



WIDER Working Paper 2017/195

## **Family structure, education and women's employment in rural India**

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November 2017

**Abstract:** This paper investigates if residing in a joint family affects non-farm employment for married women in rural India. Our estimates based on a longitudinal survey of over 27000 women conducted in 2005 and 2012, and using the conditional logistic regression and instrumental variable approach suggest that living in a joint family lowers married women's non-farm employment by more than 10 percentage points. The adverse impact is higher for younger women, for women from families with higher social status, and for those residing in Northern India. We present evidence to suggest that women with higher education levels are not constrained from cultural and traditional norms that lower women's decision-making power and mobility in a joint family. An increased education level is likely to raise women's earning capacity as well as the quality of jobs which may help in lowering family pressure against work. The results suggest that public policies that encourage higher education, improving job accessibility along with affordable childcare, especially for women with less education will raise non-farm employment for women living in a joint family.

**Keywords:** non-farm employment, family structure, female autonomy, rural areas

**JEL classification:** J21, J22, J12

**Acknowledgements:** This study was completed when Sowmya Dhanaraj was a Visiting scholar at UNU-WIDER which offered excellent facilities for research. The paper was presented in the UNU-WIDER seminar series, IEA-IGIDR international conference on social sector development in India, and Great Lakes Institute of Management's seminar series and the comments received from the participants helped improve the paper. Special thanks to Saurabh Singhal, Miguel Niño-Zarazúa, Tridip Ray, Tushar Nandi, Renuka Sane, D Sriram and P Srikanth. We thank Isha Gupta for her initial work with the dataset. However, all errors and omissions are solely ours.

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This study has been prepared within the UNU-WIDER Visiting Scholar programme.

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Information and requests: [publications@wider.unu.edu](mailto:publications@wider.unu.edu)

ISSN 1798-7237 ISBN 978-92-9256-421-6 <https://doi.org/10.35188/UNU-WIDER/2017/421-6>

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The Institute is funded through income from an endowment fund with additional contributions to its work programme from Denmark, Finland, Sweden, and the United Kingdom.

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The views expressed in this paper are those of the author(s), and do not necessarily reflect the views of the Institute or the United Nations University, nor the programme/project donors.

## 1 Introduction

In rural India female labour force participation (LFPR) fell from 33 per cent in 1993-94 to 25 per cent in 2011-12 (NSSO, 2014), led by a decline in agriculture-related work. The fact that despite India's high economic growth since 1990s, the increase in rural non-farm employment was not sufficient to compensate for the decline in farm work is a concern for policymakers. In this study, we focus on one of the factors that affect women's non-farm employment in rural India, namely the role of family structure on the ability of women to enter non-farm work.

Studies have posited various reasons for the decline in rural female LFPR in India. Rising higher secondary and tertiary education enrolment rates in the last two decades imply less women are available for work in younger age groups (Bhalla and Kaur, 2011; Kannan and Raveendran, 2012). Some studies find evidence that rising income of men have lowered women's participation in the labour market, especially in rural areas where culturally women are not encouraged to work if husband's income is considered sufficient (Rangarajan et al., 2011; Neff et al., 2012; Afridi et al., 2016; Mehrotra and Parida, 2017). On the contrary, studies like Chand et al. (2014), Neetha (2014), Paul and Raju (2014), Chatterjee et al. (2015) contend that the collapse in the number of farming jobs in rural areas without a parallel emergence of other job opportunities has adversely affected female participation in the labour market. Further, India's economic growth has not been conducive for women employment with slower growth in key sectors where women are traditionally employed (Lahoti and Swaminathan, 2016) and the lack of supportive infrastructure like banking services, roads etc. has further adversely influenced female LFPR (Sorsa et al., 2015; Lei et al., 2017). Few studies have critiqued the data limitations in using National Sample Survey Organization (NSSO) surveys for capturing women's work- especially productive activities performed within the boundary of households (Hirway, 2012; Siddiqui et al., 2017).

The existing literature acknowledges that an important determinant of women's participation in work is societal and cultural influence (through family, caste, religion and region) that mediates or restricts women's behaviour inside and outside home; but this has received scant attention in the empirical literature largely due to the difficulty associated with quantifying them. However, studies like Das and Desai (2003) and Neff et al., (2012) do not find evidence that cultural factors led to the recent decline in women's employment in India. While some other studies allude to low participation of Muslim women in labour force as examples of cultural sanctions restricting women's work outside home. Given the nature of non-farm work, cultural and traditional norms may exacerbate the influence of factors such as income growth and non-availability of suitable jobs on the labour market participation decisions of women. In this study, we focus on one of the cultural factors common to India, i.e., joint family set-up which involves multi-generational co-residence typically with women's parents-in-law. In such a set-up the decision-making authority tends to lay with the older generation and more weight is allotted to family income than individual income. In such a situation, younger women could meet with family resistance for working outside home, if incomes of other household members increase. In addition, elderly care and/or increased household work may discourage the entry into non-farm employment which tends to have long and inflexible working hours. In this context, education may play a crucial role in improving the intra-household bargaining power of women by raising their earning capacity and potentially reducing the wage gap compared to the other working members of households. As a result, the decision-making outcomes in the joint family may favour women with high education entering non-farm work, with the older generation in the joint family providing childcare support and sharing household work.

Even among the studies that evaluate the effect of cultural factors on women's work in the Indian context, the problem of endogeneity is not adequately addressed in all the studies and hence they

tend to over- or under-estimate the impact of gender norms (exceptions include studies like Debnath, 2015). Since decisions regarding family structure and work participation can be taken simultaneously, there arises the problem of endogeneity. These include cases such as women who are more inclined to work and be independent: they may prefer not to marry into a joint family, if a joint-family system is expected to restrict woman's mobility out of home. Alternatively, if a joint family system is likely to provide support in terms of domestic responsibilities and childcare, women who are inclined to work may move into a joint family. Additionally, there can be other factors that influence decisions to both work and live in a joint family. Examples include a prolonged or serious illness that can lead to both withdrawing from market work and moving into a joint family set-up to reduce the burden of domestic work. Further, studies that track same women over time and map changes in their employment behavior with changes in individual and household characteristics, are not available for India. Such an investigation will help to better understand the underlying mechanisms that affect women's movements in and out of employment.

Using the longitudinal data of India Human Development Survey (IHDS) conducted in 2004-05 and 2011-12, we test the hypothesis if residing in a 'joint' family affects non-farm employment among rural married women in India. Non-farm employment includes time spent in non-farm business as well as non-farm wage work. We use conditional logistic regression analysis to study the effect of changes in family structure and other individual, household and village characteristics on movements of women in and out of non-farm employment which is further verified via a fixed-effects model. We address the problems of endogeneity that arise in such an empirical analysis using Instrumental variable (IV) regression and investigate the channels through which family structure influences married women's non-farm work participation.

We find that residing in a joint family reduces women's participation in non-farm employment by more than 10 percentage points and this is mainly through restricting women's decision-making authority and mobility within and outside the household. The results are in contrast with evidence from countries such as China and Japan where a joint family acts as a support system for childcare and for sharing of household work, thereby allowing younger women to move into formal employment. Though we do not know if the joint-family set-up in India leads to increase or decrease in time spent in household production activities due to non-availability of data, there is suggestive evidence that gender norms are stricter for younger women in joint-family set-up than in the case of nuclear families. Thus, we posit that in the situation of increasing men's incomes and limited job opportunities in rural areas, cultural factors may further restrict women's market activities while status production activities gain more importance. There is evidence that government interventions through Integrated Child Development Scheme (ICDS) and National Rural Employment Guarantee Act (NREGA) enables women with less education to enter non-farm work. Improving policies that encourage women's education and creating network a of affordable and reliable childcare would not only raise women's empowerment, but also help realize the demographic advantage that India currently holds.

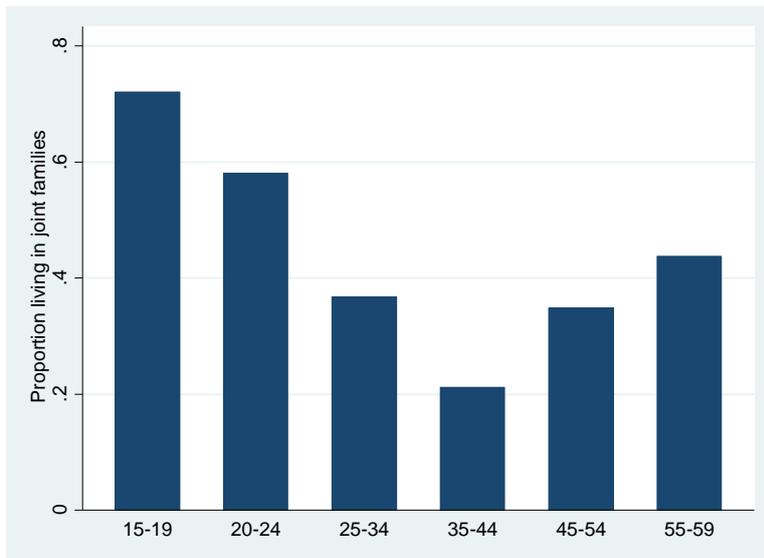
The study is organized as follows: the following section discusses briefly the mechanisms through which family structure might affect women's employment in non-farm activities. Section 3 discusses briefly the data and methodology used in the study. This is followed by sections on results, discussion and conclusions.

## **2 Theory: family structure and women's work**

'For generations, the most common family type has been a 'joint' family where men reside with their parents and extended family in the same household, and women move into their husband's

home post-marriage’ (Mookerjee, 2017). Thus, married life for most of the rural Indian women begins as a daughter-in-law in a joint-family where she resides with her husband and his parents and siblings. For instance, in the IHDS survey for women aged between 15-59 conducted in 2012, more than 97 per cent of rural women reported living in a joint family (with in-laws) immediately after their marriage. Also, most of them bear children in the early years of marriage. Over the years, the joint family tends to transit into a number of nuclear families due to crowding, migration to other locations for work, death of the patriarch, discord due to sharing of resources and responsibilities etc. However, as the woman becomes older, and her son(s) gets married, the woman might again reside in a joint family as the mother-in-law of the household (Allendorf, 2010). Thus, the probability that a married woman lives in a joint family first decreases with age, achieves its minimum around 30-40 years and then increases thereafter (Kishor and Gupta, 2004). We find evidence for the same from using IHDS data<sup>1</sup> (Figure 1).

Figure 1 Percentage of rural married women residing in a joint family by age-group (2012)



Source: Authors' compilation based on IHDS survey

There are different mechanisms through which family structure can affect woman’s participation in non-farm work which are illustrated below and the overall impact of these alternative mechanisms on female non-farm employment cannot be determined a priori.

## 2.1 Status and Autonomy

In the Indian context, historically, working outside the home is deemed to be low status while child-bearing, especially sons, and nurturing them, and home-making are deemed to be high-status activities for upper-caste married women (Eswaran et al., 2013). Thus, women withdrawing from the workforce has been ‘*viewed as a symbol of status and upward mobility in India*’. Rao (2014) and Carswell (2016) using case studies of women working in rural south India find that these high-status production activities are deemed to reflect household status even among women from lower caste groups as their spouses’ incomes increase and they are out of economic deprivation. This combined with residence in a joint family (where several generations co-reside) may impose more restrictions for women in terms of *movements outside home, access to resources and decision-making capacity*. It is important to note that these restrictions apply more so for the bride or the daughter-in-law of the household and they are lesser if the woman is the mother-in-law or the senior married woman,

<sup>1</sup> Joint family is defined as one which has more than one married couple.

who might hold a certain position and command in a joint household set-up (Deshmukh-Ranadive, 2005). Thus, a woman's status within her household depends not only on her husband but also on her husband's parents. For instance, studies have found that co-residence with parents-in-law can affect the woman's fertility decisions (Dyson and Moore, 1983), healthcare use for self and children (Griffiths et. al., 2002; Saikia and Singh, 2009) and autonomy and status within the household (Debnath, 2015; Subaiya and Vanneman, 2016). Few studies like Sorsa et al., (2015) find that being in a joint family (co-residing with parents-in-law) reduces the female LFPR by 7.5 per cent in the rural areas (after controlling for other factors) and they find this effect persisting across years. However, most of these studies do not adequately address the problem of endogeneity that arise in such an empirical analysis.

## **2.2 Access to pooled income**

Another strand of literature talks about the role of access to pooled income in a joint-family set-up particularly in rural areas where agrarian incomes are very volatile and have covariant risks (for instance, dependent on the amount of rainfall that year). In a seminal paper, Rosenzweig and Wolpin (1985) suggested that inter-generational co-residence led to lesser volatility in farm incomes and greater income diversification in rural India. Rosenzweig (1988) find that joint households are better able to smooth consumption by relying more on transfers and less on costly credit from informal markets. Thus, in the rural India joint families may be better-off due to their income and consumption smoothing abilities given imperfect credit and insurance markets. Studies based on other countries also find that if parents-in-law contribute to the household through labour or pension income, then the daughter-in-law is less likely to participate in the labour market (Landmann et al., 2017). Further, rising income of men in the joint family set-up will amplify the impact of the lack of autonomy and decision-making for younger women, thereby discouraging them to enter non-farm work

## **2.3 Access to pooled time**

Apart from the decreased autonomy and access to pooled income, residing in a joint family may also lead to increase in domestic labour (cooking, cleaning, collecting water and fuel etc.) as the number of household members increase. This in turn might adversely affect the woman's participation in market activities especially when non-agricultural work may be inflexible and it may take longer travel time, thus making it more burdensome for women to work (increase in reservation wage). However, it might be the case that there can be support in terms of domestic work from other female members of the households which might ease women's entry into work. For instance, studies based on Japan and China find that co-residence with parents or in-laws increases maternal labour force participation due to sharing of domestic responsibilities (Sasaki, 2002; Maurer-Fazio et al., 2011). However, in the Indian context, this may depend on life-stage of the woman in the household, i.e., whether she is the junior or the senior married woman of the joint household as the burden of work falls predominantly on the junior daughter-in-law (Deshmukh-Ranadive, 2005).

## **2.4 Elderly support**

Another strand of literature talks about the role of women as caregivers of elderly and ill and disabled members which in turn might reduce their labour supply (Lilly et al., 2007). Thus, co-residence with in-laws might increase the elderly/sick/disabled care provided by women which in turn reduces their labour supply.

## 2.5 Childcare support

Contrary to the above mechanisms which tend to adversely impact female employment outside home, a joint family set-up can help young mothers to take up formal employment by providing childcare assistance. Few studies in the western context have shown that proximity to parents or in-laws increases the labour force participation rates in US and elsewhere (Posadas and Vidal-Fernández, 2013, Arpino et al., 2014). However, such evidence is rare for the Indian context.

## 3 Data

We use the longitudinal dataset of Indian Human Development Survey (IHDS) which is a nationally representative survey of 41554 households that are spread across 33 states and union territories and 384 districts in 2004-05 (Desai et al., 2005). Around 83 per cent of these households were re-interviewed in 2011-12, thus making available a unique longitudinal dataset (the sample was augmented in 2012 to make up for the attrition in urban areas) (Desai et al., 2012). The survey collected rich information on women's economic participation compared to other national surveys like that of NSSO. The survey asks for the number of hours per day and number of days spent by a woman in the year preceding the survey in all types of economic activities (own farm work, non-farm business, regular salaried or casual wage work in farm and non-farm set-up).

The advantages are: 1) it reduces to some extent the under-reporting of female labour typically associated with censuses and employment surveys in India due to inability to estimate the total work. 2) Women are more often engaged in multiple informal tasks/jobs and the NSSO surveys only capture the main and one or two secondary activities. But '*a rural female worker may: collect water from the village or outside well; clean the animal shed, milk the animal, and feed it; and work at her own farm as a helper or go to an outside farm as a hired worker*' (ILO, 2013). Thus, she may not have a main activity but perform many small activities (Desai and Jain, 1994) which may not be captured by employment surveys but is captured in IHDS data. However, in the case of animal-rearing, the survey does not ask for the number of hours worked in the last year but only if the respondent takes care of cattle, poultry etc. occasionally or usually. Thus, we do not have full information on time spent in agriculture and allied activities. Another disadvantage is that we do not account for women who are actively seeking a job due to inconsistency in data across rounds. Given the strengths and limitations of IHDS dataset, we use two measures of women's non-agriculture employment; the first is a binary indicator that takes value 1 if a woman worked greater than 240 hours in the last year in non-agriculture work and 0 otherwise; and the second is a continuous variable which is the total number of hours worked in non-agricultural activities in the last year

We exploit the panel nature of the dataset to track changes in non-farm employment by following only those women who were married and aged between 15-55 years in the first round and were re-interviewed in 2011-12. This provides us with a sample of 27,404 women for this study. We exclude women who were above the age of 55 in 2004-05 since even if they were working during the first round of the survey, they would have crossed or been close to the retirement age by 2011-12. Table 1 below shows farm and non-farm employment for married women in our sample over the two periods. The average number of agriculture work hours has declined over the period; however, we do not know if there is a decline if (number of hours spent in) allied activity like animal rearing is accounted for. Nevertheless, there has been an increase in the non-agricultural employment rates, defined by women who work more than 240 hours<sup>2</sup> in non-farm work in a year

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<sup>2</sup> IHDS classifies persons working greater than 240 hours as employed in line with NSSO employment surveys that take into account subsidiary work status (worked greater than 30 days) to calculate employment rates.

from 9 per cent to 16 per cent during this period. It is important to note that while NSSO surveys for the same period show decline in agricultural employment rates and only a slight increase for non-farm employment rates of women, IHDS shows stagnation in agricultural employment rates and a higher increase in non-farm employment since the same women are followed over time. The sample in 2012 does not have anyone below 22 years and thus the rates are higher compared to NSSO surveys.

Table 1 Agriculture and non-agricultural employment in rural areas for married women aged 15-55 in 2005

	2005	2012
Average work hours (full sample)	607.6	647.1
Average work hours in farm work (full sample)	478.8	435.3
Average work hours in non-farm work (full sample)	128.9	211.9
Average work hours in farm (for women working > 240 hours)	938.0	782.3
Average work hours in non-farm (for women working > 240 hours)	256.0	387.8
% women who worked >240 hours in farm	42.2	41.6
% women who worked >240 hours in non-farm	8.7	15.9
Observations (full sample)	27404	27404

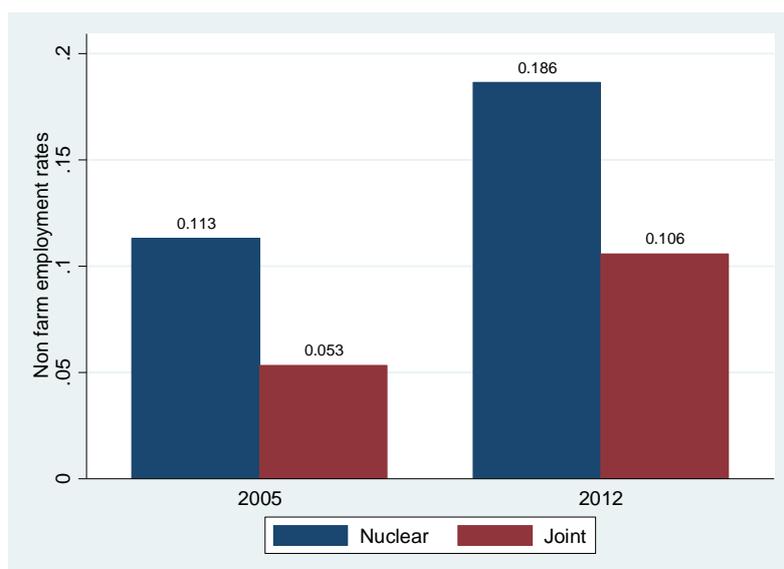
Source: Based on authors' compilation of IHDS surveys

The IHDS has rich information on health, education, marriage, household demographics, income and consumption expenditure of the household, etc. The key variable of interest is whether the woman resides in a joint-family set-up or not. We define a married woman as living in a joint family if there are two or more married women or two or more married men in the household. It is important to note that there can be different forms of joint family set-up. For instance, Debnath (2015) defines any non-nuclear family as a joint family (nuclear family consists of the woman living with her spouse and her unmarried children). However, we believe that joint family households in which married woman lives with own or husband's unmarried siblings, or those with own or husband's nephew or niece (who migrate for work or education) may not be very restrictive in terms of woman's mobility, access to resources, decision-making etc. Such a joint family set-up where parents-in-law are not a part of it, is also unlikely to be able to offer child support to a young mother. Hence, we consider those families in which there are more than two married males or females as a joint household<sup>3</sup>. The number of rural women living in joint families decreased from 43 to 34 per cent between 2005 and 2012 based on our definition using IHDS surveys. The non-farm employment rates of rural married women living in joint households increased from 5 to 10 per cent during this period whereas it increased from 11 to 18 per cent for those in nuclear households (Figure 2).

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<sup>3</sup> This is used as a proxy measure of women living with her in-laws since we do not have direct information on co-residence with in-laws for the 2005 survey.

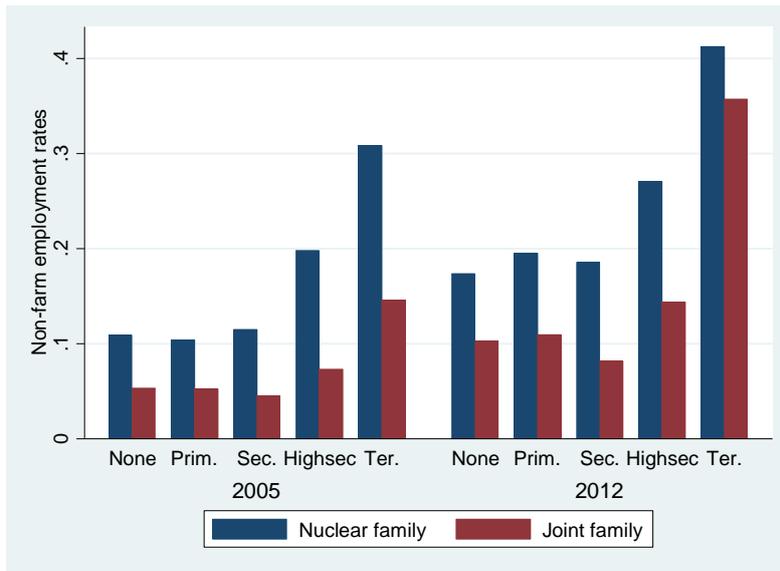
Figure 2 Non-farm employment rates of married women by family structure



Source: Based on authors' compilation of IHDS surveys

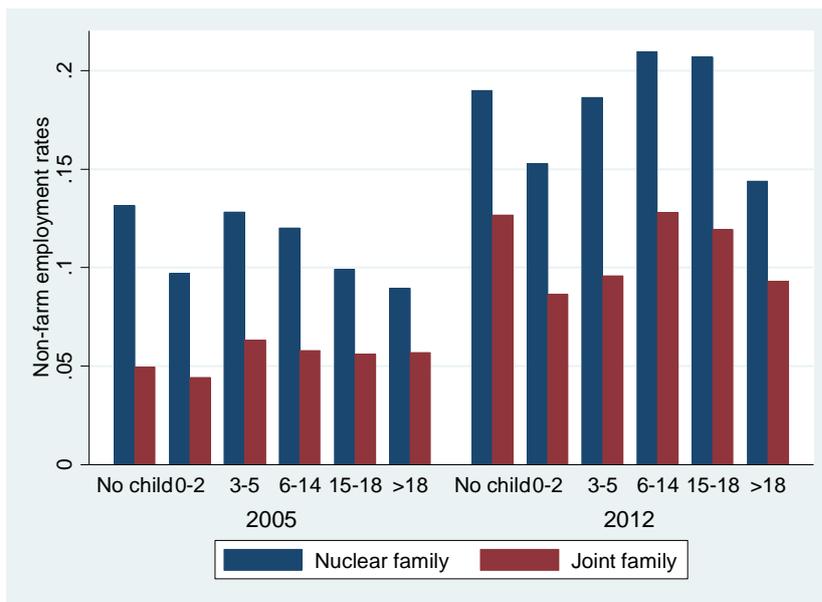
Non-farm employment rates are higher for rural married women with high education levels, i.e., higher secondary and tertiary education (Figure 3). While the employment rates are lower for women from joint families in all education categories, the gap between women from joint and nuclear families narrows for tertiary education levels in 2012. There is no prima facie evidence that women with young children receive childcare support from joint families compared with those from nuclear families (Figure 4). The difference in proportion of women working in non-farm employment between joint and nuclear families only decreases for older women when children have grown up. We also find that women from upper caste (higher social status) groups are more likely to reside in a joint family system than those from lower and/or disadvantaged groups like Other backward castes (OBC), Scheduled castes (SC) and Scheduled Tribes (ST) (Table A1 in Appendix). Also, the latter are more likely to work in non-farm employment primarily due to economic necessity. Non-farm employment rates are also not very different across consumption quintile groups; however, poorer households are slightly more likely to live in a joint family residence compared to the richer households.

Figure 3 Non-farm employment rates by education and family structure across years



Source: Based on authors' compilation of IHDS surveys

Figure 4 Non-farm employment rates by the youngest child's age and family structure



Source: Based on authors' compilation of IHDS surveys

#### 4 Panel analyses: movements in and out of non-farm employment

To study the correlates of married women's movements in and out of non-farm employment, we perform two sets of logistic regression analyses given in the following equations:

$$P[y_{ikt}] = \frac{e^\eta}{1+e^\eta} \text{ given } y_{ikt-1} = 0 \quad (1)$$

$$P[\bar{y}_{ikt}] = \frac{e^\eta}{1+e^\eta} \text{ given } y_{ikt-1} = 1 \quad (2)$$

$$\text{where, } \eta = \alpha + \beta_1 J_{ikt-1} + \beta_2 \Delta J_{ikt} + \gamma_1 X_{ikt-1} + \gamma_2 \Delta X_{ikt} + \delta_1 D_1 + \dots + \delta_K D_K + u_{ikt} \quad (3)$$

$y_{ikt}$  represents whether woman  $i$  in district  $k$  worked greater than 240 hours in non-farm employment condition for the two rounds of the survey ( $t = 1,2$ ) conducted in 2005 and 2012 while  $\bar{y}_{ikt} = 1 - y_{ikt}$  represents not working in 2012.  $J_{ikt-1}$  and  $\Delta J_{ikt}$  represent whether family structure is joint or not in 2005 and if the woman's household changed structure between 2005 and 2012.  $X_{ikt-1}$  represent characteristics like age, education, marriage status, number of days ill and disability index<sup>4</sup>, age of the youngest child, characteristics of the household like head age, gender, education, caste, religion consumption quintile group to which the household belonged to in 2005.  $\Delta X_{ikt}$  represents changes in some of these characteristics between 2005 and 2012. For instance, we account for improvement in education levels for those women enrolled in formal education in 2005. This is defined as whether they moved up the levels of education between 2005 and 2012. We also control for village level characteristics: if the NREGA is implemented well (whether sufficient work is available and payments are made on time)<sup>5</sup>, if the village has a well-functioning Anganwadi, a public childcare center under ICDS program<sup>6</sup>, if the village has access to kutchra or pucca road.  $D_i$  represents the district-fixed effects.

Table 2 shows the results of the logistic regression analysis. Women who moved from nuclear to joint family set-up between 2005 and 2012 and those who resided in joint households in both years are more likely to exit and less likely to enter non-farm employment compared to those who resided in nuclear households in both years. Those who moved from joint to nuclear families are also more likely to exit compared to those in nuclear households in both years. However, it does not affect women who enter non-farm employment. Thus, residing in a joint family is associated with low participation in non-farm employment. We also find that older women (but not very old ones) and those with higher education levels are more likely to be in non-farm employment and less-likely to exit non-farm employment. Women from poorer households and those from disadvantaged caste groups are more likely to work primarily due to economic necessity. Presence of young children also adversely affects the participation of mothers' in non-farm employment rates. In contrast, villages with access to roads, sufficient availability of jobs in NREGA scheme and relocation to urban area help women to work more in non-farm work. We also perform fixed-

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<sup>4</sup> A person's disability is measured as an ordinal variable: whether he/she can perform the following activities with ease (=0), with some difficulty (=1) or unable to do it (=2): walking 1 km, dressing, hearing, speaking, far sight, short sight, using toilet. A person is considered disabled if he/she is unable to do any of the activity.

<sup>5</sup> National Rural Employment Guarantee Act (NREGA) enacted in 2005 entitles every rural household to a minimum of 100 days of paid work every year at the statutory minimum wage with mandate that one-third of jobs be reserved for women and equal wages be paid for men and women. Studies find that NREGA had a positive impact on female LFPR, casual labour wages and empowerment of women in rural areas (Azam, 2012; Zimmermann, 2012). Thus villages with well-functioning NREGA are likely to have higher female employment rates.

<sup>6</sup> A village is said to have a well-functioning Anganwadi if it provides all the services under ICDS like health check-ups for pregnant and lactating mothers and their children, immunization, food supplement, and growth monitoring for children, pre-school education and adolescent girls program. Anganwadis provide free public pre-schooling for children under 6 years of age which in turn might improve non-farm employment of young mothers (Jain, 2016).

effects regression which controls for time-invariant factors that might influence women's employment and be correlated with family structure and verify the above results (Appendix table A2).

Table 2 Logistic regression analysis: Conditional on non-farm employment status in 2005

Variables	Out of non-farm employment in 2005		In non-farm employment in 2005	
	coefficient	Se	coefficient	se
Base: Nuclear in both rounds				
Nuclear in 2005 & joint in 2012	0.492***	0.179	-0.288***	0.078
Joint in 2005 & nuclear in 2012	0.460**	0.181	-0.087	0.067
Joint in both rounds	0.374*	0.192	-0.508***	0.071
Age in 2005: 15-19				
20-24	-0.625	0.424	0.090	0.128
25-34	-0.973**	0.424	0.241*	0.128
35-44	-0.791*	0.445	0.308**	0.136
45-54	-0.429	0.463	-0.219	0.144
Education in 2005: Illiterate				
Primary	-0.510***	0.169	0.078	0.066
Secondary	-1.055***	0.188	0.074	0.071
Higher secondary	-2.329***	0.371	0.473***	0.151
Tertiary	-2.752***	0.464	1.460***	0.188
Improvement in education levels	-0.446**	0.188	0.153**	0.074
Currently enrolled in education	2.349	1.895	2.079***	0.601
Marital status in 2005: Married				
Widowed/Divorced/Separated	-0.014	0.276	-0.000	0.109
Youngest child in 2005: 0-2 years	0.189	0.164	0.118**	0.059
Youngest child in 2005: 3-6 years	-0.008	0.140	0.091*	0.055
Youngest child in 2012: 0-2 years	0.447*	0.245	-0.227**	0.089
Youngest child in 2012: 3-6 years	-0.252	0.197	-0.026	0.070
Disability index	0.114	0.085	-0.103***	0.034
Number of days ill	0.004	0.003	-0.002*	0.001
Religion: Hindu				
Muslim	-0.487**	0.228	0.080	0.101
Christian	0.650	0.490	-0.190	0.193
Sikh	1.859**	0.756	-0.607***	0.216
Others	-0.336	0.333	0.518***	0.171
Caste group: Others				
OBC	0.243	0.186	0.332***	0.069
SC	0.192	0.198	0.631***	0.072
ST	0.421*	0.255	0.498***	0.104
Urban residence in 2012	0.039	0.426	0.353*	0.185
Anganwadi functioning	-0.224	0.170	0.005	0.067
NREGA: Payment on time	0.134	0.165	0.087	0.061
NREGA: Sufficient labour not available	0.002	0.003	-0.002*	0.001
Village has road: No				
Yes, Kutcha road	0.419	0.446	0.912***	0.269
Yes, Pucca road	0.362	0.416	0.917***	0.263
Constant	2.644*	1.396	-3.597***	0.826
Observations	2,057		22,159	

Note: Regressions include district-fixed effects and effects and other head characteristics like age, gender, education levels and consumption quintile group to which the household belongs to.

Source: Based on authors' compilation of IHDS surveys

## 5 Cross-sectional analysis: Instrumental variable regression

As discussed in Section 1, estimates from logistic regression will be biased if residence in a joint family and non-farm work are endogenous due to unobserved factors. Further, fixed-effects

method cannot account for time-varying factors that influence both family structure and employment in non-agricultural work. For instance, there are regional differences in proportion of women living in joint or nuclear families (Kishor and Gupta, 2004) and if non-farm employment opportunities or childcare programs had greatly improved in regions where joint families are less prevalent, then the coefficient of joint family set-up will be biased and significant. Hence, we use instrumental variable regression on a cross-section of ever married rural women aged above 15 years who were interviewed in 2012. The survey interviewed one or two ever-married women from each household regarding health, education, fertility, family planning, marriage, and gender relations in the household and community. From this survey, we use whether the father-in-law of the woman is alive or not as an instrument for residence in a joint family<sup>7</sup>.

This instrument is drawn based on studies like Deshmukh-Ranadive (2005) and Debnath (2015) which stress the role of the patriarch in influencing the co-residence of different generations under one roof. These studies argue that the patriarch of the household has a greater role in the Indian context because of social customs and norms that give him authority over family members and control over land and assets through patrilineal descent and patrilocal residence and gendered inheritance (Jejeebhoy & Sathar, 2001). Thus, the survival of the father-in-law is used as a plausible exogenous instrument to predict living in joint household. On similar lines, Posadas and Vidal-Fernández (2013) use the death of the grandmother as an instrument for availability of grandparental childcare to study the effect of this informal childcare support on maternal labour force participation.

Our estimating equations are given below:

$$\text{First-stage equation: } J_i = \delta + \theta S_i + \vartheta X_i + \omega_i \quad (4)$$

$$\text{Structural equation: } Y_i = \alpha + \beta J_i + \gamma X_i + \epsilon_i \quad (5)$$

Where  $Y_i$  denotes number of hours or whether woman  $i$  worked greater than 240 hours in non-farm activities in the year preceding the survey.  $J_i$  denotes whether woman  $i$  lives in the joint family,  $S_i$  denotes whether the father-in-law of woman  $i$  is alive. We also control for individual, household and village characteristics and district fixed-effects mentioned before<sup>8</sup>. The results of the first-stage regressions are shown below (Table 3). The dependent variable is whether the woman lives in a joint family set-up and the independent variable is whether the father-in-law of the woman is alive. We find that the woman is more than 14 per cent more likely to live in a joint family set-up if her father-in-law is alive. The coefficient is significant at 1 per cent level and tests of weak and under-identification are rejected. In another set of regressions (reported in the following text) we also control for characteristics that might be associated with the survival of the father-in-law (like education, land, assets, cattle ownership etc.) apart from district fixed-effects (that account for differential access to health facilities, living environment etc.) and we find the instrument remains to be a strong predictor of living in a joint family. The results of second-stage regression are shown in Table 4. We find that living in a joint-family reduces non-farm employment by around 250 hours per year on average and it reduces the rates by around 12 percentage points. The effect of other variables is similar to that of results of conditional logistic regression analysis.

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<sup>7</sup> Such a women's questionnaire was included in the first wave of the survey as well. But the question on whether the father-in-law of the woman was alive during the first wave was not asked.

<sup>8</sup> The original sample of ever married women interviewed contained around 26,007 observations but this reduced to 23,852 mainly due to missing observations on village data. Hence, we also perform an analysis without village level indicators, but the results obtained are similar.

Table 3 IV estimation: First stage regression results

First stage regressions	coefficient	se
Father-in-law alive	0.148***	0.006
Constant	-0.877***	0.060
Observations	23,853	
F( 1, 23545)	595.51	

Note: Robust standard errors in parentheses.

Source: Based on authors' compilation of IHDS surveys

Table 4 Effect of family structure on non-agriculture employment – IV estimation

Variables	Non-farm employment		Non-farm employment hours	
	coefficient	se	coefficient	se
Joint family	-0.122***	0.039	-249.570***	61.798
Number of days ill	-0.000*	0.000	-0.388***	0.118
Disability index	-0.012***	0.004	-14.521**	6.781
Age: 15-19				
20-24	0.015	0.012	6.822	17.332
25-34	0.065***	0.016	77.785***	23.999
35-44	0.094***	0.022	106.833***	34.282
45-54	0.076***	0.022	72.802**	34.490
55 and above	0.041	0.025	24.188	38.513
Education: None				
Primary	0.020***	0.007	54.102***	10.644
Secondary	0.027***	0.007	82.873***	11.299
Higher secondary	0.087***	0.013	237.453***	25.313
Tertiary	0.203***	0.019	515.291***	42.091
Currently enrolled: No				
Yes	-0.029	0.033	-159.363***	61.842
Marital status: Married				
Widowed/Divorced/Separated	0.075***	0.015	157.961***	27.404
Youngest Child age - 0 to 2 years	-0.028***	0.006	-32.288***	9.576
Youngest Child age - 3 to 5 years	-0.002	0.006	-20.492**	9.705
Children	0.003	0.002	2.543	3.495
Religion: Hindu				
Muslim	0.028***	0.010	53.597***	16.232
Christian	0.030	0.029	70.536	46.448
Sikh	-0.017	0.020	-30.971	36.673
Others	0.022	0.021	6.820	33.422
Caste group: General				
OBC	0.034***	0.006	47.244***	10.414
SC	0.068***	0.007	84.674***	12.358
ST	0.044***	0.011	82.516***	17.178
Anganwadi functioning	0.007	0.007	22.332**	10.618
NREGA: Payment on time	0.007	0.007	-4.098	10.467
NREGA: no sufficient work	-0.000	0.000	-0.167	0.156
Village has road: yes, Pucca road				
Yes, Kutcha road	-0.013	0.008	-25.209**	12.358
No road	-0.042**	0.021	-70.275**	28.174
Constant	-0.120**	0.048	-234.240***	82.774
Observations	23,853		23,853	
R-squared	0.117		0.079	

Note: Regressions include district fixed-effects and other head characteristics like age, gender and education levels and consumption quintile group to which the household belongs to. Robust standard errors are reported.

Source: Based on authors' compilation of IHDS surveys

To investigate the mechanisms through which joint family affects women's non-farm employment, we include a set of explanatory factors (apart from other controls mentioned before) in a step-wise instrumental variable regression (Table 6 and 7) that determines increased household responsibilities (presence of elderly, disabled or sick members), income effect of being in joint family (proportion of workers, pension income, land, assets, cattle, whether in-laws are literate) and woman's autonomy in the household (decision-making authority<sup>9</sup>, mobility outside home<sup>10</sup>, practice of purdah, participation in village council meetings). We do not find much change in the coefficient of joint family when factors related to domestic work and income-smoothing capacity are added (Columns 1 and 2 in Tables 6 and 7). However, we find that women in households with pension income and owning land and cattle have lower probability of working and lesser work hours in non-farm employment. Literate father-in-law also reduces the probability that woman is employed in non-farm. These factors tend to support the hypothesis that family income (and/or wealth) matters more than the individual income in a joint-family set-up. Finally, when a set of factors that predict woman's autonomy are included (Column 3 in Tables 6 and 7), we find that the coefficient on joint family becomes insignificant when non-farm employment rate is considered. In the regression with non-farm working hours, the effect of a joint family reduces but remains significant at 10 per cent level. This suggests that women in joint families are restricted in terms of decision-making, mobility, etc. which in turn affect their non-farm employment outside home. We note that around 30 per cent of observations have missing values related to variables on gender empowerment listed above and hence the lowest number of observations in Column 3 in Tables 6 and 7. We hypothesize that non-reporting would be higher among less empowered women which in turn under-estimates the effect of women's autonomy on participation in non-farm work. To check this bias, we compare the women's and households' characteristics of those who answered questions on gender relations versus those who did not, using OLS regression analysis. We find that non-reporting is higher among those who did not work, those who lived in joint family set-up, and those from richer households and upper caste women which confirms our hypothesis.

Table 3 Joint family effect on non-farm employment hours: mechanisms

Variables	(1)		(2)		(3)	
	coefficient	se	coefficient	se	coefficient	se
<b>Joint family</b>	-256.702***	64.749	-245.862***	67.445	-199.524**	96.841
<b>Elderly members</b>	20.773*	11.425	26.512**	11.173	25.272	16.040
<b>Sick care</b>	17.403	13.651	15.787	13.749	12.489	18.557
<b>Disabled care</b>	15.092	13.632	14.499	13.748	25.945	17.991
<b>Cattle</b>			-14.665***	3.274	-16.857***	4.624
<b>Land in acres</b>			-3.004***	0.796	-4.325***	1.182
<b>Mother-in-law literate</b>			-16.529	14.104	-23.542	18.542
<b>Father-in-law literate</b>			-4.679	9.529	-1.214	12.073
<b>Pension Income</b>			-40.325*	20.825	-47.805*	27.456
<b>Workers proportion</b>			15.516	26.850	5.824	35.916
<b>Decision making power</b>					8.182**	3.259
<b>Restricted mobility</b>					-10.442***	3.760
<b>Participation in village council</b>					130.617***	19.441
<b>Practise veil</b>					-26.525**	13.478

<sup>9</sup> Based on the principal component score of whether woman has a say in deciding what to cook, to purchase expensive items and land, visiting hospital when self or children are sick, children's wedding and related expenses.

<sup>10</sup> Based on principal component score whether woman needs permission to go out to visit friends, to shop, for a short-trip by bus or train etc.

<b>Constant</b>	-268.097***	90.856	-302.194***	88.650	-356.57***	102.040
<b>Observations</b>	23,853		23,728		16,262	
<b>R-squared</b>	0.078		0.081		0.100	

Notes: Regressions include other controls mentioned in text. Robust standard errors in parentheses.

Source: Based on authors' compilation of IHDS surveys

Table 4 Joint family effect on non-farm employment rates: mechanisms

<b>Variables</b>	<b>(1)</b>		<b>(2)</b>		<b>(3)</b>	
	coefficient	se	coefficient	se	coefficient	se
<b>Joint family</b>	-0.126***	0.041	-0.115***	0.043	-0.098	0.061
<b>Elderly members</b>	0.011	0.007	0.015**	0.007	0.016	0.010
<b>Sick care</b>	0.004	0.008	0.003	0.008	0.004	0.011
<b>Disabled care</b>	0.002	0.008	0.000	0.008	0.002	0.011
<b>Cattle</b>			-0.011***	0.002	-0.012***	0.003
<b>Land in acres</b>			-0.002***	0.000	-0.003***	0.001
<b>Mother-in-law literate</b>			-0.002	0.008	-0.006	0.010
<b>Father-in-law literate</b>			-0.010*	0.006	-0.009	0.007
<b>Pension Income</b>			-0.035***	0.011	-0.042***	0.014
<b>Workers proportion</b>			-0.003	0.017	-0.010	0.022
<b>Decision making power</b>					0.002	0.002
<b>Restricted mobility</b>					-0.005**	0.002
<b>Participation in village council</b>					0.082***	0.011
<b>Practise veil</b>					-0.018**	0.008
<b>Constant</b>	-0.135**	0.053	-0.158***	0.052	-0.176***	0.065
<b>Observations</b>	23,853		23,728		16,262	
<b>R-squared</b>	0.117		0.120		0.136	

Notes: Regressions include other controls mentioned in text. Robust standard errors in parentheses.

Source: Based on authors' compilation of IHDS surveys

Debnath (2015) and Subaiya and Vanneman (2016) using IHDS datasets find that women in joint households enjoy lower status and autonomy; especially the younger women. We also find similar results when we conducted IV regression analysis of the effect of joint family on women's decision-making power, mobility outside home, her participation in village council meetings etc. We find that residence in joint family is negatively associated with these factors which conforms to our results that joint-family reduces participation in non-farm work through restricted mobility, decision-making authority and access to resources (Table A2 in Appendix).

We also perform various sub-sample regressions to check the robustness of our results (Refer Table A3 in Appendix). First, we check if there is a change in the results when we change the definition of joint family system. When we define joint family as co-residence with parents-in-law, we find that coefficient on joint family remains significantly negative (co-residence with in-laws reduces non-farm employment hours by more than 320 hours and non-farm employment rates by almost 17 per cent). We also find that the higher the number of years of residence with in-laws, the lower the number of working hours and employment rates in non-farm work. In order to control for any pre-marriage characteristics of women that might have influenced work and family decisions simultaneously, we restrict the sample to those women who did not have a say in choosing whom to marry (75 per cent of the sample). IV regression analysis on this sub-sample shows that residing in joint family reduces non-farm employment rates by 15 percentage points. Thus, less empowered women are even less likely to work in a joint-family set-up.

We also perform sub-sample analysis by different age categories and find that joint family set-up has statistically significant negative effect for all age groups less than 45 years. This only disappears in the later age groups, thus showing that younger women are worse-off compared to the older women in the joint family set-up. We also find that living in joint family set-up affects non-farm employment of upper caste women (general category and OBC) more than those from lower caste groups (SC & ST). This is in line with the results of Eswaran et al. (2013) that find rural upper-caste women withdrawing from work and attending to domestic duties when the husband's income rises.

To investigate if education helps women to overcome the joint family influence in terms of participation in non-farm work, we perform sub-sample analyses by education categories. The results show that the negative effect of joint family becomes statistically insignificant for women with higher secondary or tertiary education levels. The effect is more negative for women with middle education levels (primary and secondary) than among the illiterates. This confirms the U-shaped relation of labour force participation rates with education levels of women controlling for other factors and suggests that women's intra-household bargaining power is positively influenced by the level of education, possibly because it raises their earning capacity and therefore lowers the gender income gap among the family members. This explains the fact that the greater proportion of women with secondary or tertiary education who live in a joint family set-up work in non-farm than women with low education. We also find that joint family has lesser consequences on women's employment in southern states than in northern states<sup>11</sup> which confirms to the hypothesis of Dyson and Moore (1983), that the gender norms are stricter in the northern region vis-à-vis southern region of India, and this could possibly work via lower educational levels among women in northern India.

## 6 Conclusions

In the recent debate on the low rise in non-agriculture related work among rural women in India, the influence of cultural factors on women's work is mostly ignored. This study focuses on one of the aspects of culture that is common in the Indian context, i.e. the effect of residence in a joint family on rural married woman's non-farm employment. We find that residence in a joint family set-up decreases number of working hours per year in non-farm employment by 250 hours and the rates by 12 percentage points. The adverse impact is stronger for women with low education, for higher social status and for those residing in northern India. There are alternative plausible explanations for this result. Existing evidence suggests that strong cultural and traditional norms lower women's decision-making power and mobility in a joint family. Alternatively—while elders in the joint family may not be against the idea of women working outside home per se—women might face resistance in taking up non-farm activities which are often located outside or farther from the village, due to inflexible working hours, absence of creche facilities, lack of suitable work opportunities, low wages etc. In such a case, residence in a joint family where two or more generations co-reside may inhibit women from taking up non-farm work due to stricter gender norms. Women with higher education are able to overcome family resistance to non-farm work raising their employment rates. The results suggest that government policies that improve education levels, accessibility to jobs via improvements in infrastructure like roads and childcare support etc., can increase women's work in non-farm sector greatly.

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<sup>11</sup> Northern states include Jammu & Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Haryana, Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Gujarat. Southern states include Maharashtra, Andhra Pradesh, Tamil Nadu, Kerala, Telangana and Karnataka.

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## Appendix

Table A1 Descriptive Statistics for cross section sample of ever married rural women aged 15-59 years in 2012

	Average non-agriculture working hours	Proportion working in non-agriculture employment	Proportion living in a joint family	Proportion of that category in total sample
<b>Type of family</b>				
Nuclear	245.20	18.40%		64.70%
Joint	133.69	9.80%		35.30%
<b>Age</b>				
15-19	56.90	4.70%	72.10%	2.40%
20-24	82.45	6.50%	58.10%	11.90%
25-34	196.56	14.30%	36.70%	31.50%
35-44	274.47	19.90%	21.20%	30.60%
45-54	215.38	17.10%	34.90%	19.60%
55-59	163.79	12.80%	43.70%	4.00%
<b>Education</b>				
None	187.39	16.10%	30.40%	46.40%
Primary	211.26	16.00%	30.10%	17.60%
Secondary	180.80	12.50%	40.90%	28.00%
Higher sec	287.72	15.30%	52.60%	5.00%
Tertiary	563.99	27.00%	59.50%	2.90%
<b>Marriage status</b>				
Married	190.48	14.50%	37.10%	93.70%
Widowed/separated	434.15	27.30%	8.40%	6.30%
<b>Youngest child's age:</b>				
No child	198.65	14.20%	41.20%	12.30%
0-2 years	130.17	9.80%	47.20%	19.80%
3-5 years	188.29	15.10%	34.80%	12.80%
6-14 years	261.93	18.90%	24.50%	30.90%
15-18 years	250.51	18.80%	23.90%	9.60%
Above 18 years	182.30	14.40%	44.70%	14.60%
<b>Head gender</b>				
Male	192.42	14.70%	37.80%	87.60%
Another female	189.52	12.80%	33.10%	4.70%
Self	369.04	24.30%	8.20%	7.70%
<b>Head education</b>				
None	198.63	16.00%	37.20%	37.40%
Primary	199.42	15.40%	38.50%	21.40%
Secondary	200.33	14.40%	32.00%	31.70%
Higher sec	258.19	16.10%	30.10%	5.60%
Tertiary	281.89	15.70%	33.00%	3.90%
<b>Consumption quintile</b>				
1	178.41	15.00%	38.20%	27.20%

<b>2</b>	199.19	15.30%	35.60%	23.60%
<b>3</b>	215.21	15.50%	35.40%	20.30%
<b>4</b>	226.41	15.80%	33.10%	16.20%
<b>5</b>	236.15	15.50%	31.00%	12.70%
<b>Religion</b>				
<b>Hindu</b>	202.22	15.50%	35.70%	83.80%
<b>Muslim</b>	190.12	12.70%	32.90%	9.90%
<b>Christian</b>	399.97	25.30%	25.10%	2.10%
<b>Sikh</b>	234.26	13.7	41.60%	2.80%
<b>Others</b>	191.05	16.10%	70.30%	1.30%
<b>Caste group</b>				
<b>General</b>	172.27	11.30%	39.90%	26.00%
<b>OBC</b>	197.78	15.10%	36.00%	40.40%
<b>SC</b>	245.01	19.40%	30.70%	22.80%
<b>ST</b>	233.15	17.40%	30.90%	10.90%

Source: Based on authors' compilation of IHDS surveys

Table A2 Non-agriculture employment: Balanced Panel Fixed effects regression analysis

Variables	Non-agriculture employment		Non-agriculture employment hours	
	coefficient	se	coefficient	se
Joint family	-0.016**	0.008	-18.961**	8.640
Education: None				
Primary	0.020*	0.011	30.999**	13.056
Secondary	0.024*	0.014	47.545***	17.808
Higher secondary	0.012	0.031	59.602	37.419
Tertiary	0.159***	0.056	272.154***	54.068
Currently enrolled: No				
Yes	-0.023	0.074	-151.716*	81.438
Marital status: Married				
Widowed/Divorced/Separated	0.003	0.014	-14.055	18.102
Child 1 to 2 years	-0.026***	0.009	-49.149***	9.355
Child 3 to 5 years	0.003	0.008	-26.033***	8.421
Children	0.004	0.003	8.275**	3.726
Urban residence in 2012	0.013	0.031	82.254**	33.191
Anganwadi functioning	0.017***	0.006	14.962**	7.014
NREGA: Payment on time	0.035***	0.008	33.527***	8.634
NREGA: no sufficient work	-0.000**	0.000	-0.378**	0.149
Village has road: No				
Yes, Kutcha road	0.005	0.014	8.942	16.490
Yes, Pucca road	-0.001	0.015	-2.189	17.017
2012	0.050***	0.008	67.165***	9.885
Constant	-0.039	0.050	-12.096	56.661
Observations	50,810		50,810	
R-squared	0.034		0.027	
Number of persons	27,163		27,163	

Note: Regressions include other head characteristics like age, gender and education levels and consumption quintile group to which the household belongs to.

Source: Based on authors' compilation of IHDS surveys

Table A3: Joint family effects on women's status within household: IV estimates

VARIABLES	Coefficient on joint family	se	Constant	se	Observations	R-squared
Decision-making power	-0.594***	0.182	1.316***	0.350	21,057	0.393
Restricted mobility	0.620***	0.181	-0.111	0.295	18,245	0.328
Attends village council	-0.054*	0.028	-0.099***	0.035	23,802	0.215
Practices veil	0.045	0.034	0.713***	0.060	23,837	0.578
Has bank account	-0.101*	0.058	0.103	0.093	16,121	0.214
Name on property papers	-0.099***	0.035	-0.146***	0.048	22,961	0.206

Notes: Regressions include other controls mentioned in text. Robust standard errors are reported.

p<0.01, \*\* p<0.05, \* p<0.

Source: Based on authors' compilation of IHDS surveys

Table A4: Robustness checks: IV estimates

Sub-sample	Non-farm employment hours		Worked >240 hours in non-farm employment		Observations
	coefficient	se	coefficient	se	
Women – only parents or relatives chose whom to marry	-267.847***	66.527	-0.150***	0.042	18,483
Education – Illiterate	-186.973*	97.083	-0.088	0.071	11,380
Primary or secondary	-296.105***	83.756	-0.129**	0.051	10,724
Higher secondary & above	-202.247	251.790	-0.119	0.117	1,749
Age: 15-24	-237.325*	121.287	-0.091	0.076	3,452
Age: 25-34	-282.377***	105.963	-0.144**	0.066	7,526
Age: 35-44	-289.516**	133.849	-0.112	0.084	7,273
Age: 45-59	36.471	384.966	0.066	0.261	5,602
Caste group: Others & OBC	-216.468***	72.114	-0.108**	0.044	15,734
Caste group: SC & ST	-259.577**	117.058	-0.126	0.077	8,119
Northern states	-232.503***	77.519	-0.153***	0.050	15,161
Southern states	-191.488*	114.300	-0.005	0.072	6,787
IV Tobit estimates	-724.737***	220.727			23,853
IV Probit estimates			-0.483***	0.165	23,853
Joint family is defined as residence with in-laws	-343.809***	86.599	-.168***	.054	23853

Notes: Regressions include other controls mentioned in text. Robust standard errors are reported.

Source: Based on authors' compilation of IHDS surveys