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What Effect Does Female Autonomy Have on Child Health? Microeconometric Evidence from Rural India

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Abstract

This study investigates the effects of an improvement in female autonomy on children's welfare in the developing world, taking into consideration intra-household resource allocation through decision-making processes within households. Using a female autonomy index constructed from India's *1998/99 National Family Health Survey*, the study tries to capture women's bargaining power and examine the effects on children's health and medical condition. The results of the empirical analysis suggest that often, though not always, children's health and medical condition can be enhanced by improving female autonomy. In addition, the results also imply that fostering female autonomy may play a crucial role in achieving economic development from a long-term perspective.

JEL classification codes: D13, I12, J13
Keywords: Female Autonomy, Intra-household Resource Allocation, Child Health

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1. Introduction

One of the principal objectives of this paper is to explore the effects of improvements in female autonomy – that is, improvements in the bargaining power of women within households through decision-making processes – on children's welfare by using a micro dataset from India. As the Millennium Development Goals (MDGs) list promoting gender equality and empowering women as the third goal out of eight and reducing child mortality as the fourth, the analysis in this paper provides important implications for development policies.

It is widely recognized that women in developing countries often have a lower social status than men. Often, women do not have access to health care services or equal education opportunities and lack economic opportunities inside and outside their home. Inadequate health care for women can result in early mortality; a lack of schooling perpetuates their low status, and fewer economic opportunities cause a variety of disadvantages. In India, which this paper focuses on, the disadvantages faced by women are often particularly severe: they often do not have a say even within their home, let alone enjoy equal education or economic opportunities outside their home.

India is well known not only for its large population, but also for the peculiar demographic composition of its population. In developed countries, it is usually men that die earlier than women, so that in general the population of women is larger than that of men. This is the natural pattern one observes when women and men enjoy equal levels of access to nutrition and health care. In contrast, in India there are more men than women, reflecting a higher mortality rate among women. The sex ratio in India was 971 in 1901, but has declined since then and in recent decades has been hovering around 930 (935 in 1981,

927 in 1991, and 933 in 2001).[1] Although differences in mortality and education between the sexes have recently been gradually decreasing, women still face disadvantages. As argued by Dréze and Sen (2002), deprivation of women in India remains deep-rooted.[2]

In addition, there are other serious problems for women. For example, women are often not even allowed to go out freely and, furthermore, seldom take part in household decision-making processes, let alone their own marriage. In most cases, they have no say in when or who they are to marry. In addition, they often have little say in when to bear children, and how many, once they are married. Thus, women in India face serious deprivation in that the extent to which they can make their own decisions is confined to narrow limits.

For reasons such as these, the empowerment of women in the developing world has been a key policy goal, especially since the Beijing Women's Conference in 1995 (Anderson and Eswaran, 2009). Enhancing the decision-making power of women in developing countries is considered to be one of the most important components in the empowerment of women. From the viewpoint of economics, decision-making power corresponds to bargaining power. Another way to describe this is in term of "female autonomy," since the bargaining power of women refers to the extent to which women can take part in decision-making processes within households and act according to their own free will.

In addition to the problem of women's low status, India still suffers from persistent deprivation of children. According to the *National Family Health Survey*, the child mortality rate (CMR), one of the most important indicators of children's welfare, was 109.3 per mil in 1992/93, 94.9 in 1998/99, and 74.3 in 2005/06 (IIPS and ORC Macro, 2007). There is no doubt

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[1] In India, the sex ratio is generally calculated as the ratio of females to males. Following this practice, this study shows sex ratio as the number of women for 1,000 men.
[2] See also, e.g., Bardhan (1974; 1982), Kishor (1993) and Murthi, Guio, and Dréze (1995).

that there is still plenty of room for improvement in nutrition and health care for children in India, considering that the CMR is around 10 per mil or less in developed countries. Children are the most vulnerable to poverty (Rosenzweig and Schultz, 1982) and usually do not have the means to protect themselves. In some developing countries, the CMR is over 100 per mil even today, so this is a big issue to be tackled by international society, as seen in the MDGs. Hence, this paper pays attention to how female autonomy affects children's welfare in India.

In economic studies, households are usually treated as one economic unit since data on individual household members are rarely available. Employing what are called unitary household models, such studies therefore assume that all decisions within a household are made by a "dictator" or that all household members have the same preferences.[3] A number of scholars, however, have suggested that households should be regarded as non-unitary, consisting of a plurality of members with different preferences. This is backed by empirical studies which indicate that individual household members have a variety of different preferences and therefore affect intra-household resource allocation in different ways. Thomas (1990), for example, using a micro data set of Brazil, showed that wives and husbands influenced decision-making processes within households differently. And in an empirical study on Burkina Faso, Udry (1996) found that the marginal agricultural productivity of each household member differs and that the assumption of the unitary household model is not adequate.[4]

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[3] In collective models of household behavior, it is assumed that while all household members have different preferences, the economic behavior of the household is efficient. See Browning et al (1994).

[4] Other empirical studies on non-unitary household models include Schultz (1990), Browning et al. (1994), Lundberg, Pollak, and Wales (1997), Fuwa et al. (2006), etc. A particularly notable study is that by Qian (2008), which examines the unitary household hypothesis through an empirical analysis of the effect of a rise in female income on the sex

Additionally, if resources are allocated disproportionately among household members, it is likely that the outcomes of policy interventions will differ from what policy makers expect. Haddad and Kanbur (1990), for example, found that poverty is likely to be underestimated if there are intra-household variations in welfare. Similarly, Beaton and Ghassemi (1982) showed that school feeding programs aimed at improving child nutrition and school enrollment failed to bring about the expected positive outcomes because such programs resulted in changes in intra-household resource allocation. As these studies demonstrate, it is essential to pay attention to intra-household resource allocation behavior because often expected policy goals may not be achieved under the assumption of a unitary household.[5]

In fact, the intra-household allocation of resources and specifically the enhancement of women's bargaining power within households is one of the most important factors in improving household welfare and, by extension, achieving development as shown by Thomas (1990), Lundberg, Pollak, and Wales (1997), and Eswaran (2002).[6] However, these studies only indirectly examined the effects of improvements in women's bargaining power on household welfare. And while Kantor (2003) and Anderson and Eswaran (2009) investigated what factors potentially contribute to improvements in women's bargaining power they did not explore how that influences household welfare. Thus, as far as I am aware, there are no studies that directly examine the effect of improvements in women's bargaining power on household welfare.

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ratio and gender differences in school enrollment.

[5] On this point, also see the survey by Alderman et al. (1995).

[6] It should be noted that it is possible to examine the intra-household resource allocation under the assumption of the unitary household model. Some studies, including a representative study by Rosenzweig and Schultz (1982), attempt to examine the intra-household resource allocation under the assumption of the unitary household model. See also Pitt and Rosenzweig (1990) and Pitt, Rosenzweig, and Hassan (1990), etc.

Against this background, the present study focuses on female autonomy – a key element in the empowerment of women – and assumes it is closely related to bargaining power. In other words, the effects of female autonomy are examined using a proxy for the bargaining power of women. This makes it possible to identify the effects of female autonomy on children's welfare that previous studies did not directly investigate. One of the principal objectives of this paper is to explore the effects of improvements in the bargaining power of women within households through decision-making processes on children's welfare.

In the empirical analysis in this paper, the *1998/99 National Family Health Survey*, a micro dataset that contains some variables related to female autonomy, is employed. In fact, the *National Family Health Survey* has been conducted three times: the first was conducted in 1992/93 (NFHS-1), the second in 1998/99 (NFHS-2), and the third (the latest) in 2005/06 (NFHS-3). The reasons for using the NFHS-2 rather than the NFHS-1 or the NFHS-3 are that the NFHS-1 does not contain variables related to female autonomy, while the NFHS-3 does not contain socio-economic variables at village level. The female autonomy index is constructed from the NFHS-2 and the effects on children's welfare are directly examined.

The reminder of this study is organized as follows. Section 2 provides a description of the data used and explains how the female autonomy index is constructed. The theoretical and empirical models for the analyses are then presented in Section 3, while Section 4 presents the estimation results. Section 5 concludes.

2. Data

2.1 Key features of the data

The data employed in this paper are from the *1998/99 National Family Health Survey*

(NFHS-2).[7] The survey was conducted in 26 states in India based on interviews with married women aged between 15 and 49.[8] Questions about the health and medical condition of married women and their children form a central part of the survey. It is worth noting that the survey contains a section on the "status of women."[9] This section consists of five broad topics that are subdivided into 13 detailed questions, while other sections also contain some questions related to female autonomy.

The deprivation of women and children in India can be observed from the NFHS-2 in terms of demography and educational achievement. The child mortality rate (CMR), a vital statistic significantly affecting demography, for example, is 115 per mil in Rajasthan in the north, and 138 in Uttar Pradesh and 123 in Madhya Pradesh (both in central India). In contrast, the CMR is 19 in Kerala in the south. The proportion of women with a child aged 0-4 that had taken the at least once to a medical facility during the 12-month-period preceding the survey is 39 percent in Rajasthan, 47 percent in Madhya Pradesh, and 88 percent in Kerala.[10]

The total fertility rate (TFR) is regarded as a vital statistic that is closely related to the CMR. In the context of economic development, high fertility is often considered to be problematic because it tends to be one manifestation of women's low status; that is, women in the developing world often have no say about whether to have children, resulting in repeated childbearing. Having many children can be a heavy burden on women and

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[7] The NFHS data can be downloaded from the Demographic and Health Surveys website (http://www.measuredhs.com/).

[8] In Tripura, one of the northeastern states, the survey was conducted later than in the other states of India. Therefore, most previous empirical studies exclude Tripura from their analysis and this paper follows this practice.

[9] In the basic survey report for the NFHS-2 (IIPS and ORC Macro, 2000), these variables are examined in section 6, "Women's Autonomy," in chapter 3.

[10] The vital statistics in this subsection are based on the NFHS-2 report (IIPS, 2000).

negatively affect their health (Sen, 1999). In India, fertility tends to be relatively high: the TFR in Rajasthan, for example, is 3.78, while that in Madhya Pradesh is 3.31. In contrast, in Kerala, it is only 1.96, indicating that considerable differences can be found across states.

As for education, we can easily observe gender disparities, as well as regional differences. The median of schooling years is 0.0 for women and 3.6 for men in Bihar in the east, 0.0 and 4.8 respectively in Madhya Pradesh in the central, and 4.5 and 6.4 in Tamil-Nadu and 7.6 and 8.1 in Kerala in the south. In addition to these gender disparities, educational attainment also greatly varies within states. It is said that these figures reflect women's status in each state and consequently demography and educational attainment in India differ considerably from state to state, as discussed in previous studies (see, e.g., Bardhan, 1974; 1982; Dyson and Moore, 1983; Das Gupta, 1987). This geographical diversity means that the cross-sectional analysis in this study potentially provides important information for development policies.

The figures presented here are calculated using all observations, both for urban and rural areas. However, poverty in India is more severe in rural areas (Van der Klaauw and Wang, 2005). For instance, according to the NFHS-2, the CMR is 115.5 per mil in rural areas compared with 65.4 in urban areas. As for education, the *Census of India 2001* shows that the literacy rate in rural areas is only 59.2 percent compared with 80.1 percent in urban areas. These figures indicate that although the disparities between rural and urban areas have decreased over the decades, they are still substantial. Hence, this paper concentrates only on rural areas. The number of observations is 62,248 for rural areas, while the total number of observations is 89,199.[11]

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[11] It should be noted that the number of observations used in the analysis below is less than the total number of observations. The reasons are that Tripura – as already mentioned in footnote 8 – is omitted from the analysis and that the analysis focus only on women with

2.2 Female autonomy

The NFHS-2 includes a number of questions related to female autonomy. In this paper, these questions, which ask married women whether they participate in household decision-making processes, are used to construct dummy variables employed for the empirical analysis. Specifically, the following eight questions from the NFHS-2 are used:

- In the last few months, have you discussed the practice of family planning with your husband?
- Who makes a decision on what items to cook?
- Who makes a decision on obtaining health care for yourself?
- Who makes a decision on purchasing jewelry or other major household items?
- Who makes a decision on your going and staying with parents or siblings?
- Do you need permission to go to the market?
- Do you need permission to visit relatives or friends?
- Are you allowed to have some money set aside that you can use as you wish?

Some of these questions allow the following multiple-choice answers: (1) respondent (wife) decides, (2) husband decides, (3) jointly with husband, (4) someone else decides, or (5) jointly with someone else. In this paper, the dummy variable constructed from the these questions take a value of 1 – indicating that the wife takes part in household decision-making in one way or another – if the answer is (1), (3), or (5). The dummy variables are then used to construct a female autonomy (FA) index, which is obtained by

children.

simply summing up these eight dummy variables. Of course, the FA index constructed here is not without problems. A key issue in this regard is the eight dummy variables and how the replies to the individual questions are to be judged. For instance, a key question from an economic viewpoint is the one asking "Are you allowed to have some money set aside that you can use as you wish?" The percentage of women replying that they are, at 55.8 percent is unexpectedly high, raising the question how the term "money" is interpreted by respondents. Moreover, it could be argued that some of the issues addressed by the questions are more important than others; yet, it would be difficult to rank them in importance.[12] In the construction of the FA index employed here, the eight dummy variables are therefore given equal weight for simplicity.

The average values of the FA index for India as a whole, for rural and urban areas, and for the rural areas of different states are provided in Table 1. As can be seen, the average value for India as a whole is 3.89, but this hides a substantial discrepancy between rural areas, for which it is 3.63, and urban areas, for which it is 4.49. Turning to differences between states, it is often agued that the status of women is higher in the south than in the north (see, e.g., Dyson and Moore, 1983). Yet, the FA index figures suggest that the pattern is less clear-cut. For example, the FA index is only 2.82 in Rajasthan, but 5.08 in Punjab indicating a large discrepancy even among northern states. And turning to the southern states, the FA index ranges from 3.57 for Andhra Pradesh to 5.01 for Tamil-Nadu. These results indicate that in order to understand the determinants of female autonomy, a more careful, statistical analysis is needed, taking into consideration characteristics of households, communities, local economic conditions, and socio-cultural environments.

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[12] In addition, it also should be borne in mind that three out of the eight questions are about whether women are allowed to leave the house.

[Table 1]

Examining the distribution of FA index values (not shown) indicates that this is relatively symmetric and the truncation at both ends seems sufficiently small to neglect. Given these observations, for the purpose of the empirical analysis in this paper, the FA index is assumed to be a continuous variable. However, as mentioned above, it should be noted that the FA index is not without problems.[13]

3. The model

As mentioned earlier, a key purpose of the analysis in this paper is to take into account the possibility that household members have different preferences and affect household decision-making processes differently. In particular, the effects of wives' bargaining power vis-à-vis their husband are considered. Following Eswaran (2002), an asymmetric Nash bargaining solution is assumed. The maximization problem for households thus can be represented as follows:

$$\max_{x,z} \left[U^f\left(x,z,y^f\right)-V_0^{\,f}\right]^{\gamma}\left[U^m\left(x,z,y^m\right)-V_0^{\,m}\right]^{1-\gamma} \tag{1}$$
$$\text{s.t.} \quad px+qz \leq I$$

where U denotes the utility function of spouses and superscripts f and m denote the wife and the husband, respectively. V_0 is the threat utility that represents the utility of the wife or the husband in the scenario when negotiation breaks down. x is the set of private goods

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[13] For instance, Kerala, where it is often said that the status of women is higher than in the other states, ranks tenth among 25. This indicates that it cannot be ruled out that the methodology for constructing the female autonomy index is not without problems.

that the wife and the husband own, z is children's welfare as a public good, p is the set of

prices of private goods, and q is the cost of maintenance of children's welfare. γ represents

the relative power of the wife vis-à-vis the husband that is attributed to their preferences

for bargaining,[14] and I refers to the household income. Female autonomy in this study is

assumed to inclusively reflect V_0 and γ.[15] The solution to this maximization problem is as

follows:

$$z = z\left(p^f, p^m, q, I, y^f, y^m\right) \qquad (2).$$

An empirical model is derived from this theoretical model. As noted earlier, this

study tries to identify factors that influence children's welfare as outcomes of the

intra-household resource allocation, paying particular attention to female autonomy.

Moreover, this study explores the effects of female autonomy on the children's health and

medical condition, which are used as proxies for children's welfare. Specifically, the

following two variables are employed: whether a wife had at least one child that died

before the age of 5 (CD), and whether a wife had taken her children to a medical facility of

any kind to receive health care during the 12-month-period preceding the survey (CC). In

other words, CD is an indicator concerned with child survival, while CC is an indicator

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[14] Binmore, Rubinstein, and Wolinsky (1986) pointed out that γ emerges because people have differences in time preferences and estimates of the likelihood of breakdown in negotiations. In this case, γ is presented by the ratio of time preferences or estimates of the probability of breakdown of bargaining. Eswaran (2002) argues that an increase in the parameter γ, which would be associated with a cultural shift to more favorable kinship systems, can certainly be construed as empowering women.

[15] Fuwa et al. (2006) argued that extra-environmental parameters (EEPs) probably affect bargaining power. Examples of EEPs include the local sex ratio, divorce law legislation, and the degree of prohibition on market work by gender (Fuwa et al., 2006). It is important to note that the NFHS-2 lacks such information.

related to routine health care for children. CD and CC are separately analyzed as dependent variables.

Next, it should be noted that female autonomy itself is affected by a variety of factors such as the wife's and the husband's education and income, household characteristics, and socio-economic conditions in the village that the household belongs to (Kantor, 2003; Basu, 2006; Anderson and Eswaran, 2009). Therefore, a simultaneous equation model is employed for the empirical analysis in this study, consisting of two functions of female autonomy and children's welfare as dependent variables. The empirical model is as follows:

$$f = X\beta_1 + \alpha y + u_1$$
$$z^* = X\beta_2 + \delta f + u_2 \qquad z = \begin{cases} 1 & \text{if } z^* > 0 \\ 0 & \text{otherwise} \end{cases} \qquad (3)$$

where f denotes female autonomy,[16] z^* is the latent variable that represents the health and medical condition of the family's children, and X is a set of exogenous variables. Note that at least one instrumental variable is necessary for the first equation to be identified. For this model to be correctly estimated, this instrumental variable is required to control for the effects on female autonomy without affecting the health and medical condition of children. The instrumental variable employed here is a dummy indicating whether a wife has the opportunity either to watch TV or listen to the radio at least once a week (MEDIA).[17] This choice of variable is based on the argument, put

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[16] It is assumed that f inclusively represents V_0 and γ.

[17] OLS estimation confirms that this variable avoids the weak instrument problem. See also the estimation result in Table 4.

forward, for example, by Jensen and Oster (2009), that TV and radio expose rural households to urban lifestyles, values, and patterns of behavior, which may then begin to adopt or emulate them and consequently change their behavior and way of thinking.

However, it is also possible that TV and radio programs include information on health and medical care for children. In order to control for this and ensure that the MEDIA variable is a valid instrument, a dummy variable is employed that takes 1 when a wife either watched or listened to programs on family planning in the month prior to the survey (MEDIA-HEALTH). In fact, to address issues such as India's high child mortality and fertility, the government provides guidelines for promoting the spread of information not only on family planning, but also on parenthood, reproductive health, and the survival and health of children, through various media (see, e.g., Government of India, 1993). [18] It is therefore assumed here that MEDIA-HEALTH successfully controls for the direct effects of such public health campaigns on CD and CC.

Other potential problems with regard to the instrumental variable include the following. First, there could be reverse causality between female autonomy and MEDIA; that is, greater female autonomy is likely to increase opportunities for exposure to TV and radio. In this case, MEDIA does not satisfy exogeneity, which is needed for a valid instrument. According to an empirical study on women's status and cable TV in India by Jensen and Oster (2009), the introduction of cable for TV in rural areas was determined by considering the access to electricity and the distance to the nearest town or city, increased the opportunities for women to watch TV, and consequently led to improvements in the status of women. Given these findings, this study assumes that MEDIA is exogenously

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[18] Means to disseminate such information include not only TV programs such as song and drama programs but also films and print media produced by the government.

determined.[19] Second, MEDIA may suffer from endogeneity problems because CD and CC may be influenced by other socio-economic factors. For example, it is likely that affluent regions, where people have many opportunities to watch TV and listen to the radio, also have better medical facilities. The analysis attempts to control for this effect by adding as many socio-economic variables as possible. The third potential problem is correlation between MEDIA and MEDIA-HEALTH. However, at 0.65, the correlation is not that large. For these reasons, it is assumed here that MEDIA satisfies the necessary conditions for an instrumental variable.

Before embarking on the empirical investigation in the following section, another limitation of the analysis should be mentioned. It should be noted that the NFHS-2 does not contain any information on the threat utility V_0 in equation (1), for example unearned income, which could greatly influence household members' bargaining power and behavior, so an empirical analysis excluding V_0 may result in biased estimates.[20] It is indispensable for bargaining models to take into consideration a threat scenario that describes the situation that occurs when bargaining breaks down, and in most studies focusing on bargaining among couples the assumed threat scenario is divorce, so the assets that each the wife and the husband own are regarded as V_0. Unfortunately, the NFHS-2 contains no information that would allow constructing a variable representing such an outcome, so it should be noted that in this paper it is impossible to examine what the threat scenario is.[21]

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[19] It should be noted, though, that the MEDIA variable also includes the opportunity to listen to the radio, so it differs somewhat from the situation examined by Jensen and Oster (2009).

[20] It also should be noted that the absence of important factors that influence the threat utilities of wives and husbands, such as extra-environmental parameters (EEPs), could cause the same problem as the absence of V_0.

[21] However, as shown in the empirical study on Bangladesh by Anderson and Eswaran

The absence of important factors that influence the threat utilities of wives and husbands may potentially cause an omitted variable bias. For instance, it is possible that unearned income of wives is positively correlated with female autonomy. If this is the case, omitting V_0 would cause upward bias with regard to the effect of female autonomy in the second regression, since it would result in a positive correlation between the FA index and the error term in the first regression. On the other hand, unearned income of husbands may be negatively correlated with female autonomy, which would lead to downward bias in the effect of female autonomy in the second regression. Hence, the direction of the overall bias would depend on the magnitude of these different individual biases.

To address the problem of the absence of V_0, dummies for wives' and husbands' occupation are used as an alternative. These dummies are expected to resolve the difficulties mentioned above to some extent. However, it should be noted that the occupation dummies for women could be endogenous. If these dummy variables are endogenous, that is, if greater female autonomy increases the likelihood of labor market participation or affects women's vocational choice, this might lead to an overestimation of the effects of these dummies on female autonomy, since they would be positively correlated with u_1. Thus, the theoretical value of female autonomy could be overestimated. In that case, therefore, it is expected that the effect of female autonomy on children's welfare could have an attenuation bias. In fact, the occupation dummies could also be influenced by factors other than female autonomy such as husbands' occupation and income, household wealth, and socio-cultural factors. These would be negatively correlated with u_1, so the net magnitude of the bias is ambiguous. Although these dummies are considered to be

(2009), in a South Asian context, a valid threat scenario instead of divorce would be a non-cooperative outcome within marriage. Also, in India, couples rarely ever divorce. The NFHS-2 data, for example, indicate that of the 61,337 surveyed women in rural areas, only 238 were divorced and single.

independent here due to the difficulties of finding appropriate instrumental variables, these issues should be borne in mind. However, as will be seen later, when conducting the estimation without the occupation dummies, the results are qualitatively almost the same.

Tables 2 and 3 provide summary statistics for the variables used in the empirical analysis. Two dependent variables, CD and CC, are employed as proxies representing the health and medical condition of children, while female autonomy, as noted above, is used as an endogenous regressor. Variables representing characteristics of couples and households, socio-economic and environmental features of the village households belong to, and the instrumental variable are employed as explanatory variables. As for socio-economic and environmental variables, all the available variables are made use of so as to avoid the problem of omitted variable bias, though the number of explanatory variables is large.

[Table 2]

[Table 3]

4. Estimation results

This section presents the estimation results.[22] It should be noted that while the sample for the analysis of CD – the possibility that a wife had at least one child who died before age 5 – consists of 51,023 wives, and that for the analysis of CC is limited to 31,866 wives. The reason is that CC focuses on whether a wife took one or more of her children aged below 5 to receive health care at a medical facility in the 12 months preceding the

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[22] The estimation in this paper is conducted making use of the ivprobit command in STATA.

survey, thus limiting the sample to wives who had children aged under 5 at the time of the survey.[23] In addition, the NFHS-2 does not provide any information on the assets owned by each household member but owned by the household (ASSETS). So the variable ASSETS is used as a proxy for the household economic situation.[24]

Table 4 presents the estimation results for FA from the first stage regression. They show that wives' exposure to TV and radio, represented by the MEDIA instrumental variable, has a significant positive effect on female autonomy. This suggests that the bargaining power of wives within the household improves as a result of the information and ideas they gain through media exposure. Similarly, the coefficient on MEDIA-HEALTH is significantly positive, implying that wives may come to form their own opinion through contemplating the health and medical condition of their family members.

[Table 4]

Looking at the effects of education, the number of wives' years of schooling has a significant positive effect on female autonomy. This means that greater educational attainment for wives helps to raise their bargaining power within the household. Turning to the impact of being engaged in work, all coefficients on occupation dummies for the wife are positive, indicating that working raises female autonomy. On the other hand, many of

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[23] In the analysis of CC, it is possible that the inclusion of women who bore their first child less than 5 years prior to the survey could produce biased estimates. Therefore, to check the robustness of the result, the regression was repeated excluding such women. The results were qualitatively the same.
[24] ASSETS, which takes a value ranging from 1 to 61, is calculated following the methodology for the Standard Living Index in the NFHS-2.

the occupation dummies for the husband have a negative coefficient, which is particularly large and significant for agricultural laborers and cultivators. This implies that in households in which the husband is engaged in agriculture, the bargaining power of wives tends to be relatively weak and their opportunities for participating in decision-making processes in the home to be small.

Next, Tables 5 and 6 present the estimation results relating to children's welfare. They indicate that while FA has no significant effect on CD, it does have a significant positive effect on CC, indicating that one additional point in the FA index increases CC by 38.6 percent (36.2 percent). These results suggest that an improvement in the FA index significantly raises the likelihood that a mother will take her child to a medical facility, but not necessarily that it will lower the likelihood of her child dying before the age of 5.

[Table 5]

[Table 6]

As for the impact of education on children's welfare, wives' and husbands' years of schooling have a significant negative effect on CD, indicating that an improvement in wives' and husbands' education tends to decrease the likelihood of child death. On the other hand, the estimation results for CC suggest that wives' and husbands' years of schooling have no significant effect on the likelihood that children will be taken to a health care facility.

Some of the occupation dummies for the wife show a significantly negative sign, implying that if a wife is engaged in work, this tends to have unfavorable effects on

children's welfare. A possible explanation is that working outside the home reduces mothers' time for child care and household chores. For example, it is worth noting that a wife working as an agricultural laborer is associated with a greater likelihood of child death and a wife working as a professional is associated with a reduced likelihood that she will take her children to a health care facility. These results suggest that the promotion of labor force participation of women does not always bring about benign effects for children's welfare, even though it is often considered to be important for the empowerment of women.

Next, household economic wealth (ASSETS) has no significant impact on CC but a significant negative effect on CD. This suggests that while an improvement in households' economic situation tends to mitigate child mortality, it does not influence the likelihood of routine health care for children.

The results presented above provide important implications for development policy making. First, they confirm that, as has often been pointed out, the promotion of female education and labor market participation contributes to greater female autonomy. Second, the results indicate that it is essential for development policy makers to take into account the household decision-making process, since female autonomy has a significant positive impact on CC. This suggests that non-unitary household models are more appropriate for devising development policies, which is consistent with the conclusions of previous studies.

Third, the results also showed that FA improved CC, while both wives' and husbands' years of schooling as well as household assets did not. On the other hand, FA did not have a significant favorable impact on CD, while wives' and husbands' years of schooling and household assets did. This implies that if the policy goal is to reduce child mortality,

policies aiming only at improvements in female autonomy may possibly fail to achieve the desired result.

These findings here can be summarized as follows. While female autonomy has an important effect on routine health care for children, parents' educational attainment -- likely through its effects on knowledge about health care – and household economic wealth significantly raise the probability of child survival. Put another way, promoting female autonomy increases the likelihood that children will be taken to a health care facility. At the same time, however, no significant effect of female autonomy on child mortality was observed. That is, the probability of child survival is raised directly through factors such as wives' and husbands' educational attainment and household economic wealth rather than indirectly through female autonomy. In addition, while female labor market participation is likely to increase female autonomy, it may also negatively affect the likelihood of child health care visits and child mortality. This suggests that children's welfare may not be improved by a policy aiming only at enhancing female autonomy. More importantly, the results imply that if high child mortality is characteristic of early stages of development, the enhancement of female autonomy may be crucial at later stages of economic development.

5. Conclusion

The aim of this paper was to examine what factors contribute to enhancing female autonomy and how female autonomy, in turn, affects household welfare through decision-making processes. Based on these objectives, the analysis focused on children's welfare as an outcome of intra-household resource allocation, using an index of female autonomy constructed from the *1998/99 National Family Health Survey* for India. Using a theoretical model of an asymmetric Nash bargaining solution, an empirical model was

derived in which female autonomy was considered to be a proxy for wives' bargaining power vis-à-vis their husbands. Furthermore, a simultaneous equations model was employed to take into account the possibility that female autonomy is affected by other exogenous factors. The results of the analysis can be summarized as follows.

It was found that promoting education and labor market participation of women contributes to female autonomy, which is a major component of the empowerment of women. In addition, female autonomy has a significant positive effect on the likelihood that mothers will take their children to visit a health facility. These findings indicate that in devising development policies in India, it is necessary to work on the basis of the assumption of non-unitary household models. They also mean that it is indispensable for policy-makers to pay attention to changes in intra-household resource allocation through improvements in female autonomy.

It should, however, be noted that female autonomy does not appear to have a significant effect on child survival, implying that only promoting female autonomy in some cases is likely to be insufficient to improve children's welfare. Similarly, both husbands' and wives' educational attainment, as well as household wealth, are positively correlated with child survival, but do not seem to affect the likelihood that a child will visit a medical facility. The findings lead to the following conclusion: female autonomy contributes directly to the likelihood that children will receive routine health care, while the educational attainment of the mother or the father only has an indirect effect. However, greater female autonomy is not necessarily associated with a higher likelihood of child survival, although it does tend to raise the likelihood of routine health care for children. It is the promotion of wives' and husbands' knowledge about health issues and household economic wealth rather than female autonomy that directly have a favorable effect on the

probability of child survival. This implies that it is essential to understand the channels through which development policies operate, because there may be cases where children's welfare cannot be improved just by promoting female autonomy. More importantly, the results suggest that the enhancement of female autonomy may be less important at early stages of development but is likely to be crucial at later stages. In other words, it indicates that fostering female autonomy will play a crucial role in long-term development.

Finally, several limitations of this paper should be mentioned. One possible problem is that the analysis did not include whether the wife or husband owned assets that yielded unearned income and that might affect the relative bargaining position in the household. A further limitation is associated with extra-environmental parameters (EEPs) that might affect female autonomy. McElroy (1990) and Fuwa et al. (2006), for example, argued that there may be a significant relationship between the wealth and educational attainment of the parents of a couple and the woman's bargaining power within the household. The simple reason for these omissions is that the NFHS-2 did not include any such information. Yet another issue is that, as pointed out by Anderson and Eswaran (2009) and Basu (2006), there is likely to be a two-way relationship between labor market participation by women and female autonomy. In the context of this study, this would imply that female labor market participation is endogenous and this would have to be taken into account in the empirical analysis. These issues are left for future studies.

References

Anderson, S. and M. Eswaran, 2009. What Determines Female Autonomy? Evidence from Bangladesh. *Journal of Development Economics*, 90 (2), 179-191.

Alderman, H., P. A. Chiappori, H. Lawrence, and J. Hoddinott, 1995. Unitary versus Collective Models of the Household: Is It Time to Shift the Burden of Proof? *World Bank Research Observer*, 10(1), 1-19.

Bardhan, P., 1974. On Life and Death Questions. *Economic and Political Weekly*, 9(32-34), 1293-1304.

——— 1982. Little Girls and Death in India. *Economic and Political Weekly*, 17(36), 1448-1450.

Basu, K., 2006. Gender and Say: A Model of Household Behavior with Endogenously Determined Balance of Power. *Economic Journal*, 116(511), 558-580.

Beaton, G. H. and H. Ghassemi, 1982. Supplementary Feeding Programs for Young Children in Developing Countries. *American Journal of Clinical Nutrition*, 35(Suppl. 4), 863-916.

Binmore, K., A. Rubinstein, and A. Wolinsky, 1986. The Nash Bargaining Solution in Economic Modelling. *RAND Journal of Economics*, 17(2), 176-188.

Browning, M., F. Bourguignon, P. A. Chiappori, and V. Lechene, 1994. Income and Outcomes: A Structural Model of Intrahousehold Allocation. *Journal of Political Economy*, 102(6), 1067-1096.

Das Gupta, M., 1987. Selective Discrimination in Rural Punjab, India. *Population and Development Review*, 13(1), 77-100.

Dréze, J. and A. Sen, 2002. *India Economic Development and Social Opportunity.* Oxford: Oxford University Press.

Dyson, T. and M. Moore, 1983. On Kinship Structure, Female Autonomy, and Demographic Behavior in India. *Population and Development Review*, 9(1), 35-60.

Eswaran, M., 2002. The Empowerment of Women, Fertility, and Child Mortality: Towards a Theoretical Analysis. *Journal of Population Economics*, 15(3), 433-454.

Fuwa, N., S. Ito, K. Kubo, T. Kurosaki, and Y. Sawada, 2006. Gender Discrimination,

Intrahousehold Resource Allocation, and Importance of Spouses' Fathers: Evidence on Household Expenditure from Rural India. *Developing Economies*, 44(4), 398-439.

Government of India, 1993. Information, Education and Communication. *Annual Report 1992-1993 of the Ministry of Health and Family Welfare*. Delhi. http://mohfw.nic.in/reports/Performance%20Budget%201992_93/65.pdf.

Haddad, L. and R. Kanbur, 1990. How Serious is the Neglect of Intra-Household Inequality? *Economic Journal*, 100(402), 866-881.

International Institute of Population Sciences (IIPS) and ORC Macro, 2000. *National Family Health Survey (NFHS-2), 1998-99*. Mumbai.

———— 2007. *National Family Health Survey (NFHS-3), 2005-06*. Mumbai.

Jensen, R. and E. Oster, 2009. The Power of TV: Cable Television and Women's Status in India. *Quarterly Journal of Economics*, 124(3), 1057-1094.

Kantor, P., 2003. Women's Empowerment Through Home-based Work: Evidence from India. *Development and Change*, 34(3), 425-445.

Kishor, S., 1993. 'May God Give Sons to All': Gender and Child Mortality in India. *American Sociological Review*, 58(2), 247-265.

Lundberg, S., R. A. Pollak, and T. J. Wales, 1997. Do Husband and Wives Pool Their Resources? Evidence from the United Kingdom Child Benefit. *Journal of Human Resources*, 32(3), 463-480.

McElroy, M. B., 1990. The Empirical Content of Nash-Bargained Household Behavior. *Journal of Human Resources*, 25(4), 559-583.

Murthi, M., A.C. Guio and J. Dréze, 1995. Mortality, Fertility, and Gender Bias in India: A District-Level Analysis. *Population and Development Review*, 21(4), 745-782.

Pitt, M. M. and M. R. Rosenzweig, 1990. Estimating the Intrahousehold Incidence of Illness: Child Health and Gender-Inequality in the Allocation of Time. *International Economic Review*, 31(4), 969-989.

Pitt, M. M., M. R. Rosenzweig, and Md. N. Hassan, 1990. Productivity, Health, and Inequality in the Intrahousehold Distribution of Food in Low-Income Countries. *American Economic Review*, 80(5), 1139-1156.

Qian, N., 2008. Missing Women and the Price of Tea in China: The Effect of Sex-specific

Earnings on Sex Imbalance. *Quarterly Journal of Economics*, 123(3), 1251-1285.

Rosenzweig, M. R. and T. P. Schultz, 1982. Market Opportunities, Genetic Endowments, and Intrafamily Resource Distribution: Child Survival in Rural India. *American Economic Review*, 72(4), 803-815.

Schultz, P., 1990. Testing the Neoclassical Model of Family Labor Supply and Fertility. *Journal of Human Resources*, 25(4), 599-634.

Sen, Amartya 1999. *Development As Freedom*. Oxford: Oxford University Press.

Thomas, D., 1990. Intra-Household Resource Allocation: An Inferential Approach. *Journal of Human Resources*, 25(4), 635-664.

Udry, C., 1996. Gender, Agricultural Production, and the Theory of the Household. *Journal of Political Economy*, 104(5), 1010-1046.

Van der Klaauw, B. and L. Wang, 2004. Child Mortality in Rural India. *World Bank Policy Research Working Paper*, 3281.

Table 1. Female autonomy

	Mean	Standard Deviation
All India	3.89	(2.04)
All India (rural)	3.63	(2.00)
All India (urban)	4.49	(1.98)

North	Mean	Standard Deviation		Northeast	Mean	Standard Deviation
Haryana	4.57	(1.63)		Assam	3.28	(1.66)
Himachal Pradesh	5.41	(1.40)		Manipur	4.17	(1.68)
Jammu & Kashmir	3.28	(1.84)		Meghalaya	5.09	(1.76)
Punjab	5.08	(1.64)		Mizoram	5.24	(1.82)
Rajasthan	2.82	(1.81)		Nagaland	4.17	(1.43)
Delhi	4.04	(1.79)		Sikkim	4.33	(1.72)
				Arunachal Pradesh	5.10	(1.62)
Central						
Madhya Pradesh	2.74	(1.77)		**West**		
Uttar Pradesh	2.85	(1.89)		Goa	5.05	(1.73)
				Gujarat	4.46	(1.99)
East				Maharashtra	3.54	(1.95)
Bihar	3.32	(1.95)				
Orrisa	3.25	(1.84)		**South**		
West Bengal	3.03	(2.00)		Andhra Pradesh	3.57	(1.76)
				Karnataka	3.58	(1.99)
				Kerala	4.39	(1.99)
				Tamil Nadu	5.01	(1.78)

Note: Figures shown are for rural areas in each state.

Table 2. Description of variables used in the empirical analysis

	Description of variables

Dependent variables	*Dependent variables*
	  CD (whether the wife has had at least one dead child)
	  CC (whether the wife has taken her children at least once to a medical facility to get any kind of health care during the last 12 months)
	Endogenous regressor
	  FA (female autonomy)

Characteristics of household	*Individual characteristics of wife and husband* Wife's age, Husband's age, Wife's schooling years, Husband's schooling years, Wife's age at first marriage
	Occupation dummies of wife and husband Professional, Clerical, Sales, Cultivator, Agricultural laborer, House keeper, Service, Skilled laborer, Unskilled laborer
	Religion and caste Muslim, Christian, SC/ST (scheduled caste and tribe), OBC (other backward caste)

	Other household characteristics
	  ASSETS (an index of household economic wealth, ranging from 1 to 61 calculated based on the methodology for Standard Living Index of the NFHS-2)
	  HF Worker (whether a health or family planning worker had visited the household during the last 12 months)
	  MEDIA-HEALTH (whether the wife had either watched TV programs or listened to radio programs about family planning during the last month)
	  MEDIA (whether the wife had the opportunity to either watch TV or listen to the radio at least once a week)
	  Number of children (number of children that a wife has given birth to), Number of adult males, Number of adult females

Socio-economic characteristics	Town (distance to the nearest town), District (distance to the district office), Station (distance to the nearest railway station), Other Transport (distance to other transportation networks), Paved Road (distance to paved road), Primary (distance to primary school), Middle (distance to middle school), Secondary (distance to secondary school), Higher Secondary (distance to higher secondary school), College (distance to college), Health (distance to health center), Sub-Center (distance to health sub-center), Primary Health (distance to primary health center), Community Health (distance to community health center), Gov. Dispensary (distance to government dispensary), Gov. Hospital (distance to government hospital), Private Clinic (distance to private clinic), Private Hospital (distance to private hospital), Post Office (distance to post office), Telegraph (distance to telegraph office), STD (distance to STD booth), Bank (distance to bank), Village Private (availability of private doctor), Visiting Dr. (availability of visiting doctor), VHG (availability of village health guide), Dai (availability of traditional birth attendant), Mobile Health (availability of mobile health unit), M/SSI (availability of mills/small scale industries), CCS (availability of credit cooperative society), ACS (availability of agricultural cooperative society), MCS (availability of milk cooperative society), K/GMS (availability of Kirana/General Market Shop), Weekly Market (availability of weekly market), Fair Prices Shop (availability of fair prices shop), Paan (availability of Paan shop), Pharmacy (availability of pharmacy), Mahila (availability of Mahila Mandal), Youth (availability of youth club), Anganwadi (availability of Anganwadi center), Community Center (availability of community center), IRDP (number of beneficiaries of Integrated Rural Development Programme), NREP (number of beneficiaries of National Rural Employment Programme), TRYSEM (number of beneficiaries of Training of Rural Youth for Self-Employment), EGS (number of beneficiaries of Employment Guarantee Scheme), DWARCA (number of beneficiaries of Development of Women and Children of Rural Areas), IAY (number of beneficiaries of Indira Awas Yojana), SGNY (number of beneficiaries of Sanjay Gandhi Niradhar Yojana), TV (availability of community television set), TTV (total number of television sets in village)
Others	State dummies

Note: Estimation results for the socio-economic variables and the state dummies (74 variables in total) are not reported to save space.

Table 3. Summary statistics of main variables

Variables	Obs	Mean	Standard Deviation	Min	Max
Dependent variables					
CD	51,023	0.275	0.446	0	1
CC	31,866	0.309	0.462	0	1
Endogenous regressor					
FA	51,023	3.592	1.946	0	8
Individual characteristics					
Wife's age	51,023	31.530	8.339	15	49
Husband's age	51,023	37.565	9.583	15	97
Wife's schooling years	51,023	2.585	3.824	0	22
Husband's schooling years	51,023	5.395	4.745	0	30
Wife's age at first marriage	51,023	16.781	3.022	12	44
Occupation dummies (reference = not working)					
Wife-Professional		0.014			
Wife-Clerical		0.002			
Wife-Sales		0.012			
Wife-Cultivator		0.189			
Wife-Agricultural laborer		0.128			
Wife-House keeper		0.004			
Wife-Service		0.002			
Wife-Skilled laborer		0.035			
Wife-Unskilled laborer		0.030			
Husband-Professional		0.056			
Husband-Clerical		0.027			
Husband-Sales		0.072			
Husband-Cultivator		0.358			
Husband-Agricultural laborer		0.141			
Husband-House keeper		0.002			
Husband-Service		0.039			
Husband-Skilled laborer		0.175			
Husband-Unskilled laborer		0.100			
Religion and caste (reference = other Hindu)					
Muslim		0.107			
Christian		0.052			
SC/ST		0.324			
OBC		0.305			
Other household characteristics					
ASSETS	51,023	19.693	9.406	1	61
HF worker	51,023	0.126	0.332	0	1
MEDIA-HEALTH	51,023	0.477	0.499	0	1
MEDIA	51,023	0.494	0.500	0	1
Number of children	51,023	0.728	0.811	0	4
Number of adult males	51,023	1.922	1.282	0	13
Number of adult females	51,023	1.983	1.208	1	13

Note: Summary statistics for the socio-economic variables and the state dummies are not reported to save space.

Table 4. Estimation result for female autonomy (FA)

FA	Coefficient	(Z-value)	Coefficient	(Z-value)
Individual characteristics				
Wife's age	0.020	(9.83)***	0.021	(10.35)***
Husband's age	0.004	(2.41)**	0.004	(2.41)**
Wife's schooling years	0.036	(12.18)***	0.043	(14.87)***
Husband's schooling years	0.001	(0.29)	0.005	(2.21)**
Wife's age at first marriage	-0.002	(-0.59)	-0.001	(-0.45)
Occupation dummies (reference = not working)				
Wife-Professional	0.638	(9.49)***		
Wife-Clerical	0.683	(4.15)***		
Wife-Sales	0.546	(7.61)***		
Wife-Cultivator	0.087	(3.78)***		
Wife-Agricultural laborer	0.217	(7.48)***		
Wife-House keeper	0.537	(4.29)***		
Wife-Service	0.439	(2.33)**		
Wife-Skilled laborer	0.236	(5.47)***		
Wife-Unskilled laborer	0.196	(4.13)***		
Husband-Professional	-0.019	(-0.35)		
Husband-Clerical	0.014	(0.22)		
Husband-Sales	-0.078	(-1.52)		
Husband-Cultivator	-0.248	(-5.46)***		
Husband-Agricultural laborer	-0.266	(-5.34)***		
Husband-House keeper	-0.086	(-0.48)		
Husband-Service	0.216	(3.73)***		
Husband-Skilled laborer	-0.015	(-0.32)		
Husband-Unskilled laborer	-0.089	(-1.77)*		
Religion and caste (reference = other Hindu)				
Muslim	-0.212	(-7.29)***	-0.187	(-6.47)***
Christian	0.152	(3.23)***	0.164	(3.48)***
SC/ST	0.015	(0.68)	0.062	(2.85)***
OBC	-0.004	(-0.18)	0.019	(0.93)
Other household characteristics				
ASSETS	0.006	(4.59)***	0.004	(3.11)***
HF worker	0.143	(5.79)***	0.142	(5.73)***
MEDIA-HEALTH	0.163	(7.95)***	0.173	(8.44)***
MEDIA	0.075	(3.5)***	0.092	(4.29)***
Number of children	0.018	(1.56)	0.010	(0.85)
Number of adult males	-0.064	(-8.64)***	-0.074	(-10.01)***
Number of adult females	-0.090	(-11.34)***	-0.090	(-11.35)***

Note1: * Significant at 10%; ** significant at 5%; *** significant at 1%. To save space only the results for CD are reported and coefficient estimates for the socio-economic variables and state dummies are omitted.

Table 5. Estimation result for CD

CD	dy/dx	(Z-value)	dy/dx	(Z-value)
FA	-0.033	(-0.14)	-0.045	(-0.24)
Individual characteristics				
Wife's age	0.041	(9.67)***	0.041	(11.9)***
Husband's age	-0.001	(-0.87)	-0.002	(-1.14)
Wife's schooling years	-0.018	(-2)**	-0.018	(-2.04)**
Husband's schooling years	-0.016	(-8.5)***	-0.016	(-7.53)***
Wife's age at first marriage	-0.059	(-21.28)***	-0.059	(-20.55)***
Occupation dummies (reference = not working)				
Wife-Professional	0.038	(0.24)		
Wife-Clerical	0.343	(1.61)		
Wife-Sales	0.041	(0.3)		
Wife-Cultivator	0.080	(3.05)***		
Wife-Agricultural laborer	0.055	(1)		
Wife-House keeper	-0.028	(-0.17)		
Wife-Service	-0.037	(-0.19)		
Wife-Skilled laborer	0.053	(0.81)		
Wife-Unskilled laborer	0.058	(0.99)		
Husband-Professional	0.142	(2.97)***		
Husband-Clerical	0.079	(1.42)		
Husband-Sales	0.096	(1.98)**		
Husband-Cultivator	0.105	(1.46)		
Husband-Agricultural laborer	0.082	(1.08)		
Husband-House keeper	0.218	(1.49)		
Husband-Service	0.094	(1.34)		
Husband-Skilled laborer	0.120	(2.99)***		
Husband-Unskilled laborer	0.119	(2.5)**		
Religion and caste (reference = other Hindu)				
Muslim	0.036	(0.64)	0.029	(0.67)
Christian	0.013	(0.23)	0.019	(0.37)
SC/ST	0.079	(4.41)***	0.087	(4.29)***
OBC	0.038	(2.17)**	0.043	(2.45)**
Other household characteristics				
ASSETS	-0.008	(-3.92)***	-0.008	(-5.11)***
HF worker	0.044	(1.15)	0.046	(1.4)
MEDIA-HEALTH	-0.038	(-0.78)	-0.039	(-0.89)
Number of children	-0.004	(-0.35)	-0.006	(-0.57)
Number of adult males	-0.033	(-2.08)**	-0.035	(-2.37)**
Number of adult females	-0.021	(-0.96)	-0.022	(-1.25)
NOB		51,023		
Log-likelihood		-126308.000		-126572.470

Note : * Significant at 10%; ** significant at 5%; *** significant at 1%. Coefficient estimates for the socio-economic variables and the state dummies are not reported to save space.

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Table 6. Estimation result for CC

CC	dy/dx	(Z-value)	dy/dx	(Z-value)
FA	0.386	(2.61)***	0.362	(2.78)***
Individual characteristics				
Wife's age	-0.016	(-7.82)***	-0.016	(-7.38)***
Husband's age	-0.004	(-2.81)***	-0.005	(-2.82)***
Wife's schooling years	-0.008	(-1)	-0.010	(-1.25)
Husband's schooling years	-0.001	(-0.57)	-0.002	(-1.22)
Wife's age at first marriage	0.007	(2.02)**	0.007	(2.09)**
Occupation dummies (reference = not working)				
Wife-Professional	-0.278	(-2.81)***		
Wife-Clerical	0.029	(0.14)		
Wife-Sales	-0.154	(-1.26)		
Wife-Cultivator	0.077	(2.24)**		
Wife-Agricultural laborer	-0.027	(-0.64)		
Wife-House keeper	-0.045	(-0.24)		
Wife-Service	-0.343	(-1.43)		
Wife-Skilled laborer	-0.047	(-0.95)		
Wife-Unskilled laborer	-0.072	(-1.45)		
Husband-Professional	0.030	(0.5)		
Husband-Clerical	0.037	(0.52)		
Husband-Sales	0.054	(0.98)		
Husband-Cultivator	0.049	(1.03)		
Husband-Agricultural laborer	0.131	(2.73)***		
Husband-House keeper	0.274	(1.59)		
Husband-Service	-0.027	(-0.34)		
Husband-Skilled laborer	0.033	(0.57)		
Husband-Unskilled laborer	0.072	(1.36)		
Religion and caste (reference = other Hindu)				
Muslim	0.097	(2.39)**	0.087	(2.55)**
Christian	-0.003	(-0.06)	0.007	(0.13)
SC/ST	-0.009	(-0.45)	-0.012	(-0.59)
OBC	0.006	(0.31)	0.005	(0.25)
Other household characteristics				
ASSETS	0.001	(0.37)	0.001	(0.51)
HF worker	-0.008	(-0.17)	-0.002	(-0.04)
MEDIA-HEALTH	0.004	(0.07)	0.008	(0.15)
Number of children	0.122	(3.09)***	0.128	(4.08)***
Number of adult males	0.004	(0.23)	0.003	(0.18)
Number of adult females	0.000	(0.01)	-0.003	(-0.15)
NOB		31,866		
Log-likelihood		-80447.580		-80593.974

Note : * Significant at 10%; ** significant at 5%; *** significant at 1%. Coefficient estimates for the socio-economic variables and the state dummies are not reported to save space.