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Work and Fertility Linkage in Women: A Study in Bhubaneswar City

*Subhalaxmi Mohapatra**

*Subhadip Roy***

Abstract: The present paper investigates the causal links between income, education, age at marriage and work hours with fertility in the city of Bhubaneswar. Data for the present study was collected through personal interviews from two samples of 70 working women each. The analysis revealed that fertility of working women was explained by own income, family income, education of the respondents, hours of work and age at marriage. Results also revealed that education of the respondents, age at marriage and income had negative relation with the fertility of working women whereas work hours was found to have a positive relation.

Keywords: fertility behavior, India, determinants, multiple regression

JEL Classification: J13

Introduction

Traditionally, women were confined to home and hearth due to which women that are central to the creation, propagation and perpetuation of the human race remained highly dormant. This in turn led to the un-utilization of almost half of the man power resources in the country. With the realization of the women forming a partner in the process of development of the country, the traditionally separate world of work and fertility has become increasingly interconnected. This in turn has changed their productive as well as reproductive roles. The wave of industrialization has led to shifting many of the women's productive activities from the home to the market, and thereby the roles of women in the family have changed as they began to enter the labor force in search of paid employment outside of the home. Subsequently, the

* Subhalaxmi Mohapatra is at Vigyan Jyothi Institute of Management, Hyderabad, India.

** ICFAI Foundation for Higher Education, Hyderabad, India.

percentage of women who participated in the labor force increased to a point that it became common to find women in the labor force. This increase in the participation of women in the labor market, particularly of married women with children is important evidence reflecting a change in the norms and social participation regarding the roles of women in and outside of the home. As a result of this shift in both productive as well as reproductive responsibilities, their employment opportunities now have an important impact on fertility decisions. A woman's attitude regarding children, paid employment and other exogenous factors may jointly influence her fertility and work activities.

For married women the decision to bear children or to pursue a career is often a difficult one to make since both these roles i.e., child bearing and employment place conflicting demands on women who shoulder the primary responsibility for child care. Time devoted in the work place is potentially time spent away from child rearing, thus resulting in a strain between mother and worker roles (Weller, 1997). Moreover the decision to bear children is costly in the sense that income is lost, when women do not work outside the home in order to give birth (Becker, 1960). Because of the conflicting nature of the female employment and fertility relationship, the relative rates of fertility among women may be different depending on women's participation in the work force.

While on the aggregate level, historical trends indicate that fertility rates and labor force participation rates for women are moving in opposite directions, the nature of the relationship is still in question. There are several controversies relating to the issues of specification and causality. Although some evidence suggests that fertility effect is dominant, the impact of female employment on fertility decisions have been the basis of several important studies designed to illustrate how labor market trends can explain fluctuations in birth rates. The question of whether fertility affects female employment, however, is important only to the extent that traditional values, norms and behaviors which dictate that the woman's place is in the home to care for her children continue to be generally adopted by women when they make decisions regarding employment and the bearing of children. Women who embrace such traditional roles will have already made the decision about the bearing and rearing of children, a decision that presupposes that women would not seek paid employment in the labor market. This is because traditional society has predetermined that the roles and responsibilities a woman will take are those of 'wife' and 'mother' (Welter, 1978). Therefore any decision regarding employment in the labor market would be made relative to a woman's desire to have or not to have children; that is, her fertility decisions will affect her employment opportunities. Thus for traditional women, the decision first relates to fertility and then to employment.

Given the context, the present paper begins with a literature review on the determinants of fertility behavior and the relationships identified in literature. Based

on the literature it proposes the conceptual model and details on the study methodology. The following section presents the results and subsequently the discussion. The paper ends with conclusions and direction for future research.

Review of Literature

In this part an attempt is being made to give a systematic account of the literature related to the subject of study. The review is arranged into subsections to identify the determinants of fertility behavior and also to understand the causal relationship between fertility behavior and various socio-economic indicators.

Proximate Determinants of Fertility

Several studies have investigated the proximate determinants of women's labor supply, wage, fertility and child quality. Women's education and employment have been found to be the determining factors of the fertility behavior and the choice of family size in the long run (Heptullah, 2000). Women's education and the remarkable increase in the female labor force participation have a definite impact on the family size and this has reduced the incentive to have larger families (Heptullah, 2000; Meenakshi et.al, 2000).

Some studies have contrasting results to suggest. Miah and Mizan (1984) revealed that though work does not have a significant relationship with fertility yet the type of work has lot to do. Women's education has a significant negative effect on fertility. As education level rises, total fertility goes down. Further correct uses of contraceptives are significantly related to high level of fertility among married women in the sample.

Several other studies have suggested socio-economic status of women (Shariff, 1995), role of family planning techniques (Bhatia, 1989; Kapoor, 1989; Choudhary, 1996; Samina, 1999; Rahaman et al., 1995), the importance of media (Bhat, 1996; Population Bulletin, 1997), nuptiality (Rao and Tripathy, 1993) as some of the determinants of fertility.

The relationship between age at marriage and fertility is also well found out in several researches (Population Reports, 1979; Nag, 1982; UNICEF Reports, 1996; Population Bulletin, 1997) and it is also known that a substantial increase in age at marriage is necessary for effecting reduction in fertility (Agarwala, 1967; Durch, 1980; Visaria, 1999).

Proximate Determinants of Work Participation/Labor Supply

Kamaiah et al. (1999) found wife's education, wage, age, husband's income, education, employment status, number of children in the age group 0-5 and fertility to be the proximate determinants of work participation/labor supply. Greenhalgh (1980) found that the wife's own wage as well as the age and the children over the years of 10 had a positive effect on the work participation whereas the income of the family members, the presence of dependants and young children and poor health are some of the factors impacting negatively to the work participation behavior.

Relationship between Work Characteristics and Fertility

In developing countries, the examination of the relationship between labor force participation and fertility has yielded widely different results. This is due to level of economic development of the country, rural-urban differentials, role incompatibility, types of female employment and motivational factors. The linkage between work and fertility behavior of women is still a debatable question.

A negative association between women's participation in the work force and fertility is observed in several studies (Bhargava and Saxena, 1985; Bhargava and Saxena, 1986). The decrease in fertility is attributable to the incompatibility between the maternal role and the role played by the women outside at work place and if both the roles are not compatible to each other that may lead to an inverse linkage between work participation and fertility. (Bhargava and Saxena, 1986; Tesfaghiorghis, 2004) similar results were derived by Nanda and Surender (1997) suggesting that women who worked home have more number of children than those working outside. This indicates that doing economically productive work within the house has positive influence on the number of children born to women, thus women working outside the home have a positive relationship with lower fertility rate. Women engaged in economic activities usually prefer small family and status of women varies directly by level of education and its impact on demographic behavior also varies (Agarwal, 1993)

Further, researchers have asserted that it is not female labour force participation that actually lowers the fertility rate instead it is the role incompatibility between work and motherhood that contributes to the inverse relationship (Duza, 1990; Mabud, 1985). Fertility decreases with higher degree of incompatibility between the roles of mother and worker. This negative relationship is more prominent in the urban areas where women are usually gainfully employed away from home. In the rural areas, the workplace and the home frequently are located in close proximity and the work role of the woman is more compatible with her motherhood role. Also the

extended network and parental surrogates can be utilized by working mothers to minimize childcare and the service is however absent in urban centers.

The reason for the negative linkage between work and fertility can be variously explained. Workingwomen have access to more sources of knowledge and communication with other women that may affect their attitudes on delayed marriage and marriage disruption. In addition access to public health facilities and other commercial market places makes them less dependent on male family members (Mahmud, 1988). Women with no or small families enter into the labor force in large proportion as it is comparatively easier to manage work and family together. Workingwomen avoid unwanted pregnancies and will have much more planned families. Also they tend to marry late as marriage would mean increase in household responsibilities and also at times change in place of residence, thereby leading to shorter duration of married life and lesser number of children. Further employed women have greater knowledge about family planning devices; they would use these methods earlier and also use them regularly and effectively (Srivastava, 1978) along with these labor force participation is one of the means of depressing fertility through the exposure to printed media, modernization and the use of temporary as well as permanent methods of contraception (Arora, 1990)

Within the household, fertility decisions are rational choices between husband and wife with the goal of maximizing household income. With economic development, the cost of rearing children goes up because parents desire to give quality of life to children as opposed to having a large number of children. Further, the opportunity cost of gainfully employed women becomes higher when she bears a child. After considering the economic activity of employment as compared to childcare, a woman tends to allocate more time to work activities. Thus working women limit their families to smaller size (Ridkar, 1976).

Studies have found out that type of occupation also has a bearing on the fertility rate. Full time employees and the unemployed had the lowest fertility; while those not in the labor force had the highest fertility. Part time employees had an intermediate fertility level. Of employed women those who worked part-time had the highest fertility while those who worked full time, particularly those working for 41 hours or more per week, had the lowest fertility (Tsfaghiorghis, 2004). Women working in higher prestigious occupations have lower fertility rate than the non-working women. The effect of women's maternal role incompatibility on fertility in case of women engaged in lower prestigious occupations is observed to be strong than those working in higher prestigious occupations resulting in lower fertility of the former (Saxena and Aoun, 1997)

Relationship between Education and Fertility

Education is one of the most important variables to determine the rate of fertility per women (Singh, 1979). Several studies have emphasized the relationship between women's education and their status. They argue that women's education increases female autonomy, leading to later marriage, increased contraceptive use, and lower fertility and that wife's education has a more negative effect on fertility than does husband's education (Mason, 1986; Cochrane, 1983). Education may change perceptions of the costs and benefits of having children and it also influence the age at marriage and reduces the infant mortality rate. Education may also change attitudes to contraception. In the long run it is usually the case that increasing education especially of girls will ultimately reduce fertility (Bhat and Sharma, 2005). Some researchers are of the view that educational attainment of spouse has decisive bearing on fertility through its direct effect of widening wisdom and increasing contraceptive use and indirectly through raising age of marriage and participation in labor force (Graff, 1979). Tesfaghiorghis (2004) tried to identify the key issues around work and family balance by investigating the factors involved and their associations and came to conclude that the younger the age of leaving the school the higher is the fertility irrespective of the current age of women. Thus educational enrolment is associated with low fertility. Similarly, wife's education exhibited a significant negative influence on her probability to work which is due to lack of appropriate employment opportunities matching her qualification and husband's occupational status (Nirmala et al., 1992)

The study of the existing literature relating to the proximate determinants of fertility reveals that fertility of women is affected by a multitude of factors. There are several socio economic factors that have a bearing on the fertility rate. Those factors are education, income, caste, and place of residence, religion etc. but these factors affect the fertility through several other factors proportion of females married, prevalence of contraceptive use, incidence of induced abortion and the fertility inhibiting effect on breast feeding.

Study Objective

The studies reviewed have revealed that there is a high linkage between work, education and fertility of women. However, researchers (Mincer, 1962; 1963; Kosters, 1966; Cain, 1966) have pointed out that the classical dichotomy of market work and leisure may be more appropriately associated with the role played by the husband in a household rather than a wife, under which her contribution made to production activities at home is overlooked. Therefore, it would be more logical to

analyze the activities of a wife in terms of not just market work and leisure, but also in terms of her responsibilities at home. The present study therefore attempts to identify factors that influence the fertility through labor participation of a wife within a family, given her economic, domestic and personal constraints. Even though factors like female labor force participation, hours of work supply and fertility, form simultaneous decisions, a single equation system is adopted here because of the considerable interest in the parameter estimates of a participation function and its growing importance in labor force projections (Greenhalgh, 1980)

Methodology

Variables and Measurements

The independent variables (predictors) identified from the literature and used in the present study were Income (both Individual and Family), Education, Age at marriage and Work hours. Monthly Income was measured in Indian Rupees (INR), Education in Total Number of Schooling Years, Age at Marriage in Years and Work Hours by number of hours put at work per week. The dependent variable, Fertility was measured by the Number of Live Births in the family.

Sample and Data Collection

The city of Bhubaneswar was selected for the reason of it being the capital city of Orissa having the largest proportion of working women in the total female work force. The data was collected from a sample of 140 married women working in the organized and unorganized sectors (70 each) of Bhubaneswar city. The survey was conducted during May 2005 through personal interview of the respondents. The sample was restricted to only married women working for wage employment and those with spouse present, as taking up employment becomes a necessity for the widowed, divorced or separated, for supporting themselves or their family members. Working women in both the organized and unorganized sector were included in the sample.

The Analytical Model

In the present study, an attempt is made to analyze the OLS model to calculate the causal relationship existing between the fertility behavior of working women and

socio-economic, demographic and educational variables. To achieve this purpose, the linear multiple regression method is utilized to accommodate the causal relationship of the above variables. The analysis was carried out based on the linear equation (1):

$$Y_1 = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon_1 \quad (1)$$

Where

- Y_1 = Live birth of children,
- X_1 = Own Income,
- X_2 = Family Income,
- X_3 = Working Hour,
- X_4 = Educational qualification, (in years)
- X_5 = Age at marriage,
- ε_1 = Error term

Given equation (1), the income of the women and family income were found to have high correlation (Table 1). Hence, equation (1) was split into two equations, i.e., one with own income (equation 2) and the other with family income (equation 3) as one of the determinants (all the other predictors remaining same).

$$Y_1 = \alpha_0 + \beta_1 X_1 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon_1 \quad (2)$$

Where

- Y_1 = Live birth of children,
- X_1 = Own Income,
- X_3 = Working Hour,
- X_4 = Educational qualification, (in years)
- X_5 = Age at marriage,
- ε_1 = Error term

And,

$$Y_1 = \alpha_0 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon_1 \quad (3)$$

Where

- Y_1 = Live birth of children,
- X_2 = Family Income,
- X_3 = Working Hour,
- X_4 = Educational qualification, (in years)

X_5 = Age at marriage,
 ε_1 = Error term

In the OLS analysis natural log (ln) of both the income variables and of working hours were used instead of their absolute values.

Results

The estimated equation (4) and (5) are results of the OLS regression between live birth and other determinants of women fertility of the sample data. The values in the parentheses represent the t-statistics of the respective estimated coefficients. Equation (4) relates the live birth with own income, working hours, education and age at marriage (Figures in Parentheses indicate Standard Error).

$$Y_1 = 1.685 - 0.635X_1 + 1.755X_3 - 0.127X_4 - 0.068X_5 \quad (4)$$

(0.151) (0.757) (0.028) (0.025)

In case of equation (4), the R square was found to be 0.405 and the significant F statistic justified the model fit (Table 2). All the predictor variables were found to have significant coefficients at 5% level (Table 3). However, the coefficient of work hours (lnwrkhr) had a low t value. The coefficients associated with own income, age at marriage and education were all found to be negative.

Equation (5) relates the live birth with family income, working hour, education and age at marriage of the workingwomen for the sample data.

$$Y_1 = 4.010 - 0.516X_2 + 1.231X_3 - 0.128X_4 - 0.075X_5 \quad (5)$$

(0.145) (0.747) (0.028) (0.025)

In case of equation (5), the R square was found to be 0.385 and a significant F statistic justified model fit (Refer to Table 4). In this case only the variable working hours was not found significant. All the other predictors i.e., age at marriage, education and family income were found to have a negative and significant effect on live births (Table 5). Thus the results were almost consistent over the two models.

Discussion

The results from the present study support and contribute to the literature relating to work and fertility. Firstly, both own income and family income have been found to

have a significant negative impact on live birth. This supports finding by Kamaiah et al. (1999). The working hours was expected to have negative impact on the fertility behavior of workingwomen. The Indian women's participation in the work force is increasing in the recent years and this is resulting in rise of own as well as family income. However, with more female participation, the outlook of women is broadening and that may be having the negative effect. It is also argued on the ground that the opportunity cost of the working women is high for an extra baby and hence they may not be willing to have more children. The relationship between the total years of education and live births is also an indicator that more educated women are going for fewer children. As supported by literature, higher education is leading to more knowledge about contraception, family planning etc (Mason, 1986; Cochrane, 1983). Higher education is also making the women more aware of the economic and social scenario of the country and that may be leading to lesser number of children in the household. The negative relationship between age at marriage and live births is also supported in literature (Agarwala, 1967; Durch, 1980; Visaria, 1999). Presently, in India, the average age at marriage of women is going up. The possible reason being more women participation in work. The age at marriage determines the number of times women are exposed to the risk of pregnancy and the risk is considerably reduced if the age at marriage is higher. The only surprising finding was that of the relation between work hours and live births. In case of model 1, it was found significant but in case of model 2, it was not found significant. A closer examination of the correlation between work hours and live births revealed an insignificant correlation which contradicts literature (Bhargava and Saxena, 1985; 1986). However, according to Duza (1990) or Mabud (1985), rather than the work hours, it is the role incompatibility of the women which has an impact on fertility. In this case the probable logic may be that the Indian women are more capable of handling work life balance (testing which is beyond the scope of this research) and thus the amount of time they put in at work does not affect their fertility behavior.

Conclusion

The present study was aimed at investigating the effects of socio economic variables on fertility behavior of married women with living husbands. The influencing factors considered included income, education, work hours and age at marriage. These factors together constituted economic, demographic and personal constraints. The study reveals that women from the organized sector were found to have a higher socio-economic background as compared to the women from the unorganized sector. The higher social and economic background of most of the women from the organized sector was ascertained through their higher level of income (both own and

family income). Further, most of the women from the organized sector were found to have more hours at work place, increased age at the time of marriage and at the time of first pregnancy, lower number of children, increased contraceptive awareness and more exposure to mass media, as compared to unorganized sector. It was observed that fertility of working women was well explained by their own income, family income, education of the respondents, and age at marriage. Education of the respondents was found to be negatively related with number of live births. Higher the level of education, lower is the number of live births per woman. Number of working hours outside home was found to have a positive effect on number of live births. The analysis on the whole clearly reveals that education of the respondents, age at marriage and income (of the respondent and total family income) came out with negative signs where as number of working hours outside home was positively related. It may be desirable at this stage to highlight the limitations of the present study. The study was limited to 140 respondents. Also, respondents were reluctant to reveal answers to the questions. As a result of micro level analysis, generalization of the whole phenomena may not sound to be rational. There was the limitation with respect to the time period and so a broader analysis was not possible.

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Appendix

Table 1: Bivariate Correlation between Variables Used in the Study

Variable	live births	lnowincome	lnfamincome	lnwrkhr	eduysrs	agemarriage	
live births	Pearson Correlation	1	-.487(**)	-.474(**)	.005	-.494(**)	-.395(**)
	Sig. (2-tailed)		.000	.000	.953	.000	.000
	N	140	140	140	140	140	140
lnowincome	Pearson Correlation	-.487(**)	1	.952(**)	.305(**)	.368(**)	.406(**)
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	140	140	140	140	140	140
lnfamincome	Pearson Correlation	-.474(**)	.952(**)	1	.179(*)	.396(**)	.378(**)
	Sig. (2-tailed)	.000	.000		.035	.000	.000
	N	140	140	140	140	140	140
lnwrkhr	Pearson Correlation	.005	.305(**)	.179(*)	1	.075	.153
	Sig. (2-tailed)	.953	.000	.035		.376	.072
	N	140	140	140	140	140	140
eduysrs	Pearson Correlation	-.494(**)	.368(**)	.396(**)	.075	1	.262(**)
	Sig. (2-tailed)	.000	.000	.000	.376		.002
	N	140	140	140	140	140	140
agemarriage	Pearson Correlation	-.395(**)	.406(**)	.378(**)	.153	.262(**)	1
	Sig. (2-tailed)	.000	.000	.000	.072	.002	
	N	140	140	140	140	140	140

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 2: Regression Summary for Equation 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Statistic	Sig.
1	.637 ^a	.405	.388	1.324	23.000	.000

^a Predictors: (Constant), lnwincome, lnwrkhr, eduyrs, age at marriage

Table 3: Regression Coefficients for Equation 2

Model ^a	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta		
(Constant)	1.685	3.705		.455	.650
lnwincome	-.635	.151	-.333	-4.219	.000
lnwrkhr	1.755	.757	.162	2.318	.022
eduyrs	-.127	.028	-.332	-4.603	.000
age at marriage	-.068	.025	-.198	-2.700	.008

^a Dependent Variable: live births

Table 4: Regression Summary for Equation 3

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Statistic	Sig.
1	.620 ^a	.385	.367	1.347	21.116	.000

a. Predictors: (Constant), lnfamwincome, lnwrkhr, eduyrs, age at marriage

Table 5: Regression Coefficients for Equation 3

Model ^a	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta		
(Constant)	4.010	3.809		1.053	.294
lnfamwincome	-.516	.145	-.278	-3.567	.000
lnwrkhr	1.231	.747	.114	1.648	.102
eduyrs	-.128	.028	-.335	-4.519	.000
parage at marriage	-.075	.025	-.220	-2.976	.003

^a Dependent Variable: live births