working class rises.

The estimated coefficient on the AGE variable is positive suggesting that the likelihood of working is higher, if her age is higher, ceteris paribus. The coefficient is significant at less than 10% level. The continuous variable AGE2 affects the likelihood of working for a married woman negatively. The effect is statistically significant at less than 10% level. The logit associated with the AGE coefficient has a positive sign while the AGE2 logit bears a negative sign with it. So, the effect of age on a married woman's LFP is non-linear. If plotted in a two dimensional diagram we will get a bowl-shaped curve indicating that as age rises the probability for a married woman to be in the labor force rises up to a certain level and then declines with higher ages. Investigation reveals that the peak is reached at early 40's followed by a gradual decline.

The fact that the estimated coefficient associated with SEDN is positive implies that the higher is the woman's education, the greater is the probability of working for her(other things equal). If education of the woman rises by one year of schooling, the log-odds in favor of working rises by .181. The effect of self-education is significant at less than 1% level.

A quick glance at the results reveals that the effects of the variables FEDN, MEDN, C, SC, FP and PADR are insignificant. The fact that the impacts of father's education and mother's education are insignificant is not surprising. Though these variables can affect a woman's acquisition of desired caliber or stature, they are unlikely to be significant in case of her working decision. Because, after the marriage, the woman is usually at her husband's disposal. Moreover, most parents of the currently married women are members of older generations and the time elapsed between generations is likely to make their impact indirect and less significant. Again, the total number of children as well as the age of the youngest child exerts insignificant influences on the mother's working decision. These imply that children in various age groups (<6, 6-18) are more important determinant compared to the total number of children or the age of the youngest child. However, though age of the youngest child is insignificant when mothers of all ages (from 18 to 57) are taken together, it may be significant for certain age groups. The impact of family planning is also unimportant. It probably indicates that the "event" of family planning is somewhat evenly distributed among working and non-working women (though it may not be true for various income groups). In addition, the variable reflecting whether the woman is a permanent resident of the city or not, is insignificant. One reason of this outcome may be that many of the working females are from migrant families where the prime reason of migration is to earn more and live a better life. In a

survey, Hussain (1956) found 54% of middle class female workers with rural background. Chaudhury (1975) found that economic necessity was the prime cause of rural urban migration and may innately induce female members of migrant families to work for pay. Again, transfers in job may force some working women to stay in Dhaka. These factors may offset the advantages of a permanent resident of being with (or to find) a job.

For a more robust and rigorous interpretation of the effects of the variables we need to calculate the marginal effects (relating to continuous variables) and the impact effects (relating to dummy variables). At first, we define a typical married woman (the base married woman relative to whom comparison is made). Let for this base married woman all the continuous variables are at their means and all the dummies are with the value of zero.

If the age of the woman rises by one year, her probability to be in the labor force rises by .057454508 or by 5.7454508 percentage point (both linear and nonlinear impact of AGE are considered). If the self-education of the woman is higher by 1 year of schooling, her probability is 4.5214199 percentage point higher in favor of being in the labor force. Husband's education affects the wife's probability of working negatively. If the husband is 1 year more educated, it reduces his wife's probability of working for pay by 2.9726462 percentage point. Family income less own income also affects the woman's probability to participate in the labor force negatively. A one-unit increase in the family income less own income reduces the woman's probability of being in the labor force by 1.7236352 percentage point. If the woman's age gap with her husband rises by 1 year, her probability to be in the labor market is reduced by 2.0233978 percentage point. For the base married woman, one more child in the <6 years' age group reduces her probability of working by 12.0654465 percentage point. Again, for one more offspring in the 6-18 age group her probability of working is waned by 16.2871038 percentage point.

Now we will interpret the impact effects. If that typical woman is trained then her probability of being in the paid labor force is increased from .48593611 to .682162922 or by 19.6226812 percentage point. If there is a senior working female in the benchmark woman's family then her probability is increased by .18130418 or by 18.130418 percentage point to be in the labor force. If the woman accomplishes her household works by herself, this reduces her likelihood of working (probability falls by 21.6457678 percentage point). If her husband is involved in income generating activities, then she has a 22.4838286 percentage lower probability in favor of working. If her notion about working women is good (or not bad), her probability of working is raised by 25.765723 percentage point. (Appendix Table A3 reports all the marginal and impact effects.)

Sometimes it is more appealing to interpret the inverse [10]. On average, if the family income less own income is 1 unit lessened, the odds of working is 1.07 times or increases by 7% (controlling for other variables). Sometimes we may want to interpret a larger range. Married women's have .70822 times or 29.17796% lower odds of working if her family income less own income rises by 5 units (controlling for other variables). Again such women are 1.411989921 times or 41.19835%, more likely to be working (controlling for other variables). (Appendix Table A3 reports the values of inverse effect, range effect and the inverse of range effects).

6. Conclusion

Major findings of the study are that self-education, presence of senior working female in the family, training, own view regarding woman employment, number of children aging less than six years affect married women's decision to participate in the labor force positively while husband's education and earning status, age gap, family income less own income exert negative influence. Age has a nonlinear impact. The impacts of variables like father's education, mother's education, number of children age of the smallest child, family planning and permanent address in Dhaka were found insignificant.

The significance of self-education, training and number of children in certain age groups implies that women's ability to enter the labor market can be influenced by government policies regarding education (traditional and technical), fertility etc. Female activity in the labor force may be increased through the interaction of govt. policies and related socio-cultural factors (changes in attitude is one of them). Technological change can facilitate growth in married women's LFP by providing substitutes for the wife's time at home. Hence, policy should be formulated to enhance women's access to education, training and other assets (or asset building mechanisms) in order to increase participation (and empowerment as well). Policies should also be designed to provide childcare (Child-Care Leave Laws should be redesigned and properly enforced.) to promote flexible work schedules and part-time work. Public awareness about women rights may lead to more males' sharing in household duties (still maximizing the family welfare).

This study emphasizes the possible factors affecting the value of household production (the quasi wage). Emphasis should also be given on the factors determining the market wage rate (this model can be extended to incorporate factors like unemployment rate, relative employment opportunities and employment change). Married women's employment-nonemployment transition

[10] Eliason & Massoglia (2003) gives examples of computing inverse effect and the range effect.

may be another possible area of future research. In this study, only the married women staying with their husbands are considered. However, there is another group of married women consisting of widows and divorcees. Their inclusion may yield interesting results. In addition, the sample size can be increased for more generalized findings. Moreover, implicit in the study is the assumption of the existence of a decision-maker in the family. Often the woman is most unlikely to be that person. Hence, for women possessing that decision making power (due to higher degree of psychological as well as economic emancipation) the findings may look different. Again, the present study does not take account of possible endogeneity of variables. Future research should contemplate these issues.

Appendix

Table A1 : means and standard deviations of the variables

variable	Whole sample		Non-working group		Working group	
	mean	s. d	mean	s. d	mean	s. d
W	.43	.49	0	0	1	0
Age	34.51	7.58	34.95	7.5	33.92	7.65
Sedn	9.79	5.13	8.5	4.65	11.54	5.24
Hedn	11.92	4.76	11.24	4.6	12.83	4.83
Fedn	8.31	5.63	7.44	5.57	9.48	5.5
Medn	4.35	4.51	3.59	4.13	5.38	4.79
Filoi	12.41	9.66	12.83	10.31	11.85	8.69
Age gap	5.43	2.83	5.99	2.71	4.67	2.86
C	2.26	1.53	2.66	1.57	1.71	1.29
L six	.41	.63	.43	.64	.39	.61
Bse	1.36	1.20	1.7	1.24	.91	.98
S c	7.17	5.73	7.47	5.38	6.78	6.16
Fp	.67	.47	.66	.48	.69	.46
T	.24	.43	.15	.36	.36	.48
Naww	.84	37	.778	.416	.925	.264
Ewm	.22	.41	.15	.36	.32	.47
Hhw	79	41	.89	.32	.67	.47
Hi	.94	.24	.96	.21	.92	.28
Padr	.46	.50	.93	.5	.51	.5

Table A2 : Wald statistics

Variable	General Model		Parsimonious Model	
	Wald	Df	Wald	Df
Constant	1.096	1	1.202	1
AGE	2.814*	1	3.208*	1
AGE2	1.823	1	2.812*	1
SEDN	9.472***	1	13.574***	1
HEDN	4.442**	1	6.006**	1
FEDN	.827	1		
MEDN	2.576	1		
FILOI	17.791***	1	17.168***	1
AGE GAP	3.341*	1	3.254*	1
C	.271	1		
L SIX	2.939*	1	5.438**	1
BSE	7.881***	1	21.695***	1
SC	.372	1		
FP	.221	1		
T	8.788***	1	9.787***	1
EWM	5.957**	1	7.247***	1
HHW	8.955***	1	9.553***	1
HI	4.227**	1	3.814*	1
NAWW	10.748***	1	9.553***	1
PADR	1.654	1		

*significant at 10%level. **significant at 5%level. ***significant at 1%level.

Table A3 : The effects (marginal, impact and inverse)

Variable	Marginal effect	Impact effect	Inverse effect	Effect for a range(5 units	Inverse of range effect
AGE	5.8203914		-20.76069731	220.5922883	-68.8077337
AGE2	-.0749406618		.300902708	-1.488806039	1.511306523
SEDN	4.5214199		-16.5971	147.1931923	-59.54581149
HEDN	-2.9726462		12.6126	-44.84374	81.30309478
FILOI	-1.7236352		7.0663811	-29.17796	41.19835
AGE GAP	-2.0233978		8.45986	-33.30231891	49.93178
L SIX	-12.0654465		62.0745543		
BSE	-16.2871038		91.9385797		
T		19.6226812	-55.9665345		
EWM		18.130418	-52.8524281		
HHW		-21.6457678	156.4102564		
HI		-22.4838286	167.3796791		
NAWW		25.765723	-67.40547588		

Note: marginal and impact effects are in percentage points. Inverse effect is the change in odds ratio of working married female (in percent).

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