MGNREGA and Women's Empowerment: An Analysis of the Impact of India's Largest Workfare Programme on the Welfare of Rural Women.

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Abstract

This paper uses longitudinal data from the Indian Human Development Survey (IHDS) to examine the impact of household participation in the National Rural Employment Guarantee Scheme (NREGS) on changes in women's empowerment. Empowerment is measured using a composite index that captures economic, sociocultural and interpersonal dimensions. An instrumental variables estimates strategy is employed to deal with potentially endogenous programme participation. The findings show that household participation in the scheme has significant positive impacts on changes in women's empowerment and the effect is larger in households where women participate in the scheme. These results indicate that India's public workfare programme has important implications for the welfare of rural women.

1.   Introduction

There are two main arguments favouring the promotion of women's empowerment as a factor in development policies (Duflo, 2012). The first is that equity is in itself an intrinsic human right and with women worse off than men in most developing nations, it is important to encourage policies that promote women's welfare. The second is that women play an important role in the development process. This argument stems from the rationale that reducing the gender gap in education, labour force participation and/or political participation will not only benefit women but also have positive implications for society as a whole. The World Bank identifies women's empowerment as a key element of policies designed to tackle poverty and drive sustainable economic growth (World Bank, 2001).

This paper examines the potential impact of a public workfare scheme on the autonomy of rural women in India. While gender gaps in education, autonomy, health and employment opportunities exist in all societies, these differences tend to be more pronounced in developing countries like India. Despite achieving a steady level of economic growth in the past decade, India has made little progress towards reducing the disparities between men and women. In

2018, the World Economic Forum's Gender Gap index ranked India 108 out of 149 countries with a decline in the country's individual ranking across all segments, namely economic participation and opportunity, health and survival, educational attainment and political empowerment. With women constituting a significant proportion of the working age population in India, reducing the disparities between men and women across all dimensions could have positive implications for both economic growth and development.

India's National Rural Employment Guarantee Scheme (NREGS) was implemented in 2006 with the primary aim of providing rural households with a guaranteed entitlement to wage employment. Today, it is one of the largest public workfare programmes in the world with wide ranging implications for the welfare of rural households. The study of NREGS's impact on women's empowerment outcomes in this paper is motivated by the presence of specific provisions under the scheme aimed at ensuring that women have equitable access to work.

NREGS mandates that one-third of the programme participants should be women, and this is likely to have implications for women's labour force participation rates in rural areas. Despite rapid economic growth since 2004, India has experienced declining rates of female labour force participation. This phenomenon is concentrated among women in rural areas aged 25-65 years (Afridi et al, 2012). As of 2011-12, only 35.8[1] percent of rural women participated in the labour force as compared to 81.4 percent of rural men. Additionally, the gender gap in participation rates in rural areas has widened by over 9 percentage points during the period 2004-05 to 2011-12.

One of the possible reasons for the decline is that women have limited opportunity to participate in paid work outside of the home (Mehrotra et al, 2016). However, women's participation in NREGS has remained relatively stable since its inception. According to the 2011 Census, while 34.9 percent of rural women participated in the workforce, their representation was higher at 48 percent on average for 2010-12 in NREGS (Narayan et al, 2014). Thus, it is evident that NREGS plays a role in increasing access to paid employment for women in rural areas. Additionally, the scheme contains provisions to further encourage the participation of rural women. It stipulates the payment of equal wages to men and women. It also requires work to be provided close to the participant's home and for the provision of creche facilities at worksites.

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[1] Labour force participation statistics are taken from the National Sample Survey Office's labour force surveys for 2004-05 and 20011-12.

The participation of women in the workforce is often thought of as an indicator of women's empowerment. Additionally, access to paid work can influence other indicators of empowerment, particularly autonomy in household decision-making. Existing literature notes that women who engage in paid work are more likely to have a say in household decisions including control over resources, experience greater mobility and make decisions to secure their wellbeing. Moser (1993) finds that the access to wage employment may change a woman's perception of her own contributions to household resources, possibly leading to better bargaining positions in the household. Further, Anderson and Eswaran (2009) find that in rural Bangladesh, engaging in paid employment contributes to a woman's autonomy in the household. Agarwal (1994) highlights the role of paid work as a contributing factor to a woman's bargaining power in rural areas.

Following this strand of literature, this study examines whether participating in NREGS improves a woman's status in intra-household bargaining dynamics. First, to examine any role NREGS plays in the empowerment of women, the concept of empowerment needs to be operationalised. The conceptualisation of empowerment has been widely discussed in literature. While there is some difference on how empowerment is viewed, most studies focus on some element of choice available to women or power to make own decisions.

Kabeer (1999) offers a definition that effectively captures the overlapping elements in many empowerment studies and that is applicable to the development context. The author describes empowerment as a process of change that enables women who were previously denied the ability to make life choices, acquire that ability. Following from this idea, this paper studies empowerment as a woman's ability to make choices that affect her wellbeing as well that of her family.

Here, working under NREGS influences a woman's intra-household bargaining power in keeping with literature on female empowerment and collective household bargaining theory (Manser and Brown, 1980, Chiappori, 1992). The bargaining model suggests that women can improve their intra-household bargaining power by improving their outside option. In this context, NREGS offers many rural women with the opportunity for paid work, improving their outside option. This holds true particularly for those women who did not have access to paid work prior to the scheme. Thus, this study hypothesizes that participating in NREGS has positive implications for a woman's status in intra-household bargaining dynamics.

Since work under NREGS is provided at the household level and there is no restriction on how the work is allocated amongst adult members in a household, this study examines the impact of household participation in the scheme on empowerment. This is intended to capture

any impact on empowerment outcomes due to women's participation in the scheme as well as any indirect impacts when men in the household participate in the scheme. Men's participation in the scheme could impact empowerment outcomes through income effects or through potentially changing attitudes towards women's participation in wage work.

This paper uses longitudinal data from a nationally representative survey that collects information on the same rural women aged 15 to 49 years in 2004-05 and 2011-12. The first round of the survey covers the period prior to the implementation of NREGS and the second round is carried out after the scheme was operational across all rural districts in the country. The panel structure of the data enables an examination of the impact of NREGS on women's empowerment as a dynamic process. Here, the survey's module on gender relations is used to construct a women's empowerment index that captures economic, interpersonal and sociocultural dimensions of empowerment. The empirical results indicate that household participation in the scheme has a positive impact on women's status in intra-household bargaining dynamics. The results are positive and significant for the overall index as well as for each of the three sub-indices.

This paper extends the general literature on labour force participation and empowerment. The empirical results are consistent with existing research that indicates a positive association between a woman's access to paid work and her household bargaining power. This paper also contributes to the literature on the impact of NREGS on the welfare of rural women. There is limited empirical work that assesses whether participation in NREGS leads to changes in empowerment indicators. Moreover, the existing studies use a difference-in-differences approach and fixed effects to deal with endogenous programme participation. This paper attempts to estimate the causal impact of the scheme on women's empowerment using an instrumental variables estimation strategy. Further, unlike the other papers, this study allows for a differential impact of the scheme on different dimensions of empowerment.

The rest of this paper is organised as follows. Section 2 provides a general background on the reform. Section 3 provides a review of existing literature on the impact of the programme. Section 4 describes the data and the outcome variables. Section 5 outlines the empirical strategy. Section 6 presents the results and Section 7 concludes.

2. Background on reform

The National Rural Employment Guarantee Act (NREGA) was passed by the Parliament of India in 2005 with the aim of improving the livelihood security of rural households through the provision of unskilled manual work. Under this legislation, any rural household that demands work is guaranteed up to 100 days of wage employment per year at the statutory minimum wage rate. However, it was assumed that the nature of work and low wage rate provided under NREGA would largely result in the poor self-selecting into the programme. The enactment of the legislation resulted in the implementation of the National Rural Employment Guarantee Scheme (NREGS) in 2006 and today, NREGS constitutes the largest workfare programme in the world. The act was renamed the Mahatma Gandhi Rural Employment Guarantee Act (MGNREGA) in 2009.

NREGS was implemented across the rural districts of the country in three phases. The roll-out of the programme was non-random and based on a district backwardness index constructed by the Planning Commission of India. It was first implemented in February 2006 in 200 of India's poorest rural districts and subsequently extended to cover an additional 130 districts in April 2007. The final phase in April 2008 made the scheme available to the remaining rural districts in the country.

In addition to the primary aim of generating wage employment, the act aimed at the creation of durable assets in rural areas to provide for long-term employment opportunities and encourage sustainable development in these areas. Projects taken up under NREGS include road construction, drought proofing, flood control, water conservation and water harvesting. Households interested in participating in these projects must first file an application for a job card at the Gram Panchayat (local village council). The NREGS job card lists the adult members of a household including details of past employment and wage payments under the scheme. The Gram Panchayat issues only one job card per household and is required to do so within 15 days of receipt of an application. Once in possession of the job card, members of the household can apply for work by submitting a written application to the Gram Panchayat. The provisions of the act call for the payment of an unemployment allowance if work is not allotted to the household within 15 days of application. In addition, the act requires employment to be provided within a 5-kilometre radius of the applicant's home, failing which, the applicant is eligible for a transport allowance.

A key feature of the scheme is that it contains provisions that specifically seek to encourage the participation of rural women. First, NREGS mandates that one-third of its participants be

women. Second, the act also stipulates the payment of equal wages to men and women. This provision is especially important because the average casual wage rate for women is lower than that for men across all Indian states. As of 2009-10, the average wage rate under NREGS was higher than the average casual wage for women across all states. (Ministry of Rural Development, 2012). Thus, wage equity under the scheme implies an increase in the earning potential for rural women (Khera and Nayak, 2009). Third, the act requires the provision of childcare facilities at any NREGS worksite where more than five children below the age of six years are present.

NREGA is funded jointly by the central and state governments. The central government covers the entire wage costs but only 75 percent of the material costs. The remainder of the material costs is borne by the state governments, which are also responsible for any unemployment allowance resulting from not being able to provide work within the stipulated time period. Additionally, the wage and piece rates are set by the state governments. In the six years following its implementation, NREGS generated more than 12 billion person days of employment with a total expenditure in excess of 23 billion USD (Ministry of Rural Development, 2012).

3.   Literature Review

There is a large body of literature examining the potential impact of NREGS on various aspects of rural welfare. As a largescale workfare programme, NREGS's impact on labour markets has been widely studied. Azam (2012) uses a difference-in-differences approach and National Sample Survey (NSS) data to estimate the scheme's impact on labour market outcomes. He finds that NREGS has a positive impact on labour force participation rates as well as the real wages of casual workers. The results also show that the effect is significantly stronger for women suggesting that the scheme plays a role in reducing prevailing gender wage gaps.

Similar effects are reported by Imbert and Papp (2015) using the same data and a similar empirical strategy. They compare early and late phase districts to find that NREGS employment crowds out private sector work and increases casual wages in the private sector by 4.7 percent. Additionally, the authors find that the effect is concentrated in states that were known to implement the programme well.

Using a similar approach and a data series on agricultural wages, Berg et al (2017) find broadly similar results. They find that the scheme increased the real agricultural wage rate by 4.3 percent per year and that the effect was concentrated in the main agricultural season. Unlike

Azam (2012), Berg et al (2017) find no evidence of a differential impact on the wages of men versus women. Using NSS data and a regression discontinuity approach, Zimmermann (2015) finds substantially different results. She finds that the scheme does not result in a significant increase in either public sector employment or real wages in the private sector. Her results also show no evidence of a difference in impact across gender. The author, however, does find that take up of NREGS increases after a negative rainfall shock suggesting that the programme performs as an effective safety net.

The existing literature on NREGS also includes several descriptive studies that document the impact of the scheme on the lives of rural women. Using a four-state survey, Jandu (2008) measures the benefits of NREGS to women over a two-year period following its implementation. The author finds that despite the need for an increase in supply of work under the programme and more timely payment of wages, NREGS has contributed to the empowerment of women. Some of the perceived benefits include reduced need for migration, lower dependence on money lenders and increased health expenditure. Further, the survey responses suggest that women experience greater confidence in decision-making and enjoy more economic independence as a result of the scheme.

Narayan (2008) finds similar results using a survey covering 15 NREGS worksites in Viluppuram district in Tamil Nadu. She concludes that though NREGS has a positive impact on the lives of women in rural areas, the lack of proper child-care facilities prevents the scheme from reaching its full empowerment potential. Similarly, Khera and Nayak (2009), in their survey of 1060 NREGS workers in six North Indian states find that the lack of creches at worksites and presence of illegal contractors hinder women's participation in the scheme. However, the study finds that despite the barriers, the women who do participate experience improved food security, better ability to cope with illness, reduced need for migration and protection from exploitative work.

Pankaj and Tankha (2010) find broadly similar results from a field survey conducted in Bihar, Jharkhand, Rajasthan and Himachal Pradesh. Their findings show that women who collect their wages themselves experience greater choice over their consumption basket and increased involvement in household decision making processes. Additionally, the authors find no evidence of change in women's participation in community development processes, indicating that the scheme's benefits on empowerment may be limited to the household level. Pellisary and Jalan (2011) study a village in Guntur district in Andhra Pradesh and unlike the above studies, find no immediate impact of the scheme on the social transformation of women. The authors find some evidence of increased choices available to women and suggest that the

scheme has the potential to contribute to women's empowerment through improved gender relations. Overall, most of the qualitative literature on the empowerment effects of NREGS reinforces the earlier view that the scheme's ability to empower women lies in its ability to reduce their economic dependence on family members (Dreze and Oldiges, 2007).

There is some empirical literature that largely supports the above findings of NREGS's impact on women's empowerment. Amaral, Bandhyopadhyay and Sensarma (2015) estimate the impact of NREGS on women's welfare using gender-based violence as the outcome of interest. The authors find a reduction in women's welfare using data on crimes against women from the National Crime Record Bureau and a difference-in-differences approach. They show that increased participation of women in the labour force due to NREGS has led to an increase in gender-based violence with the exception of dowry deaths.

However, Desai, Vashishtha and Joshi (2015) find a largely positive impact of the scheme on women's empowerment. The authors use two waves of the Indian Human Development Survey (IHDS) and a difference-in differences framework to examine the impact of the intensity of NREGS participation on various indicators of women's empowerment and child development. Indicators include the ability to freely seek healthcare, decision-making power, control over spending decisions, completed grades of schooling and reading and writing scores. They find that scheme has an overall positive impact on most of the indicators of women's empowerment and child development particularly for those households where women participate in the scheme. They suggest that most of the positive empowerment impact could be due to NREGS likely providing the first opportunity for paid work for most rural women.

Barcia de Mattos and Dasgupta (2017) find similar results using the same data and a slightly different approach. The authors construct an index to estimate the impact of the scheme on a women's empowerment and find that women who participate in NREGS are twice as likely to have control over household resources and decision making. However, they find limited evidence of empowerment leading to transformative gender equality as measured by time spent in school by the older girl child in the household. Desai (2015) uses the same data and a difference-in-differences approach to examine the impact of the scheme on women's economic empowerment as measured by participation in paid work and total wage incomes. She finds a significant positive impact particularly for those women living in villages with a higher availability of the scheme. They do not find similar effects for men.

A section of literature studies the impact of NREGS on child wellbeing through its impact on women's labour force participation. Afridi, Mukhopadhyay and Sahoo (2012) use the child and household panel from the Young Lives study in Andhra Pradesh to analyse the impact of

mothers' labour-force participation on children's educational outcomes. The authors use an instrumental variables strategy and finds that increased labour-force participation by mothers due to NREGS leads to better grade progression and increases the time spent at school by children. They also establish that this change is driven mainly by working mothers having greater decision-making authority, as opposed to income and substitution effects.

Dev (2011) uses existing studies on NREGS impact in various states and a small focus group in Rajasthan to understand the mechanisms through which NREGS has an impact on household and child outcomes. He finds a positive impact on women's nutrition and empowerment outcomes, which in turn leads to improved infant feeding and increased health expenditure on children. Different results are found in Das and Singh (2015) which uses two phases of the District Level Household and Facility Survey and a difference-in-differences approach to study the impact of NREGS on children's educational outcomes. They find no evidence of improvement in education outcomes due to NREGS but conclude that the lack of an effect could be the result of opposing income and substitution effects.

Li and Sekhri (2013) find mixed results when assessing the impact of NREGS on school enrolment outcomes using the District Information System for Education data. They find an increase in private school enrolment but worse outcomes in terms of grade repetition and pass rates. They attribute this to children leaving school to perform household chores in response to increased labour-force participation by parents. A similar study by Shah and Steinberg (2015) estimates the impact of NREGS on human capital investment. They use data from the Annual Status of Education Report and the NSS to show that increased labour demand due to NREGS leads to an increase in the opportunity cost of schooling for children and thereby reduces investment in human capital. Using a difference-in-difference strategy, they find that NREGS leads to a 2-percentage point decrease in enrolment. Additionally, their results show that math scores decline by 2 percent of a standard deviation with 13-16-year-olds being the most affected group. They show that the impact is driven by adolescent boys substituting for paid work and adolescent girls substituting for unpaid domestic work.

4.   Data

The analysis in this paper uses data from two waves of the Indian Human Development Survey (IHDS) series conducted jointly by the National Council of Applied Economic Research (NCAER) and the University of Maryland. The IHDS is a nationally representative survey that collects data for over 40,000 households across 28 states and 5 union territories in both rural

and urban areas. It is a multi-topic survey containing information on economic status, employment including NREGS employment, health and education at the household and individual levels. In addition, the survey includes a module containing information on marriage history, fertility, contraception and gender relations for at least one ever-married woman per household.

The first wave of the IHDS (IHDS-I) was conducted during 2004-05 prior to the implementation of NREGS and covered 41,554 household and 215,754 individuals. The second wave (IHDS-II) was carried out during 2011-12, by which time the scheme was operational in all districts of the country. The IHDS-II re-interviewed 83 percent of the original households including any split households that resided in the same village. The recontact rate was higher at approximately 90 percent in rural areas. Randomly selected households were used as replacements in areas where attrition was particularly high. The final sample included 42,152 households and 204,569 individuals. While both waves of the survey are similar in most aspects, they are not identical. The second wave interviewed more than one ever-married woman per household and contains additional information on various aspects of households and individuals. Notwithstanding the discrepancies in the two waves of data collection, the IHDS series offers a panel dataset that benefits from a high re-contact rate and in-depth information on various topics that facilitate the examination of long-term impacts of socio-economic policies and programmes.

To minimise any bias that may arise due to attrition which could be non-random, the longitudinal analysis in this paper is restricted to only those households and eligible women interviewed in both rounds of the survey. Further, the panel excludes households and individuals residing in urban areas as the scheme specifically targeted rural households. Lastly, to maintain a homogenous household structure within the sample, the panel is further limited to include only those women who are married and living with their spouse in both rounds of the survey. This excludes any woman who separated from her husband or was widowed between the survey rounds. Thus, the final sample includes observations on 14,918 ever-married women interviewed in both survey rounds.

For the purpose of this study, measures of women's empowerment are constructed using the survey's module on "eligible women". An eligible-woman is defined as an ever-married woman (including currently married, separated, divorced and widowed) aged between 15 and 49 years. The questionnaire administered under this module collected information reflective of an eligible woman's self-assessed status over various aspects of decision making in the household. It

included questions on mobility, fertility, beliefs about health, attitudes towards domestic violence and other aspects of gender relations.

Here, a composite index is constructed to capture the multi-dimensional nature of women's empowerment. The index comprises of indicators which measure three distinct dimensions of empowerment commonly used in empirical empowerment literature, namely, economic, sociocultural and interpersonal dimensions. The sub-indices are constructed by grouping together responses to questions that reflect an eligible woman's degree of control within the required dimension of decision making. The *economic sub-index* measures a woman's access to or control over resources. It includes responses to the following questions, asked in both rounds:

- Do you yourself have cash in hand to spend on household expenditures?

- Is your name on the ownership or rental papers for your home?

The *sociocultural sub-index* measures a woman's degree of mobility and is constructed using the following questions:

- Do you have to ask permission of your husband or a senior family member to go to the local healthcentre?

- Do you practice the ghungat/purdah/pallu?

Lastly, the *interpersonal sub-index* measures a woman's status in the domestic decision-making process using the following questions:

- Do you have a say in what to do if your child falls sick?

- Do you have a say in how many children you have?

- Do you have a say in whether to buy an expensive item such as TV or fridge?

All the above questions are dichotomous asking for yes/no responses. The response to each question is assigned a value of one if it is indicative of a positive empowerment effect and zero otherwise. For instance, a value of one is assigned if a woman does not practice the purdah or if she has a say in deciding the purchase of an expensive item. Each individual sub-index is obtained by averaging the assigned values across its component questions and ranges between

0 and 1. Lastly, the composite index of women's empowerment is obtained by averaging the economic, sociocultural and interpersonal sub-indices.

To maintain objectivity, equal weights are assigned to responses to construct the index. However, for observations with missing responses to one or more of the component questions, the index is constructed by assigning equal weight to the non-missing responses[2]. This limits the breadth of the index and may lead to an overestimation of the overall impact where missing values represent negative responses for empowerment. However, the questions within each index are generally reflective of the same latent factor that drives empowerment along that dimension and therefore these responses tend to be positively correlated. Thus, any bias arising due to this should be limited. The resulting women's empowerment index ranges between 0 and 1 with 0 indicating no empowerment and positive values indicating movement towards empowerment. Since this study is concerned with changes and not levels of empowerment, any positive change in empowerment due to the programme participation will be considered favourable.

Table 1 provides summary statistics for the rural sample in the final dataset. Mean values for both outcomes as well as household characteristics, prior to the implementation of the scheme have been computed for participant and non-participant households. The non-participant households are significantly different from the participating households in terms of most of the outcomes as well as the household and eligible woman characteristics. However, the household and eligible woman characteristics have been included as controls in the regression specification as they can independently influence the outcomes of interest.

5. Empirical Strategy

The baseline difference-in-differences specification is

$$Y_{it} = \alpha_i + \beta post_t + \gamma participate_i + \delta(post * participate)_{it} + Z_{it} + \epsilon_{it}$$

Here, Y_{it} is the composite index of women's empowerment for the eligible woman in household i at time t. α_i captures household fixed effects. $Post_t$ is a binary indicator of time that equals zero for the pre reform period (2004-05) and one for the post reform period (2011-12). $Participate_i$ is a dummy variable capturing household participation in NREGS. It equals one if

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[2] Missing value pattern analysis shows that approximately 91 percent of the observations have no missing responses. Logit regressions of missing responses on eligible woman characteristics show age and education to be a significant predictor.

any member in household i; male or female, participated in the scheme in the twelve months preceding the survey. This includes part-time work (greater than 240 hours but less than full-time work), other work (less than 240 hours) and in some cases full time work (at least 250 days and 2000 hours). This term drops out from the specification due to the inclusion of fixed effects.

Z_{it} is a vector of observed time-varying household and eligible woman characteristics commonly used in literature as independent determinants of a woman's intra-household bargaining power. The household controls capture household structure and include household assets, total number of working-age members and the highest level of adult male education measured in years. These covariates are often negatively correlated with the level of say a woman has in the intra-household decision making process. The eligible woman characteristics included in the regression are age, completed years of education and number of children. While age and education are expected to be positively correlated with empowerment outcomes, fertility is generally hypothesised to have a negative relationship with empowerment. The square of age is also added to account for any possible non-linear relationship between age and empowerment outcomes.

OLS estimates of the causal impact of household participation in NREGS on changes in the empowerment index may be subject to bias. This is because participants self-select into NREGS work and therefore households that choose to participate in the scheme are likely to differ from those who do not. The difference can arise from observable characteristics such as income and education as well as from unobservable characteristics such as personality or motivation. Further, estimates may also be biased due to reverse causality arising from a possible bidirectional relationship between programme participation and empowerment. On the one hand, participation in NREGS could have an impact on women's empowerment, but on the other hand, households that have higher empowerment levels may be more likely to participate in the scheme. Including the vector of controls accounts for time-variant observable characteristics which simultaneously determine household participation in the programme and levels of empowerment. Additionally, to account for heterogeneity caused by time-invariant unobservables, household fixed effects are included in the specification.[3]

The coefficient of the interaction term provides the causal estimate of interest. In other words, the parameter δ measures the change in empowerment outcomes for households that participated in the scheme compared to those that did not. Lastly, ϵ_{it} is the error term. As

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[3] As the analysis includes only one eligible woman per household between survey rounds, these fixed effects should control for any time-invariant sources of heterogeneity at the individual level.

observations within each village are expected to be correlated, the error term is clustered at the village level.

The validity of the estimates obtained from the above specification rests on the assumption that the controls and fixed effects included in the model sufficiently account for the potential endogeneity of household participation in NREGS. This implies that the unobserved characteristics which simultaneously determine household participation in the scheme and the eligible woman's status in intra-household bargaining dynamics are assumed to be time-invariant. While this assumption may be reasonable for shorter time periods, it may not hold over the time period considered here. Thus, it is important to consider that the some of the unobservable characteristics that impact both a household's decision to participate in the scheme and the bargaining power of women in that household could vary over time. Some of these characteristics include motivation, attitudes towards unskilled work, awareness of rights, prior experience with the scheme, attitudes and beliefs of other household members and cultural norms in the village. Not accounting for these characteristics could lead to biased estimates of programme impact. To address this concern, an instrumental variable (IV) strategy is adopted in addition to the fixed effects model. For this purpose, the availability of NREGS in a village is used as an instrument for household participation in the scheme.

An instrument must satisfy two basic conditions. First, it must be correlated with the endogenous regressor. This is known as the relevance assumption. Moreover, it must be uncorrelated with the residual in the structural equation. Here, the structural equation is represented by the baseline specification. This is known as the exclusion restriction and ensures that the IV does not affect the outcomes of interest except through its impact on endogenous regressor. Provided these conditions are satisfied, IV estimation will lead to consistent estimates of causal impact. The IV estimation procedure can be represented as follows:

First stage:

$$participate_i = \alpha_i + \beta post_t + \gamma instrument_i + \delta(post * instrument)_{it} + Z_{it} + \epsilon_{it}$$

Second stage:

$$Y_{it} = \alpha_i + \beta post_t + \gamma \widehat{participate}_i + \delta(post * \widehat{participate})_{it} + Z_{it} + \epsilon_{it}$$

Reduced form:

$$Y_{it} = \alpha_i + \beta post_t + \pi instrument_i + \lambda(post * instrument)_{it} + Z_{it} + \epsilon_{it}$$

The remainder of this section describes the instrument and discusses its validity. By the second round of the survey, NREGS was accessible to all rural districts in the country and it was reported that at least one in four rural households was participating in the scheme (Desai et al, 2015). However, close to one-third of the individuals in the IHDS sample resided in villages where no household participated in the scheme. Figure 1 shows the number of villages in the sample that have no participating sample households. The lack of participation could be the result of either low demand for work or the scheme not being operational in a village. However, given that over 70 percent of rural households in the IHDS sample claim the lack of enough work to be the reason for non-participation (Desai et al, 2015), it would seem likely that there was demand for work in villages with no participating households.

While all rural households in a village are expected to have access to the scheme, the actual availability of the scheme depends largely on the presence of efficient village officials or good local administrative capacity to implement the scheme. The reason for this stems from the administrative design of the programme. NREGS is a demand-driven scheme where local village authorities play a key role in its implementation process. While households interested in participating in the programme needed to register their interest in the local village council meeting, it is important to note that local village council itself has primary responsibility for generating demand for NREGS projects. In addition to first identifying the list of works in the village, at least 50 percent of the cost of works is to be implemented through the Gram Panchayat. This would suggest that limited administrative capacity at the village level can have a substantial impact on the ability of the poor to access work under the scheme. Existing empirical work using NSS data shows that the demand for work under NREGS far exceeds its supply which leads to rationing of work under the scheme (Dutta et al, 2012, Das, 2015). Further, Desai et al (2015) reports that a significant proportion of the variation in NREGS participation in the IHDS data is driven by differences in participation across villages within districts. Additionally, note that villages in the IHDS sample with no observed NREGS participation are not confined to poorer states. Figure 2 shows the distribution of the zero-participation villages by state. It can be seen that even states like Andhra Pradesh, Tamil Nadu and Rajasthan, known for their high levels of implementation, have villages with no NREGS participation.

Taking this into account, an instrument reflecting the availability of the scheme in a village is constructed. First, data on household participation in NREGS is aggregated at the village level to ascertain the number of households within each village that have participated in the scheme. This is then used to construct a binary indicator of scheme availability in a village. The

scheme is assumed to be operational in a village if at least one household in the village participated in the scheme. However, to account for any bias arising due to household's own potentially endogenous participation status, the instrument for each household equals one only if at least one *other* household in the village participated in the scheme.

The instrument captures whether NREGS is active in a village, and this has a direct impact on the probability of household participation in the scheme. The idea behind the instrument is similar to an 'encouragement design'. In principle, households in all villages in rural areas are eligible to participate in NREGS. However, households in some villages, where NREGS is active, receive an "invitation" to participate in the scheme.

Thus, in villages where NREGS is operational, households are more likely to participate in the programme. The first stage regression is shown in Table 2. The instrument appears to be strongly correlated with household participation in NREGS. In other words, households in villages that have an active scheme are more likely to participate in the scheme relative to households in other villages. This satisfies the relevance assumption. Further, the F-statistic is large, suggesting that the endogenous regressor is unlikely to suffer from bias due to weak identification.

Additionally, for the instrument to be valid, it must influence women's empowerment only through household participation in the scheme. In other words, the presence of an active village council and better implementation policies should not be systematically linked to any unobserved factors in the residual that relate to both household participation in the scheme and changes in empowerment. Again, the scheme being operational in a village is largely a function of supply side factors such as the administrative capacity of its local village council rather than demand side factors such as income and other household characteristics. Therefore, there is no reason to believe that the instrument is linked to unobservable factors that determine a woman's status in intra-household bargaining power dynamics. Table 3 provides mean values of village-level organisation memberships and household and eligible-woman characteristics for households for the pre reform period based on whether they have access to an active scheme or not. Households in villages with an active scheme do not appear to be significantly different from households in villages without an active scheme in terms of being members of Mahila Mandals[4] or caste associations. They do differ in terms of being members of self-help groups or NGOs and household and eligible women characteristics. However, most of these variables have been included as controls in the specification. Further, the inclusion of fixed effects and

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[4] Informal social service clubs in villages for women and girls.

controls should minimize concerns over village-level unobservables that may impact the probability of the scheme being operational in a village. Given this, it seems reasonable to conclude that the instrument complies with the exclusion restriction.

The impact estimates for this study are obtained under the additional assumption that treatment is a monotonic function of the instrument. In other words, the probability of households participating in the scheme is positively correlated with scheme being operational in a village. Given that since its implementation in 2006, the demand for work under NREGS far exceeds its supply, the monotonicity assumption appears reasonable. Under this additional assumption, the IV estimates provide the Local Average Treatment Effect (LATE) which measures the impact of household participation in NREGS on compliers.

A potential concern about the instrument is the presence of measurement error. In villages where no sample household was observed to have participated in the scheme, it is possible that households outside the sample did in fact participate in the scheme. Therefore, the absence of participating households in a village does not necessarily rule out the possibility of the scheme being operational in that village. However, it is likely that participation in these villages was very low. In this case, the instrument would capture the impact of a small improvement in a village's capacity to implement the scheme on changes in women's empowerment. While this changes the interpretation of the results slightly, it is not likely to bias the estimation procedure. This is primarily because households are more likely to participate in the scheme in villages with higher NREGS activity. Further, the impact of an improvement in implementation capacity is relevant for policy given implementation challenges have prevented the scheme from reaching its full potential.

6. Results

Results are presented for the overall index of women's empowerment as well as for each of the sub-indices. This is done to examine if participation in the scheme has differential impacts across the three dimensions of empowerment considered in this study. Table 4 presents the results from the OLS and IV specification for the women's empowerment index. The OLS results are statistically significant and suggest that household participation in NREGS is positively associated with changes in empowerment. The addition of controls to the specification results in a small increase in the size of the impact. The inclusion of fixed effects does not change the results. The full specification with controls and fixed effects (column (3)) shows that household participation in the scheme is associated with a 0.05 unit increase the

index or around 22 percent of a standard deviation at baseline. However, while the IV results are identical in direction to the OLS estimates, they are larger in magnitude. This would imply that the impact on the compliers is larger than that on the rest of the population. The IV estimates suggest that for households that choose to participate in the scheme in response to it being operational in the village, the overall index increases by 0.12 units or around 55 percent of a standard deviation at baseline. The result is statistically significant at the 1 percent level.

Next, Tables 5-7 report results from OLS and IV regressions for each of the three sub-indices used to construct the index. A comparison of the impact estimates across the sub-indices reveals that household participation in the scheme has the most impact on the interpersonal dimension of empowerment. As before, the IV estimates are larger in magnitude than the OLS estimates and indicate that household participation in the scheme increases the eligible woman's domestic decision-making power by 0.14 units. The impact is significant at the 1 percent level. The results are equally significant but slightly smaller in size for the economic sub-index. The IV estimates suggest that household participation in the scheme is accompanied by a 0.13 unit increase in the eligible woman's access to resources. Both the OLS and IV results for the sociocultural sub-index suggest that household participation in the scheme is associated with a significant increase in the eligible woman's mobility. The IV estimates indicate that household participation in NREGS increases the sociocultural sub-index by 0.09 units.

The above results suggest that while household participation in NREGS did lead to positive changes in the empowerment indicator, the impact was not uniform across the three constituent dimensions. The increase in the overall index is driven by changes in the economic and interpersonal sub-indices. The positive impact of the scheme on the economic sub-index is perhaps not surprising given that NREGS workers are paid wages in cash. Further, the impact of NREGS participation on the interpersonal sub-index could be explained by the positive correlation between a woman's access to resources and her bargaining position in the household. Following literature, women's participation in the labour force is expected to have a positive impact on her mobility. This is reflected in the results which show an increase in the sociocultural sub-index. However, it should be noted, that the results reflect changes in the index and therefore, a positive change does not necessarily imply that a woman is empowered. It simply indicates that in households which participated in NREGS, eligible women experience larger increases in the empowerment index and in doing so, move in the direction towards becoming empowered.

6.1. Further Analysis

In this section, the IV estimation procedure is carried out for subsamples defined by the gender of the NREGS participant. This is motivated by two factors. First, NREGS contains provisions to encourage the participation of women. Second, empirical empowerment literature generally focuses on the relationship between women's participation in paid work and an increase in their bargaining power. Thus, it would be interesting to analyse if the impact of NREGS on empowerment varies based on the gender of participant.

Table 8 presents the IV estimates for the subsample excluding female participants and Table 9 presents the estimates for the subsample excluding male participants. A comparison of the results shows a significant and positive impact of participation on the overall index for both subsamples. The index increases by 0.17 units when men participate in the scheme and by 0.28 units when women participate in the scheme. Additionally, the impact is significant on the economic as well as the sociocultural index in both cases, but is larger in magnitude when women participate in the scheme. No significant impact is found for the interpersonal index when men participate in the scheme. However, the interpersonal index for eligible women in households where women participate in the scheme increases by 0.31 units and is significant at the 1 percent level. Lastly, Table 10 shows the IV results for impact on empowerment if the participating member in the household is the eligible woman. The results are similar to the subsample excluding male participation but are slightly larger in magnitude.

The subsample analysis suggests that while women seem to benefit so long as their reservation wage is altered, they appear to benefit more through actually participating in the scheme. In other words, women's participation in the scheme might play an important role in bringing about changes in their intra-household bargaining power. Importantly, larger benefits accrue to women who participate in the scheme themselves.

A potential concern with the analysis in this study is that it fails to account for the eligible woman's labour force participation history. These variables have not been included in the regression on account of potential endogeneity reasons. In this section, IV regressions will be shown for two subsamples of eligible women based on their labour force participation history. The IHDS provides data indicating whether the eligible woman participated in paid work in 2004-05. Here, paid work includes salaried work or non-agricultural wage work or agricultural wage work. Using this information, the IV specification is run separately for the subsample of women who did work for pay in the first year of the survey and those who did not.

Tables 11 and 12 present the IV regression results for women who were not engaged in paid work in 2004-05 and for women who were engaged in paid work in 2004-05 respectively. It can be observed that the impact on women who did not work for pay is larger for the overall index as well as for the economic, sociocultural and interpersonal dimensions. The results suggest that for women who did not work for pay in 2004-05, the overall index increases by 0.13 units with increases of 0.16 units in the economic sub-index, 0.09 units in the sociocultural sub-index and 0.15 units in the interpersonal sub-index. The index increases by 0.09 units for women who engaged in paid work in 2004-05. Further, the economic sub-index increases by 0.09 units, the sociocultural sub-index increases by 0.08 units and the interpersonal sub-index increases by 0.11 units.

Desai et al (2015) suggest that NREGS likely offered the first opportunity for many rural women to engage in paid work and earn a cash income. This could explain the larger impact on the group of women who did not engage in paid work in 2004-05. It is also interesting to note that NREGS benefits women who have engaged in paid work prior to the scheme. This suggest that in some way, NREGS might be different from other paid work. Sarkar et al (2019) find that NREGS significantly reduces the exit probability of women from the labour market. This could indicate that access to NREGS enables rural women retain their labour force participation status and thus, has an impact on their household bargaining power.

Lastly, there may be possible spillover effects for non-participant households in villages with an active scheme. To check for any such spillover effects, the following specification is run on the subsample of non-participants:

$$Y_{it} = \alpha_i + \beta post_t + \gamma instrument_i + \delta(post * instrument)_{it} + Z_{it} + \epsilon_{it}$$

Here, Y_{it} is the composite index of women's empowerment for the eligible woman in household i at time t. α_i captures household fixed effects. $Post_t$ is a binary indicator of time that equals zero for the pre reform period (2004-05) and one for the post reform period (2011-12). $Instrument_i$ is a dummy variable capturing the household's access to an active scheme. It equals one if household i is a village with an active scheme and zero. Z_{it} is a vector of observed time-varying household and eligible woman characteristics. ϵ_{it} is the error term clustered at village level.

The results are presented in Table 13. It can be observed that eligible women residing in households in villages with an active scheme experience a weakly significant increase in the overall index of 0.02 units. Additionally, the economic sub-index increases by 0.03 units and

the sociocultural sub-index increases by 0.05 units. The interpersonal sub-index increases by a small magnitude but is not statistically significant.

Non-participation is potentially endogenous and therefore these results do not necessarily represent a causal impact. However, they might indicate the presence of spillover effects. These effects could be the result of possible demonstration effects or changing social norms in villages where women participate in the scheme.

7.   Conclusion

This paper studies the effect of participation in India's National Rural Employment Guarantee Scheme on women's empowerment using a nationally representative panel survey. Empowerment is measured by a composite index constructed to capture economic, sociocultural and interpersonal dimensions. Further, to identify the impact of potentially endogenous participation, an instrumental variable estimation strategy used.

The regression estimates obtained suggest that participation in the scheme is associated with an increase in the overall index. The effect is also positive and significant for the economic, sociocultural and interpersonal sub-indices indicating that participating in NREGS increases a woman's access to resources, her mobility as well her status in domestic decision making in the household. These findings are consistent with most of the qualitative studies that examine the impact of the scheme on the welfare of rural women. Further, the analysis finds larger significant increases in the index as well as each of the three sub-indices for women who were not engaged in paid employment in the first round of the survey relative to women who had participated in the workforce. This suggests that NREGS leads to positive changes in empowerment for women irrespective of their work history.

The validity of the estimates computed depend largely on the validity of the instrument used in the estimation process. However, the estimated impact of household participation in NREGS on women's empowerment is identical in direction to the results found in existing empirical studies. Further, the subsample analysis suggests that the impact is likely driven by women in the household participating in the scheme. Thus, it could be assumed that the reservation of work for women as well as the provision of equal wages to men and women under the scheme are contributing factors to the empowerment of women.

The benefits from increases in empowerment outcomes are not necessarily limited to women. Some studies report a positive association between empowerment and family and child welfare.

Thomas (1990) and Quisumbing and Maluccio (2003) find that an increase in a mother's earned income tends to result in better health and education outcomes for children. Thus, increased access to work under NREGS could lead to better health and education outcomes for children. However, many survey reports document the existence of factors that continue to hinder the participation of women in the scheme These include women facing work rationing due to lack of work supply and the lack of creche facilities at worksites among many others. This suggests that policy should focus on better programme implementation, especially in backward rural districts, to ensure increased and consistent access to the scheme for rural women.

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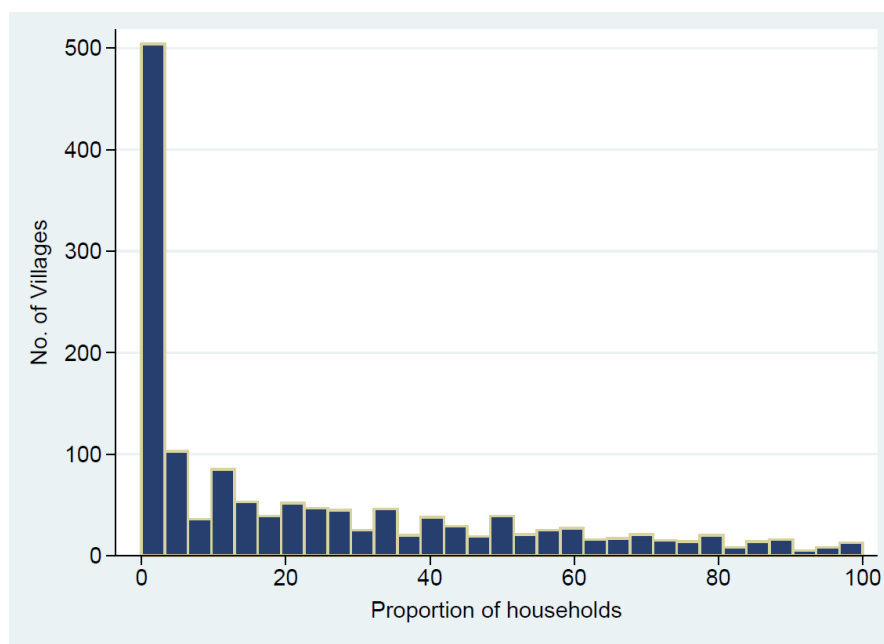
Appendix-A

Figure 1: Count of villages for different proportions of household participation in NREGS (in sample).
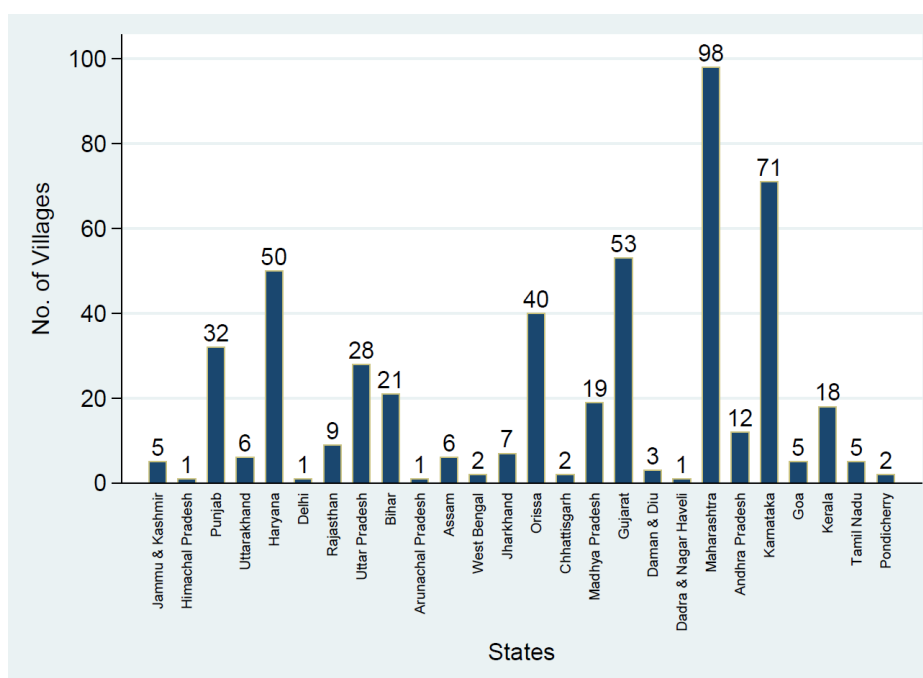
Figure 2: State-wise distribution of villages with zero NREGS participants (in sample).

Appendix-B

Table 1: Summary statistics

	Non-participants	Participants	Equivalence of means
	Mean(sd)	Mean(sd)	t-stat
Economic sub-index	0.49	0.46	0.03***
	(0.30)	(0.28)	(5.93)
Sociocultural sub-index	0.30	0.29	0.01
	(0.33)	(0.33)	(0.80)
Interpersonal sub-index	0.78	0.72	0.06***
	(0.34)	(0.39)	(9.00)
Women's Empowerment Index	0.56	0.52	0.04***
	(0.21)	(0.22)	(8.92)
Assets (HH)	10.56	7.73	2.83***
	(5.32)	(3.76)	(29.11)
No of working age member (HH)	3.84	3.44	0.39***
	(1.82)	(1.61)	(11.37)
Highest male education (in yrs) (HH)	6.61	4.60	2.02***
	(4.79)	(4.43)	(21.87)
Age (EW)	32.57	32.53	0.04
	(7.95)	(7.78)	(0.28)
Education (in yrs) (EW)	3.60	1.94	1.65***
	(4.24)	(3.21)	(20.89)
No of children (EW)	2.75	2.90	-0.15***
	(1.62)	(1.63)	(-4.71)
Observations	11355	3464	14819

Notes: HH stands for household variables. EW stands for eligible-woman variables.

Table 2: First stage regression results

	post*participation
post*instrument	0.332***
	(0.0118)
Observations	28740
F-stat for excluded instrument	799.92
Controls	Yes

Notes: Robust standard errors clustered at the village level are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table 3: Household and eligible-woman characteristics by access to an active NREGS in a village

	(No active scheme)	(Active scheme)	Equivalence of means
	Mean(sd)	Mean(sd)	t-stat
Member Mahila Mandal	0.09	0.09	0.00
	(0.29)	(0.29)	(0.12)
Member Union/Business	0.03	0.03	0.01[*]
	(0.18)	(0.16)	(2.28)
Member Self Help	0.11	0.13	-0.02[***]
	(0.31)	(0.33)	(-3.36)
Member Caste Association	0.13	0.14	-0.01
	(0.34)	(0.35)	(-1.44)
Member Development NGO	0.02	0.01	0.01[*]
	(0.14)	(0.12)	(2.23)
Voted in 2004 election	0.92	0.92	0.00
	(0.27)	(0.28)	(1.04)
Economic sub-index	0.51	0.47	0.04[***]
	(0.29)	(0.29)	(7.44)
Sociocultural sub-index	0.33	0.28	0.06[***]
	(0.33)	(0.32)	(9.90)
Interpersonal sub-index	0.80	0.75	0.05[***]
	(0.33)	(0.37)	(9.30)
Women's Empowerment Index	0.58	0.53	0.05[***]
	(0.21)	(0.22)	(13.87)
Assets (HH)	11.17	9.10	2.07[***]
	(5.42)	(4.79)	(23.67)
No of working age member (HH)	3.86	3.67	0.19[***]
	(1.81)	(1.76)	(6.33)
Highest male education (in years) (HH)	6.72	5.78	0.94[***]
	(4.74)	(4.79)	(11.59)
Age (EW)	32.56	32.56	0.01
	(7.85)	(7.95)	(0.06)
Education (in years) (EW)	3.84	2.82	1.02[***]
	(4.28)	(3.90)	(14.58)
No of children (EW)	2.70	2.83	-0.13[***]
	(1.56)	(1.67)	(-4.70)
Observations	5698	9121	14819

Notes: HH stands for household variables. EW stands for eligible-woman variables. Mahila Mandals are village level women's organisations.

Table 4: Regression results for the overall index of women's empowerment.

	(1) OLS	(2) OLS	(3) OLS	(4) IV
Post	0.0500***	0.00723	0.0133*	
	(0.00508)	(0.00516)	(0.00810)	
Participation	-0.0370***	-0.0249***		
	(0.00800)	(0.00781)		
Post*Participation	0.0489***	0.0485***	0.0494***	0.115***
	(0.00859)	(0.00863)	(0.00867)	(0.0249)
Constant	0.559***	0.248***	0.280***	
	(0.00489)	(0.0207)	(0.0415)	
Observations	29634	29189	29189	28740
Controls	No	Yes	Yes	Yes
FE	No	No	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table 5: Regression results for the economic sub-index

	(1) OLS	(2) OLS	(3) OLS	(4) IV
Post	0.0630***	0.0145**	0.00560	
	(0.00657)	(0.00694)	(0.0118)	
Participation	-0.0337***	-0.0228***		
	(0.00820)	(0.00825)		
Post*Participation	0.0473***	0.0481***	0.0477***	0.133***
	(0.00987)	(0.00993)	(0.0100)	(0.0305)
Constant	0.490***	0.219***	0.134**	
	(0.00570)	(0.0258)	(0.0606)	
Observations	29605	29161	29161	28684
Controls	No	Yes	Yes	Yes
FE	No	No	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table 6: Regression results for the sociocultural sub-index

	(1) OLS	(2) OLS	(3) OLS	(4) IV
Post	-0.0181**	-0.0685***	-0.0308***	
	(0.00736)	(0.00779)	(0.0116)	
Participation	-0.00511	0.0151		
	(0.0120)	(0.0118)		
Post*Participation	0.0228**	0.0227**	0.0226**	0.0863**
	(0.0107)	(0.0109)	(0.0108)	(0.0354)
Constant	0.298***	0.0123	0.247***	
	(0.00756)	(0.0328)	(0.0600)	
Observations	29633	29188	29188	28738
Controls	No	Yes	Yes	Yes
FE	No	No	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table 7: Regression results for the interpersonal sub-index

	(1) OLS	(2) OLS	(3) OLS	(4) IV
Post	0.0928***	0.0666***	0.0630***	
	(0.00915)	(0.00930)	(0.0150)	
Participation	-0.0618***	-0.0561***		
	(0.0136)	(0.0137)		
Post*Participation	0.0691***	0.0679***	0.0688***	0.144***
	(0.0163)	(0.0164)	(0.0165)	(0.0459)
Constant	0.782***	0.567***	0.563***	
	(0.00790)	(0.0424)	(0.0858)	
Observations	29614	28682	28682	27768
Controls	No	Yes	Yes	Yes
FE	No	No	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table 8: IV results for the sample excluding female participants.

	(1) Economic	(2) Sociocultural	(3) Interpersonal	(4) WEI
Post*Participation	0.240***	0.189***	0.127	0.168***
	(0.0650)	(0.0726)	(0.0908)	(0.0507)
Observations	24790	24842	24808	24844
Controls	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. WEI represents the overall index of women's empowerment. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table 9: IV results for the sample excluding male participants.

	(1) Economic	(2) Sociocultural	(3) Interpersonal	(4) WEI
Post*Participation	0.312***	0.244**	0.308**	0.279***
	(0.102)	(0.116)	(0.146)	(0.0813)
Observation	23620	23668	23638	23670
Controls	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. WEI represents the overall index of women's empowerment. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table10: IV results for eligible-woman participants.

	(1) Economic	(2) Sociocultural	(3) Interpersonal	(4) WEI
Post*Participation	0.324***	0.260**	0.316**	0.289***
	(0.107)	(0.121)	(0.153)	(0.0853)
Observations	23526	23574	23544	23576
Controls	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. WEI represents the overall index of women's empowerment. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table 11: IV results for the subsample of women who did not work for pay in 2004-05.

	(1) Economic	(2) Sociocultural	(3) Interpersonal	(4) WEI
Post*Participation	0.161***	0.0933**	0.146**	0.130***
	(0.0406)	(0.0467)	(0.0590)	(0.0317)
Observations	19782	19824	19796	19826
Controls	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. WEI represents the overall index of women's empowerment. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table 12: IV results for the subsample of women who worked for pay in 2004-05

	(1) Economic	(2) Sociocultural	(3) Interpersonal	(4) WEI
Post*Participation	0.0975***	0.0789**	0.113**	0.0950***
	(0.0324)	(0.0369)	(0.0501)	(0.0269)
Observations	8902	8914	8908	8914
Controls	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. WEI represents the overall index of women's empowerment. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.

Table 13: OLS results on non-participants by access to active NREGS in a village.

	(1) Economic	(2) Sociocultural	(3) Interpersonal	(4) WEI
Post	0.00926	-0.0608***	0.0749***	0.0170
	(0.0191)	(0.0203)	(0.0229)	(0.0132)
Post*Instrument	0.0330*	0.0436**	0.00690	0.0238*
	(0.0186)	(0.0201)	(0.0244)	(0.0141)
Constant	0.163**	0.202***	0.569***	0.340***
	(0.0739)	(0.0721)	(0.0829)	(0.0505)
Observations	22373	22398	22383	22399
Controls	Yes	Yes	Yes	Yes
FE	Yes	Yes	Yes	Yes

Notes: Household-level fixed effects are included in the regression. Robust standard errors clustered at the village level are in parentheses. WEI represents the overall index of women's empowerment. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level of significance respectively.