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Working Paper

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Economics Discussion Papers, No. 2013-6

Provided in Cooperation with:

Kiel Institute for the World Economy – Leibniz Center for Research on Global Economic Challenges

Suggested Citation: Gupta, Prachi; Das, Upasak; Singh, Ashish (2013) : Child disability and maternal work participation: New evidence from India, Economics Discussion Papers, No. 2013-6, Kiel Institute for the World Economy (IfW), Kiel

This Version is available at:

<https://hdl.handle.net/10419/67951>

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Discussion Paper

No. 2013-6 | January 15, 2013 | <http://www.economics-ejournal.org/economics/discussionpapers/2013-6>

Child Disability and Maternal Work Participation: New Evidence from India

Prachi Gupta, Upasak Das, and Ashish Singh

Abstract

Using data from the India Human Development Survey, this paper analyses the relationship between child disability and maternal work participation for India. The authors' findings suggest a significant positive relationship between child disability and the work participation of the urban mothers who are wives of household heads. These mothers are 1.27 times as likely to participate in labour market as mothers (wives in urban areas) without a disabled child. However, for the same mothers, child disability significantly affects the weekly work hours of those participating in the labour market in a negative manner with presence of a disabled child reducing the weekly work hours by 3.6 hours. For the rural mothers and the mothers in urban areas who are household heads, our findings do not suggest any significant association between child disabilities and their work participation (or weekly work hours).

JEL J10 J22

Keywords Child disability; maternal work participation; India

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Citation Prachi Gupta, Upasak Das, and Ashish Singh (2013). Child Disability and Maternal Work Participation: New Evidence from India. Economics Discussion Papers, No 2013-6, Kiel Institute for the World Economy. <http://www.economics-ejournal.org/economics/discussionpapers/2013-6>

1. Introduction

There is an increasing evidence in the literature on parental work participation which shows that children and their upbringing has a significant impact on the labour supply of parents, especially mothers. As noted by Breslau *et al.* (1982), women's activities in the labour market are dominated by the events in their motherhood. Factors like fertility, child age, and child health are some of the key child related factors which determine a mother's labour participation. Since, a disabled child often requires additional support for self care and mobility, presence of a disabled child in a household generally increases the child care demands on the household members. In such situations, the responsibility of the female members of the household, especially mothers is observed to rise due to powerful cultural norms that assign women the principal responsibility of taking care of sick members of the household (Lewis & Lewis, 1977; Carpenter, 1980). This may lead to reduced participation of women especially mother's in the labour force. However, as noted by Breslau *et al.* (1982) and Gould (2004), presence of a disabled child in a household could also lead to an opposite effect on mother's work activity wherein faced with the additional financial burden due to health care requirements of the disabled child, the mother may chose to enter the work force or increase her hours of participation.

Most of the existing studies on the subject find a negative correlation between child disability and mother's labour participation (Breslau *et al.*, 1982; Salkever, 1982a; Kimmel, 1998, Porterfield, 2002; Dunkelberg & Spiess, 2007). But in the case of single mothers, the evidence is mostly mixed. Lu and Zuo (2010) find that child disability has different impacts on the labour market activities of married and non-married women in Australia, with child disability imposing a greater hardship on the non-married women. This is so because they may have to stay on to work as usual even if they have a disabled child in order to meet the financial requirements of the medical care of the disabled child. Another study by Wolfe and Hill (1995) based on US, analyses data on female household heads (single mothers) and documents that child disability reduces their labour force participation. Similar evidence for single mothers is also presented by Gould (2004) (based on US), where there is a negative correlation between mother's work participation and the child disability in cases of time-intensive illness. Apart from labour force participation, existing studies have also analysed the impact of child disability on the work hours of mothers. As usual, the evidence is mixed. While studies by Porterfield (2002) and Gould (2004), find disability to have a negative impact on the work hours of married mothers, Salkever (1990) finds no significant impact of child disability on the work hours of single mothers.

An important reason behind such varied evidence may lie in the fact that various studies use different datasets, methods, and disability definitions. Powers (2003) provides an excellent survey of the studies on the subject along with their main findings. Addressing the mixed evidence, Powers (2003) applies multiple definitions of disability in both static and dynamic frameworks to analyse the

impact of child disability on maternal work activity and finds negative effect of child disability on women who are either female heads or the wives of household heads in a static framework. However, in the dynamic framework, the negative effect is only evident in the case of female heads but not for the wives. With respect to the working hours, Powers (2003) finds increase in the work hours over time for the female heads.

It is important to note that all the reviewed studies are based on developed countries. Surprisingly, studies assessing the impact of child disability on mother's work activity for developing countries, especially India, are absolutely rare.¹ This study, where we investigate the association between child disability and mother's labour participation (and mother's weekly hours of work) in India is important for several reasons. First, India is home to the largest number of children in the world, significantly greater than China (UNICEF, 2011). However the health condition of Indian children remains deplorable. Various studies have identified the poor state of average child health in India (see for example, Singh *et al.*, 2011; UNICEF, 2011). India contributes to more than 20 per cent of the total child deaths in the world. Poverty, malnutrition, early motherhood, inadequate sanitation, and insufficient health care services have extreme implications on child health leading to long term chronic illness and disability (Singh *et al.*, 2011, UNICEF, 2011).

According to Census 2001, India had 3.2 million children in the age group of 0-9 years and 4.4 million children in the age group of 10-19 years who were suffering from some form of disability. This approximately constitutes to 1.6 per cent of the population of the children in the age group of 0-19 years. According to another estimate by NSSO (2002), in rural areas there were 0.5 per cent, 1.1 per cent, 1.5 per cent, and 1.7 per cent children in the age groups of 0-4 years, 5-9 years, 9-14 years, and 15-19 years, respectively, who were suffering from at least one kind of disability. For urban areas these figures stood a slightly less at 0.5 per cent, 1 per cent, 1.3 per cent, and 1.3 per cent, respectively.

As discussed earlier, presence of a disabled child in a household could either restrict or increase the labour participation of the household members, especially mothers. One cannot be sure about the kind of relationship between child disability and maternal work participation in the Indian context, precisely because there is no study till date which has investigated this relationship.

Given this gap in the existing literature, we in this paper, examine the impact of the presence of a disabled child on the maternal labour force participation for India. We provide separate analysis for mothers residing in rural and urban areas as well as mothers who are household heads and mothers who are wives of household heads. We also conduct the analyses for two indicators, namely, work participation and weekly work hours. Our results show that there exists a significant positive relationship between child disability and work participation of the mothers who are wives of household heads and reside in urban areas. However, for these mothers, the relationship between

child disability and weekly hours of work is found to be negative (and significant). For the mothers in rural areas and mothers in urban areas who are household heads, our findings do not suggest any significant relationship between child disabilities and maternal work participation (or weekly work hours).

The remaining of the paper is organised as follows. The next section briefly presents the data, variables, and some sample statistics. It is followed by a section on the multivariate analyses used in the paper along with the main findings of the study. Finally, the study concludes with some discussion on the main findings and a few concluding remarks.

2. Data, Variables and Sample Statistics

2.1 Data

We use the publicly available data from the Indian Human Development Survey (IHDS), conducted by the National Council of Applied Economic Research, New Delhi, India in collaboration with the University of Maryland, in 2004-2005. The IHDS is a micro unit recorded and nationally representative survey with an average response rate of 92 per cent. It is spread over 33 states and union territories of India and covers 26,734 and 14,820 households in rural and urban areas, respectively. It is unique in the sense that it was designed to measure different dimensions of human development with modules on education, health, employment, economic status, marriage, fertility, gender relations, and social capital.

Since the main objective of our study is to examine the association between child disability and work participation of the mothers, we primarily use the information on women and their children collected through the education and employment modules of the household level questionnaire as well as the health module of the individual level questionnaire (women's questionnaire). In addition we also use some household level information (for example, socioeconomic characteristics and family structure) obtained through the household level questionnaire.

2.2 Outcomes of Interest - Maternal Work Participation and Weekly Hours of Work

The primary outcome of interest of the multivariate analyses of the present study is the work status of the mothers, which we measure using two variables, namely labour force participation (work participation) and weekly hours of work. These two variables form the outcome variables for our study. The IHDS survey directly provides information on the work status of individuals and categorises it as '1' (individual is working) if the individual is involved in 240 or more hours of work in a year, otherwise '0' (not working). Similarly, weekly hours of work for women are also obtained from the 'Household Farm: Household Labour', 'Household Nonfarm Business', and 'Wage and Salary Work' modules of the IHDS.

Our analysis is based on a sample of 27,857 women (aged 15-60 years at the time of survey) who are either household heads or wives of household heads and who have at least one child aged 21 years or less. The lower limit for women's age is taken as 15 years because in India women get married at a young age and therefore different demographic (or other) surveys (for example, IHDS, NFHS) set the lower limit of 15 years as the age of women for interviews related to fertility, health, gender relations, and birth history modules (IIPS & ORC Macro, 2007; Desai *et al.*, 2010). The upper age limit is taken as 60 years because in India it is the upper age limit for active employment.

The analysis is performed separately for the mothers who are married to household heads and the mothers who are household head themselves. This is done because child disability can have a very different kind of impact on these two types of mothers. Since, the majority of the mothers who are household heads are either widows or divorcees; their work participation can be significantly different from the mothers who are married to household heads. This is also in line with the published literature on the subject (for example, see Kimmel, 1988; Powers, 2003). The analysis is performed separately for urban and rural areas, because the nature of labour market is very different in these two areas. Moreover, the family structure in India also differs by urban and rural areas. It is worthwhile to note that the multivariate analyses (models, specifications, and the variables) presented in this paper are well acceptable in the literature on the subject (for example, see Powers, 2003).

2.3 Child Disability

For identifying child disability, we follow the broader International Classification of Functioning, Disability and Health (ICF) framework developed by The World Health Organization (WHO). The WHO developed the International Classification of Impairments, Disabilities, and Handicaps in the early 1980s, which was later revised and renamed as the International Classification of Functioning, Disability, and Health (WHO, 2001; Mitra & Sambamoorthi, 2006). Typically, ICF is presented as an integration of the medical and the social models of disability (WHO, 2001, p. 20): 'ICF attempts to achieve a synthesis, in order to provide a coherent view of different perspectives of health from a biological, individual and social perspective'.

Defining disability as per the ICF model includes the three disability measures which are commonly used in the applied disability research: measures based on impairments, functional limitations and activity limitations. Impairment measures of disability focus on the presence of impairment intrinsic to an individual, for example, impairments that might include blindness, deafness, mental retardation, stammering and stuttering, and complete or partial paralysis. Functional limitations refer to difficulties experienced with particular bodily functions such as seeing, walking, hearing, speaking, climbing stairs, lifting, and carrying, irrespective of whether the individual has an impairment or not. Activity limitations are limitations in activities of daily living (ADL) such as bathing or dressing. Activity limitations may also include participation limitation in major life

activities such as going outside the home, work or housework for working age persons, and school or play for children (Mitra & Sambamoorthi, 2006, p. 4022-23).

To be precise, we have defined child disability as follows: First, for children aged 7 years and above – a child is considered disabled if s/he is ‘unable’ or ‘finds it difficult’ to perform the following activities of daily living; walking, going to toilet, dressing, hearing normal conversation, speaking normally, seeing distant things (with glasses if any), and seeing near objects such as reading (with glasses if any). This information is directly obtained from the ‘Activity of Daily Living’ module of the IHDS individual questionnaire. A child is also considered disabled if s/he is not able to perform normal activities of daily living due to major illnesses, for example, High BP, Heart disease, Diabetes, Leprosy, Cancer, Polio, Paralysis, Epilepsy, Mental illness, AIDS or other long term illnesses.² Second, for the children aged below 7 years – in the absence of direct module on the activities of daily living for this age group of children, we use the ‘Major Morbidity’ module of the IHDS individual questionnaire and categorise a child as disabled if s/he is not able to perform normal activities of daily living due to major illnesses, for example, High BP, Heart disease, Diabetes, Leprosy, Cancer, Polio, Paralysis, Epilepsy, Mental illness, AIDS or other long term illnesses.³

The child disability variable hence constructed forms the first explanatory variable of primary interest in our study. Though, it is interesting to analyse how maternal work participation and weekly hours of work are related to child disability, it is also interesting to investigate how the maternal work participation as well as weekly work hours vary with the degree of disability of children. To investigate the nature of relationship between maternal work participation (and weekly work hours) and degree of disability of children, we construct another variable which captures the degree of disability of children. For this purpose we divide the disabled children into two groups, children who are disabled but not severely disabled and children who are severely disabled. Therefore, the degree of child disability variable is categorised into three levels, not disabled (if child does not have a disability), disabled but not severely disabled, and severely disabled (if child is severely disabled). From the sphere of all disabled children, children who are ‘unable’ to perform the following activities of daily living; walking, going to toilet, dressing, hearing normal conversation, speaking normally, seeing distant things (with glasses if any), and seeing near objects such as reading (with glasses if any); or children who are not able to perform normal activities of daily living due to Leprosy, Cancer, Polio, Paralysis, Epilepsy, Mental illness, and AIDS are categorised as severely disabled. Identification of severe disability as above is in line with the US Census Bureau’s guidelines (McNeil, 1997, p.7, 2001). Our identification of disability and severe disability is also similar to Powers’ (2003) definition 1 of disability and the definition of severe disability, respectively. Hence defined, the degree of child disability forms another explanatory variable of primary interest. It may be noted that, we conduct the analyses based on the variables child disability (dichotomous) and degree of child disability (three categories) separately.⁴

2.4 Control Variables

Drawing from the published literature on the determinants of mother's work participation (Powers, 2003; Lu and Zuo, 2010) and taking into account the Indian context, we include a number of controls. These can be broadly classified into four groups; first group relates to child specific characteristics, second is related to the maternal characteristics, third pertains to father's characteristics, and fourth is related to the household characteristics. Child specific characteristics include the age, the square of age, and the gender of the youngest child. Including gender of the youngest child is a departure from the existing literature (mostly based on developed countries) but we include it given the compelling evidence of discrimination against female children in providence for basic necessities in India (see Pande & Astone, 2007 for an exhaustive review).

The variables related to maternal characteristics include age, the square of the age, years of completed schooling (categorised into four levels - no formal schooling, schooling up to primary (5 years), more than primary but up to secondary (10 years), and more than secondary), and health status which is taken as dichotomous and is captured by the variable whether the mother received treatment (or advice) for a major illness in the last year.

We also include father's characteristics by using data on his age, square of his age, and his level of schooling. As in the case of mothers, the schooling of fathers is also divided into the four categories of no formal schooling, schooling up to primary (5 years), schooling more than primary but up to secondary (10 years), and schooling more than secondary. In the multivariate analyses, no education (both in case of mothers and fathers) is taken as the reference category. It may be noted that in the analyses based on the sample of mothers who are household heads, fathers' characteristics are not included in the models. It is in line with the existing literature (Powers, 2003).

To characterise the households we use dummies for caste and religion, number of children (age - less than or up to 21 years), number of other adult (age - greater than 21 years) females, and the number of adult males in the household. The categorical variable for caste is coded into the categories of 'Scheduled' groups ('Scheduled Caste' (SC) and 'Scheduled Tribes' (ST)), 'Other Backward Classes' (OBC), and 'Other Castes' (OC; taken as reference) which are meaningful representations of the Indian social fabric along caste lines.⁵ Religion is also divided into three categories, namely, 'Hindu' (the majority religious group in the Indian population; taken as the reference category), 'Muslim' (largest group among religious minorities), and 'Others'. 'Muslims' lag behind their 'Hindu' and 'Others' counterparts in education, employment and income (Government of India, 2007). Of note is the fact that the different geographical regions of India are at different levels of economic and demographic development, with the regions of south and west generally better than their other counterparts (Bose, 1991; Bhat & Zavier, 1999; Singh, 2011). To control for the regional effects, following Singh (2011), we divide India into the regions of North, Central, East, North East,

West, and South and include the regional dummies in all the models. The list of variables and the sample statistics are presented in Table 1.

2.5 Sample Statistics

Some stylised observations can be noted from Table 1 which in addition to elucidating the variables used in our models, also presents the sample statistics for the rural as well as the urban samples for the two groups - mothers who are wives of household heads (henceforth referred as wives) as well as mothers who are the household heads themselves (henceforth referred as household heads). It can be observed that the work participation of mothers in rural areas is substantially higher than that of urban areas. It can also be observed that among the two types of mothers, the work participation of the household heads is higher than that of the wives. As far as instances of child disability is concerned, the figures are quite similar for the wives in rural (4.58%) and urban areas (4.33%) as well as for the household heads in the two areas (5.25% and 5.24%). Further, it may be observed that the rural and urban samples are comparable within the respective groups (wives and household heads) in terms of demographic factors like age of the youngest child, age of the mothers, age of the fathers, number of adult males, number of other adult females, and the number of children in the household. Moreover, the educational attainment (in terms of more than 5 years of schooling) of the mothers in urban areas is substantially higher than that of the mothers in rural areas.

Table 1. Sample Statistics

	Rural		Urban	
	Wives	Female Household Heads	Wives	Female Household Heads
<i>Dependent Variable</i>				
Work participation (%)	72.1	80.08	23.10	56.63
Usual weekly hours (mean)	10.8	15.89	5.58	20.68
<i>Independent variables</i>				
<i>Child related variables</i>				
Has a disabled (including severely disabled) child (%)	4.58	5.25	4.33	5.24
Has a disabled but not a severely disabled child (%)	2.18	2.54	2.07	3.27
Has a severely disabled child (%)	2.40	2.70	2.26	1.96
Age of the youngest child (yrs; mean)	8.94	11.90	9.32	13.49
Youngest child is female (%)	40.62	41.56	43.42	44.19
<i>Maternal Characteristics</i>				

Age in yrs (mean)	36.54	41.72	36.01	42.09
No formal schooling (%)	62.50	68.93	31.52	40.75
≤ 5yrs of formal schooling (%)	16.03	14.59	14.88	14.73
5 yrs < formal schooling ≤ 10 yrs (%)	18.49	14.10	36.13	31.26
Formal schooling > 10 yrs (%)	2.98	2.38	17.47	13.26
Received medical treatment (advice) for major illness in last year (%)	7.89	10.98	9.15	15.55
<i>Father's characteristics</i>				
Age in yrs (mean)	41.99		41.70	
No formal schooling (%)	70.13		45.33	
≤ 5yrs of formal schooling (%)	20.50		24.32	
5 yrs < formal schooling ≤ 10 yrs (%)	8.18		22.92	
Formal schooling > 10 yrs (%)	1.19		7.43	
<i>Household Characteristics</i>				
<i>Composition</i>				
Number of adult males (mean)	1.30	0.33	1.28	0.45
Number of other adult females (mean)	0.30	0.29	0.26	0.31
Number of children (age ≤ 21 yrs; mean)	3.00	2.72	2.57	2.37
<i>Caste</i>				
OBC (%)	39.93	41.07	38.42	37.97
SC/ST (%)	34.98	36.23	20.53	21.11
OC (%)	25.09	22.70	41.04	40.92
<i>Religion</i>				
Hindu (%)	81.47	78.11	77.37	70.70
Muslim (%)	10.64	11.80	16.26	20.29
Other religion (%)	7.89	10.08	6.37	9.00
N	16363	1220	9663	611

Source: Authors' computations based upon IHDS (2004-05).

3. Multivariate Analyses and Results

3.1 Maternal Work Participation

We use binary logistic models for mother work participation (since it is dichotomous in nature). We conduct the analyses at two levels for both, the rural wives and rural household heads as well as the urban wives and urban household heads.

At the first level we conduct the regression analysis taking child disability as a binary variable, that is, '1' if the mother has a disabled child and '0' otherwise. At the second level we take the degree of disability into account which is categorised into 'no disabled child = 0', 'has a disabled but not a severely disabled child = 1', and 'has a severely disabled child = 2'. The control variables include the child level, maternal level, father's level (only in case of wives), and household level characteristics as discussed in the 'control variables' subsection of the previous section.

The odds ratios from the logistic models for the rural areas are presented in Table 2. In the rural sample, for both the wives (model 1) as well as mothers who are household heads (model 3) the maternal work participation shows an insignificant (positive in nature) relationship with child disability. The relationship remains insignificant even when degree of disability is taken into account (models 2 and 4).

Table 2. Odds Ratio estimates of Logistic Regression Models for the Dependent Variable – Maternal Work Participation (Yes = 1, No = 0): Rural India

	Wives		Female Household Heads	
	(1)	(2)	(3)	(4)
Has a disabled child (Ref: no disabled child)	1.03 (0.09)		1.548 (0.557)	
Severity of child disability (Ref: no disabled child)				
Has a disabled but not severely disabled child		1.230 (0.164)		1.478 (0.662)
Has a severely disabled child		0.884 (0.105)		1.629 (0.928)
Age (youngest child)	1.086*** (0.014)	1.086*** (0.014)	1.180*** (0.064)	1.180*** (0.064)
Square of age (youngest child)	0.997*** (0.001)	0.997*** (0.001)	0.993*** (0.002)	0.993*** (0.002)
Youngest child female (Ref: male)	0.994 (0.037)	0.994 (0.037)	0.895 (0.140)	0.896 (0.140)
Maternal Characteristics				
Age	1.105*** (0.026)	1.105*** (0.026)	1.052 (0.078)	1.052 (0.078)
Square of Age	0.999*** (0.000)	0.999*** (0.000)	0.999 (0.001)	0.999 (0.001)
Education (Ref: no formal schooling)				
≤ 5yrs of formal schooling	0.679***	0.679***	0.509***	0.508***

	(0.035)	(0.035)	(0.108)	(0.108)
5 yrs < formal schooling ≤ 10 yrs	0.499***	0.499***	0.288***	0.289***
	(0.026)	(0.026)	(0.060)	(0.060)
Formal schooling > 10 yrs	0.371***	0.371***	0.251***	0.251***
	(0.040)	(0.040)	(0.107)	(0.107)
Received medical treatment (advice) for a major illness in last year	0.776***	0.773***	0.776	0.777
	(0.051)	(0.051)	(0.178)	(0.178)
Father's Characteristics				
Age	1.062***	1.062***		
	(0.022)	(0.022)		
Square of Age	0.999***	0.999***		
	(0.000)	(0.000)		
Education (Ref: no formal schooling)				
≤ 5yrs of formal schooling	0.794***	0.793***		
	(0.038)	(0.038)		
5 yrs < formal schooling ≤ 10 yrs	0.725***	0.725***		
	(0.048)	(0.048)		
Formal schooling > 10 yrs	0.563***	0.564***		
	(0.090)	(0.090)		
Household Characteristics				
Composition				
Number of other adult females	1.051	1.052	1.242	1.241
	(0.036)	(0.036)	(0.170)	(0.170)
Number of adult males	0.860***	0.860***	0.686***	0.686***
	(0.029)	(0.029)	(0.092)	(0.092)
Number of children (age ≤ 21 yrs)	1.048***	1.048***	0.964	0.964
	(0.016)	(0.016)	(0.059)	(0.059)
Caste (Ref: OC)				
OBC	1.003	1.004	1.057	1.058
	(0.049)	(0.049)	(0.219)	(0.219)
SC/ST	1.043	1.043	1.337	1.337
	(0.056)	(0.056)	(0.313)	(0.313)
Religion (Ref: Hindu)				
Muslim	0.557***	0.557***	0.549***	0.550***
	(0.035)	(0.035)	(0.124)	(0.124)
Other religion	0.859**	0.858**	0.567**	0.567**
	(0.059)	(0.059)	(0.144)	(0.144)
Regional Dummies				
Yes	Yes	Yes	Yes	Yes
N	16363	16363	1220	1220

Notes: Figures in parenthesis are robust standard errors. ***Significant at the 1% level; ** significant at the 1% level; * Significant at the 10% level.

Source: Authors' computations based upon IHDS (2004-05).

Among the control variables of interest, it can be seen that the maternal work participation (for both, the wives as well as household heads) shows a significant but nonlinear ('inverted U') kind of relationship with the age of the youngest child. A similar kind of relationship also exists between the maternal work participation and mother's age. However, the relationship is significant only in the case of wives. It makes sense because most of the women who are working in rural areas are either self employed in agriculture or are agricultural labourers. Given, the physical nature of this work and the

age (15 - 60 yrs.) of the women in our sample, it is possible that the participation will increase with the age initially (in the earlier ages) but will decrease as the women move from being young to older ages. But in the case of women who are household heads, the relationship is insignificant because irrespective of their age they have to work in order to take care of the financial needs of their families.

It is surprising to observe that the maternal work participation is decreasing in the education of mothers (models 1, 2, 3, and 4). It will not seem surprising if seen in the light of the Indian social fabric, the correlation between education of wives and husbands, and the correlation between education and income in India. In India, education of wives and husbands is highly correlated and education itself is strongly correlated with the occupation and therefore income. The increasing completed years of schooling of mothers is nothing but an indicator of the increasing economic status of the households to which they belong. Combine this with the social norms in rural India, where women step out of the house to work in the fields only when the economic status of the household is such that there is no other option but for the women to come out and work.⁶ Further, mothers who received medical treatment (or advice) for a major illness in the last year are less likely to work (significant only in the case of wives) than women who didn't receive any treatment (or advice) for the same. The relationship is not significant for mothers who are household heads probably due to the fact that they have to work despite their poor health status because in the absence of other earning members (mostly husbands) they are bounded by the financial needs of their households. Moreover, the maternal work participation (for both, wives as well as household heads) shows a negative and significant relationship with the number of adult males in the household. It is not unnatural because more number of adult males means more number of earning hands and therefore less chances for the women to come out of house and work.

Table 3 reports the odds ratios from the logistic models for the maternal work participation for urban areas. It is interesting to note that, unlike rural areas, for the women who are wives of household heads, the maternal work participation is positively (significant at the 5% level) related to the presence of child disability (model 1). The wives who have a disabled child are 1.27 times as likely to work as the wives who do not have a disabled child. When severity of disability is taken into account (model 2), then wives who have a disable child (but not a severely disabled one) are 1.41 times as likely to work as the wives who do not have a disabled child. However, the positive nature of relationship between child disability and maternal work participation is not significant in the case of a severely disabled child. Of note is the finding that the relationship (though positive in nature) between child disability and maternal work participation is not significant in the case of mothers who are household heads (models 3 and 4).

Table 3. Odds Ratio estimates of Logistic Regression Models for the Dependent Variable – Maternal Work Participation (Yes = 1, No = 0): Urban India

	Wives		Female Household Heads	
	(1)	(2)	(3)	(4)
Has a Disabled child (Ref: no disabled child)	1.267** (0.147)		1.208 (0.467)	
Severity of child disability (Ref: no disabled child)				
Has a disabled but not severely disabled child		1.408** (0.226)		1.059 (0.511)
Has a severely disabled child		1.149 (0.188)		1.491 (0.915)
Age (youngest child)	1.088*** (0.021)	1.088*** (0.021)	1.153* (0.098)	1.152* (0.098)
Square of Age (youngest child)	0.996*** (0.001)	0.996*** (0.001)	0.994* (0.003)	0.994* (0.003)
Youngest child Female (Ref: male)	1.015 (0.051)	1.014 (0.051)	1.323 (0.241)	1.323 (0.241)
Maternal Characteristics				
Age	1.130*** (0.046)	1.130*** (0.046)	1.073 (0.125)	1.073 (0.125)
Square of age	0.999** (0.001)	0.999** (0.001)	0.999 (0.001)	0.999 (0.001)
Education (Ref: no formal schooling)				
≤ 5yrs of formal schooling	0.670*** (0.052)	0.670*** (0.052)	0.843 (0.233)	0.843 (0.233)
5 yrs < formal schooling ≤ 10 yrs	0.457*** (0.032)	0.457*** (0.032)	0.387*** (0.092)	0.385*** (0.091)
Formal schooling > 10 yrs	0.802** (0.070)	0.803** (0.070)	1.350 (0.436)	1.342 (0.433)
Received medical treatment (advice) for a major illness in last year	0.956 (0.085)	0.954 (0.085)	0.895 (0.229)	0.897 (0.230)
Father's Characteristics				
Age	0.951 (0.033)	0.951 (0.033)		
Square of Age	1.000 (0.000)	1.000 (0.000)		
Education (Ref: no formal schooling)				
≤ 5yrs of formal schooling	0.667*** (0.044)	0.666*** (0.044)		
5 yrs < formal schooling ≤ 10 yrs	0.615*** (0.045)	0.614*** (0.045)		
Formal schooling > 10 yrs	0.795** (0.087)	0.793** (0.087)		
Household Characteristics				
Composition				
Number of other adult females	1.116** (0.053)	1.115** (0.053)	1.111 (0.187)	1.104 (0.187)
Number of adult males	0.887** (0.043)	0.888** (0.043)	0.533*** (0.084)	0.533*** (0.084)

Number of children (age \leq 21 yrs)	1.101*** (0.024)	1.102*** (0.024)	0.991 (0.076)	0.989 (0.075)
Caste (Ref: OC)				
OBC	1.245*** (0.077)	1.245*** (0.077)	1.042 (0.227)	1.041 (0.227)
SC/ST	1.418*** (0.102)	1.419*** (0.102)	2.367*** (0.685)	2.371*** (0.687)
Religion (Ref: Hindu)				
Muslim	0.776*** (0.060)	0.775*** (0.060)	0.709 (0.179)	0.710 (0.179)
Other religion	1.093 (0.115)	1.095 (0.115)	1.793 (0.702)	1.808 (0.711)
Regional Dummies	Yes	Yes	Yes	Yes
N	9663	9663	611	611

Notes: Figures in parenthesis are robust standard errors. ***Significant at the 1% level; ** significant at the 1% level; * Significant at the 10% level.

Source: Authors' computations based upon IHDS (2004-05).

The nature of relationship in the urban areas between maternal work participation and the control variables of interest (for example, age of the youngest child, age of the mothers, education of the mothers, and number of adult males) is similar to that of rural areas. The notable exception is the result that the negative nature of relationship between maternal work participation and the poor health status of wives is not insignificant.

3.2 Maternal Weekly Work Hours

Before estimating the effect of child disability on weekly hours of work, we tested for the existence of self selection bias on account of the fact that the weekly work hours are non-observable for the mothers who did not participate in the labour market. We tested for the self selection bias using Heckman's two step sample selection model (Heckman, 1979). However, the inverse mills ratio came out to be insignificant; suggesting the absence of any significant self selection bias.⁷ We therefore present the estimates of the determinants of weekly work hours obtained using OLS method for only those mothers, who participated in the labour market.

The estimation is once again carried out separately for wives and household heads and also for rural and urban areas. It is also carried out at two levels; the first level includes child disability as a dichotomous variable whereas, the second level takes into account the degree of disability of the children. The control variables included in the model are same as those included in the maternal work participation models presented earlier.

Table 4. Coefficient estimates of OLS Regression Models for the Dependent Variable – Maternal Weekly Work Hours: Rural India

	Wives		Female Household Heads	
	(1)	(2)	(3)	(4)
Has a Disabled child (Ref: no disabled child)	0.053 (0.569)		-0.244 (2.141)	
Severity of child disability (Ref: no disabled child)				
Has a disabled but not severely disabled child		-0.687 (0.798)		-1.349 (3.074)
Has a severely disabled child		0.773 (0.788)		0.738 (2.903)
Age (youngest child)	0.319*** (0.085)	0.318*** (0.085)	0.364 (0.405)	0.357 (0.406)
Square of Age (youngest child)	-0.016*** (0.004)	-0.016*** (0.004)	-0.020 (0.017)	-0.020 (0.017)
Youngest child Female (Ref: male)	0.297 (0.248)	0.298 (0.248)	0.736 (1.012)	0.744 (1.012)
Maternal Characteristics				
Age	0.081 (0.172)	0.080 (0.172)	0.350 (0.554)	0.334 (0.555)
Square of age	-0.002 (0.002)	-0.002 (0.002)	-0.006 (0.006)	-0.006 (0.006)
Education (Ref: no formal schooling)				
≤ 5yrs of formal schooling	-0.281 (0.356)	-0.281 (0.356)	0.935 (1.498)	0.902 (1.500)
5 yrs < formal schooling ≤ 10 yrs	-1.148*** (0.376)	-1.148*** (0.376)	1.333 (1.656)	1.324 (1.657)
Formal schooling > 10 yrs	5.022*** (0.891)	5.025*** (0.891)	-3.220 (3.714)	-3.268 (3.717)
Received medical treatment (advice) for a major illness in last year	-0.427 (0.460)	-0.407 (0.460)	-3.697** (1.630)	-3.700** (1.630)
Father's Characteristics				
Age	0.115 (0.154)	-0.504 (0.240)		
Square of Age	-0.001 (0.002)	-0.225 (0.093)		
Education (Ref: no formal schooling)				
≤ 5yrs of formal schooling	-1.781*** (0.329)	-1.777*** (0.329)		
5 yrs < formal schooling ≤ 10 yrs	-0.783 (0.499)	-0.777 (0.499)		
Formal schooling > 10 yrs	2.505* (1.315)	2.492* (1.315)		
Household Characteristics				
Composition				
Number of other adult females	-0.234 (0.227)	-0.232 (0.227)	-0.545 (0.945)	-0.576 (0.948)
Number of adult males	-0.505**	-0.504**	-0.743	-0.742

	(0.240)	(0.240)	(1.011)	(1.011)
Number of children (age \leq 21 yrs)	-0.223**	-0.225**	-0.962**	-0.963**
	(0.093)	(0.093)	(0.407)	(0.407)
Caste (Ref: OC)				
OBC	0.559*	0.559*	-1.680	-1.664
	(0.337)	(0.337)	(1.426)	(1.427)
SC/ST	1.752***	1.756***	1.611	1.614
	(0.359)	(0.359)	(1.497)	(1.497)
Religion (Ref: Hindu)				
Muslim	-2.627***	-2.626***	-0.981	-0.977
	(0.465)	(0.465)	(1.792)	(1.793)
Other religion	-2.211***	-2.204***	-3.421*	-3.411*
	(0.501)	(0.501)	(1.930)	(1.930)
Constant	8.587***	8.565***	14.369	14.757
	(2.297)	(2.297)	(10.960)	(10.992)
Regional Dummies	Yes	Yes	Yes	Yes
N	11797	11797	977	977

Notes: Figures in parenthesis are robust standard errors. ***Significant at the 1% level; ** significant at the 1% level; * Significant at the 10% level.

Source: Authors' computations based upon IHDS (2004-05).

Table 4 presents the estimates for rural areas. For both, wives as well as household heads, the maternal weekly work hours is not significantly related to the presence of a disabled child (models 1 and 3). The coefficient is positive for wives, whereas for household heads, it is negative. When degree of disability is taken into account, then also the relationship remains insignificant (models 2 and 4). For wives (models 1 and 2), weekly work hours - is positively (significant) related to their (as well as their husbands') formal schooling if more than 10 years; seem to follow an 'inverted- U' kind of relationship with the age of youngest child; and is negatively affected by increase in number of adult males and number of children. Caste and religious affiliation also affects the weekly work hours of these mothers. When we consider the mothers who are household heads, only three variables affect their weekly work hours significantly. To be precise, their poor health status, (increase in) total number of children in the household and belonging to non-Hindu and non-Muslim religions (reference – Hindu) affects their weekly work hours negatively. The insignificant effect of most of the important variables on the weekly work hours of mothers who are household heads and are participating in the labour market points to one thing, that is, these women do not have much choice when it comes to the supply of weekly work hours as their households depend on them for earnings.

Table 5. Coefficient estimates of OLS Regression Models for the Dependent Variable – Maternal Weekly Work Hours for those who participated in labour market: Urban India

	Wives		Female Household Heads	
	(1)	(2)	(3)	(4)
Has a Disabled child (Ref: no disabled child)	-3.558** (1.657)		5.467 (4.004)	
Severity of child disability (Ref: no disabled child)				
Has a disabled but not severely disabled child		-5.241** (2.340)		5.524 (5.002)
Has a severely disabled child		-1.970 (2.276)		5.370 (6.414)
Age (youngest child)	0.338 (0.285)	0.354 (0.286)	2.234*** (0.809)	2.235*** (0.811)
Square of Age (youngest child)	-0.017 (0.013)	-0.018 (0.013)	-0.096*** (0.033)	-0.096*** (0.033)
Youngest child Female (Ref: male)	0.291 (0.760)	0.286 (0.760)	-2.691 (1.849)	-2.691 (1.852)
Maternal Characteristics				
Age	1.866*** (0.606)	1.873*** (0.606)	-0.428 (1.235)	-0.429 (1.239)
Square of age	-0.022*** (0.007)	-0.023*** (0.007)	0.005 (0.014)	0.005 (0.014)
Education (Ref: no formal schooling)				
≤ 5yrs of formal schooling	0.522 (1.157)	0.532 (1.157)	-2.314 (2.772)	-2.315 (2.776)
5 yrs < formal schooling ≤ 10 yrs	0.250 (1.034)	0.231 (1.034)	0.466 (2.450)	0.466 (2.454)
Formal schooling > 10 yrs	11.484*** (1.361)	11.465*** (1.361)	1.561 (2.852)	1.563 (2.858)
Received medical treatment (advice) for a major illness in last year	0.755 (1.316)	0.793 (1.316)	1.024 (2.734)	1.022 (2.740)
Father's Characteristics				
Age	-1.259** (0.521)	-1.265** (0.521)		
Square of Age	0.013** (0.005)	0.013** (0.005)		
Education (Ref: no formal schooling)				
≤ 5yrs of formal schooling	-0.808 (1.022)	-0.744 (1.024)		
5 yrs < formal schooling ≤ 10 yrs	-0.061 (1.163)	-0.048 (1.163)		
Formal schooling > 10 yrs	1.314 (1.777)	1.344 (1.777)		
Household Characteristics				
Composition				
Number of other adult females	0.174 (0.698)	0.198 (0.698)	-0.718 (1.882)	-0.716 (1.889)
Number of adult males	-1.499**	-1.506**	-2.649	-2.650

	(0.730)	(0.730)	(1.699)	(1.702)
Number of children (age \leq 21 yrs)	-0.839***	-0.843***	-2.223***	-2.222***
	(0.314)	(0.314)	(0.823)	(0.826)
Caste (Ref: OC)				
OBC	-1.119	-1.168	-2.501	-2.501
	(0.960)	(0.961)	(2.340)	(2.343)
SC/ST	1.652	1.623	-2.876	-2.879
	(1.129)	(1.129)	(2.625)	(2.634)
Religion (Ref: Hindu)				
Muslim	-2.088*	-2.121*	1.063	1.064
	(1.151)	(1.151)	(2.751)	(2.756)
Other religion	1.090	1.035	-1.798	-1.800
	(1.646)	(1.647)	(3.180)	(3.187)
Constant	15.891**	15.893	47.861	47.881
	(7.953)	(7.953)	(25.083)	(25.143)
Regional Dummies	Yes	Yes	Yes	Yes
N	2232	2232	346	346

Notes: Figures in parenthesis are robust standard errors. ***Significant at the 1% level; ** significant at the 1% level; * Significant at the 10% level.

Source: Authors' computations based upon IHDS (2004-05).

The respective estimates for the urban areas are reported in Table 5. Unlike rural areas, we find significant (significant at the 5% level) negative relationship between child disability and maternal weekly work hours of mothers who are wives of household heads. Presence of a disabled child decreases the weekly work hours of these mothers by about 3.6 hours. This implies that for wives who participate in labour market despite of having disabled children, seem to compensate the increased participation by supplying less labour through decreased weekly hours of work. Of note is the fact that we found positive (and significant) relationship between maternal work participation and child disability for wives (Table 3, model 1 and 2). When severity of disability is taken into account (model 2), then wives who have a disable child (but not a severely disabled one) are likely to supply 5.2 less weekly hours of work (significant at the 5% level) as the wives who do not have a disabled child. We also find wives weekly hours of labour supply follow an 'inverted U' shape curve with their as well as their husbands' age. It is negatively affected by number of adult males and children in the household but is positively affected by their formal education if it is more than 10 years. However, in the case of household heads, we find no significant relationship between child disability and the maternal weekly work hours. The nature of relationship between the maternal weekly work hours and the control variables of interest comes out to be more or less insignificant for mothers, who are household heads. However for the household heads, their weekly hours of work seem to increase with age of youngest children but decrease for higher levels of their age (inverted-U).

4. Conclusions

In this paper, we provide the first estimates of the association between child disability and maternal work participation as well as maternal weekly work hours for India. While doing so, we provide the

estimates separately for the mothers who are wives of household heads and those who are household heads themselves. We also provide separate analyses for the rural and the urban areas of India. In addition, we also conduct the analyses at two levels; first by taking child disability as a binary outcome and second by taking severity of child disability into account.

In rural areas, we find that the presence of a disabled child does not have any significant association with the work participation and the weekly work hours of the wives as well as the household heads. Severity of disability is also found to have an insignificant relationship with the work choice of both the wives and the household heads. This insignificant relationship between child disability and maternal work participation (and weekly work hours) can be due to the fact that the females in rural households engage themselves in traditional (agriculture related) occupations (Desai & Jain, 2004). Since these activities can be taken up while keeping the child nearby, maternal work participation may not be affected by child disability. Also the structure of the rural society in India is integrated with the community and the networks. Hence, it is also seen that the child is taken care by the neighbouring households and community as a group, which acts like a social insurance for the households (Munshi & Rosenzweig, 2006, 2009). Another point to ponder upon is the health care infrastructure and the cost of health care in rural areas. Only about 25 per cent of the health care infrastructure, medical man power and other health resources are concentrated in the rural areas (Patil *et al.*, 2002). Due to the traditional beliefs and the absence of proper health care infrastructure, a large proportion of rural population still uses the traditional medication system as well as the services of quacks which are relatively cheaper (Kumar *et al.*, 2007). Since, in these cases the cost of medical care is not very high, it may not impose significant financial burden on the households with a disabled child and which in turn may not compel the women of the households to work. The above discussion may plausibly explain why child disability may not significantly affect maternal work decisions in rural areas of India.

However, in the case of urban households, we find that the presence of a disabled child has a significant positive association with the work participation of those mothers who are wives of household heads. This difference between the nature of association of child disability with maternal work participation in rural and urban areas may be explained by the high cost of living (including health care) in the urban areas. Of note is the finding that even in urban areas the maternal work participation of mothers who are household heads and have at least a disabled child is not significantly different from the mothers who are also household heads but do not have a disabled child. The reason may lie in the fact that in the case of mothers who are household heads, the responsibility of the financial needs of the households lie with the mothers and they have to work in order to fulfil the daily needs of the household members irrespective of whether they have a disabled child or not. Another point of interest is that the relationship between maternal weekly hours of work (for non- household head mothers who participated in labour market) and disability of children is found to be negative and significant. This signifies that the mothers who participate in labour market

due to disability of children in the households seem to compensate the increased participation by working less during the week.

It is surprising to note that in a country like India which has achieved unprecedented economic growth during the past two decades and which has social schemes like pension for widows and freedom fighters, a social scheme in terms of financial aid to households (especially households headed by widows and divorced mothers) with disabled children, like the SSI (supplementary security income) disability benefits in the US is missing. The demand for such a scheme is not unjustified if we consider the following. We found that in the case of female household heads, the maternal work participation (both rural and urban areas) of mothers who have received treatment (or advice) in the last year for a major illness is not significantly different from the mothers (again household heads) who did not receive any. Also, in the urban areas, even the weekly work hours of the mothers who are household heads and received treatment (or advice) for a major illness in the last year is not significantly different from those mothers who are also household heads but did not receive any treatment or advice for a major illness. This shows the compulsion of the mothers who are household heads to work irrespective of their poor health status. On top of this if these mothers have a disabled child then their plight can be very worrisome.

Though the Government of India provides some tax benefits to the individuals with a dependent disabled individual, it is fundamentally different from providing financial assistance to the mothers of disabled children, if seen in the context of maternal work participation. First, to get a tax exemption benefit the mother has to participate in work activity and earn, which may not be desirable in many cases, especially in the cases where the disabled child needs substantial attention and care. Second, the income of females up to a certain upper limit is already completely exempted from income tax, so any mother who has a disabled child and is earning less than this limit will not get any advantage out of the tax benefits based on the disability criteria.⁸ Further, in most of the cases of mothers who are wives of household heads and have a disabled child, it is the household head (or the husband) who is the earning member, so the tax benefits on account of the disability criteria will go to the household head (husband). Whereas, there is substantial evidence in literature which says that the welfare (in terms of, say, education and health) of children increases with the increase of direct control of mothers over the household income (Thomas, 1990; Hoddinott & Haddad, 1995; Phillips & Burton, 1998; Duflo, 2003; Seebens, 2009). So, based on our findings and the above discussion we advocate the policy of providing financial assistance directly to the mothers (especially the mothers who are household heads) of disabled children.

Notes

1. To the best of our search, we could not find even a single study which has assessed the aforesaid relationship for India.

2. This information is obtained from the 'Major Morbidity' module of the individual questionnaire of IHDS.
3. This information is also obtained from the 'Major Morbidity' module of the individual questionnaire of IHDS.
4. These two variables are never used simultaneously in any model.
5. It may be noted that the SCs and STs have suffered from severe social exclusion and discrimination from historical times and lag behind the OCs as well as OBCs in the different indicators of welfare. OBCs have also suffered from discrimination but to a lesser extent than SCs and STs. They also lag behind OCs in the indicators of welfare (Deshpande, 2011).
6. The average monthly per capita consumption expenditure (MPCE) for women who have no formal schooling is 657.38 Indian Rupees compared to the average MPCE of 1834.85 Indian Rupees for the women who have more than 10 years of completed schooling. We could not include MPCE or wealth in the regression analyses because it will lead to multicollinearity problems.
7. The results can be provided upon request.
8. Presently (year, 2011) this limit for females is 0.19 million Indian Rupees annually (The Economic Times, 2011). Also, agriculture income in India is exempted from income tax as per the Income Tax Act of India. So, the women involved in agricultural activities in rural areas cannot benefit from tax exemptions based on the disability criteria.

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