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Determinants of the Low Female Labour Force Participation in India

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ABSTRACT/RÉSUMÉ

Determinants of the Low Female Labour Force Participation in India

The low and declining female labour force participation rate in India despite strong growth over the past decade is puzzling and stands out among emerging markets. At the same time greater economic participation of women can be a source of inclusive growth, and wellbeing. Assessing determinants of the labour force participation of women in India can open important policy insights. This paper first describes key employment trends in India by gender. Then the potential determinants of female labour force participation are identified based on literature, basic statistics and econometric techniques. Given the large regional differences in India the analysis is also conducted by region and between rural and urban areas. In contrast to other BRIICs or OECD countries, education and incomes are negatively correlated with female labour for participation in India. Apart from lack of jobs, social and cultural factors keep women outside the labour force. Other determinants relate to infrastructure, access to finance, labour laws and rural employment programmes.

This Working Paper relates to the 2014 *OECD Economic Survey of India* (www.oecd.org/eco/surveys/economic-survey-india.htm).

JEL classification: J16, J18, J21, J22, J46, J71, J82, J83.

Keywords: *India, gender, female labour force participation, gender equality*

Les déterminants de l'activité économique des femmes en Inde

Le taux d'activité féminin en Inde, faible et en repli en dépit de la solide croissance des dix dernières années, laisse perplexe et fait figure d'exception parmi les économies émergentes. Parallèlement, une plus forte participation des femmes à l'économie pourrait être source de croissance inclusive et de bien-être. L'évaluation des déterminants de l'activité économique des femmes en Inde pourrait ouvrir d'importantes pistes d'analyse pour l'action publique. Le présent document décrit tout d'abord les principales tendances de l'emploi en Inde, en fonction des sexes. Puis les déterminants potentiels de l'activité féminine sont identifiés à partir d'une revue des publications, de statistiques élémentaires et de modèles économétriques. Compte tenu des grandes différences régionales en Inde l'analyse est également menée par région et entre les zones rurales et urbaines. Contrairement à d'autres pays de l'OCDE ou BRIICS, l'éducation et les revenus sont en corrélation négative avec le travail des femmes à la participation en Inde. Outre le manque d'emplois, facteurs sociaux et culturels empêchent les femmes en dehors du marché du travail. Autres facteurs déterminants ont trait à l'infrastructure, l'accès au financement, la législation du travail et des programmes d'emploi rural.

Ce Document de travail se rapporte à *l'Étude économique de l'OCDE de l'Inde, 2014* (www.oecd.org/fr/eco/etudes/etude-economique-inde.htm).

Classification JEL: J16, J18, J21, J22, J46, J71, J82, J83.

Mots clefs: *l'Inde, l'activité économique des femmes, l'égalité des sexes*

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DETERMINANTS OF THE LOW FEMALE LABOUR FORCE PARTICIPATION IN INDIA

By Piritta Sorsa, Jan Mares, Mathilde Didier, Caio Guimaraes, Marie Rabate, Gen Tang and Annamaria Tuske[1]

The low and declining female labour force participation rate in India despite strong growth over the past decade is puzzling and stands out among emerging markets. At the same time, greater labour force participation of women can be a source of inclusive growth, and wellbeing. Assessing determinants of the labour force participation of women in India can offer important policy insights for raising growth and wellbeing. The paper first describes key employment trends in India by gender. Then the potential determinants of female labour force participation are identified based on literature, basic statistics and econometric techniques.

In contrast to other BRIICs or OECD countries, education and incomes are negatively correlated with female labour for participation in India. Social and cultural factors are important in keeping women outside the labour force. Even after accounting for variables proxying for infrastructure, stage of development, and banking services, individual and household characteristics strongly influence the low female labour market participation. There are some signs that the influence of these factors is diminishing over time and with education. Lack of jobs is another important determinant of female participation, but it is harder to capture in the regressions.

Financial inclusion and financial development show positive impact on female labour force participation. Having their own bank account increases the autonomy of women within a household and thus decisions to work. Making access to finance easier may also facilitate start-ups or self-employment among women. Infrastructure is another significant positive determinant of female labour force participation, while labour market regulations tend to lower female participation. On the other hand, active labour market policies, such as the rural employment programme (NREG) help overcome the social barriers, raise female labour force participation and reduce wage gaps with men.

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1. Piritta Sorsa is head of the division responsible for the India Desk in the Economics Department of the OECD. Jan Mares worked on the India Desk as an intern. Annamaria Tuske is a statistician working on the India Desk. Mathilde Didier, Caio Guimaraes, Marie Rabate and Gen Tang are masters students at Paris ENSAE who prepared their thesis on this topic under Ms Sorsa's supervision. This working paper is based on material prepared for the 2014 OECD Economic Survey of India published in November 2014 under the authority of the Economic and Development Review Committee (EDRC). The authors would like to thank Isabelle Joumard, Robert Ford and Urban Sila and participants at an OECD seminar for valuable comments on earlier drafts. Thanks go to Hermes Morgavi for the statistical work and Anthony Bolton and Mikel Inarritu for administrative support. Special thanks to Vincent Koen and Willem Adema for their contribution at various stages.

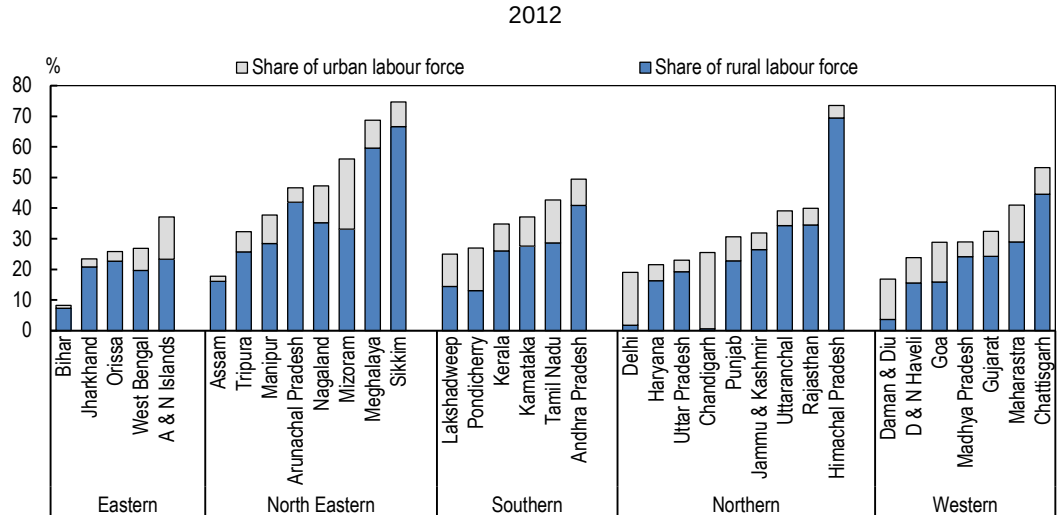
Regional differences in the determinants of female labour force participation are large. The low female participation in the North seems to reflect strong cultural and religious factors and less the socioeconomic status concerns which are stronger in the more developed and educated South and West.

Detailed labour data in India are difficult to find and thus the results should be interpreted with some caution. The main data sources are ILO (relatively aggregate data), a household survey by IHDS (latest data is 2005 with about 40 000 observations), and the NSSO household survey (every five years, latest 2012 with about 150 000 observations each year). The NSSO sample covers both informal and formal work. The formal sector (or workers with social security benefits) covers less than 10% of total employment. Despite different methodologies in collecting the data, the main trends of low and declining female labour force participation are similar in the different sources. This study uses the NSSO data as it provides the most recent information and is broadest in coverage. Given the large regional differences in India the analysis is also conducted by region and between rural and urban areas.

Who works and where?

Female labour force participation in India at about 32% of working age population in 2012 is low compared to emerging market peers. Female participation is much higher in the South and West of India than in the North (Figure 1).

Figure 1. **Regional differences in female labour force participation**[1]

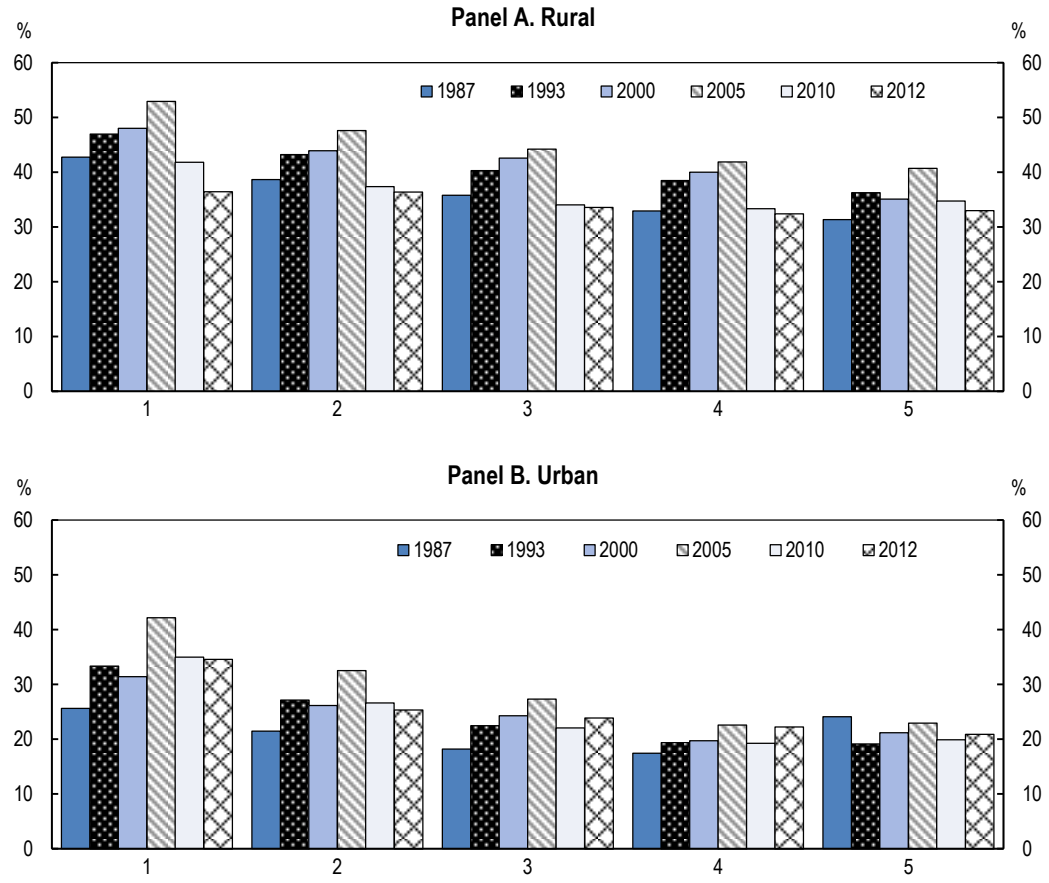


1. Data refer to working age population (15 to 64 years) and were collected between July 2011 and June 2012. *Source*: NSSO, Employment and unemployment survey, 68th round.

Participation is also higher in rural than urban areas (Figure 2). After rising slightly until 2005, female participation has declined thereafter in most income categories, but most strikingly among the lower income groups in rural areas.

Figure 2. **Female labour force participation by income quintiles[2] 1987-2012**

Working age population (15-64 years)

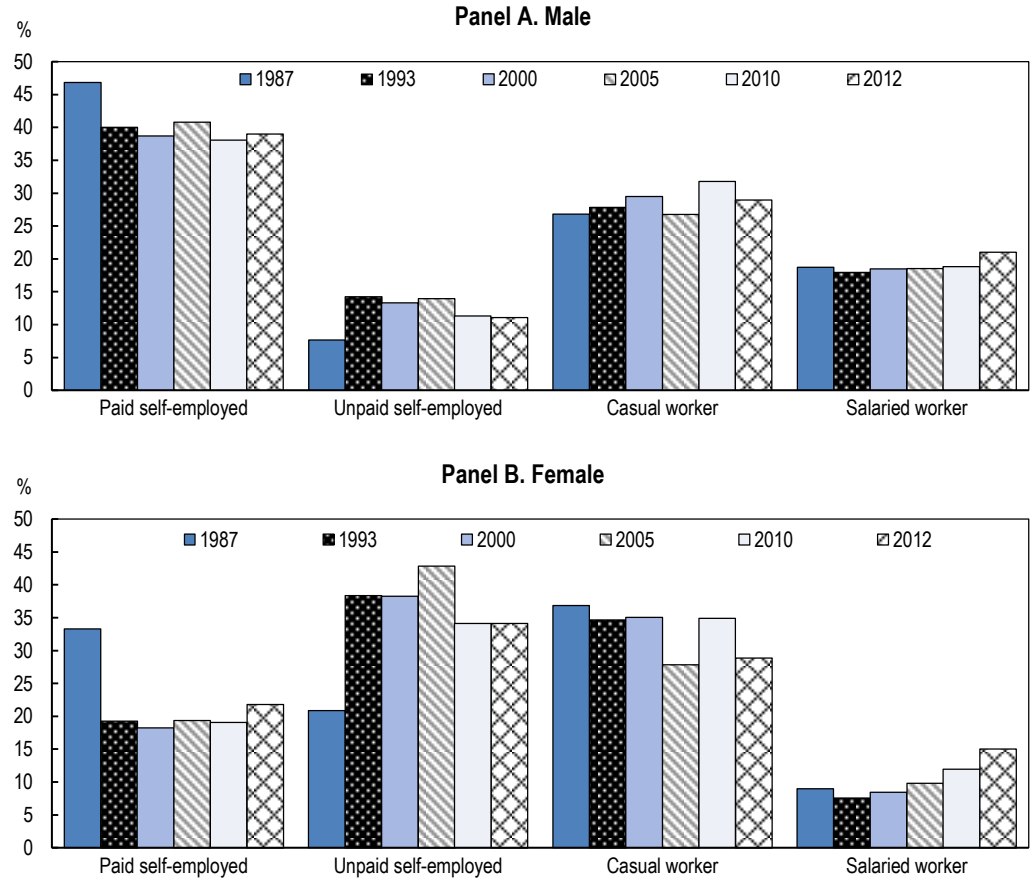


1. Income quintiles refer to the monthly per capita consumption expenditure of households.

Source: NSSO, Employment and Unemployment Survey, Rounds no. 43, 50, 55, 61, 66 and 68.

Most women continue to work in marginal jobs (Figure 3). More than half of women work as self-employed (for definitions see Annex 1), of which most are unpaid helpers. The large rise in female participation until 2005 and the drop thereafter was among the unpaid self-employed group (unpaid helpers can be agricultural workers within a family, shop assistants or street vendors) (Figure 4). As unemployment in India is small, most of those that lost their jobs dropped out of the labour force. Although this meant that female participation declined, the drop in marginal jobs (unpaid helpers) and rise in salaried employment suggest that the quality of female jobs is likely to have increased over this period. However, only about 6% of working women had any social benefits in 2012, defined as those that worked in the organised (more than 10 employees in the firm).

Figure 3. **Worker status[1] by gender**



Source: NSSO, Employment and unemployment survey, rounds no. 43, 50, 55, 61, 66 and 68.

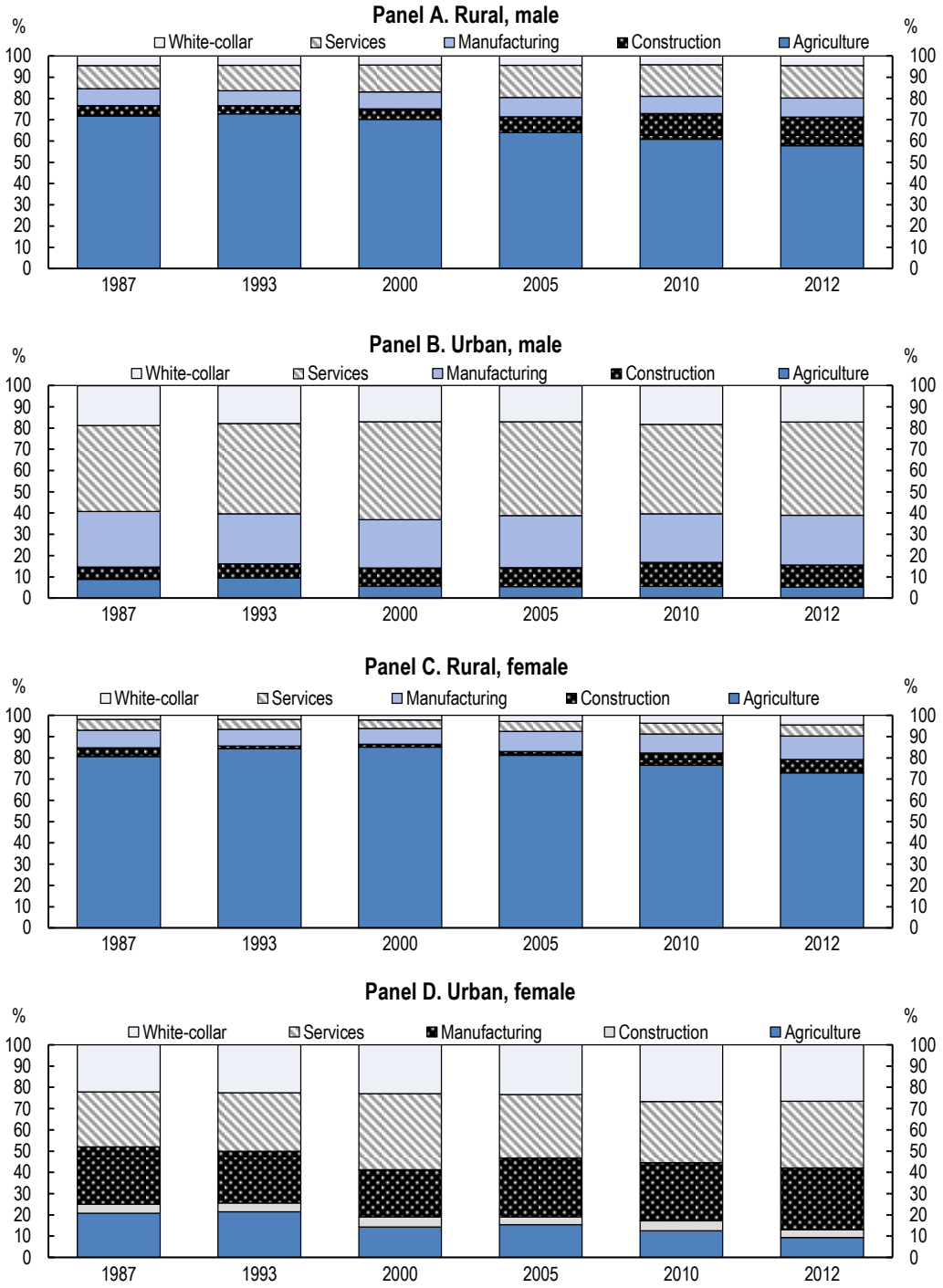
Figure 4. **Change in employment between 2005-12**



Source: NSSO, Employment and unemployment survey, rounds no. 61 and 68.

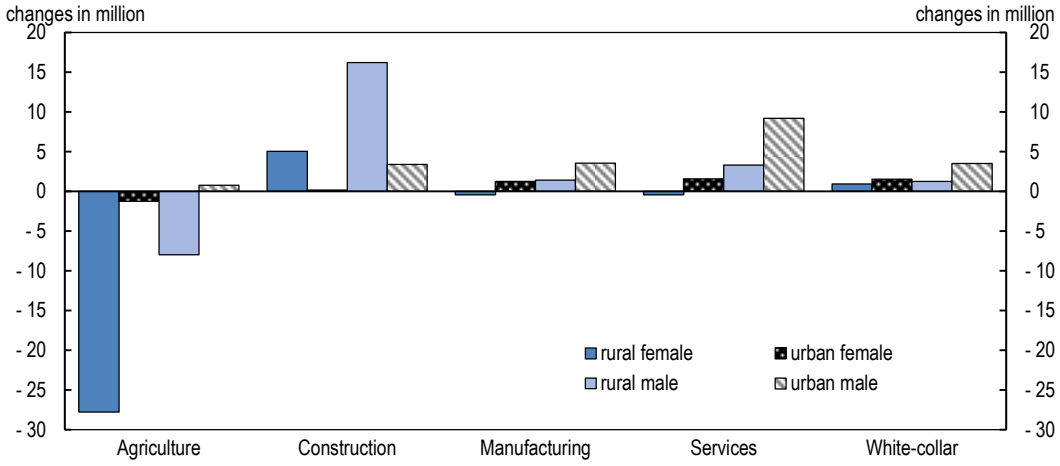
In the rural areas the dominance of agriculture as sector of employment has gradually declined, while jobs are being created in construction in both rural and urban areas (Figure 5). However, most of the job creation in construction is still benefitting men (Figure 6).

Figure 5. **Shares of total employment by gender and sector**



Source: NSSO, Employment and unemployment survey, rounds no. 43, 50, 55, 61, 66 and 68.

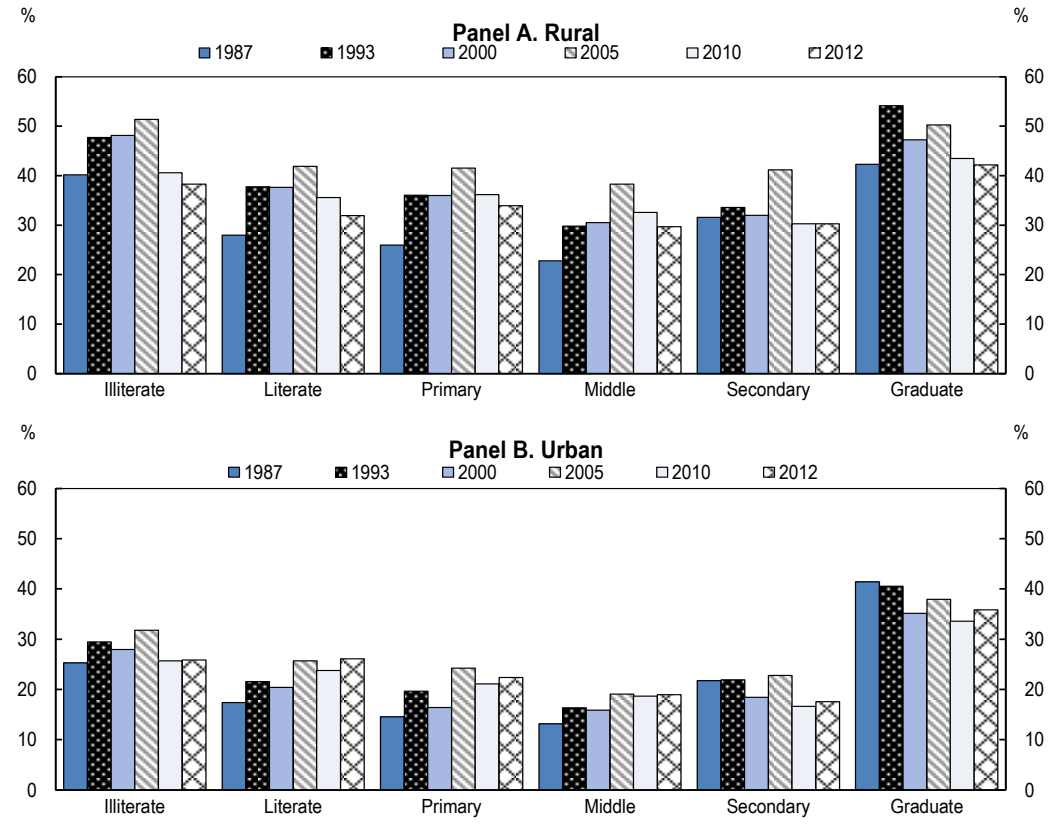
Figure 6. **Changes in employment by sector between 2005-12**



Source: NSSO, Employment and unemployment survey, rounds no. 61 and 68.

Male and especially female labour force participation declines with education levels until the graduate level in a U-shaped form (Figure 7). As education levels and income are highly correlated, a similar U-shape applies to income (see Figure 8).

Figure 7. **Female participation by education levels, 1987-2012**[1]

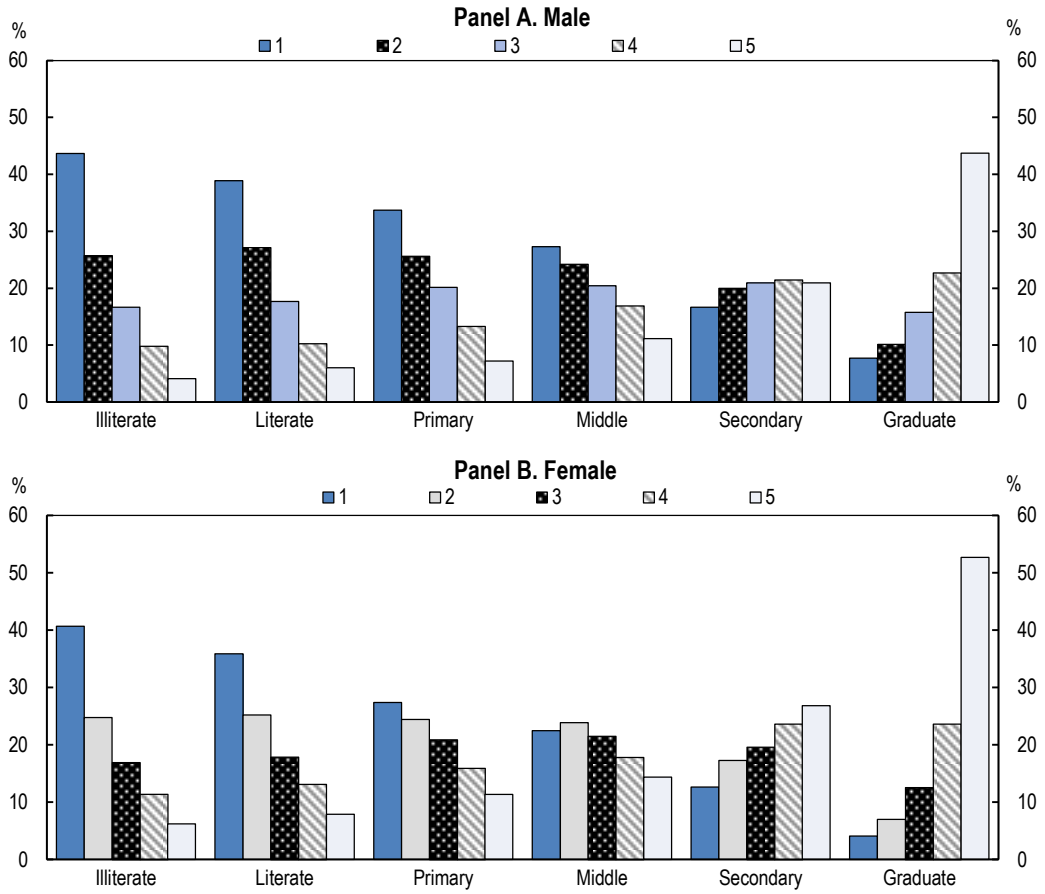


1. Education levels refer to the following grades: primary - grades 1-5, middle - grades 6-8, secondary - grades 9-10.

Source: NSSO, Employment and unemployment survey, rounds no. 43, 50, 55, 61, 66 and 68.

Figure 8. **Education levels by income quintiles in 2012[1]**

% of working age population



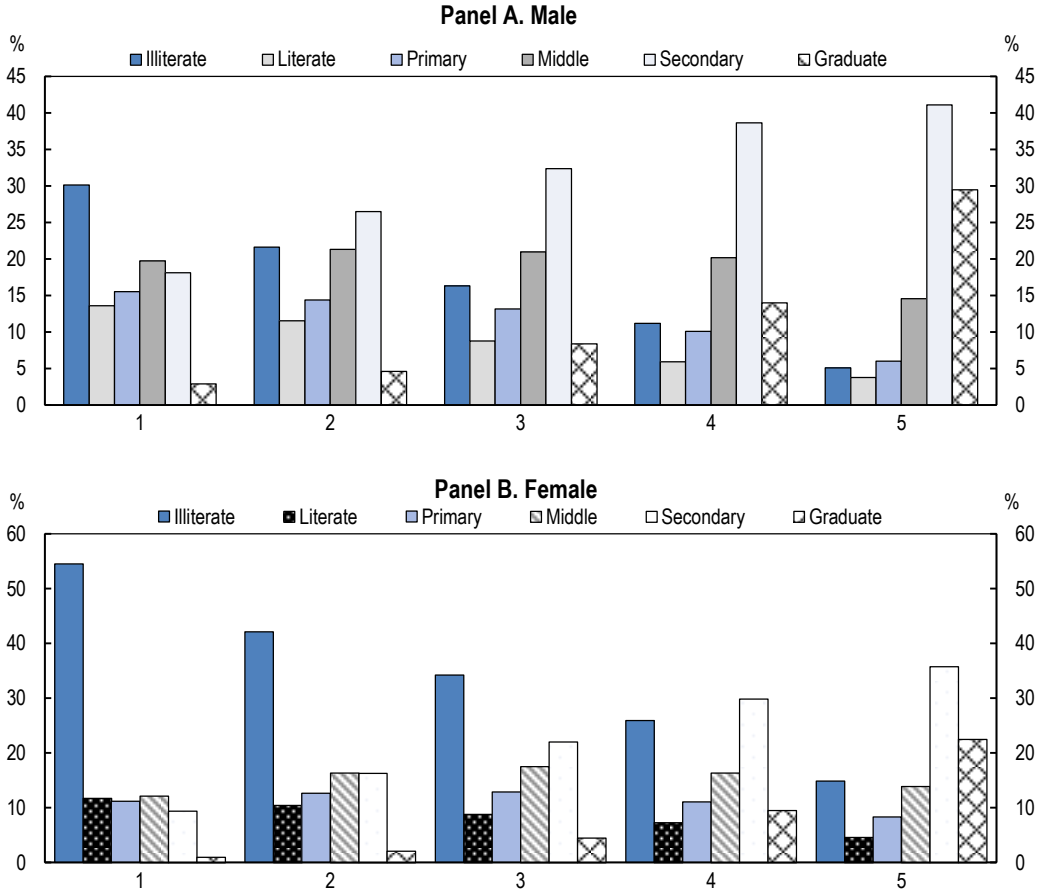
1. Education levels refer to the following grades: primary - grades 1-5, middle - grades 6-8, secondary - grades 9-10.

Source: NSSO, Employment and unemployment survey, round no. 68.

Education and consequently human capital are also important factors in terms of potential for employment and labour market participation. Despite huge progress, a large part of the population still remains illiterate; especially rural women (see Figures 9 and 10). This can explain the large share of marginal employment among rural women, which have very low skills.

Figure 9. Income quintiles by education levels in 2012[1]

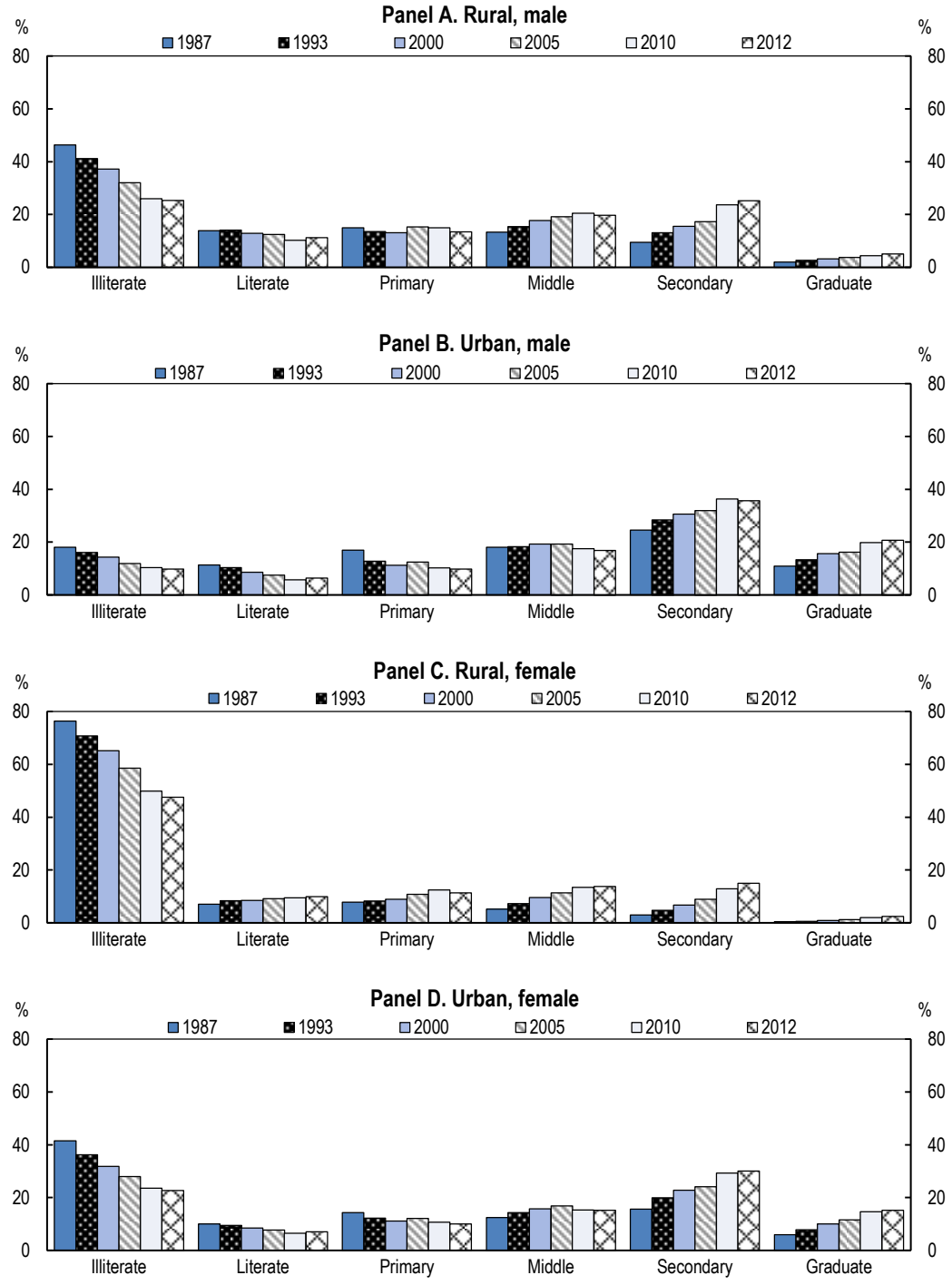
% of working age population by gender



1. Income quintiles refer to the monthly per capita consumption expenditure of households.

Source: NSSO, Employment and unemployment survey, round no. 68.

Figure 10. **Education levels by sector and gender 1987-2012**[1]



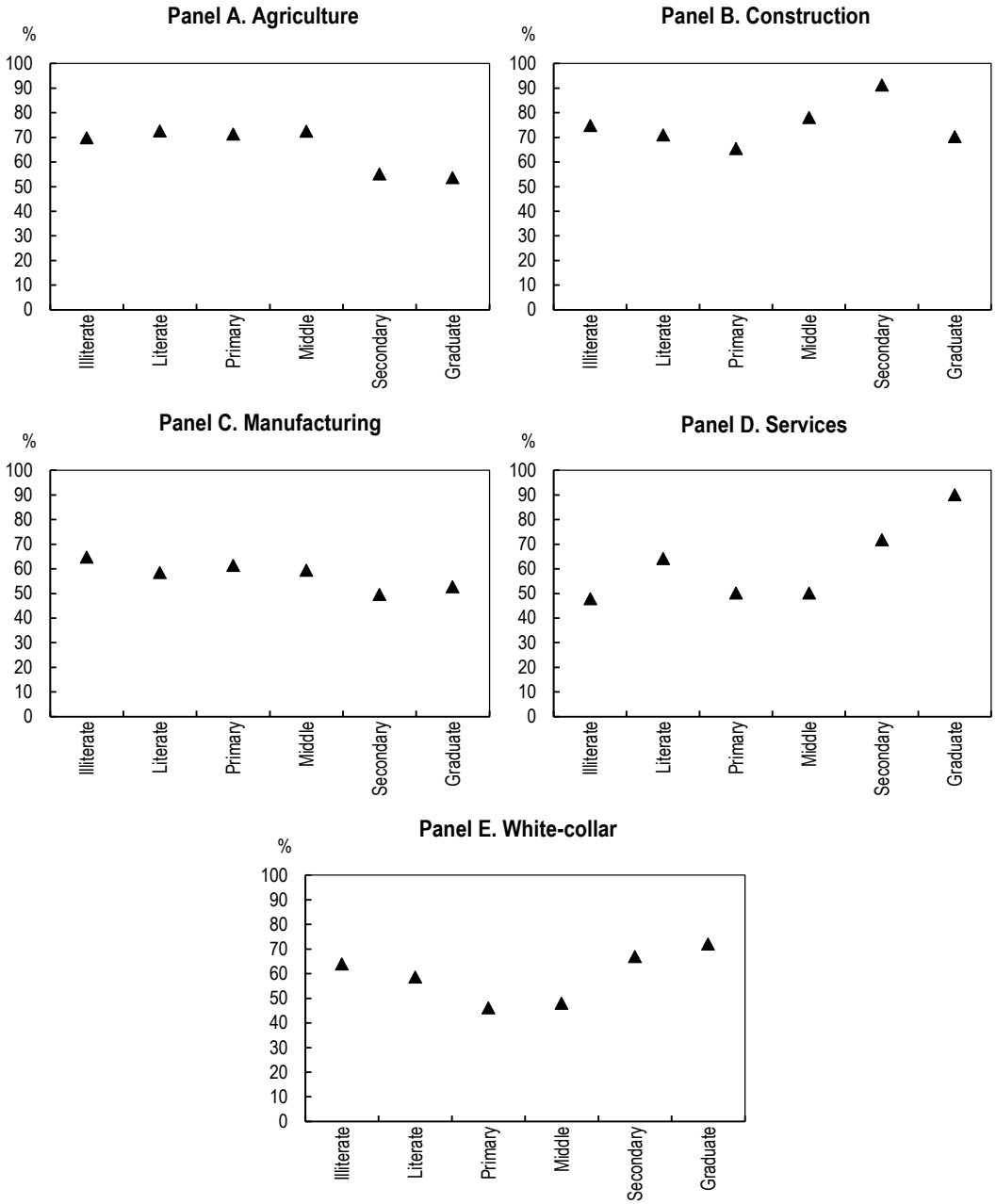
1. Education levels refer to the following grades: primary - grades 1-5, middle - grades 6-8, secondary - grades 9-10.

Source: NSSO, Employment and unemployment survey, rounds no. 43, 50, 55, 61, 66 and 68.

Available data show that wage gaps remain large between men and women (Figure 11), which may lower female participation especially at very low wage levels (reservation wage). Depending on sectors the wage gaps vary across education categories but with no clear pattern. The most striking wage differentials are within the white-collar services (financial and business services, public administration, education, health and social work). This would suggest that e.g. the public sector lags badly behind in equal pay despite the existence of equal pay laws.

Figure 11. **Daily wages by sector and education in 2012**

Female to male wage ratio, percentage



1. Education levels refer to the following grades: primary - grades 1-5, middle - grades 6-8, secondary - grades 9-10.

Source: NSSO, Employment and unemployment survey, round no. 68.

Female participation is also affected by lack of job growth over the past decade despite robust GDP growth. While male jobs grew by 25% between 2000 and 2012, female jobs barely increased (Table 1). The labour market and higher school attendance "absorbed" fully the estimated net increase in male working age population over the past decade. At the same time, about 70 million women dropped out of the labour force as available jobs were scarce (net of the rise in school attendance). Most of these were unpaid self-employed workers in agriculture (see Figures 4 and 6). As a result female labour force participation declined from 38% to 32% of female working age population over the period.

Table 1. **Changes in employment and labour force 2000-2012 (15-64 years of age)**

Millions….	2000	2005	2012	Change 2000-05	Change 2005-12
Female -Working age population	**304**	**340**	**403**	**36**	**63**
Labour force					
Employment	123	148	129	25	-19
Unemployment	2	4	3	2	-1
Remaining outside labour force					
In education	18	23	42	5	19
Not in education	161	165	229	4	-64
Male-Working age population	**326**	**365**	**427**	**39**	**62**
Labour force					
Employment	274	318	343	35	34
Unemployment	7	7	8	-	1
Remaining outside labour force					
In education	32	36	61	4	25
Not in education	13	13	15	-	2

Source: working age population 15-64 years, estimates based on NSSO rounds no. 61 and 68

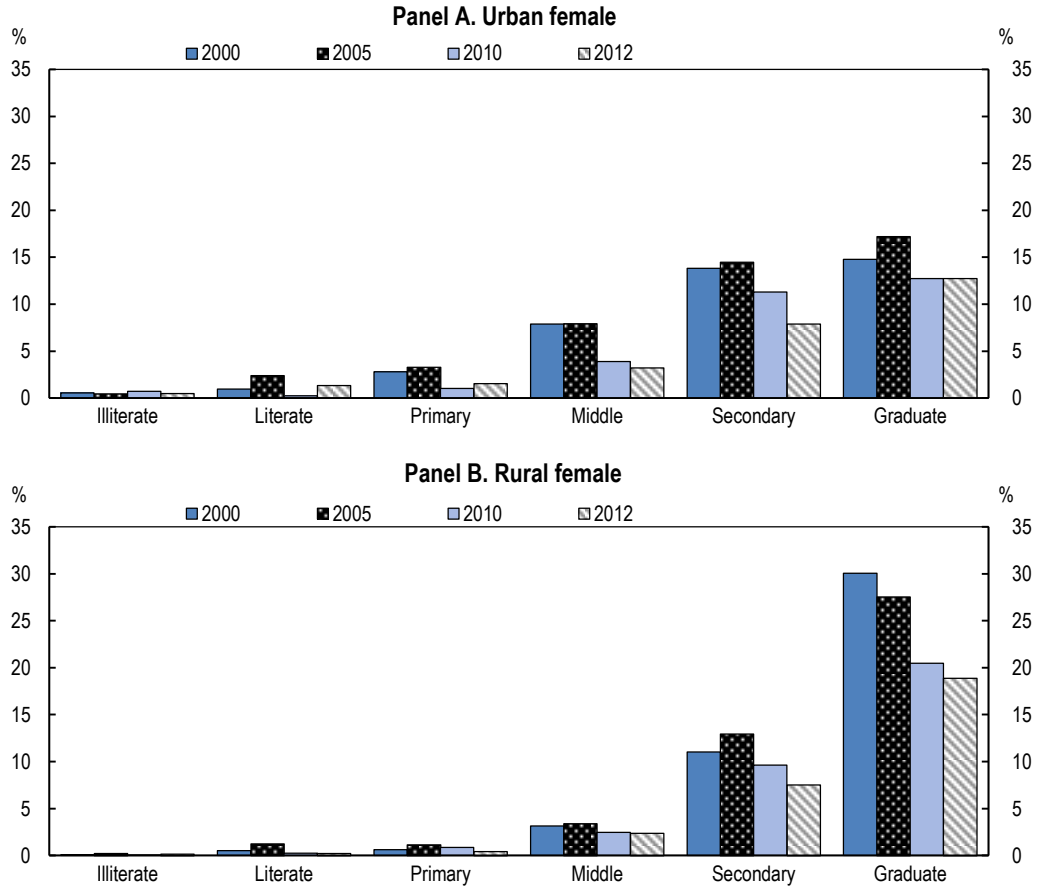
More women would like to work

The sluggish growth of jobs overall and especially for women point to demand problems explaining part of the low female labour force participation. The high unemployment rate among educated women in both urban and rural areas also suggest that many women would like to work if suitable jobs were available (Figure 12). The low growth of jobs, male or female, may reflect the impact of the stringent labour laws in promoting capital intensive activities especially in manufacturing (Gov. of India 2013, CRISIL 2014, OECD 2014). Another factor can be skill mismatches as many entrepreneurs complain that for example university graduates do not always have the required skills (CRISIL 2014).

Willingness to work is also evident from survey questions, in which many women have responded that they would like to work given the right opportunities. In 2012, almost 32% of women "performing domestic duties" (a survey definition) outside the labour force said they would be willing to work either part time (73%) or full time (22%). Many were also interested in occasional job opportunities (NSSO).

Figure 12. **Unemployment rate by education[1]**

Based on usual principal and subsidiary status



1. Data refer to working age population (15 to 64 years). Education levels refer to the following grades: primary - grades 1-5, middle - grades 6-8, secondary - grades 9-10.

Source: NSSO, Employment and unemployment survey, rounds no. 55, 61, 66 and 68.

The econometric estimates of determinants of female labour force participation

The decision to participate in the labour force is influenced by women's individual preferences and/or those of her household, family circumstances, and local job markets (especially those which are preferred by women as socially acceptable). The probability of participating in the labour force is thus modelled as a function of several explanatory variables split into four categories: individual characteristics, household characteristics, district characteristics and state characteristics (see more details on the model in Annex 2). The statistical trends discussed above and the existing literature (e.g. Klasen and Peters 2012, World Bank 2012) suggest that important determinants of participation in India can be education, family income, socio-economic and cultural factors, access to resources (skills and capital), labour market regulations, and infrastructure.

Methodology

Total sample regressions

As a first step several different regressions were run on the various years of NSSO household survey data (details on the data are in Annex 1). An extended probit model was first run on the most recent survey from 2012, which was then extended to data from other years to compare the evolution of coefficients over time. The probit model captures the average change in probability of a woman being in the labour force with a unit change in the independent variable, or dummy variables related to the nature of the individuals in the sample (married, religion etc.) Regressions measure the average (in the population considered) correlation between each explanatory variable and the outcome variable, all other explanatory variables being held constant.

A model using the 2012 survey data was also estimated by ordinary least squares (OLS) methodology (Annex 2) to test for robustness of the model and to have a complementary assessment of determinants of participation. However, it is weaker than the probit formulation as by using district level data it does not capture all the individual factors in the probit model. The model has been tested for basic OLS assumptions and accordingly adjusted for heteroskedasticity. The results are summarized in Annex 3 tables A-D.

Sub-sample regional regressions

As a second step, given the large diversity in determinants of participation by region, or rural and urban areas the regressions were run on these sub-groups. The large size of the sample of about 120 000-150 000 observations allows for testing with various sub-groups without losing degrees of freedom. The grouping of the regions into four large areas with distinct characteristics (Southern, Western and Northern and Eastern) is explained in Annex 5. The regions were further divided into sub-groups according to type of work identified in the NSSO surveys. For example, the rural sub-population was split into self-employed and non-self-employed workers, as the self-employed group seems to have substantially different determinants of participation in the regressions (see Annex 5) and in the statistical analysis (see Figure 4 above) than the other occupations. This is not done for urban households as the determinants for participation for the various types of workers (self-employed and casual and salaried workers) are more similar. A separate model was estimated for rural and urban households as some of the explanatory variables differ (for more details see Annex 2).

For each pair of two regions (among the four regions considered) (see Annex 5), the difference between the average marginal effects and its statistical significance was calculated (Annex 3 tables D-F). The differences which are both statistically significant (at the 10% level) and are greater or equal to 0.05 are highlighted with red.

Robustness and endogeneity

Endogeneity

Endogeneity can arise from measurement errors, omitted variables and simultaneity between explanatory and explained variables, which can cause correlation between the explanatory variable and the error terms. Measurement errors are assumed low with the large sample and potential omitted variables are assumed to be covered by proxies - e.g. human capital can be taken into account with educational variables. Positive (need of money) or negative (domestic tasks) family constraints are considered via household variables: income per capita, share of unemployed men, number of children of each age class. Also the study covers married women only. Socio-cultural variables are also included: caste (as defined in the NSSO survey) and religion. Finally, the numerous district level variables permit to take into account

labour demand. Some explanatory variables could present simultaneity issues. First, the type and level of education can be determined simultaneously by participation in the labour force, especially at the graduate level. However, the level of education is also a way to a "good marriage", so that the simultaneity issue with a high level of education remains limited. The number of children could also be determined simultaneously with participation in the labour force. (Didier et al 2014).

Robustness

To check for robustness linear regressions were run for both rural and urban sectors and compared with the results from the Probit models. The probability of participation of each woman using the linear model and the proportion of individuals whose probability of participation is not comprised between 0 and 1 (extreme values) were predicted. These latter individuals were removed, and the results were re-evaluated. A prediction is considered accurate if the predicted probability of participation is below 0.5 and the woman actually does not work, or the predicted probability is more than 0.5 and the woman actually works. Although the proportion of extreme values is quite high – 8% in rural areas and 10% in urban areas – they don't influence the model too much as the coefficients don't vary much and the proportion of accurate predictions remains quite the same: respectively 85% and 83% with and without extreme values in urban areas, 75% and 73% in rural areas. The predictions are also run with the Probit models. This shows 85% and 75% of accurate predictions in urban and rural areas respectively, which matches the previous results. The models give better results for urban than for rural areas. The control variables are also modified in the regressions (one regression with only individual variables, one with individual and household variables, one with all variables except state level variable), which shows that the main determinants of the FLFP remain the same.(Didier et al. 2014 Table 16 and 17 in Appendix C).

Household and individual variables

Social and cultural factors

Social institutions in India are assumed to have a strong influence on female labour force participation (World Bank 2012). Religious attitudes have been shown in a number of studies to influence women's roles in society and economic participation (Seguino 2011, Das and Desai 2003). Participation is also influenced by social class (measured in the NSSO survey by groups such as scheduled tribes etc.) (Klasen and Peters 2013). In traditional societies risks of exposure to other males outside the home often keeps women at home. Thus self-employment within the home may be a way to reduce these social risks while raising participation in the labour force.

The regression results confirm a strong influence of social and cultural factors under the extended specification probit model (Annex 3 table A2-A4). The variables are usually significant in both urban and rural areas, but their magnitudes (size of the coefficients) differ, e.g. marriage has a stronger negative impact on labour force participation of women in urban areas. Overall the impact of socio-economic and cultural factors is stronger in urban than rural areas potentially explaining some of the lower urban female participation. In regressions by religion Muslim women have constantly lower probability of taking part in the labour market. There is no clear trend observable for this variable over time, although it shows a distinct one-off decrease in the latest survey. In urban areas Christianity as a religion has a positive influence on female participation. This result is not consistent, however, throughout observed period and the reasons for religion to be influential only in urban areas are unclear.

Women from lower socio-economic groups (NSSO identifies backward classes, scheduled tribes and scheduled caste as specific socio-economic groups – see Annex 2) have a higher probability of engaging in economic activity than those from higher socio-economic groups, especially in rural areas. This can partly reflect economic imperatives of having to work to earn a living for the family among the poorest groups. Some authors mention the potential role of so-called '*saskritization*' or emulating the customs of upper castes by the lower ones. Women staying at home would thus raise the status of the family (Eswaran et al, 2013).

The regional and other sub-group regressions also confirm the strong impact of socio-economic factors. The most striking result is the difference in proxies for socio-economic status as determinants of participation between the South-West and North-East. While in the North-East women from all social groups are equally likely to participate in the labor force, there are clear and statistically significant differences in participation between social groups in the South-West. Women from the upper castes are the least likely to work, followed in order by women from other backward classes, scheduled castes, and scheduled tribes (ST). Women belonging to scheduled castes have a probability of participating in the labour market of about 16 percentage points (pp) greater than those in the upper castes. This is a bit surprising as the North-East has low overall female participation, lower incomes and education levels compared to the South-West.

However, the results support findings by other studies whereby staying home is a "status good" in India (Eswaran et al, 2013), or at least in the South-West. Since status concerns rise along the caste hierarchy, women from the higher castes are more likely to stay out of the labour market. Female participation is usually high among the ST group which may reflect necessity to work at lower incomes (Eswaran et al. 2013).

Income and household head education

The U-shaped relationship between family income and participation also points to the importance of status in determining labour force participation. The low substitution effect in terms of home goods production and market work, and a high income elasticity for "non-market goods, status or leisure" (superior goods) is attributed by some authors to the importance of status production (Eswaran et al. 2013, Klasen and Peters 2013). In lower income groups participation may be "cyclical" depending on family incomes. When family incomes rise women may stay home and vice versa. This can depend, for example, on harvest or other job opportunities for the family members.

The probit regressions point to a strong negative effect on female participation from family (husband's) income, which is confirmed by the OLS regressions. The income effect was strongest in 1987, and has decreased over time, but remains significant and negative. In the sub-group regressions significant income effect is present in both rural and urban areas. This provides further evidence for the income/status hypothesis, suggesting that higher incomes of households decrease the probability of female labour force participation. As with socio-economic factors, the income effect is strongest in the South and West parts of India. In the largely rural and Muslim East and North, other factors matter more such as cultural traditions and religion (Eswaran et al 2013). The decline in the coefficients over time, and the fact that participation again rises among the highest income groups suggests that the influence of status on labour force participation decisions is gradually declining.

To test the cyclicality of participation hypotheses, the regressions were run on the share of unearned income from regular employment and underemployment of male household members. The coefficient was strong for the underemployment variable among the non-self-employed. Thus improving overall job creation is likely to reduce marginal employment among poor women. However, the impact of underemployment among male household members is rather volatile, changing sign, significance, and

magnitude across regions and education levels. It is consistently negative across education levels in rural regions, but only begins to gain importance from primary education onwards in urban regions. However, the magnitude is higher with each additional educational level for urban regions. While in rural areas, the household head with a university degree decreases the probability of women's participation by 5pp compared to the illiterate household head, the same factor decreases the probability by almost 13pp in urban areas.

Education of the household head (proxy for wealth and status) shows the largest change of dynamics over time. The absolute values of the coefficients decrease to almost one half of their 1987 levels over the examined period. This points to a declining importance of family status and stigma attached to the women's labour force participation.

As far as only self-employed workers in rural areas are concerned, the household head education level has no effect on female participation in the four regions. This can confirm the fact that many self-employed are low-skilled and working for necessity. Excluding the self-employed from the sample gives opposite results. If higher status leads to more restrictions on women and greater wealth reduces the need for women to work, the education level of the household head should have a strong negative effect on participation, except maybe for the very top. Graduates may have a more 'modern' attitude towards women's work. This is indeed the case for the South-West. However, the household head education level has no statistically significant effect in the East-North, a result similar with incomes.

Own education

The results confirm the U-shaped relationship between education and participation depicted previously in the statistical analysis. The effect of education on participation is negative except at the graduate level, and slightly stronger on lower education levels. Having a graduate degree raises the probability of being in the labour force in urban regions. The absolute value of the effect moves around 16pp, but remains negative up to the secondary level. The probit model provides evidence about negative effects at lower education levels throughout the examined period peaking in 2005 when female participation also reached its highest levels. This suggests that it was dominantly the illiterate women who were behind the increase of labour participation in 2005 and subsequent decline.

The negative effect of education levels has decreased over time. At the same time, the positive effect of university level education is lower. This can be due to lack of job opportunities for well educated women or high marriage market returns to education documented by Klasen and Pieters (2013). A woman with completed primary education has about the same probability of participating as the illiterate one, while high-school graduates are 4pp less likely to be active on the labour market relative to the same group.

In the Southern Region a woman with secondary education is 13pp less likely to participate in the labour force than an illiterate woman. In the Western Region there is no statistically significant difference in the likelihoods. The education level is the only variable at the individual level whose effect on participation is different between regions. In the East-North, the education level seems not to have a large impact on the decision of participating in the labour market since no average marginal effect is statistically significant at the 10% level. At the same time, in the South-West, there is the classic U-shape relationship between education level and female participation: the probability of participation decreases from the illiterate up to the individuals with middle or secondary education and increases afterwards. In this region, graduates are about 13pp more likely to work than illiterates.

The rationale behind the U-shape relationship can reflect incomes and status. Among the least educated, that also tend to be poor, women are forced to work to survive and can combine farm work with domestic duties. Among the highly educated, high wages can attract women to work, and social stigmas

against female employment may be lower. Between these two groups, women may face barriers to labour force participation related to both the absence of an urgent need of female employment (the income effect), and the presence of social stigmas associated with female employment. Another factor to take into account is self-selection. Indeed, the choice of pursuing graduate studies can be linked to the willingness to work for many women.

The impact of women's education level is very different between the two groups of regions (South-West and East-North). There is also a huge gap between the East and the North regarding graduates: women with a graduate degree are 37pp more likely to work in the East than in the North.

The regressions also show a large impact of household income on participation in the lowest educated sub-group but a negligent impact in the highly educated sub-group. Thus education matters in mitigating socio economic attitudes. Also the religious influence on participation is smaller for the highly educated group (in line with the Klasen and Peters 2013 findings for urban areas). Despite a potential negative short-term impact on female participation, education will over time counter socio-economic factors working against women's ability to take advantage of economic opportunities.

Number of children and in-laws

The presence of young children in a household has a negative impact on participation. Having a child younger than 6 years old on average lowers the probability of being in the labour force by 3.8pp for urban women. Lack of child care can be a factor in urban areas. Having young children is less significant and weaker in rural areas. One of the explanations may be that again more women in rural regions have to work out of necessity. The negative influence of having young children on participation also increased over time although the effect is not robust throughout the examined period. Having young children decreases the probability consistently by more than twice as much in urban compared to the rural regions in 2000s. Notably, this effect was comparable in both regions in 1987; since then it has significantly diverged. Thus having more options for childcare could raise female participation especially in urban areas.

The presence of children between 6-14 years old is insignificant for both regions and thus the hypothesis of older children positively influencing female labour force participation cannot be confirmed. Even in rural areas, there is no evidence that older children potentially looking after their younger siblings significantly affect the participation probability.

Prevailing negative influence on participation of parents-in-law in rural regions is strong, hovering around 7.5pp on average. This is consistent with the anecdotal evidence from India, where parents or parents-in-law are known to determine women's role in the family and have important say on their economic activity. This can also mean that women stay home to take care of their older relatives. Female labour force participation could thus potentially be increased by developing various options for older care.

Marriage

In both rural and urban areas there is a robust negative impact of marriage on female labour force participation. Marriage decreases the probability of female labour force participation by 7.8% in rural areas and more than twice as much in urban areas. This should not be surprising as rural women are often employed within the household in the agricultural production process. The effect is much higher in urban areas where the share of household employment is only 14% and the share of agriculture is very low relatively to other sectors.

The importance of marital status for female labour force participation has increased over time. While back in 1987 being married had an insignificant impact on participation, in 2012 this effect was negative and close to 8pp. In urban areas this effect doubled between 1987 and 2012 and is continuously much higher relatively to rural areas.

The district characteristics appear to be of low importance.

District level employment shares can capture the suitability of different sectors to female employment (Gaddis and Pieters, 2012). To avoid endogeneity, shares are constructed based on male shares of sectoral employment. A similar procedure is adopted for the district unemployment rate. The employment shares in different sectors of the economy are insignificant with the exception of agriculture in urban areas. Keeping the shares of other sectors on district employment the same, a higher share of agriculture relative to manufacturing slightly decreases the probability of female participation. This suggests that the socio-economic factors override type of work available for participation.

The share of graduates (a proxy for supply of skilled labour) has a negative correlation with female participation with varying significance. Overall, its effect appears to be smaller and insignificant in the recent surveys, while it is statistically significant for years 1987 and 2000. Although the share of graduates in rural regions is quite low, less than 5% of economically active population, this potentially signals demand problems for high skilled labour. A large high-skilled labour force can mean higher competition for pro-women jobs in white-collar and other services. At the same time, there is well known shortage of demand for high-skilled labour in rural sector with its low share of non-agricultural employment.

The interpretation of remaining variables is not straightforward about the level of development in the district. Availability of sanitary facilities in the household and outstanding credit per capita represent proxies of the district stage of development. They allow for distinction between average income per household and the overall wealth of the district. The district level product, an equivalent to state and national level GDP would serve this purpose better, but as its availability is limited the model needs to rely the aforementioned proxies. These variables come out with significant and negative effects, consistent with the income level hypothesis. The richer and more advanced the district is, the lower is the female labour participation.

Access to financial services

Access to financial services is often mentioned as a factor promoting women's independence and ability to participate in the labour market (World Bank 2012). District credit levels and number of accounts proxy financial depth and financial breadth respectively. Both are deemed important in fostering economic development. As the availability of initial finance for projects is a frequently stated reason why women do not take part in the labour market, higher financial depth should promote participation through increased availability of credit. At the same time, having an own bank account has been shown to promote female economic independence and say within the household. Financial depth and breadth are hypothesised to positively affect the female labour force participation (World Bank 2012, OECD 2012).

In line with expectations, the availability of banking services seems to increase the probability of female labour force participation in the regressions, especially in rural areas. The probability of female participation in the labour market increases by 2pp with 10pp increase in availability of banking within the district. For urban areas, the same variable remains insignificant, but the number of accounts is important and significant. This may reflect the importance of having a bank account in boosting women's independence (World Bank 2013).

In the OLS specification the availability of banking and ability to get funding for small-scale businesses is significant. Increasing the share of households within a district with access to banking services by 1pp raises female labour force participation by 0.22pp. Banking is not only important with respect to providing financial services, but in promoting gender equality. Having a bank account independent from their spouse increases women's independent say within households as discussed above. The importance of financial services is further strengthened by the accounts per 10 inhabitants, which captures the breadth of the financial sector. In the simple OLS model, 1 additional account per 10 people increases female participation by 1.5 pp.

Infrastructure

Female time availability between home and market work can be influenced by infrastructure and technology (Klasen and Pieters 2013). Access to water or electricity in the household can impact women's time available for outside work. In recent years India has made large investments in infrastructure on roads, as indicated by the large increase in construction activity. Also electricity is now reaching more households and businesses. However, the infrastructure gap between needs and availability remains large (OECD 2014).

Infrastructure measured by the share of paved roads or access to water was significant in the regressions on female labour force participation in both urban and rural areas. This may be capturing the fact that improved access to both types of infrastructure generates time savings that may be reallocated to other productive tasks, including not only to market work but also child rearing and learning (Agenor and Canuto 2013). Safety concerns have risen for women and more safe public transport can improve opportunities to work. In India improving infrastructure has many win-win benefits not just for female labour force participation but for removing overall growth bottlenecks.

The OLS model also provides evidence on the importance for infrastructure variables for female labour force participation. Regressions were also run on availability of tap water and electricity within a district. In the OLS estimation both variables are significant and positive. The magnitude of the effect is relatively small for availability of water as the increase of 1 pp in households having access to tap water increases participation by less than 0.1 pp, while the same increase in access to electricity pushes participation up by 0.3 pp.

The average marginal effects of the infrastructure variables at the district level vary greatly between all four regions. This is also the case for rural households, for which the results are in general more difficult to understand and there are fewer similarities within each of the pairs of regions.

State level variables, labour market regulations and policies

Wage differentials

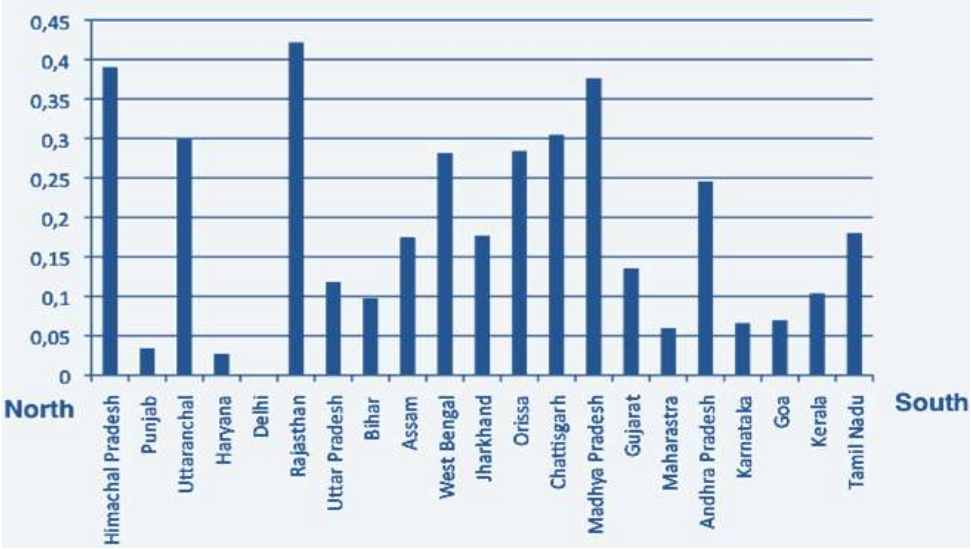
Large wage differentials with men can reduce female labour force participation by increasing the relative value of women's home good production compared to market work. The fact that female labour force participation rose substantially in the rural employment (NREGA) programme (see below), that provides equal pay with men, suggests that this can be the case. However, "own-wage" information is not available for the self-employed, which constitute about half of the female labour force, which makes testing this hypothesis more difficult.

Rural employment programme

A number of studies have emphasized the importance of the The National Rural Employment Guarantee Act (NREGA) in raising female labour force participation and wage equality. It was enacted in 2005 and guarantees 100 days of work per year, for a minimum salary fixed by the state (same for men and women), for all members of rural households willing to do unskilled manual labour with quotas for women. According to existing literature, this programme has had a significant impact on rural employment, increasing both public and private employment and casual wages (Imbert and Papp, 2013). Moreover, some studies (Khera and Nayak 2009) have shown that this programme brought significant benefits for women, including improvement of their food security and ability to avoid hazardous work.

To test the impact of the programme on female labour force participation a number of econometric techniques were used with 2009 data (see Appendix 4). The sample covers married women aged between 25 and 54 years, who live in rural areas, and whose household participated in NREGA programme. In 2009, 12 701 women of the sample live in households that participated in the programme and 56 333 did not. In 2009 the program was better established in North and Central India, where it was also initially started (Figure 13). Among the women in households that participated to NREGA program, many are Hindu, have relatively low education, or technical or vocational education, and scheduled castes and tribes are overrepresented (see Annex 4). Labour force participation is significantly higher for women whose household participates in the program (44% versus 22% for those who do not).

Figure 13. Female participation rate to the NREGA program by States



Source: NREGA website.

The probit regression (see Annex 4) shows that NREG increases the probability of female labour force participation. When a woman lives in a household that participates in the program, her probability of participation in the labour force increases on average by 0.06. This result is significant, and it is quite high compared to other factors. The marginal effect is less important than having technical or vocational education, but NREG is particularly well fitted for rural female work.

The matching method confirms the results (see Annex 4 for details). It gives a local (computed on the household who did enter the programme) evaluation of the effect, which is more accurate. The average treatment effect on the treated (part of the programme) is 0.095. That means that when a woman's household is participating in NREG she has a probability 0.095 higher to be a part of the labour force, than if she does not. This effect is also significant.

Labour market regulations

Labour regulations in India are highly restrictive. They are set at the state-level with considerable variation among states (Dougherty 2008). Various studies have found that the complex laws protecting organised (formal) sector workers (about 10% of total) leads to lower elasticity of demand for labour in manufacturing, and low productivity (Dougherty et al. 2014, Panangaria 2008). Moreover, they effect tends to be important on marginal workers and tend to exclude women from the market (Didier et al. 2014).

The rigidity of employment protection legislation is evaluated with a restrictiveness index that indicates if the state law is pro-worker and rigid or not (the numerical values run from 4 to -2). Another indicator drawn from the literature is reforms made on 8 areas of labour market regulation (IDA, Factories Act, State Shops and Commercial establishment Acts, Contract Labour Act, the role of inspectors, the maintenance of a register, the filling of returns and union representation). This index takes values between 0 and 100. For details see Annex 6.

The regressions show that past reforms of existing labour regulation are positively and significantly correlated with both men's and women's employment (respectively 0.32 and 0.08), but are stronger for men and in specific sectors (services and white collar employment respectively). Reforms are also correlated positively, and significantly with wage inequality between men and women: the ratio of what a female earns compared to men is decreasing with reforms of labour regulations (-0,21 of correlation – see Annex 6). This suggests that new job creation (potentially in the organised sector) favours men's employment more.

Probit models were run to test the influence of the different indexes on probability of female labour force participation. Although rigidity of labour regulation is expected to deter female labour force participation, in the probit regressions a reform of the system does not appear to be a positive and significant determinant of female labour force participation. According to Montag (2013) labour regulation and stringency of "pro-worker" laws are a burden for female employment by cutting low wage workers off the labour market. Recent reforms of the regulations seem to have done do little to raise female participation.

One explanation is obtained by a decomposition analysis, which compares the effect of reforms on participation for men and women (Annex 6). The reference group is the men's group. This method shows that reforms of labour regulations do have a different impact on labour force participation of men and women. Although reforms do not seem to help women's employment, men benefit more ("return") from reformed regulations for employment. It can be that the reforms would have to be much more substantial to benefit also female employment.

Conclusions

In contrast to other BRIICs or many OECD countries, education and incomes are negatively correlated with female labour for participation in India. Social and cultural factors remain the principal driving factors of keeping women outside the labour force. Even after accounting for variables proxying for infrastructure, stage of development, and banking services, individual and household characteristics strongly influence the low female labour market participation. There are some signs that the influence of these factors is diminishing over time and with education.

Financial inclusion and financial development show positive impact on female labour force participation. Having their own bank account increases the autonomy of women within a household. Making access to finance easier may also facilitate start-ups or self-employment among women. Infrastructure is another significant positive determinant of female labour force participation, while labour market regulations lower female participation. On the other hand, active labour market policies, such as the rural employment programme (NREG) help overcome the social barriers, raise female labour force participation and reduce wage gaps with men.

Regional differences in the determinants of female labour force participation are large. The low female participation in the North seems to reflect strong cultural and religious factors and less the socioeconomic status concerns which are stronger in the more developed and educated South and West.

ANNEXES

Annex 1: Data and variables

The sample

Labour force participation in India is explored at the individual level utilizing data from five-yearly household surveys of the National Sample Survey Office (NSSO) available since 1987 up to 2012. The NSSO Employment and Unemployment survey provides data on households and individuals regarding their demographic characteristics, economic activity, and consumption. The survey utilises two-stage sampling design. First, primary sampling units (villages in rural areas and blocks in the urban areas) are randomly chosen based on information from then most recent Census of India (COI). Second, the households are randomly selected within these primary units. The households are then assigned weights to be representative of the whole population. The surveys are not a continuous panel preventing cross section panel estimation.

In all the specifications the sample comprises only women aged 15-64 and excludes the ones currently attending an educational institution. Women claiming to be heads of households are further excluded, as the education of household head is used as a proxy to social status and non-wage income; keeping them in the sample would result in endogeneity.

NSSO contains information on three different activity statuses. Daily status defined on the basis of day of the survey, current weekly status (CWS) determined by the prevalent activity during the week preceding the survey, and principal status (PS) based on the prevalent activity in one year preceding the survey. Principal status is used as the most representative of stable employment and thus used to determining the economic status of women for econometric models. Subsidiary status (SS) measures secondary work undertaken over the year.

The main employment categories in the survey are salaried (with regular wages and contracts) and casual (workers with temporary or short term contracts) workers in enterprises (formal or informal), self-employed, which can be paid or unpaid.

Only 20 largest Indian states by population[2] are considered in the models as some of the other states are cities or small enclaves with specific characteristics. Together they represent more than 95% of population. The 50th NSSO round from 1993 used in statistical display is not included in the econometric analysis as it is missing crucial district identifiers. The annual samples are about 120 000 people.

Choice of regions

There is no official division of India in regions, but a useful classification is found in the "Report on the Working of the Minimum Wages Act, 1948 for the Year 2011" of the government of India. It defines five regions: Eastern, North Eastern, Northern, Southern, and Western Region. As only one state (Assam) of the North Eastern Region is in the sample, this region is grouped together with the Eastern Region. Therefore the following regions are considered: Eastern (Assam, Bihar, West Bengal, Jharkhand, Orissa,

[2] Andhra Pradesh, Assam, Bihar, Chattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharastra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttaranchal, West Bengal.

and Chattisgarh); Southern (Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu); Northern (Himachal Pradesh, Punjab, Uttaranchal, Haryana, Delhi, Rajasthan, and Uttar Pradesh); and the Western (Madhya Pradesh, Gujarat, Maharastra, and Goa).

The descriptive statistics performed demonstrate that the Southern and the Western regions (S & W), as well as the Eastern and Northern regions (E & N), are very similar to each other in various aspects. At the same time, these two groups of regions seem to be quite different regarding several relevant factors for the research. S & W has the highest income per capita, FLFP (around 45%), education levels, and percentage of people in urban areas (around 35%). In contrast, E & N has the lowest FLFP (around 20%) and the lowest percentage of people living in urban areas (around 22%). The North and the South also differ with respect to another factor: the culture in the North is strongly patriarchal, in contrast to the South. Women in the Northern states of India have less autonomy than their counterparts in the Southern states (Eswaran et al, 2013).

Annex 2. The model of female labour force participation

The model

The probability of women i being in labour force is estimated separately for every year as:

$$\boldsymbol{P_i = F(\alpha_{st} + \beta_i X_i + \gamma_i Z_i)}$$

where F is the cumulative distribution function of standard normal distribution and α_{st} captures the state effect.

X_i is a vector of explanatory variables on *individual or household* level. The income of the household excluding the respective woman's own income is taken into account. Income has been established as important determinant for female participation and so-called income hypothesis claims that in the initial stages of development; increasing income first makes women withdraw from the labour force, and only in the later phase the participation increases again with rising importance of services and narrowing gap in education (Boserup, 1970; Mammen and Paxson, 2000).

Whether women live in the household headed by her parents-in-law, underemployment of male household members (whether a man from the household was seeking employment for longer than one month in the preceding year), number of young children up to 5 years old, number of children between 6 and 14 years old and the marital status of women are also considered. Children, especially the younger ones, are an essential driver of woman's decision whether to participate in the labour market. Providing childcare, especially for the younger kids, is crucial in promoting the female labour participation (OECD2012). The effect is assumed to be negative and diminishes as older children do not require so much attention and enrol into education system, eventually freeing women's disposable time. Moreover, older children in developing countries can sometimes take care of their younger siblings and can therefore have positive impact on labour force participation of women in the household.

Household level controls also include the religion and social group of the household, own education and the education of the household head. Education of the household head is included to capture the welfare status of the household, i.e. wealth or income additional to total wage earnings. Presuming that higher social status is associated with lower female participation on the labour market, as in Eswaran et al. (2013), the higher education level of the household head should negatively influence female participation.

Other variables having an impact on participation are the regulatory framework affecting labour or capital, access to bank accounts or credit etc.

Z_i is a vector of district level variables. It comprises of labour supply and demand factors: district unemployment rate, shares of employment in agriculture, construction, manufacturing, and services including white-collar. Also considered is the share of graduates in the district labour force as a proxy for the high-skilled labour supply.

For the extended model on 2012 data, this vector also encompasses the district share of households with access to tap water, water on premises, electricity, and water closet. Tap water, water on premises, and usage of electricity are included to account for in their theoretical effect on time-disposal of women for outside work. All of the three should decrease the time required for household duties and therefore allow for higher participation in labour market activities. Availability of water closet serves as a proxy for the development stage of a district.

Methodology

Estimates of regression models provide measures of the degree of association/correlation between any given explanatory variable and the dependent variable with all other factors held constant. Such an association is not necessarily the outcome of a genuine causal relationship: it could originate as well from a mutual correlation with an omitted variable, from a causal relationship in the inverse direction, or even from a sheer coincidence. Tests for causality were not undertaken as it is difficult to be sure that all underlying hypotheses of the models are true and that all confounding variables are controlled for. As the dataset is extremely rich in quantity and representativeness of observations, and quality and diversity of explanatory variables, the statistical power of the results is naturally increased. The use of control variables also enhances the accuracy of the measures for participation decision by women.

In addition, descriptive statistics and cultural analysis were used to assess potentially valid relationships. As the subject of study is of great complexity, any method/approach has its strengths and weaknesses and can provide at most provisional, partial, and conditional explanations. Therefore, the robust relationships can only be clarified through an overview of the research in the area in question and the confluence of the diverse streams of evidence. In other words, the statistical results should be interpreted with caution and in light of all evidence/knowledge available.

A challenge for the regional regressions was the potential impact on the results of substantially different shares of various sub-populations in the total population with different determinants of participation. For example, if different castes have different determinants of FLFP and/or different average marginal effects of the determinants of FLFP, and there is a huge gap between two regions with respect to the shares of the population belonging to the different castes, the differences of these shares can bias the results. A great gap exists, for instance, between the Western and the Southern Region: the percentage of the population belonging to the upper caste in these regions are 34% and 21%, respectively. Therefore a three steps approach was chosen.

In the first step the main female sub-populations which are likely to differ substantially with respect to the labour force participation behavior were identified by a literature review, descriptive statistics, and preliminary econometric estimates. Then these sub-populations were narrowed down to those that differ significantly between at least two of the four regions. To judge whether two given shares of a variable are substantially distinct, both the statistical significance of the differences and their order of magnitude was used. As a rule of thumb, we considered a difference to be substantial if it was greater or equal to 5% and statistical significant at the 10% level.

As for the second step, as the sample is reduced, any given sub-population among the selected ones was tested to check whether the regression coefficients varied substantially between this sub-population and the rest of the population. This allowed the establishment of a list of pertinent interaction terms to be included in the original statistical models. The selection of interaction terms was carried out separately for urban and rural households, and for sub-populations excluding either the self-employed or the non-self-employed workers.

The final step is to estimate the extended models—that is, the original ones with the inclusion of the interactions terms determined in the second step—, and to compare the estimated average marginal effects both in statistical and in practical terms.

Data limitations in India are important which naturally can affect the robustness of the results. For example lack of wage data for the self-employed (proxied by consumption) that make half of the female labour force is a limiting factor. Issues with some other variables are discussed below. On the other hand, the large sample tends to raise the robustness of the results.

Issues with some specific variables

Infrastructure proxies - the percentage of access to safe water, telecommunication and electricity

The access to safe water can improve health levels. Better health care can decrease the likelihood of disease in the family, especially in children, which may encourage women to participate in the labour market as there would be less work of taking care of a patient at home. Moreover, with telecommunication and electricity, people are able to have access to information about outside world. This could make local culture more liberal and more modern and increase female participation rate of labour force.

The 2011 census has data on the percentage of households with access to safe water, telecommunication and electricity within a district or state or the whole of India. As an individual is more sensible to the infrastructure level in his/her neighbourhood, we use the data at district level. Better infrastructure is expected to raise female labour force participation.

"Woman most say index"

The degree of women's autonomy is one of the most important factors to determine the decision of participating in the labour market. One way to measure it is the "women most-say index" developed by Montag (Montag 2011). The index counts the number of cases in which the respondent identified herself as the one who has the most say in a household in response to the following 5 questions: What do you cook on a daily basis; whether to buy an expensive item such as a TV or fridge; how many children do you have; what do you do if a child falls sick; and who should your children marry? The respondent is the "eligible woman", i.e. "a married woman between the ages of 15 and 49" in a household. These five typical questions can reflect what a woman's status in a family is. By including this variable in the model, we can estimate how the female labour force participation rate is influenced by the independence of woman. This index comes from an individual survey, which is different from our main database. In order to use it, we calculate the average value within a district and impute it for every district.

Predicted wage

Wage is another important factor determining participation decisions. However, there are no wage data for females who are out of the labour force, and for the self-employed, which are a sizable portion of the labour force in India. To include a wage variable in the model, a predicted wage was imputed for these groups from a wage regression of people in wage employment with Heckman-type correction. The main assumption here is that women with similar characteristics can get similar salary in the labour market even if she doesn't work or is self-employed. This variable was used to estimate unearned household income of the self-employed.

Another way to proxy incomes of the self-employed is the consumption of the household. This is believed to be fairly accurate approximation as savings among the poor are generally low in India; especially among rural agricultural workers, where the self-employed concentrate. Individual total weekly wages of household members are considered first and if unavailable, the household weekly consumption is used instead. The values are further divided by the number of the household members to adjust for the number of people dependent on household's income.

Socio-economic groups

The NSSO data proxies socio-economic groups by various caste groups. In the employment survey, households are coded as "scheduled tribes (ST)," "scheduled castes (SC)," "other backward classes (OBC)," and "others". Scheduled tribes and scheduled castes have been so historically disadvantaged that they are constitutionally guaranteed affirmative action policies, especially in terms of representation in Parliament, public sector jobs, and education. Other backward class is also a constitutionally recognized category of castes and communities that are deemed to be in need of affirmative action (but not at the cost of the representation of ST and SC groups). "Others" are social groups that are not targets of affirmative action. Therefore, in terms of official policy, it is the SC group that is at the lower end of the traditional caste hierarchy, the "other" castes at the higher end ("upper castes"), and the OBC in the middle.

Financial services

Access to finance is measured by the district credit per 1000 and number of accounts per 10 inhabitants. Availability of banking reflects the district share of household claiming they have access to banking services according to the COI 2011.

Education

Education and education of the household head enter the model as dummy variables taking value of 1 for the highest educational level achieved. Religion, caste, and marital status are also coded as dummy variables.

Table A1 **District characteristics, summary statistics in 2012**

Variable	Mean	Std. Dev.
Bank accounts	1.131	1.617
Credit per capita	0.030	0.096
Rural		
Banking	0.562	0.173
Electricity	0.584	0.309
Tapwater	0.318	0.288
WC	0.212	0.17
Water on premises	0.353	0.232
Urban		
Banking	0.666	0.114
Electricity	0.876	0.124
Tapwater	0.599	0.266
WC	0.669	0.142
Water on premises	0.666	0.180

1. Bank accounts per 10 and credit per 100 inhabitants

Annex 3. Estimation results total sample

Table A2**: Extended probit model results, 2012**

	Rural	Urban
Personal characteristics		
Household income	-0.0133***	-0.0060***
Parents-in-law	-0.0763***	-0.0443***
Underemployment	0.0099	-0.0022
Children <5	-0.0138**	-0.0397***
Children 5-14	0.0031	0.0001
Married	-0.0786***	-0.1724***
Religion & caste – ref. Hindu/non ST/SC		
Muslim	-0.0528***	-0.0860***
Christian	-0.0048	0.0810***
Other	-0.0206	-0.0235
ST/SC	0.0493***	0.0227**
District employment – ref. manufacturing		
Agriculture	0.0010	0.0002
Construction	-0.0786***	-0.1724***
Services	-0.0786***	-0.1724***
White-collar	0.0017	-0.0011
Unemployment	0.0021	0.0017
Share of graduates	-0.0026	-0.0006
Education – ref. illiterate		
Literate	-0.0388***	-0.0239*
Primary	-0.0201	-0.0354**
Middle	-0.0637***	-0.0720***
Secondary	-0.0404***	-0.0289*
Graduate	0.1158***	0.1611***
Education of HH head – ref. illiterate		
Literate	-0.0275*	-0.0060
Primary	-0.0337**	-0.0381**
Middle	-050584***	-0.0582***
Secondary	-0.0641***	-0.0947***
Graduate	-0.0394*	-0.1211***
District characteristics		
Banking	0.0020**	0.0001
Bank accounts	0.0051	0.0044**
Credit per capita	0.0000	-0.0001**
Tapwater	0.0001	0.0004
Water on premises	-0.0018***	0.0000
Electricity	0.0008	0.0010
WC	-0.0006	-0.0009

Note: Women aged 15-64, participation based on principal status. Regressions also include age, square of age, state dummy variables and square of HH income.

Probit 1987-2012

Table A3. **Estimation results, rural areas 1987-2012**

	1987	2000	2005	2010	2012
Personal Characteristics					
Household income	-0.1572***	-0.0286***	-0.0530***	-0.0225***	-0.0138***
Parents-in-law	-0.0505***	-0.0764***	-0.0764***	-0.0666***	-0.0735***
Underemployment	-0.0508***	-0.0345***	0.0181*	0.0373**	0.0091
Children <5	-0.0092***	-0.0045**	-0.0232***	-0.0070	-0.0141**
Children 5-14	0.0022	0.0022	0.0002	0.0002	0.0033
Married	-0.0116	-0.0395***	-0.0404***	-0.0649***	-0.0804***
Religion & caste- ref. Hindu/non ST/SC					
Muslim	-0.1113***	-0.0794**	-0.1157***	-0.1203***	-0.0629***
Christian	0.0444	0.0377	-0.0157	0.0424	-0.0043
Other	0.0032	0.0246***	0.0405	-0.0673*	-0.0233
ST/SC	0.0586***	0.0848***	0.0424***	0.0372***	0.0495***
District employment- ref. manufacturing					
Agriculture	0.0004	-0.0008	-0.0008	0.0002	0.0010
Construction	0.0045	0.0005	0.0015	-0.0009	0.0003
Services	-0.0043	-0.0040*	-0.0028	0.0017	-0.0001
White-collar	0.0064	0.0016	-0.0011	-0.0010	0.0016
Unemployment	0.0010	-0.0030	-0.0067*	0.0016	0.0024
Share of graduates	-0.0294**	-0.0203***	-0.0074	-0.0063*	-0.0023
Education- ref. illiterate					
Literate	-0.0117	-0.0426	-0.0580***	-0.0380**	-0.0378***
Primary	-0.0995***	-0.0619***	-0.0729***	-0.0372***	-0.0190
Middle	-0.1470***	-0.1159***	-0.0899***	-0.0726***	-0.0648***
Secondary	-0.0963***	-0.0683***	-0.0395**	-0.0696***	-0.0414***
Graduate	0.0263	0.1481***	0.1980***	0.1232***	0.1157***
Education of HH head- ref. illiterate					
Literate	-0.0316**	-0.0664***	-0.0293***	-0.0212	-0.0246*
Primary	-0.0559***	-0.0679***	-0.0419***	-0.0231*	-0.0298**
Middle	-0.0662***	-0.1109***	-0.0545***	-0.0462***	-0.0574***
Secondary	-0.1037***	-0.1409***	-0.0927***	-0.0693***	-0.0619***
Graduate	-0.1232***	-0.1639***	-0.0916***	-0.0713*	-0.0350
Observations	96526	111692	85655	60769	60756

1. * $p < 0.05$,** $p < 0.01$, *** $p < 0.001$

2. Women aged 15-64, participation based on principal status. Regressions also include age, square of age, state dummy variables and square of HH income.

Table A4. **Estimation results, urban areas 1987-2012**

	1987	2000	2005	2010	2012
Personal Characteristics					
Household income	-0.0247***	-0.0009	-0.0189***	-0.0059***	-0.0059***
Parents-in-law	-0.0332***	-0.0603***	-0.0227	-0.0499***	-0.0425**
Underemployment	-0.0161	-0.0586***	0.0091	0.0230*	-0.0022
Children <5	-0.0050*	-0.0132***	-0.0333***	-0.0346***	-0.0393***
Children 5-14	0.0017	-0.0019	-0.0016	-0.0040	0.0002
Married	-0.0758***	-0.1472***	-0.1695***	-0.1586***	-0.1728***
Religion & caste- ref. Hindu/non ST/SC					
Muslim	-0.0475***	-0.0645***	-0.0956***	-0.0854***	-0.0871***
Christian	-0.0043	0.0383*	0.0823***	0.0336	0.0846***
Other	-0.0186	0.0031	0.0002	-0.0067	-0.0226
ST/SC	0.0247***	0.0466***	0.0113	0.0453***	0.0222**
District employment- ref. manufacturing					
Agriculture	0.0008	0.0021**	0.0014*	-0.0006	0.0002
Construction	-0.0003	0.0002	-0.0007	-0.0021**	-0.0019**
Services	-0.0008	-0.0004	-0.0003	-0.0006	-0.0019***
White-collar	-0.0001	0.0013	-0.0004	-0.0003	-0.0013
Unemployment	-0.0001	-0.0012	-0.0003	0.0014	0.0017
Share of graduates	-0.0021**	-0.0017*	-0.0004	-0.0026***	-0.0009
Education- ref. illiterate					
Literate	-0.0046	-0.0402	-0.0690***	-0.0271*	-0.0236*
Primary	-0.0415***	-0.0702***	-0.0961***	-0.0254*	-0.0341**
Middle	-0.0540***	-0.0771***	-0.1445***	-0.0466***	-0.0722***
Secondary	-0.0245**	0.0069	-0.0822***	-0.0290**	-0.0296*
Graduate	0.0884***	0.1761***	0.1569***	0.1512***	0.1619***
Education of HH head- ref. illiterate					
Literate	-0.0443***	-0.0471***	-0.0308**	-0.0352*	-0.0072
Primary	-0.0645***	-0.0660***	-0.0373***	-0.0507***	-0.0378**
Middle	-0.0876***	-0.1135***	-0.0492***	-0.0842***	-0.0590***
Secondary	-0.1313***	-0.1593***	-0.0783***	-0.1164***	-0.0961***
Graduate	-0.1432***	-0.1754***	-0.0274	-0.1036***	-0.1233***
Observations	50024	65504	42805	36860	36137

1. * $p < 0.05$,** $p < 0.01$, *** $p < 0.001$

2. Women aged 15-64, participation based on principal status. Regressions also include age, square of age, state dummy variables and square of HH income.

Table A5. **Estimation results OLS, 2012**

Variable	Coefficient	(Std. Err.)
Log(inc)	-0.074***	(0.022)
Years of education	-0.009	(0.006)
Children <6	-0.222***	(0.075)
Children 6-14	0.013	(0.012)
Availability of banking	0.002***	(0.001)
Tapwater	0.001*	(0.000)
Electricity	0.003***	(0.000)
Water closet	-0.002***	(0.001)
Financial breadth	0.000***	(0.000)
Financial depth	-0.166***	(0.034)

Annex 4. NREG regressions

Methodology

To compare the real effects of NREGA program on labour for participation two methods were used.

i) probit regression. The probability to participate is regressed on labor force under covariates that incorporate a dummy for NREGA participation (among other explanatory variables).

With logit regression we obtain the marginal effect that is the effect that participation to NREGA has on the probability to participate to labor force for rural women on average.

ii) Second we ran a method of matching. It compared every woman that participated to the program to another one, whose characteristics were close but did not participate. The matching was made using a propensity score to participate to the program. Matching methods using propensity score are more robust and reliable as regression methods.

With matching method we obtained an Average Treatment effect on the Treated (ATT, formula below), that is the effect for those who participated to the program that this has had on their labor force participation, compared to what should have happened if they did not had participate (formula below). This estimator is more accurate because it compares the effect of the program for those who participated in, with their counterfactual. It eludes selection effect

Definition of the Average Treatment effect on the Treated:

$$\Delta^{ATT} = \mathrm{E}(Y_{i1} - Y_{i0} | T_i = 1)$$

Y_{i1} is the probability to be a part of labor force for a woman i who did NREGA,

Y_{i0} is the probability to be a part of labor force for the same woman but if she did not do NREGA,

T_i is a dummy that indicates if the woman participated to NREGA

Table A6. **Characteristics of women participating in NREGA (2009)**

	NREGA=1 12701 Obs.		NREGA=0 56333 Obs.		All 69034 Obs.	
Variable	**Mean**	Std. Dev	**Mean**	Std. Dev	Mean	Std. Dev
participat~n	**.4408314**	.4965063	**.2189125**	.4135128	.2597416	.4384959
literate	**.121644**	.326887	**.0877461**	.2829278	.0939827	.2918067
primary	**.1315644**	.3380299	**.1290008**	.3352038	.1294724	.3357245
middle	**.1044012**	.3057924	**.1577228**	.3644841	.1479126	.3550159
secondary	**.0657429**	.2478418	**.2201019**	.4143188	.1917026	.3936432
graduate	**.0058263**	.0761106	**.0962491**	.2949352	.0796129	.270695
technical_~d	**.0014172**	.0376207	**.01429**	.1186848	.0119217	.1085344
vocational~d	**.0388946**	.1933513	**.042302**	.2012791	.0416751	.1998471
living_wit~s	**.1471538**	.3542731	**.1725809**	.3778879	.1679028	.3737826
age_group	**3.025825**	1.588332	**3.089148**	1.600612	3.077498	1.598537
HH_Size	**5.510039**	2.566562	**5.474784**	2.710431	5.48127	2.684557
children_5	**.5199591**	.8235792	**.4728667**	.7956757	.4815308	.8010842
Sch_tribe	**.1638454**	.3701498	**.0547814**	.2275551	.0748472	.2631465
Sch_caste	**.2521061**	.434239	**.1510127**	.3580645	.1696121	.3752944
Backward	**.3813873**	.4857464	**.4126711**	.492319	.4069154	.4912624
Muslim	**.081096**	.2729932	**.1248114**	.3305079	.1167685	.3211466
Christian	**.0191324**	.1369956	**.0254203**	.1573992	.0242634	.1538669
other_nonH~u	**.0154319**	.1232676	**.0434026**	.2037635	.0382565	.1918163
income_group	**3.147547**	1.020556	**3.802762**	1.136666	3.682215	1.144712
share_regu~y	**7.714338**	23.2729	**27.93394**	42.03249	24.2139	40.03377

Table A7. **Probit results - married women in rural areas (2009)**

participation	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
NREGA	**0,0654393**	**0,0108624**	**6,02**	**0**	**0,0441493**	**0,0867293**
literate	-0,0312351	0,0130989	-2,38	0,017	-0,0569084	-0,0055617
primary	-0,0275654	0,0133606	-2,06	0,039	-0,0537516	-0,0013792
middle	-0,0504863	0,015029	-3,36	0,001	-0,0799426	-0,02103
secondary	-0,0634605	0,0190466	-3,33	0,001	-0,1007912	-0,0261298
graduate	0,1102712	0,0382005	2,89	0,004	0,0353996	0,1851428
technical_education_ind	0,1034588	0,0622927	1,66	0,097	-0,0186327	0,2255503
vocational_training_ind	0,1252521	0,0242497	5,17	0	0,0777235	0,1727807
living_with_inlaws	-0,0291689	0,0151959	-1,92	0,055	-0,0589523	0,0006144
age_group						
2	0,0082088	0,0117594	0,7	0,485	-0,0148392	0,0312568
3	0,062703	0,0128378	4,88	0	0,0375413	0,0878646
4	0,0678721	0,0140786	4,82	0	0,0402784	0,0954657
5	0,0626901	0,0153181	4,09	0	0,0326672	0,092713
6	0,0436813	0,0171769	2,54	0,011	0,0100152	0,0773473
HH_Size	-0,001369	0,0028111	-0,49	0,626	-0,0068786	0,0041406
children_5	-0,0020746	0,0058329	-0,36	0,722	-0,0135068	0,0093576
children69	0,0082956	0,0065733	1,26	0,207	-0,0045877	0,021179
girls1014	0,0047666	0,0074641	0,64	0,523	-0,0098629	0,019396
boys1014	-0,0012101	0,0074589	-0,16	0,871	-0,0158293	0,0134091
prop_wom	0,0017763	0,0003041	5,84	0	0,0011802	0,0023723
Sch_tribe	0,1140889	0,0199934	5,71	0	0,0749027	0,1532752
Sch_caste	0,0483967	0,014167	3,42	0,001	0,0206299	0,0761636
Backward	0,0559324	0,0135633	4,12	0	0,0293488	0,082516
Muslim	-0,0900396	0,0181799	-4,95	0	-0,1256715	-0,0544077
Christian	0,0555019	0,028331	1,96	0,05	-0,0000259	0,1110297
other_nonHindu	-0,1559709	0,0307334	-5,07	0	-0,2162073	-0,0957346
income_group						
2	-0,604203	0,021485	-28,12	0	-0,6463129	-0,5620932
3	-0,6296997	0,0196966	-31,97	0	-0,6683043	-0,5910951
4	-0,6410004	0,0200317	-32	0	-0,6802619	-0,6017389
5	-0,6725683	0,0225159	-29,87	0	-0,7166986	-0,628438
share_regular_salary	-0,0007669	0,0001637	-4,69	0	-0,0010877	-0,0004462
underemployment	0,0240897	0,0117019	2,06	0,04	0,0011544	0,047025
Head_literate	-0,0177042	0,0142101	-1,25	0,213	-0,0455554	0,010147
Head_primary	-0,0041801	0,0127726	-0,33	0,743	-0,0292138	0,0208537
Head_middle	-0,0194898	0,013071	-1,49	0,136	-0,0451085	0,0061289
Head_secondary	-0,0213838	0,0141886	-1,51	0,132	-0,049193	0,0064254
Head_graduate	-0,0175748	0,0314345	-0,56	0,576	-0,0791852	0,0440357
head_without_occ	-0,0785015	0,0185601	-4,23	0	-0,1148786	-0,0421244
head_service_sector	-0,0390302	0,0142546	-2,74	0,006	-0,0669686	-0,0110917
head_white_collar	-0,0575872	0,01631	-3,53	0	-0,0895542	-0,0256202
Bank_Account_Held_By_Any_Member	-0,0000559	0,0100902	-0,01	0,996	-0,0198323	0,0197205
District_Density	-0,0000675	0,0000261	-2,59	0,01	-0,0001186	-0,0000164
age_struct	-0,0020483	0,0018615	-1,1	0,271	-0,0056967	0,0016001
avg_inc	0,0006342	0,0001558	4,07	0	0,0003288	0,0009397
salary_ratio	-0,0635616	0,0209478	-3,03	0,002	-0,1046186	-0,0225046
grad_share	-0,0138511	0,0025225	-5,49	0	-0,0187952	-0,008907
men_unempl_share	0,0001538	0,0033516	0,05	0,963	-0,0064152	0,0067228
dist_agro	0,00213	0,0010555	2,02	0,044	0,0000612	0,0041988
dist_whitecollar	0,0036713	0,0036033	1,02	0,308	-0,003391	0,0107336
dist_manuf	0,0012815	0,0016065	0,8	0,425	-0,0018673	0,0044302
dist_services	0,0028368	0,0015636	1,81	0,07	-0,0002278	0,0059015
labourindex	0,0038708	0,0009636	4,02	0	0,0019823	0,0057594
District_Gov_Share	0,0017095	0,0009017	1,9	0,058	-0,0000579	0,0034769
District_Unionization	0,0004658	0,0003436	1,36	0,175	-0,0002077	0,0011393
District_Acc_Per_Adult	-0,0204355	0,0179714	-1,14	0,255	-0,0556588	0,0147879
Credit_Per_Capita	0,4163304	0,3485844	1,19	0,232	-0,2668826	1,099543
District_WC	-0,0012403	0,0009068	-1,37	0,171	-0,0030176	0,0005369
electricity_group						
2	0,0357714	0,0237664	1,51	0,132	-0,0108098	0,0823527
3	0,2236539	0,0329213	6,79	0	0,1591295	0,2881784
4	0,248376	0,0379021	6,55	0	0,1740892	0,3226628
5	0,2408947	0,0492829	4,89	0	0,144302	0,3374874
water_group						
2	-0,0057037	0,02503	-0,23	0,82	-0,0547617	0,0433543
3	-0,0701724	0,0296636	-2,37	0,018	-0,1283119	-0,0120328
4	-0,058802	0,0294576	-2	0,046	-0,1165379	-0,001066
5	-0,1521892	0,0361573	-4,21	0	-0,2230562	-0,0813221

Annex 5. Regional regressions

Table A8**. Differences between the average marginal effects of the explanatory variables for the different regions regarding urban households**

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
Individual characteristics						
Education [Ref. = Illiterate]						
Literate below primary	**0.078****	0.029	-0.049	0.016	-0.061	-0.012
Primary	0.107	0.004	-0.103	0.075	-0.031	0.071
Middle	0.096	0.009	**-0.088***	**0.109***	0.013	**0.100****
Secondary	**0.097****	0.000	**-0.098*****	-0.008	**-0.105*****	-0.008
Graduate	-0.090	-0.042	0.049	**-0.100***	-0.010	-0.059
Technical education	0.037	-0.042	-0.080	0.022	-0.015	0.065
Vocational training	0.137	0.018	-0.119	0.222	0.086	0.204
Lives with parents-in-law	-0.033	-0.010	0.023	0.000	0.033	0.010
Age [Ref. = 25-29]						
30-34	-0.022	-0.002	0.020	-0.010	0.012	-0.008
35-39	-0.006	0.008	0.014	0.000	0.005	-0.009
40-44	-0.016	-0.013	0.003	-0.024	-0.009	-0.012
45-49	-0.010	-0.024	-0.014	-0.017	-0.007	0.007
50-54	-0.062	-0.011	0.051	0.008	0.070	0.018
Household characteristics						
Number of members	0.015*	-0.005	-0.020***	0.003	-0.012	0.009
Children between 0 and 5	0.009	-0.015	-0.024	0.007	-0.002	0.022
Children between 6 and 9	-0.012	0.008	0.020	0.029*	0.041**	0.021
Girls between 10 and 14	-0.033	-0.013	0.020	0.006	0.039*	0.019
Boys between 10 and 14	**-0.068*****	-0.029**	0.039***	-0.043	0.025	-0.014
Proportion of women among adults (%)	0.000	0.000	0.000	0.000	0.000	0.000
Social group [Ref. = Others]						
Scheduled tribe	**-0.121***	-0.004	**0.117***	**-0.139****	-0.018	**-0.135****
Scheduled caste	**-0.122****	-0.038	0.085	**-0.208*****	-0.086	**-0.171*****
Other backward class	-0.061	0.003	0.064	**-0.112*****	-0.051	**-0.115*****
Religion [Ref. = Hinduism]						
Islam	0.036	-0.039	-0.075	0.049	0.012	0.087
Christianity	-0.151	-0.080	0.071	-0.120	0.032	-0.039
Other	0.109	-0.006	-0.115	0.021	-0.088	0.027
Unearned income per household member [Ref. = 1st]						
2nd	**0.094*****	0.021	**-0.072*****	0.033	**-0.060***	0.012
3rd	**0.076****	0.005	**-0.071****	0.049	-0.027	0.044
4th	0.042	**-0.060***	**-0.102*****	-0.010	-0.053	0.050
5th	**0.053***	**-0.073****	**-0.127*****	0.008	-0.045	**0.081****
Regular earnings share of income (%)	0.000	0.000***	-0.001**	0.000	0.000	0.000
Underemployed household member	-0.027	-0.004	0.023	-0.021	0.007	-0.017

(Table A8- "Household characteristics"- continued)

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
Household head education [Ref. = Illiterate]						
Literate below primary	0.070	0.007	-0.063	0.020	-0.050	0.013
Primary	**0.063***	-0.014	**-0.077****	0.050	-0.013	**0.065****
Middle	**0.216*****	0.042	**-0.174*****	**0.147****	-0.069	**0.105****
Secondary	**0.104*****	0.005	**-0.098*****	**0.146*****	0.043	**0.141*****
Graduate	**0.161*****	0.052	**-0.109*****	**0.144*****	-0.017	**0.092*****
Household head occupation [Ref. = Blue collar job]						
No economic activity	0.039	-0.023	**-0.062****	-0.015	-0.054	0.009
Service sector job	-0.038	-0.020	0.019	-0.017	0.021	0.003
White collar job	0.000	-0.015	-0.015	0.025	0.026	0.040
At least one in hh has a bank account	-0.031	-0.009	0.022	-0.033	-0.002	-0.025
District characteristics						
Population density	0.000	0.000*	0.000**	0.000	0.000	0.000
Age structure	0.014***	0.001	-0.014***	0.006	-0.008*	0.005
Average income	-0.001***	0.000**	0.001***	0.000	0.001***	0.000
Female-to-male earnings ratio	-0.012	-0.095	-0.083	-0.106	-0.094	-0.011
Women's most say	**0.085****	**0.089****	0.004	-0.089	**-0.173****	**-0.177*****
Population share with graduate degree	0.007	-0.002	-0.009*	-0.003	-0.010*	-0.002
Male unemployment rate	-0.015	-0.001	0.014	0.000	0.015	0.001
Shares of male employment (%) [Ref. = Construction]						
Agriculture	0.002	0.004**	0.002	-0.003	-0.005*	-0.007***
Manufacturing	-0.006**	-0.004*	0.003	-0.004	0.002	0.000
Services	-0.005*	-0.002	0.003	-0.009**	-0.004	-0.006*
White collar services	0.020***	0.015***	-0.005	0.013**	-0.006	-0.001
Government share on employment	-0.004*	-0.002	0.002	-0.001	0.003	0.001
Unionization rate	-0.001	0.000	0.001*	-0.001	0.000	-0.001
Number of bank accounts per adult	-0.014	-0.037	-0.023	-0.022	-0.008	0.015
Outstanding credit per capita	**-0.506***	-0.364	0.142	-1.006	-0.501	-0.643
Availability of water closet (%)	0.003**	0.000	-0.003**	0.004**	0.001	0.004**
Electricity = main source of lighting [Ref. = 1st]						
2nd	**-0.078****	0.044	**0.122*****	-0.005	**0.073***	-0.048
3rd	0.019	**0.086****	0.067	0.001	-0.018	**-0.084***
4th	**0.102****	**0.119****	0.017	**0.116***	0.014	-0.003
5th	**0.110***	0.063	-0.046	-0.040	-0.149	-0.103
Enough water available within the premises [Ref. = 1st]						
2nd	-0.003	-0.028	-0.025	**-0.091*****	**-0.087*****	**-0.062***
3rd	**-0.114*****	-0.037	**0.077***	**-0.144*****	-0.030	**-0.107****
4th	-0.036	0.020	0.055	**-0.202*****	**-0.166*****	**-0.222*****
5th	**-0.107***	0.046	**0.153****	-0.098	0.009	**-0.144***

(Table A8- "District characteristics" - continued)

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
Availability of telephone or mobile phone [Ref. = 1st]						
2nd	-0.044	0.001	0.045	**0.069***	**0.113*****	**0.068***
3rd	-0.029	-0.036	-0.006	-0.015	0.014	0.021
4th	-0.029	**-0.114*****	**-0.085****	-0.022	0.007	**0.092***
5th	**0.084****	**-0.072***	**-0.155*****	-0.103	**-0.187****	-0.031
Total length of roads per unit of area [Ref. = 1st]						
2nd	**0.101****	0.006	**-0.095*****	0.013	**-0.088****	0.006
3rd	0.042	-0.028	**-0.070****	-0.034	**-0.075***	-0.006
4th	**0.123****	0.018	**-0.105****	0.011	**-0.112***	-0.007
5th	0.088	-0.045	**-0.133****	-0.106	**-0.195****	-0.061
State characteristic						
Labor regulation indicator	0.007**	0.005**	-0.002	-0.002	-0.010**	-0.008

1. ***p<0.01, ** p<0.05, *** p<0.10
2 N. e. = not estimable
3. Statistically significant (at the 10% level) differences which are greater or equal to 0.05 are highlighted in red
4. GX-GY: average marginal effect for region GX minus average marginal effect for region GY
5. G1 = Eastern Region + North Eastern Region, G2 = Southern Region, G3 = Northern Region, G4 = Western Region

Table A9. Differences between the average marginal effects of the explanatory variables for the different regions regarding rural households and self-employed workers

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
Individual characteristics						
Education [Ref. = Illiterate]						
Literate below primary	**0,069****	0,022	-0,047	0,035	-0,033	0,014
Primary	0,015	-0,004	-0,019	**0,061***	0,046	**0,066***
Middle	0,036	-0,018	**-0,054***	**0,085****	0,049	**0,103*****
Secondary	**0,135*****	0,045	**-0,089****	**0,220*****	**0,085***	**0,175*****
Graduate	**0,563*****	**0,367*****	**-0,195*****	**0,624*****	0,061	**0,256*****
Technical education	0,053	**0,184*****	0,131	0,206	0,153	0,022
Vocational training	**-0,244*****	-0,052	**0,193*****	**-0,253*****	-0,008	**-0,201****
Lives with parents-in-law	**0,062***	-0,011	**-0,073***	-0,011	-0,073	0,000
Age [Ref. = 25-29]						
30-34	-0,014	-0,026	-0,013	-0,017	-0,003	0,009
35-39	-0,037	**-0,051****	-0,014	**-0,094*****	-0,057	-0,043
40-44	**-0,068***	**-0,074*****	-0,007	-0,055	0,012	0,019
45-49	-0,032	**-0,064****	-0,032	-0,022	0,010	0,042
50-54	0,019	**-0,079****	**-0,097****	0,040	0,021	**0,119****

(Table A9 continued)

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
Household characteristics						
Number of members	0,006	0,006	0,000	0,003	-0,003	-0,004
Children between 0 and 5	-0,003	-0,008	-0,004	-0,015	-0,012	-0,008
Children between 6 and 9	-0,033*	-0,001	0,032*	-0,019	0,014	-0,018
Girls between 10 and 14	-0,010	0,014	0,024	0,011	0,021	-0,002
Boys between 10 and 14	-0,001	0,017	0,018	0,024	0,025	0,007
Proportion of women among adults (%)	-0,001	0,000	0,001	-0,001	0,000	0,000
Social group [Ref. = Others]						
Scheduled tribe	0,015	0,047	0,032	0,161	0,146	0,114
Scheduled caste	0,114	0,000	-0,113	0,143	0,030	0,143
Other backward class	0,049	-0,024	-0,073	0,081	0,032	0,105
Religion [Ref. = Hinduism]						
Islam	**0,295*** **	0,012	-0,283	**-0,745*** **	-1,040***	**-0,757*** **
Christianity	**0,162** **	N. e.	**0,164*** **	**0,270** **	0,108	-0,056
Other	N. e.	**0,185*** **	N. e.	0,056	N. e.	**-0,129***
Unearned income per hh member [Ref. = 1st]						
2nd	-0,011	-0,030	-0,019	**-0,057***	-0,047	-0,027
3rd	0,001	-0,008	-0,009	**-0,057***	-0,058	-0,049
4th	-0,002	0,009	0,011	-0,035	-0,033	-0,044
5th	0,038	-0,026	-0,063	-0,008	-0,045	0,018
Regular earnings share of income (%)	0,002***	0,001**	-0,001***	0,002***	0,000	0,001***
Underemployed household member	0,018	0,024	0,006	0,046	0,028	0,022
Land cultivated [Ref. = No]						
1st	-0,003	-0,018	-0,015	0,062	0,065	0,080
2nd	-0,074	-0,072	0,002	-0,039	0,034	0,032
3rd	**-0,113** **	-0,018	0,095	-0,026	0,087	-0,008
4th	**-0,198*** **	-0,041	**0,157** **	-0,023	**0,175***	0,018
5th	**-0,173** **	-0,013	**0,160** **	-0,063	0,110	-0,050
Land owned [Ref. = No]						
1st	-0,038	**-0,094*** **	-0,056	**-0,118*** **	-0,081	-0,025
2nd	**-0,121*** **	**-0,160*** **	-0,040	**-0,225*** **	**-0,104***	-0,065
3rd	**-0,241*** **	**-0,200*** **	0,040	**-0,336*** **	-0,096	**-0,136** **
4th	**-0,265*** **	**-0,219*** **	0,045	**-0,320*** **	-0,055	-0,101
5th	**-0,365*** **	**-0,303*** **	0,062	**-0,373*** **	-0,008	-0,070
Household head education [Ref. = Illiterate]						
Literate below primary	0,032	0,019	-0,013	-0,020	-0,052	-0,039
Primary	-0,014	0,022	0,036	-0,017	-0,003	-0,039
Middle	-0,034	-0,014	0,020	-0,014	0,020	0,000
Secondary	-0,022	-0,042*	-0,019	0,001	0,023	0,042
Graduate	0,050	0,008	-0,042	0,067	0,017	0,059

(Table A9- "Household characteristics"- continued)

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
Household head occupation [Ref. = Blue collar job]						
No economic activity	0,048	-0,035	**-0,084****	-0,072	**-0,120****	-0,037
Service sector job	**-0,177*****	-0,032	**0,145*****	**-0,126*****	0,051	**-0,094****
White collar job	**-0,180*****	-0,025	**0,155*****	**-0,125*****	0,054	**-0,100****
At least one in hh has a bank account	0,007	0,000	-0,006	**0,070*****	**0,063****	**0,070****
District characteristics						
Population density	0,000	0,000	0,000*	0,000**	0,000	0,000***
Age structure	0,005	0,004	-0,001	-0,003	-0,008	-0,008
Average income	0,000	0,001**	0,001***	0,000	0,001**	0,000
Female-to-male earnings ratio	-0,064	**-0,065****	-0,002	0,056	0,120	**0,122***
Women's most say	0,001	0,073	0,071	0,019	0,018	-0,053
Population share with graduate degree	0,023***	-0,008**	-0,031***	-0,002	-0,025***	0,007
Male unemployment rate	-0,020***	-0,012***	0,007	-0,001	0,019	0,011
Shares of male employment (%) [Ref. = Construction]						
Agriculture	0,000	0,004*	0,004	-0,001	-0,001	-0,005
Manufacturing	-0,011***	0,002	0,013***	-0,002	0,010	-0,003
Services	-0,002	-0,003	-0,001	-0,007	-0,005	-0,004
White collar services	-0,011	0,003	0,014*	-0,009	0,002	-0,012
Government share on employment	-0,001	0,000	0,001	0,006**	0,006*	0,006**
Unionization rate	-0,001	0,000	0,000	-0,001	-0,001	-0,001
Number of bank accounts per adult	-0,029	0,020	0,049	-0,097	-0,069	-0,117
Outstanding credit per capita	-0,092	0,367	0,460	-1,130	-1,037	-1,497
Availability of water closet (%)	0,000	0,000	0,001	0,001	0,001	0,001
Electricity = main source of lighting [Ref. = 1st]						
2nd	0,010	0,009	-0,001	0,020	0,010	0,011
3rd	-0,027	-0,040	-0,013	-0,081	-0,054	-0,041
4th	-0,018	-0,079	-0,061	0,020	0,038	0,099
5th	0,090	-0,094	**-0,184***	0,191	0,101	**0,285***
Availability of water within the premises [Ref. = 1st]						
2nd	0,041	-0,011	-0,053	-0,079	-0,120	-0,068
3rd	0,042	-0,017	-0,059	**-0,140***	**-0,182****	-0,123
4th	0,092	0,063	-0,028	-0,063	-0,154	-0,126
5th	0,078	**0,148*****	0,070	-0,035	-0,112	-0,183
Availability of telephone or mobile phone [Ref. = 1st]						
2nd	**-0,095***	-0,033	0,062	**0,172****	**0,267*****	**0,204*****
3rd	**-0,080***	-0,047	0,033	**0,196*****	**0,276*****	**0,243*****
4th	0,039	-0,059	**-0,098***	0,094	0,055	**0,153***
5th	0,010	-0,071	-0,082	**0,146***	0,136	**0,218****

(Table A9- "District characteristics" -continued)

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
Total length of roads per unit of area [Ref. = 1st]						
2nd	0,051	-0,043	**-0,095***	-0,050	-0,101	-0,007
3rd	0,006	-0,061	-0,067	**-0,166****	**-0,171****	-0,104
4th	-0,008	-0,038	-0,029	-0,060	-0,052	-0,022
5th	0,055	-0,037	-0,093	**-0,274*****	**-0,330****	**-0,237****
State characteristic						
Labor regulation indicator	-0,002	0,011***	0,013***	-0,013*	-0,011	-0,024***

1. ***p<0.01, ** p<0.05, *** p<0.10
2. N. e. = not estimable
3. Statistically significant (at the 10% level) differences which are greater or equal to 0.05 are highlighted in red
4. GX-GY: average marginal effect for region GX minus average marginal effect for region GY
5. G1 = Eastern Region + North Eastern Region, G2 = Southern Region, G3 = Northern Region, G4 = Western Region

Table A10. Differences between the average marginal effects of the explanatory variables for the different regions regarding rural households and non self-employed workers

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
Individual characteristics						
Education [Ref. = Illiterate]						
Literate below primary	0,057	0,012	-0,044	0,032	-0,025	0,019
Primary	**0,111*****	0,018	**-0,093*****	0,000	**-0,111*****	-0,018
Middle	**0,177*****	0,000	**-0,177*****	**0,094*****	**-0,082***	**0,095*****
Secondary	**0,273*****	-0,048	**-0,321*****	**0,140*****	**-0,133*****	**0,188*****
Graduate	**0,246*****	**0,214*****	-0,032	**0,401*****	0,155	**0,187****
Technical education	-0,114	0,014	0,127	**-0,418*****	**-0,305***	**-0,432*****
Vocational training	-0,071	0,029	0,099	**-0,142***	-0,071	**-0,170*****
Lives with parents-in-law	0,045	-0,017	-0,062	-0,028	-0,073	-0,011
Age [Ref. = 25-29]						
30-34	**-0,062****	0,001	**0,063****	0,009	**0,071***	0,008
35-39	-0,036	0,012	0,048	-0,039	-0,003	-0,050
40-44	**-0,083****	-0,025	0,057	**-0,090*****	-0,007	**-0,064***
45-49	-0,004	0,010	0,014	-0,032	-0,028	-0,042
50-54	-0,008	-0,025	-0,017	**-0,072***	-0,064	-0,047
Household characteristics						
Number of members	0,023***	0,009**	-0,013*	0,009	-0,014	-0,001
Children between 0 and 5	0,004	-0,006	-0,010	-0,013	-0,018	-0,008
Children between 6 and 9	-0,033*	0,002	0,035*	-0,044***	-0,011	-0,046***
Girls between 10 and 14	-0,005	0,003	0,009	0,001	0,006	-0,003
Boys between 10 and 14	-0,042*	-0,008	0,034	-0,015	0,027	-0,007
Proportion of women among adults (%)	0,000	0,001	0,001	0,000	0,000	-0,001

(Table A10- "Household characteristics"- continued)

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
Social group [Ref. = Others]						
Scheduled tribe	-0,192	**0,112****	**0,304****	**-0,160***	0,032	**-0,272*****
Scheduled caste	-0,153	0,032	0,184	**-0,161****	-0,008	**-0,192****
Other backward class	-0,047	**0,085****	0,132	-0,080	-0,033	**-0,164****
Religion [Ref. = Hinduism]						
Islam	**0,346****	-0,032	**-0,378*****	0,227	-0,119	0,259
Christianity	**0,174****	N. e.	N. e.	**0,203***	0,029	N. e.
Other	N. e.	0,057	N. e.	0,124	N. e.	0,068
Unearned income per hh member [Ref. = 1st]						
2nd	0,023	-0,006	-0,029	0,013	-0,010	0,018
3rd	0,002	-0,005	-0,007	0,008	0,006	0,014
4th	0,024	-0,003	-0,027	**-0,074****	**-0,098****	**-0,071****
5th	**0,071***	0,039	-0,032	**0,078***	0,007	0,039
Regular earnings share of income (%)	0,000	0,000	0,000	0,001*	0,000	0,001**
Underemployed household member	**-0,094*****	-0,020	**0,074****	-0,038	0,056	-0,018
Land cultivated [Ref. = No]						
1st	**-0,130****	-0,038	**0,092***	**-0,158*****	-0,028	**-0,120****
2nd	**-0,160*****	**-0,065***	**0,095****	**-0,156****	0,004	-0,091
3rd	**-0,136*****	-0,015	**0,120****	-0,040	0,096	-0,025
4th	**-0,163*****	-0,048	**0,115***	-0,074	0,089	-0,025
5th	-0,080	-0,044	0,036	-0,070	0,010	-0,025
Land owned [Ref. = No]						
1st	**0,098****	0,002	**-0,097****	-0,020	**-0,118****	-0,021
2nd	-0,024	0,022	0,046	0,006	0,030	-0,016
3rd	-0,033	0,013	0,047	0,085	0,118	0,072
4th	-0,015	-0,004	0,011	**0,212*****	**0,227*****	**0,216*****
5th	**0,128****	**-0,051****	**-0,179*****	**0,230*****	0,103	**0,282*****
Household head education [Ref. = Illiterate]						
Literate below primary	**0,066***	0,043**	-0,023	-0,010	-0,076	-0,053
Primary	-0,015	0,020	0,035	0,041	0,056	0,021
Middle	0,033	0,022	-0,011	0,032	-0,002	0,010
Secondary	**0,086****	-0,004	**-0,090****	**0,085****	-0,002	**0,088****
Graduate	0,079	0,001	-0,077	0,092	0,013	0,090
Household head occupation [Ref. = Blue collar job]						
No economic activity	-0,018	-0,022	-0,004	0,020	0,038	0,042
Service sector job	**0,062***	-0,033*	**-0,095*****	**0,155*****	**0,093****	**0,188*****
White collar job	**0,088*****	**-0,058*****	**-0,146*****	**0,145*****	0,058	**0,203*****
At least one hh member has bank account	**-0,070*****	-0,001	**0,068*****	0,003	**0,072****	0,004

(Table A10 continued)

Explanatory variable	G1-G2	G1-G3	G2-G3	G1-G4	G2-G4	G3-G4
District characteristics						
Population density	0,000	0,000*	0,000	0,000	0,000	0,000
Age structure	0,015***	0,000	-0,015***	-0,003	-0,018***	-0,003
Average income	-0,001**	0,000***	0,001***	0,000	0,001*	-0,001**
Female-to-male earnings ratio	**0,345*** **	-0,027	**-0,371*** **	0,095	**-0,250***	**0,122***
Women's most say	0,025	**0,063***	0,038	0,038	0,013	-0,025
Population share with graduate degree	0,007	-0,011***	-0,018***	-0,003	-0,010	0,008
Male unemployment rate	-0,006	-0,002	0,003	-0,004	0,002	-0,001
Shares of male employment (%) [Ref. = Construction]						
Agriculture	0,001	0,005***	0,004	-0,002	-0,003	-0,007*
Manufacturing	-0,003	0,002	0,005	-0,001	0,002	-0,003
Services	0,003	0,001	-0,002	-0,004	-0,007	-0,005
White collar services	0,013	0,010***	-0,004	-0,006	-0,020	-0,016*
Government share on employment	0,003	-0,001	-0,004	0,002	-0,001	0,003
Unionization rate	0,000	0,000	0,000	-0,001	0,000	-0,001
Number of bank accounts per adult	0,031	-0,014	-0,044	0,114	0,083	**0,127***
Outstanding credit per capita	0,122	0,234	0,112	**-2,192****	**-2,314***	**-2,426*****
Availability of water closet (%)	-0,002	0,000	0,002	0,004	0,006*	0,004
Electricity = main source of lighting [Ref. = 1st]						
2nd	0,025	-0,027	-0,052	-0,082	-0,108	-0,056
3rd	0,039	-0,016	-0,055	-0,067	-0,106	-0,051
4th	**0,133****	-0,029	**-0,162****	-0,046	**-0,179***	-0,017
5th	**0,312*****	0,092	**-0,219*****	0,179	-0,133	0,087
Availability of water within the premises [Ref. = 1st]						
2nd	0,028	-0,043	-0,071	**-0,116****	**-0,144***	-0,073
3rd	-0,004	**-0,054***	-0,051	**-0,141****	**-0,137***	-0,087
4th	-0,025	-0,026	-0,001	**-0,254*****	**-0,229****	**-0,228*****
5th	0,130	0,010	-0,119	-0,124	**-0,254****	-0,135
Availability of telephone or mobile phone [Ref. = 1st]						
2nd	**-0,172*****	0,003	**0,175*****	0,063	**0,235*****	0,060
3rd	**-0,174*****	-0,009	**0,165*****	0,080	**0,253*****	0,089
4th	**-0,114***	0,016	**0,131****	0,122	**0,236*****	0,105
5th	0,008	0,016	0,008	**0,204*****	**0,196****	**0,188****
Total length of roads per unit of area [Ref. = 1st]						
2nd	0,033	0,015	-0,019	0,035	0,001	0,020
3rd	0,039	-0,027	-0,066	-0,041	-0,080	-0,014
4th	0,014	0,007	-0,007	0,008	-0,006	0,001
5th	**-0,179***	-0,025	**0,154***	-0,026	0,153	-0,001
State characteristic						
Labor regulation indicator	-0,003	-0,001	0,002	-0,001	0,002	0,000

1. ***p<0.01, ** p<0.05, *** p<0.10
2. N. e. = not estimable
3. Statistically significant (at the 10% level) differences which are greater or equal to 0.05 are highlighted in red
4. GX-GY: average marginal effect for region GX minus average marginal effect for region GY
5. G1 = Eastern Region + North Eastern Region, G2 = Southern Region, G3 = Northern Region, G4 = Western Region

Annex 6. Labour regulations

Definition of indexes of labour regulation

Labor regulation is under the Industrial Dispute Act (IDA) the most prominent labor law. IDA does not apply to agricultural work, so it is excluded.

The two indexes used are set at state-level.

- An index of the strength of reform of the existing labor regulation (most reforms took place between 2002-2006), developed by Dougherty in Dougherty 2008, using OECD data of 2007.
- An index of the stringency of the labor regulation, that evaluates the rigidity of the State-level as it was in 2004. Montag, in Montag 2013, developed this index.

Index of labor reforms

This index reflects the reforms that were made to limit transaction costs - by limiting the scope of regulation, providing greater clarity and simplifying procedures. Its name is labor index.

For each state, the index summaries the reforms that were made concerning 8 specific areas: the IDA, Factories Act, State Shops and Commercial Establishments Acts, Contract Labor Act, the role of inspectors, the maintenance of registers, the filling of returns and union representation.

For each State it counts the number of reforms made on all these areas, pro rata to the maximal and minimal values on all states. It is then weighted with the relative importance that different areas have (maximal weight for IDA's, Labor Act and Union Representation reform, and minimal weigh for register and filling of return).

We backed this index with two other built with the same data and using the same methodology, but which were simpler and clearer to interpret:

- A "count index" which counts for each state the number of reforms made (without distinction on their areas).
- And a "proportional index", which is the mean on all areas of count indexes in percent of their maximal value (= the value it would had if all possible reforms in a given area had been made)[3].

The use of those reforms indexes only can induce a bias. Indeed a high number of recent reforms (i.e. large value of the index) does not say anything about the situation before those reforms. If all those reforms happened in a particularly rigid state - as it is likely to be the case, it is highly probable that employment will still suffer from this former rigidity. It will then introduce a negative bias in the evaluation.

That is why we corroborated our analysis with an indicator of the stringency of the law in 2004.

[3] See Dougherty 2008 for more details on the index and type of reforms covered.

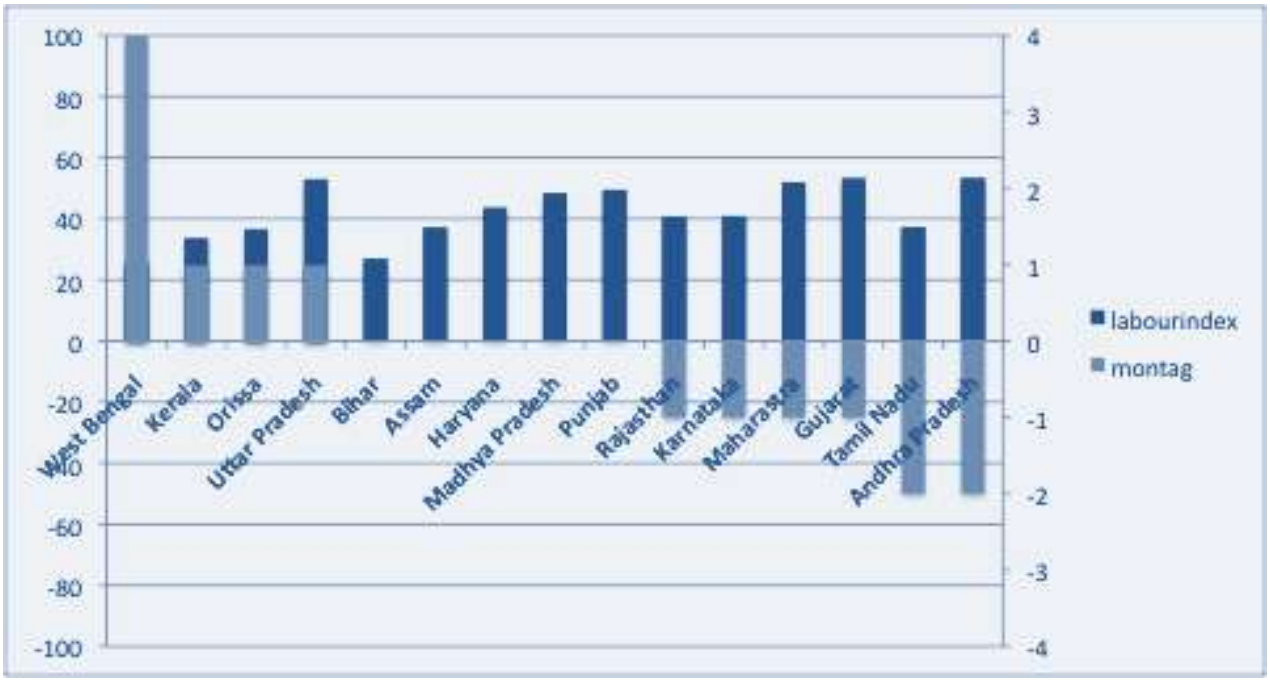
Index of rigidity of the law

Montag in Montag 2013 measures labor regulation with an index that mixed the methodology of Besley and Burgess's measure (2004) and of the Investment Climate measure (2002).

The final index takes value between -2 and 4. A positive value means a pro-worker state's legislation (often tied to institutional rigidity) and a negative value means pro-employer legislation (more liberal).[4] Conversely to labor reform's index we do not have this index for every states.

There is a significant negative correlation between the two indexes (0,50). Figure A2 shows that the states that have a rigid regulation (left of the graph) are the state that made fewer reforms (low value of labor index) – except for Uttar Pradesh. Conversely states that made more reforms are those who were previously less rigid (at right of the graph) are also those who conducted more reform. So there is little chance that we introduced to much bias when we studied the effect of the reforms, all the more so as we control for state economic opportunities in the regressions.

Figure A2. Comparison of rigidity index and reform index between states



1. "Rigidity index"= "montag"
2. "Reform index" = "labour index"

Description of the index of reforms of existing regulation

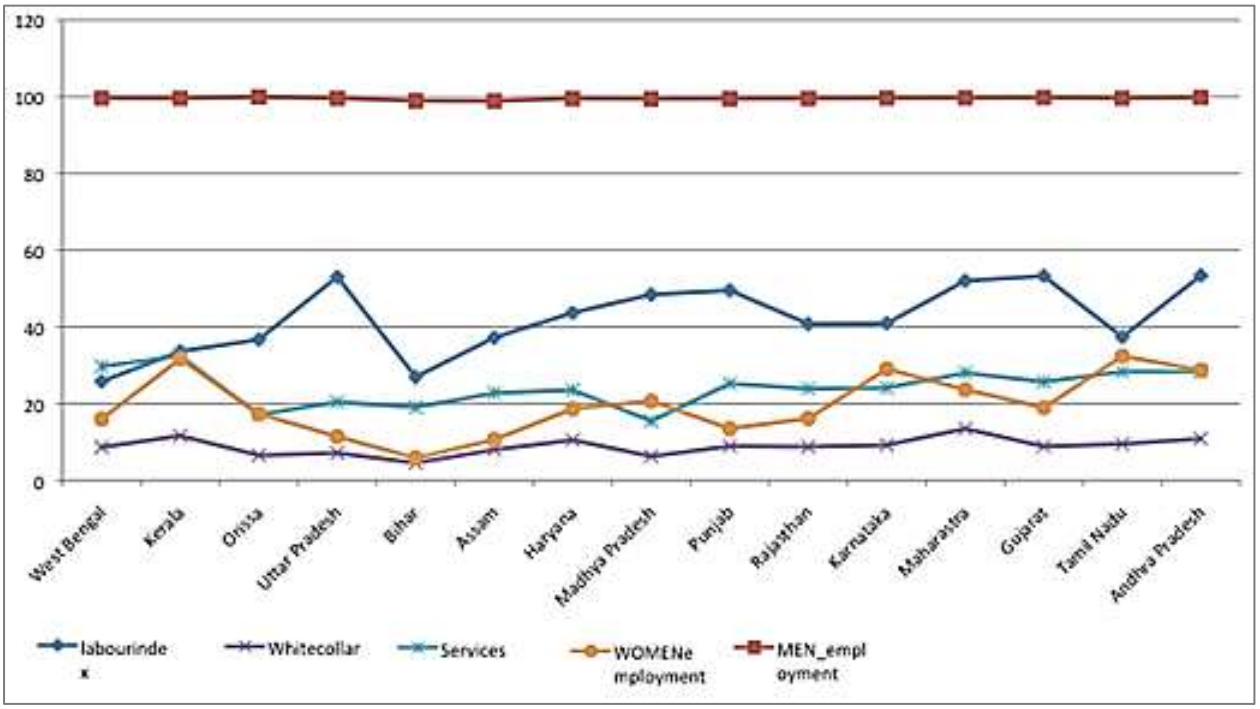
The weighted labor index takes values between 25,75 and 53, and the mean value is 40 (see Table A11, below). The higher the index is, the higher the number of reforms that were made is.

[4] See Montag in Montag 2013 for more details on how the index is built from the two other indexes.

There is a lot of variation between the different States of India, which is shown is the high value of standard deviation the index has.

In Figure A3 we compare the value of labor index with the value of employment for married men and women who live in urban areas and aged between 25 and 54 (calculated on surveyed households with NSS data). The employment rate for men is unchanging and always close to 100 (full-employment). On the other hand for women the employment rate is much smaller and seems to vary with the value of labor index. In particular labor reforms seem to affect white collar and service employment.

Figure A3. **Comparison of employment rate and labour index**



Source: NSS Survey 2010, Dougherty 2008

Decomposition analysis method: comparison of the reforms of labour regulation return on men and women

We then compared the different effect that relaxed labor regulation has on men and women. We performed a decomposition analysis. It allows us to split the observed difference of labor participation between the two groups, men and women into:

- An explained part- "endowments": the part due to difference in characteristics between men and women.
- An unexplained part -"coefficients": this part is due to difference of returns on the characteristics on the two groups. This is the effect we are seeking: if the coefficient of labor index is significant that means that labor index differently affects men and women.

The reference group is the men's group.

The coefficient of labor index for the unexplained part is positive, important and significant. Whereas the endowment for the explained part is not significant (Table A14).

Reforms of labor regulation do have a different impact on men and women. Although reforms do not seem to help women's work, men draw more benefit ("return") from reform of regulation in their labor participation. This seems to indicate that recent reforms of labor regulation would benefit men more than women. There would be particular effect that this new regulation has on men and that is has not on women.

Table A11. **Probit regression, all women**

Probit regression					Number of obs	3750
					Wald chi2(57)	= 453.70
					Prob > chi2	= 0.0000
Log pseudolikelihoo	=	-2247804.6			Pseudo R2	= 0.1936
			(Std.	Err.	adjusted for 415	clusters in cluster)
participation	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
montag	**-.0842357**	**.0324623**	**-2.59**	**0.009**	**-.1478606**	**-.0206108**
literate	-.494619	.2186619	-2.26	0.024	-.9231884	-.0660497
primary	-.0709303	.1431123	-0.50	0.620	-.3514253	.2095648
middle	-.1274999	.1329276	-0.96	0.337	-.3880332	.1330335
secondary	-.1510144	.1420724	-1.06	0.288	-.4294712	.1274425
graduate	.3003298	.2040189	1.47	0.141	-.0995398	.7001995
technical_educatio~	.3305747	.2433486	1.36	0.174	-.1463797	.8075291
vocational_trainin~	.1183046	.1099119	1.08	0.282	-.0971188	.333728
living_with_inlaws	.1425202	.1799064	0.79	0.428	-.2100899	.4951304
age_group						
2	-.203008	.1607728	-1.26	0.207	-.5181168	.1121008
3	-.1812064	.1433658	-1.26	0.206	-.4621982	.0997854
4	.1188921	.1858081	0.64	0.522	-.2452851	.4830693
5	-.0355206	.1745506	-0.20	0.839	-.3776335	.3065923
6	.1619864	.260799	0.62	0.535	-.3491702	.6731429
HH_Size	.029481	.0363063	0.81	0.417	-.041678	.10064
children_5	-.182437	.0614104	-2.97	0.003	-.3027991	-.0620748
children69	-.1577375	.0876441	-1.80	0.072	-.3295169	.0140418
girls1014	-.2985438	.0820584	-3.64	0.000	-.4593753	-.1377123
boys1014	-.0738747	.0902005	-0.82	0.413	-.2506645	.1029152
prop_wom	.0083345	.0038239	2.18	0.029	.0008398	.0158291
Sch_tribe	.5255941	.2550947	2.06	0.039	.0256177	1.02557
Sch_caste	.3500394	.1498024	2.34	0.019	.0564321	.6436468
Backward	.1657307	.102905	1.61	0.107	-.0359594	.3674207
Muslim	-.1981244	.1949168	-1.02	0.309	-.5801543	.1839055
Christian	.5415199	.200616	2.70	0.007	.1483198	.93472
other_nonHindu	-.2697236	.2857558	-0.94	0.345	-.8297948	.2903476

Table A12. **Probit regression, Services**

Probit regression			Number of obs =		1170	
			Wald chi2(56) =		483,72	
			Prob > chi2 =		0	
Log pseudolike =		-676645,52	Pseudo R2 =		0,2408	
participation	Coef,	Robust Std, Err,	z	P>z	[95% Conf,	Interval]
montag	-0,1478107	0,0513783	-2,88	0,004	-0,2485103	-0,0471112
literate	-0,159591	0,3390751	-0,47	0,638	-0,8241661	0,504984
primary	0,3753637	0,227606	1,65	0,099	-0,0707359	0,8214632
middle	-0,0222051	0,2431167	-0,09	0,927	-0,4987051	0,454295
secondary	-0,1135122	0,2262113	-0,5	0,616	-0,5568781	0,3298537
graduate	-0,0567192	0,339759	-0,17	0,867	-0,7226345	0,6091962
technical_edu	0	(omitted)				
vocational_tra	0,0263008	0,2767009	0,1	0,924	-0,516023	0,5686246
living_with_inl	-0,3976576	0,3082476	-1,29	0,197	-1,001812	0,2064967
age_group						
2	-0,2418127	0,2983114	-0,81	0,418	-0,8264922	0,3428669
3	-0,3574878	0,2535398	-1,41	0,159	-0,8544167	0,1394411
4	0,2301613	0,3691713	0,62	0,533	-0,4934011	0,9537237
5	-0,2871283	0,3366004	-0,85	0,394	-0,9468529	0,3725963
6	0,752308	0,4400617	1,71	0,087	-0,110197	1,614813
HH_Size	0,0491317	0,0566243	0,87	0,386	-0,0618499	0,1601133
children_5	-0,219777	0,1517329	-1,45	0,147	-0,5171681	0,0776141
children69	-0,0879665	0,1441185	-0,61	0,542	-0,3704336	0,1945006
girls1014	-0,2555552	0,1436987	-1,78	0,075	-0,5371995	0,0260891
boys1014	-0,2267963	0,1339033	-1,69	0,09	-0,4892419	0,0356493
prop_wom	0,0101285	0,0056812	1,78	0,075	-0,0010065	0,0212634
Sch_tribe	0,9272908	0,5923761	1,57	0,117	-0,233745	2,088327
Sch_caste	0,4036379	0,2196238	1,84	0,066	-0,0268167	0,8340925
Backward	-0,0724867	0,1483797	-0,49	0,625	-0,3633056	0,2183322
Muslim	-0,0682302	0,2703511	-0,25	0,801	-0,5981086	0,4616483
Christian	0,6318818	0,4668064	1,35	0,176	-0,2830419	1,546806
other_nonHinc	-0,5059309	0,3055353	-1,66	0,098	-1,104769	0,0929074

Table A13. **Probit regression, women self-employed**

Probit regression			Number of obs =	1642	
			Wald chi2(57) =	417.20	
			Prob > chi2 =	0.0000	
Log pseudolike =		-1549210.8	Pseudo R2 =	0.2156	
participation	Coef.	Robust Std. Err.	z	P>z	[95% Conf.	Interval]
montag	**-.1163651**	**.0466641**	**-2.49**	**0.013**	**-.207825**	**-.0249051**
literate	-.2277863	.2312684	-0.98	0.325	-.6810639	.2254914
primary	.0981295	.1608427	0.61	0.542	-.2171163	.4133754
middle	.0780594	.1505856	0.52	0.604	-.217083	.3732017
secondary	.018158	.1832786	0.10	0.921	-.3410614	.3773774
graduate	-.1586411	.288207	-0.55	0.582	-.7235164	.4062342
technical_edu	.3619208	.3081932	1.17	0.240	-.2421267	.9659683
vocational_tra	.3874827	.1451289	2.67	0.008	.1030354	.6719301
living_with_inl	.0681865	.2531419	0.27	0.788	-.4279626	.5643356
age_group						
2	-.1977055	.2224139	-0.89	0.374	-.6336287	.2382177
3	-.1916082	.2138167	-0.90	0.370	-.6106812	.2274649
4	.1776592	.2671854	0.66	0.506	-.3460145	.7013328
5	.0068843	.2677337	0.03	0.979	-.5178641	.5316327
6	.3026976	.2957627	1.02	0.306	-.2769866	.8823818
HH_Size	.0399867	.0512154	0.78	0.435	-.0603936	.1403671
children_5	-.1378322	.0827952	-1.66	0.096	-.3001079	.0244435
children69	-.0383234	.0977961	-0.39	0.695	-.2300003	.1533535
girls1014	-.2920593	.1063849	-2.75	0.006	-.50057	-.0835487
boys1014	-.0127299	.1135392	-0.11	0.911	-.2352626	.2098028
prop_wom	.0110748	.0045992	2.41	0.016	.0020605	.020089
Sch_tribe	.6545249	.3228026	2.03	0.043	.0218435	1.287206
Sch_caste	.2844822	.1789546	1.59	0.112	-.0662625	.6352268
Backward	.176814	.1502513	1.18	0.239	-.1176733	.4713012
Muslim	-.0337369	.2222434	-0.15	0.879	-.4693259	.4018521
Christian	.5608006	.2783694	2.01	0.044	.0152065	1.106395
other_nonHinc	-.1531539	.4118935	-0.37	0.710	-.9604503	.6541425

Table A14. Decomposition analysis, endowments

Variable	Coefficient	(Std. Err.)
Equation 3 : coefficients		
labourindex	0.126*	(0.059)
literate	0.007†	(0.004)
primary	0.045**	(0.009)
middle	0.030**	(0.007)
secondary	0.075**	(0.012)
graduate	0.027**	(0.009)
technical_education_ind	-0.003**	(0.001)
vocational_training_ind	0.005	(0.004)
living_with_inlaws	-0.056**	(0.006)
age_group==2	0.003	(0.008)
age_group==3	0.010	(0.010)
age_group==4	0.007	(0.008)
age_group==5	0.018*	(0.008)
age_group==6	0.003	(0.005)
Household size	0.134**	(0.044)
(sum) children_5	0.012	(0.008)
children69	-0.024**	(0.009)
girls1014	-0.017**	(0.005)
boys1014	-0.023**	(0.008)
prop_wom	0.250**	(0.039)
Sch_tribe	0.002	(0.002)
Sch_caste	-0.002	(0.006)
Backward	0.040**	(0.013)
Muslim	0.011*	(0.005)
Christian	-0.005**	(0.001)
other_nonHindu	0.001	(0.002)
income_group==2	-0.028†	(0.015)
income_group==3	-0.091**	(0.035)
income_group==4	-0.166**	(0.060)
income_group==5	-0.379**	(0.128)
share_regular_salary	0.051**	(0.017)
(max) underemployment	0.013*	(0.006)
Head	0.002*	(0.001)
avg_inc	0.178**	(0.067)
salary_ratio	0.032	(0.027)
grad_share	-0.114*	(0.055)
men_unempl_share	-0.028*	(0.013)
dist_agro	-0.040	(0.060)
dist_whitecollar	-0.021	(0.050)
dist_manuf	0.102*	(0.044)
dist_services	0.022	(0.085)
electricity_group==2	0.005	(0.009)
electricity_group==3	-0.033**	(0.011)
electricity_group==4	-0.049**	(0.016)
electricity_group==5	-0.098**	(0.026)
Intercept	0.560**	(0.090)
N	51503	
Log-likelihood	-	

Significance levels : † : 10% * : 5% ** : 1%

Table A15. **Decomposition analysis, coefficients**

Variable	Coefficient	(Std. Err.)
Equation 1 : overall		
group_1	0.998**	(0.000)
group_2	0.173**	(0.004)
difference	0.825**	(0.004)
endowments	0.447**	(0.021)
coefficients	0.790**	(0.008)
interaction	-0.411**	(0.022)
Equation 2 : endowments		
labourindex	0.000	(0.000)
literate	0.000	(0.000)
primary	0.000	(0.000)
middle	-0.003**	(0.001)
secondary	-0.007**	(0.001)
graduate	0.001*	(0.000)
technical_education_ind	-0.004**	(0.001)
vocational_training_ind	0.017**	(0.002)
living_with_inlaws	-0.001	(0.002)
age_group==2	-0.001†	(0.000)
age_group==3	0.000	(0.000)
age_group==4	0.002**	(0.001)
age_group==5	0.001*	(0.000)
age_group==6	0.002*	(0.001)
Household size	0.000	(0.000)
(sum) children_5	-0.002**	(0.001)
children69	0.000	(0.000)
girls1014	0.000	(0.000)
boys1014	0.000	(0.000)
prop_wom	-0.003**	(0.001)
Sch_tribe	0.000	(0.000)
Sch_caste	0.001†	(0.000)
Backward	0.000	(0.000)
Muslim	-0.001†	(0.001)
Christian	0.000†	(0.000)
other_nonHindu	0.000	(0.000)
income_group==2	-0.055**	(0.005)
income_group==3	0.039**	(0.004)
income_group==4	0.114**	(0.007)
income_group==5	0.370**	(0.015)
share_regular_salary	0.000	(0.000)
(max) underemployment	0.000	(0.000)
Head	-0.025	(0.029)
Bank_Account_Held_By_Any_Member	0.000	(0.000)
District_Density	-0.001†	(0.001)
electricity_group==2	0.000	(0.000)
electricity_group==3	0.000	(0.001)
electricity_group==4	-0.001	(0.002)
electricity_group==5	0.002	(0.002)
water_group==2	0.000	(0.000)
water_group==3	0.000	(0.000)
water_group==4	0.000	(0.000)
water_group==5	0.000	(0.000)

Significance levels : † : 10% * : 5% ** : 1%

Annex 7. Description of the variables employed

Independent variables	
Variable name	**Description**
Individual characteristics	
Education **Ref. = Illiterate**	
Literate below primary	Dummy variable that equals to 1 if and only if the woman is literate and has not completed primary education
Primary	Dummy variable that equals to 1 if and only if the woman has completed primary education
Middle	Dummy variable that equals to 1 if and only if the woman has completed middle education
Secondary	Dummy variable that equals to 1 if and only if the woman has completed secondary education and/or has obtained a diploma/certificate whose level is lower than the graduate level and higher than the middle school level
Graduate	Dummy variable that equals to 1 if and only if the woman has completed graduate education
Technical education	Dummy variable that equals to 1 if and only if the woman has obtained a technical education degree
Vocational training	Dummy variable that equals to 1 if and only if the woman has obtained a vocational training diploma
Lives with parents-in-law	Dummy variable equals 1 if and only if the woman is the spouse of a child of the household head
Age **Ref.= 25-29**	
30-34	Dummy variable equals 1 if and only if the woman's age is between 30 and 34
35-39	Dummy variable equals 1 if and only if the woman's age is between 35 and 39
40-44	Dummy variable equals 1 if and only if the woman's age is between 40 and 44
45-49	Dummy variable equals 1 if and only if the woman's age is between 45 and 49
50-54	Dummy variable equals 1 if and only if the woman's age is between 50 and 54
Household characteristics	
Number of members	Number of people living in the household
Children between 0 and 5	Number of children in the household whose age is between 0 and 5
Children between 6 and 9	Number of children in the household whose age is between 6 and 9
Girls between 10 and 14	Number of children in the household whose age is between 10 and 14
Boys between 10 and 14	Number of children in the household whose age is between 10 and 14
Proportion of women among adults (%)	Percentage of women among adults in the household

(Continued- "Independent variables")

Variable name	Description
Social group **Ref. = Others**	
Scheduled tribe	Dummy variable equals 1 if and only if the social group of the household is classified as scheduled tribe
Scheduled caste	Dummy variable equals 1 if and only if the social group of the household is classified as scheduled caste
Other backward class	Dummy variable equals 1 if and only if the social group of the household is classified as other backward class
Religion **Ref. = Hinduism**	
Islam	Dummy variable that equals to 1 if and only if Islam is the religion of the household
Christianity	Dummy variable that equals to 1 if and only if Christianity is the religion of the household
Other	Dummy variable that equals to 1 if and only if the household is not religious or the religion of the household is not Hinduism, Islam, or Christianity
Unearned income per hh member (quintiles) **Ref. = 1st**	Total wage and salary earnings of all members in the household except the woman in question for the work done in all activities during in the reference week in Rs divided by the number of members of the household. The earnings of the self-employed are imputed by means of a Heckman model
Regular earnings share of income	Percentage of the household income which is earned in regular salaried employment
Underemployed hh member	Dummy variable that equals to 1 if and only if at least one employed man in the household sought for work or was available for work for one month or more
Land **Ref. = No**	
cultivated (quintiles)	Land cultivated (number of hectares of land cultivated between July 2008 and June 2009)
Land owned (quintiles)	Land owned as on the date of the survey (number of hectares)
Household head education **Ref. = Illiterate**	
Literate below primary	Dummy variable that equals to 1 if and only if the household head is literate and has not completed primary education
Primary	Dummy variable that equals to 1 if and only if the household head has completed primary education
Middle	Dummy variable that equals to 1 if and only if the household head has completed middle education
Secondary	Dummy variable that equals to 1 if and only if the household head has completed secondary education and/or has obtained a diploma/certificate whose level is lower than the graduate level and higher than the middle school level
Graduate	Dummy variable that equals to 1 if and only if the household head has completed graduate education
Household head occupation **Ref. = Blue collar job**	
No economic activity	Dummy variable that equals to 1 if and only if the household head is not involved in an economic activity
Service sector job	Dummy variable that equals to 1 if and only if the household head occupation is a service sector job
White collar job	Dummy variable that equals to 1 if and only if the household head occupation is a white collar job
At least one hh member has a bank account	Dummy variable that equals to 1 if and only if at least one household member has a bank account

(Continued- "Independent variables")

District characteristics		
Variable name	**Description**	**Source and remarks**
Population density	Population density per km^2	Employment and Unemployment Situation in India 2009-10 (NSS 66th ROUND)
Age structure	Percentage of the district population whose age is between 15 and 64	Employment and Unemployment Situation in India 2009-10 (NSS 66th ROUND)
Average income	District average income per individual	id.
Female-to-male earnings ratio	Female-to-male ratio of district average earnings in the principal activity	Employment and Unemployment Situation in India 2009-10 (NSS 66th ROUND)
Women's most say	Women's most say index	India Human Development Survey (IHDS), 2005 (ICPSR 22626
Population share with graduate degree	Percentage of graduates	Employment and Unemployment Situation in India 2009-10 (NSS 66th ROUND)
Male unemployment rate	Percentage of unemployed men between 15 and 64 years old in the male labor force	id.
Shares of male employment (%) = Agriculture	Percentage of employed men between 15 and 64 years old in agriculture	id. Sector omitted (to avoid collinearity) : Construction
Shares of male employment (%) = Manufacturing	Percentage of employed men between 15 and 64 years old in manufacturing	id.- Sector omitted (to avoid collinearity) : Construction
Shares of male employment (%) = Services	Percentage of employed men between 15 and 64 years old in services	id.- Sector omitted (to avoid collinearity) : Construction
Shares of male employment (%) = White collar services	Percentage of employed men between 15 and 64 years old in white collar services	id.- Sector omitted (to avoid collinearity) : Construction
Government share on employment	Percentage of workers who work for the government	id.
Unionization rate	Percentage of workers who are members of a union/association	id.
Number of bank accounts per adult	Average number of bank accounts per adult	id.
Outstanding credit per capita	Average outstanding credit per capita	Employment and Unemployment Situation in India 2009-10 (NSS 66th ROUND) &
Availability of water closet (%)	Percentage of households having a water closet	Census of India 2011
Electricity = main source of lighting (quintiles)	Percentage of households having electricity as the main source of lighting	id. Ref. = 1st
Availability of enough water within the promises (quintiles)	Percentage of households having a source of potable water within the promises	id. Ref. = 1st
Availability of telephone or mobile phone (quintiles)	Percentage of households owning a telephone or a mobile phone	id. Ref. = 1st
Total length of roads per unit of area (quintiles)	Total length of roads in hundreds of kilometers divided by the district area	id. Ref. = 1st
State characteristic		
Labour regulation indicator		
Participation in the labour force	Dummy variable that equals 1 if and only if the woman is in the labor force with respect to the usual principal activity in the reference year	Employment and Unemployment Situation in India 2009-10 (NSS 66th ROUND)

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