Determinants of Female Work Participation and Labour Supply Behaviour of Urban Women in Tripura: A Logit Estimation

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Abstract

This paper tries to identify the labour supply behaviour of women in urban Tripura from a primary survey on working as well as non-working women. The overall picture emerging from the exercise is that certain factors such as time spent at the work place and in household activities, monthly income and the travel time to work place have negative impact on the labour supply. Along with creation of sustainable jobs in the constrained economy of Tripura, policy prescriptions lie on provisioning of certain supportive services for an improvement in women's participation in the labour market. Moreover, the constraints and burden arising out of a task depends on factors like health issues, nature of the task, earning from the task etc. all need much deeper analysis.

I. Introduction

The analysis of women's work participation has attracted considerable attention since the pioneering works of Mincer (1962). In the developing economies, the issue of woman's contribution in economic activities now has been a topic of interest among the researchers leading to formulation of policies on the subject. In developing economies male participation rate dominate over women's in activities recognised to be economically productive. This is despite the longer hour of work women spend in household activities as unpaid labour as well as outside home in various economically productive activities. This paper tries to find out the determinants that influence women's work participation and the labour supply behaviour considering urban Tripura as a case.

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Data and Methodology

Data for this paper are collected through a sample survey conducted in four randomly selected urban areas of West Tripura district during 2014. Census of India (2001) categories 13 areas in West Tripura, four in South Tripura, three areas each in Dhalai as well as in North Tripura districts as urban areas. The Agartala municipality area in West Tripura district accounts for 64.9 per cent urban population of the state and the data for this paper is from four areas of Agartala municipality - namely Nagerjala, Dhaleswar, Ram Nagar and Hapania. A sample of 138 households was picked up randomly from the list of residents provided by the municipality. Information were collected through a structured questionnaire on socio economic, demographic and work related conditions of women in the age group of 15years and above. Factor analysis is done to identify the determinants of work participation of women and logit estimation is run on the composite factor score to examine the labour supply behaviour.

II. Factors Affecting Women's Work Participation: A Review of Literature

In developing countries both demographic as well as non-demographic factors act as determinants in the changes in the labour force. Among the demographic factors the size of the family, economic status, age etc. are considered as important determinants(Rayappa and Erpenshade, 1975). Majumdar (2011) with the help of a binary choice model has demonstrated how the labour force participation decision is influenced by individual, household, and macro level factors. The variables taken into consideration by Majumdar are age, years of schooling, and marital status at the individual level; socio religious groups, place of residence, sex ratio, household dependency ratio and (log of) household income at the household level; and average unemployment rate and average wage rate at macro level as the determinants. Majumdar (2011) finds a clear U shaped pattern between education and female labour force participation. Participation rate is higher among illiterates, decreases consistently for higher educational groups, and again shows a rise for graduates and above. The U shaped is more prominent for urban areas. Again it is found that women withdraw from labour market as their economic situation improves. The U shaped labour force participation curve is also indicated by Unni (1994) and Olsen and Mehta (2009). Massod and Izhar's (2009) study based on NSSO 61st round (2004-05) data revealed personal variables like education and wages are significant determinant of urban women labour force participation, but not for rural women. Anbreen and Afzal's (2012) study in case of Pakistan revealed that income, education, employment status of husband have positive impact on labour force participation of women. Fatma and Bhatt (2013) attempted to investigate the determinants of married women labour force participation in North Cyprus, but could not find any negative effect of being married. There are however evidences that participation and non-participation of married women in the labour force is largely influenced by number of off springs (Anbreen and Afzal, 2012). Muhammad et al (2009) showed that marital status, educated husband, family setup, number of children all influence work participation of women positively and significantly but presence of assets, spouse employment, presence of children in the age group below 6 years, reduces female work participation. Gill et al (2001) in their study focussing on Punjab confirmed that feeling responsible towards family work is

the prime factor responsible for work participation in the farm sector, whereas economic responsibility is the reason of participation in the non-farm activities. Table 1 presents profile of the sampled working and non-working women, derived from the field study. These variables are used to address the determinants of labour supply behaviour.

Table 1: Demographic and Socio Economic Profile of the Respondents

No. of respondent		Working	Nonworking	Total
		80 (58%)	**58 (42%)**	**138**
Economic status	Below poverty	11 (14%)	02 (3.4%)	13
Family type	Joint	25 (31%)	18 (30%)	43
	Nuclear	55 (69%)	40 (70%)	95
Age	15 to 24	5 (6%)	8 (14%)	13
	25 t0 34	23 (29%)	6 (10%)	29
	35 to44	32 (40%)	11 (19%)	43
	45 to 54	18 (22%)	25 (43%)	43
	55 above	2 (3%)	8 (14%)	10
Education of the respondent	None	1 (1%)	0	1
	Primary	10 (12%)	0	10
	Secondary	11 (14%)	16 (28%)	27
	Graduation	35 (44%)	38 (65%)	73
	Post-graduation	23 (29%)	4 (7%)	27
Marital status	Married	63 (79%)	40 (69%)	103
	Unmarried	12 (15%)	5 (9%)	17
	widow	05 (6%)	13 (22%)	18
Husband Education	primary	4 (6%)	0	4
	secondary	6 (9%)	3 (5%)	9
	graduation	31 (46%)	39 (71%)	70
	Post-graduation	27 (40%)	13 (24%)	40
Number of family members	one	2 (3%)	0	2
	two	17 (21%)	8 (14%)	25
	three	19 (24%)	30 (52%)	49
	more than three	42 (53%)	20 (34%)	62
	None	03 (5%)	5 (9%)	8
Number of children under 15 Year	One	18 (33%)	18 (26%)	36
	Two	25 (4%)	2 (37%)	27
	None	25 (63%)	35 (63%)	60
Number of working people in the family	One	37 (46%)	29 (50%)	66
	Two	29 (36%)	25 (43%)	54
	Three	6 (7%)	4 (7%)	10
	More than three	2 (3%)	0	2
	None	6 (8%)	0	6
Number of people financially dependent on the respondent	One	17 (21%)	-	17
	Two	36 (41%)	-	36
	Three	23 (33%)	-	23
	None	4 (5%)	-	4

Source: Field Survey, 2014

III. Work Profile of the Urban Working Women

It is stated that if both SNA (System of National Accounts) and Extended SNA activities are taken together, women in India would be found to be working for much longer hours than men (Government of India, 2000).The SNA activities primarily include production activities like agriculture, forestry, fishing, mining, quarrying, processing, animal husbandry; and tertiary activities like trade, business and services. Extended SNA activities include household maintenance, care for children, sick and elderly; while the non SNA activities include learning, social and cultural activities, personal care and self-maintenance. Table 2 provides a brief idea about the average time spent on SNA and extended SNA activities by urban working women of Tripura.

Intensity of the works is an important dimension of women's work. A helping hand at domestic as well as in other works to a good extent could reduce the intensity of work for the women. This study finds that about 38 per cent working women have full time helping hands and 44 per cent have part time helps to assist in their domestic chores. The respondents are almost equally distributed among government jobs (31 per cent), private jobs (30 per cent) and self-employed (30 per cent) and 9 per cent respondents in daily wage earning. The estimates on the average number of hours spent by the working women in both paid and unpaid activities reveal that working women spend on an average around 7 hours at the work place apart from spending on an average 4 hours in household activities and 3 hours in care giving activities. All these increase their work burden by at least 4 to 5 hours compared to the non-working women. The harshness of such situation is experienced by all women who juggle production (including the non SNA activities performed) and reproduction activities with serious consequences to their personal well-being. This calls for the need of legitimising the unpaid activities of women as 'work'. The time use survey of Government of India (2000) at least acknowledges the long working hours of women, a large part of which is unpaid. Table-3 represents the other work related particulars, derived from the field work, which tend to affect women work participation.

Table 2: Time Use of Urban Women

Categories of women	Average hours spent in Paid work	Average Hours spent in unpaid household activities	Average hours spent in care giving of Elders and children
Working women	7 hours	4hours	3 hours
Non-working women		7 hours	4hours

* Source: Government of India (2000)

Table 3: Work Related Particulars of Working Women

Type of job women are engaged with	
Part time	31 (39%)
Fulltime	49 (61%)
Job description	
Government sector	25 (31%)
Private Sector	32 (40%)
Agriculture	0 (0%)
MNREGA/Daily labourer	7 (9%)
Own firm or Business	24 (30%)
Type of support system the working women have to help in the household work	
Full time paid helper	38%
Part time paid helper	44%
Distance from the work place	
1 to 3km	35 (44%)
4 to 6km	20 (25%)
7 to 9km	2 (2%)
10 to 12km	9(11%)
More than 12 km	14(18%)
Mode of Travel	
Walking	30(37%)
Public transport	25(31%)
Organization transport	11(14%)
Own vehicle	12(15%)
Hired vehicle	3 (3%)
Monthly Family Income	
5000 and less	1 (1%)
5001 to 10,000	17 (21%)
10,001 to 20,000	6 (8%)
20,001 to 30,000	17 (21%)
30,000 & above	39 (49%)
Respondent Monthly Income	
5000 and less	16 (20%)
5001 to 10,000	22 (27%)
10,001 to 20,000	18 (22%)
20,001 to 30,000	22 (28%)
30,000 & above	2 (3%)
Husbands Monthly Income	
5000 and less	6 (9%)
5001 to 10,000	10 (16%)
10,001 to 20,000	13 (20%)
20,001 to 30,000	24 (38%)
30,000 & above	11 (17%)

* Calculated by authors

IV. Labour Supply Behaviour of Urban Women in Tripura

To find out the significant factors that determine the labour supply behaviour of women, the principle component method is used to extract the factors from two different groups of data, namely household particulars and work related particulars. At the first step, for each category of sample, factor analysis is carried out. Sample adequacy is checked using KMO and Bartlett's test[1], which yield satisfactory result for both the category[2]. After extracting the factors, logit regression model is run on composite factor score for each respondent to identify the probability of a women participating in the labour force.

Under the household particulars, most of the demographic variables discussed in the earlier section are incorporated in the analysis. While incorporating the variables on work related particulars of working and non-working women few additional variables like time spent at work place, time spent for household activities, time spent for the activities like in child care, caring for elders at home are added. In addition to these variables, the distance travelled daily by working women and the mode of travel are also considered in the analysis. The variables family income, income of the husband and the income of the working women etc. are included on the right hand side of the female labour supply equation. Care has been taken not to miss any variable which might affect the labour supply behaviour of a woman. For this, the availability of helping hands, full or part time is also considered as support system for a woman.

We found that four factors loaded in household particulars category, explain cumulative 66.5% variance. Three factors loaded in work related particulars explain cumulative 68.1% variance. After extracting the factors with the factor score, two binary logit models are estimated. In model 1 we have incorporated the household and demographic variables, and in model 2 work related particulars are incorporated.

Details results of the factors extracted are presented in table 4.

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[1]   Kaiser-Meyer-Olkin(KMO) measure of sample adequacy is an index used to examine the appropriateness of factor analysis. High values between (0.5 and 1.0) indicate factor analysis is appropriate. Bartlett's test of sphericity is a test statistics used to examine the hypothesis that the variables are uncorrelated in population. In other word the variable correlation matrix is an identity matrix.

[2]   Sample adequacy is 0.579 in case of household particulars and 0.747 in case of work profile.

Table 4: Varimax Roated Loading (Household profile)

Factors and variables	Factor 1	Factor 2	Factor 3	Factor 4
First factor				
Education	0.868			
Status of the respondent	0.795			
Husband's education	0.631			
Second factor				
Age		0.741		
Number of people financially dependent on respondent			0.697	
Number of children above 15 years		0.692		
Marital status		0.459		
Third factor				
Family type			0.792	
Number of working member in the family			0.778	
Fourth factor				
Number of children under 15 years				0.889

Table 4 explains the household related factors affecting the labour supply behaviour of urban women in Tripura. In the first factor, variables loaded are education of the respondent, status of the respondent and husband's education in case of married women. In the second factor variables loaded are age of the respondent, number of people financially dependent on the respondent, number of children above 15 years of age and the marital status of the respondent. In the third factor variable loaded are family type and number of working member in the family. In the fourth factor only one variable - number of children under 15 years is loaded.

The logit model can be written as

$$L_i = (P_i/1-P_i) = \beta_1 + \beta_2 FS1 + \beta_3 FS2 + \beta_4 FS3 + \beta_5 FS4 + + \mu_i$$

Table 5: Results of Logit Model -1 Estimated Through Factor Score

Household				
Dependent Variable: Working /Nonworking				
Method: ML - Binary Logit (Quadratic hill climbing)				
Sample: 138				
Included observations: 138				
Convergence achieved after 4 iterations				
Covariance matrix computed using second derivatives				
Variable	**Coefficient**	**Std. Error**	**z-Statistic**	**Prob.**
C	0.4706	0.221865	2.121112	0.0339
FC1	-0.17731	0.248494	-0.71353	0.4755
FC2	1.35509	0.251285	5.392642	0.0000
FC3	0.010087	0.226175	0.044597	0.9644
FC4	-0.99014	0.249479	-3.96882	0.0001
McFadden R-squared	0.311232	LR statistic		58.44511
Prob (LR statistic)	0	Total observation		138

Findings of Model 1

The Mc Fadden R squared[3] value in our analysis is 0.311232 and likelihood ratio (LR) is positive at 58.44 which is highly significant (Table 5).The findings show that in urban Tripura, education of the respondent and husband's education does not have any significant impact on the women's labour supply behaviour. The reason may be that being a small state Tripura does not offer much job opportunities for women with higher education. As we had found while analysing respondent's education, almost 65 per cent of the respondents who are graduate are housewives in urban Tripura. The variable which are loaded in factor 2 are age of the respondent, number of children above 15 years, number of people financially dependent on the respondent and marital status of the respondent have a significant impact on labour supply behaviour of a women in urban Tripura. The reason might be as the children become older, women find it much easier to involve in outside economic activities as she has to spend less time in extended SNA activities. Number of financially dependent person also has a significant impact on the work participation of women. Higher number of financially dependent people means more requirement of income in the household, thus forcing women to engage in economically meaningful activities. Marital status and age of the respondent though might have loaded negatively as individual variables but together in the factor it has a positive and significant impact on the labour supply behaviour of women. Factor 3 in which two variables are loaded i.e. number of family members and number of working members in the family does not have significant impact on urban women labour supply in Tripura. The reason might be that a large number of respondent have nuclear family (see table 1). The Factor 4, in which only one variable - number of children below 15 years of age is loaded, has a negative impact on labour supply behaviour of women.

Table 6: Varimax Roated Loading (Work Profile)

Factors and variables	Factor 1	Factor 2	Factor 3
First factor			
Time spent at work place	0.916		
Respondent's monthly Income	0.857		
Time spent on household activities	0.81		
Job description	0.778		
Type of job	0.746		
Distance from the work place	0.647		
Mode of travel	0.613		
Second factor			
Monthly family income		0.902	
part time helper		0.684	
full time helper		0.581	
Third factor			
Time spent on care giving activities			0.784
husband monthly income			0.588

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3   Mc Fadden R^2 also ranges between 0 and 1. It may however keep in mind that in binary regression models goodness of fit is a secondary importance. What matter most is the expected sign of regression coefficients and their statistical or practical importance. Each slope coefficient in this equation is a partial slope coefficient and measures change in the estimated logit for a unit change in the value of given regressor (holding other regressor constant). Thus the factor 2 coefficient 1.36 means with other factors held constant if factor 2 increases by a unit, on average the estimated logit increases by about 1.36 units suggesting a positive relationship between the work participation of urban women and variables which are loaded in factor 2 (Gujarati and Sangeetha, 2007).

Table 6 explains the work related variables which are loaded in three different factors that affect the labour supply behaviour of urban women in Tripura. Factor 1 has the maximum variables loaded. The factor 2 has loaded three variables and in factor 3 two variables are loaded.

Table 7: Results of Logit Model -2 Estimated Through Factor Score

WORK PROFILE				
Dependent Variable: Working/Nonworking				
Method: ML - Binary Logit (Quadratic hill climbing)				
Sample (adjusted): 2 138				
Included observations: 138				
Convergence achieved after 5 iterations				
Covariance matrix computed using second derivatives				
Variable	**Coefficient**	**Std. Error**	**z-Statistic**	**Prob.**
C	0.910947	0.328475	2.773262	0.0055
FC1	-2.331611	0.403257	-5.781951	0.0000
FC2	-0.076204	0.216779	-0.351528	0.7252
FC3	-0.114268	0.248263	-0.460272	0.6453
McFadden R-squared	0.441560	LR statistic		82.43514
Prob (LR statistic)	0.000000	Total observation		138

Findings of Model 2

Table 7 reveals that out of three factors loaded only factor 1 is significant and the coefficient is negative which means that this factor has a negative impact on women labour supply behaviour. The factor which includes the variable like time devoted at the work place, time devoted in household activities, monthly income, modes of travelling etc. has a negative impact on labour supply behaviour of urban women in Tripura. Individually some variable might have a positive significant impact but when combining with other variable in an extracted factor, it shows a negative impact. In other words the estimate reflects that in case the amount of time spent in workplace or at home is more, the income derived monthly is less and time spent for travelling travel to work is more, women in general would refrain from participating in the labour market. In other words, this indicates that women value that the cost of labour/time spent for participating in labour market is more than the payoffs received and therefore tends to withdraw from labour market participation.

V. Conclusion

The overall picture emerging from the exercises is that the labour supply behaviour of women in Tripura is complex. The results of this study reveal that children below 15 years, marital status and number of people financially dependent on women have

a significant and positive impact on labour supply behaviour of women in urban Tripura. On the other hand time spent at the work place and in household activities and monthly income and the travel time to work place etc. have negative impact on labour supply behaviour of urban women in Tripura. The tiny small and populous state of Tripura is remotely located from mainland India and has bottlenecks in transport infrastructure. Besides, the small size of the economy has limitations in generation of decent and sustainable job opportunities for educated urban women. Along with creation of sustainable jobs, policy prescriptions lies on provisioning of supportive services of child care which could lead to an improvement in women's participation in the urban labour market. The discussion (Floro, 1995) on women's work burden and allocation of time, also suggest that the effect of macroeconomic policy reforms need to take into account both the level of output and the resulted changes in the level and intensity of work for women. This is because constraints and burden arising out of a task depends on a number of factors like health issues, experiences, nature of task, earning from the task etc. all need much deeper analysis.

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