Consumption and Time-Use Effects of India's Employment Guarantee and Women's Participation

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I. Introduction

The National Rural Employment Guarantee Act (NREGA) was passed by the Parliament of India in 2005. The act aims to provide at least 100 days of employment to members of rural households who are willing to perform unskilled, manual work in a financial year. The main aim of NREGA is to provide wage employment to rural households and create durable assets in rural areas. The act costs about 0.51% of India's gross domestic product (or US$8.7 billion during the 2010–11 fiscal year; World Bank 2012) while covering about 11% of the world's population (Niehaus and Sukhtankar 2013). At the time NREGA was implemented, the poverty head count ratio of India (at the national poverty line) was 37.2% in 2005. Given the sheer scale of the number of people the act attempts to cover, it is one of the largest antipoverty programs in the world (World Bank 2012). Therefore, it is important to understand the welfare implications of this program on rural households.

This paper uses household data from the state of Andhra Pradesh in southern India to estimate the causal impact of NREGA participation on a number of outcomes that can potentially influence household welfare. The outcome variables I consider are food and nonfood expenditures at the household level, implications for household food security, and individual time use. It might be of interest to mention why I study two sets of outcomes in this paper: consumption and time allocation. This is because an antipoverty program like NREGA may not only potentially improve food security and raise the nutritional status of children but may also result in children substituting for adults in performing

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activities (such as agricultural or nonagricultural work) when adults go out to work under NREGA. Therefore, there is a possibility that welfare gains associated with improved food security and household diet diversification could be counterbalanced by increased involvement of children in adult's activities. Through this paper, I wish to analyze both the beneficial and any plausible unintended negative consequences of the program by studying these two different types of outcome variables.

The act contains provisions that particularly encourage women's participation (Khera and Nayak 2009). Using household survey data from the National Sample Survey (NSS), Narayanan and Das (2014) find that among the households that got employment under NREGA, about 22.3% of these households in Andhra Pradesh sent only their female members to work. In comparison, the proportion of households in the state from which only male members participated under the program was 0.6%. This finding is, however, not peculiar to Andhra Pradesh. Similar findings can be obtained for states like Tamil Nadu and Kerala, where more than 50% of households sent only their female members to work under the program, whereas the corresponding figure for households that sent only their male members to work under NREGA is less than 1% (Narayanan and Das 2014). The potential increase in women's bargaining power in the household due to NREGA participation may result in increased spending on commodities that might benefit children more than adults. Further, whether expenditures on girls are likely to increase because of NREGA and women's participation relative to that of men needs to be investigated. Descriptive analysis from field surveys in northern India shows that a majority of the women are able to retain their earnings from NREGA, and earned income from NREGA reduced their dependence on male family members for their consumption needs (Dreze and Khera 2009; Pankaj and Tankha 2010). Pankaj and Tankha (2010) also find that women were able to make decisions to purchase items of daily consumption, items for the education and health of their children, and items to meet their personal needs (such as cosmetics and medicines). Women were also able to seek health care on their own as well as frequently visit their natal families because of greater autonomy due to paid employment opportunity provided by NREGA. Therefore, it might be interesting to study how consumption expenditures on different commodities as well as household food security are likely to be affected because of women's participation under the program relative to that of men.

Now, the availability of work under NREGA could alter major activity patterns of adults and children in the household. If women are more likely to participate in the program, it is important to study whether women's engagement in domestic chores decreases. It is possible that women may be effectively working

more as they may have to perform both domestic chores as well as work outside the home under NREGA. It is possible that improvements in women's well-being because of paid employment opportunities are offset by a plausible reduction in women's leisure if time spent performing domestic work does not decline in response to increased paid employment opportunity outside the home. Now, as adults participate in the program, there might be two different effects on children. On the one hand, greater investment in children's education can take place. On the other hand, it is possible that children may have to take time off from education to perform domestic tasks when adults participate in the program. Given social norms about gender roles in rural India, this effect may be more prominent for girls than for boys. Thus, it is also important to investigate how children's activity patterns and time allocation are affected because of adult participation under NREGA by their gender and age groups.

In this paper, the causal impact of the number of days worked under NREGA is estimated using instrumental variables (IV) estimation strategy because ordinary least squares (OLS) estimates of the number of days worked under the program could yield biased estimates. Even after controlling for household-level characteristics that could potentially influence the number of days worked, unobserved individual characteristics of household members could influence the total number of days a household works under the program. In addition, OLS results may overestimate the spending on cheaper sources of calories such as rice and underestimate the spending on nutritious but more expensive sources of food as households with higher spending patterns on cereals and lower spending patterns on more expensive foods may also want to work more under the program. I exploit a provision under NREGA that specifies that households should be provided with work within 15 days of registration to construct the instrument for the likely endogenous explanatory variable of interest—that is, the number of days worked. However, it is important to investigate whether being provided with work within 15 days of registration (henceforth "on time") is likely to be a valid instrument. I provide suggestive evidence that household characteristics that are possible indicators of household influence (e.g., belonging to political parties, donating to political parties), voting behavior in elections, exposure to information, social capital (e.g., belonging to self-help groups [SHGs] or cooperative societies, participating in solving community or village problems), or access to other public programs in a village are unlikely to influence whether households were provided with work on time. This supports the documentation in the existing literature that the proficiency of NREGA's operation is largely on account of administrative bottlenecks rather than the characteristics of villagers, who are its potential beneficiaries (Imbert and Papp 2015; Ravi and Engler 2015).

This paper finds that a household working an additional 10 days under NREGA not only is associated with an approximate 7.6% increase in monthly per capita real household food expenditure relative to the mean but also increased spending on dairy products, fruits and vegetables, and proteins including fish, meat, and eggs—all of which can increase the nutritional status of the household and especially that of children. Further, I find increased spending on some luxury goods such as edible oil, salt, sugar, and spices. However, I do not find any significant change in the spending on adult goods such as alcohol and tobacco products. I also find that household expenditure on girls' clothing and footwear increases, but no significant effect is found for expenditure on analogous items for boys.[1] Further, most of these findings appear to hold for households that have a larger number of days worked by women under the program relative to that by men. This paper also finds that a greater number of days worked by the household in NREGA is associated with a reduction in women's engagement in domestic chores as their major activity with no associated effect on major activity patterns for men. In particular, I find that working an additional 10 days under NREGA reduces the number of days spent by women in a typical month performing domestic chores as their major activity by nearly 1 day. Further, I find that when adults work an additional 10 days under the program, the number of days spent by boys in a typical month performing agricultural tasks goes up by nearly 0.3 day. This finding is mostly relevant for boys who are 10–18 years old. However, I do not find that adult participation under NREGA has any significant impact on major activity patterns of girls. In terms of detailed time allocation by children in a typical day, I find that an additional 10 days worked by adults under NREGA raises the time spent by younger girls (those who are 9 years of age or younger) in school by nearly 24 minutes. However, greater number of days worked by adults in the program reduces the time spent playing for both younger girls and boys. No significant impact is found on the time spent performing domestic chores by both girls and boys regardless of their age groups because of adult participation under the program. Although it is comforting to find that, despite social norms about gender roles in rural India, girls are unlikely to perform domestic chores; the greater engagement of boys in agricultural tasks (plausibly in lieu of adults) is an unintended negative consequence of the program.

[1] There is conflicting evidence on the impact of NREGA on agricultural wages in rural India. Studies by Azam (2012) and Imbert and Papp (2015) indicate crowding out of casual agricultural labor markets because of NREGA, thereby contributing to the rise in agricultural wages. Berg et al. (2018) also find a similar impact on agricultural wages because of NREGA. However, studies by Mahajan (2015) and Zimmermann (2015) find limited impact of NREGA on rural agricultural labor markets. Therefore, it might be difficult to conclude that consumption expenditures of nonparticipants under NREGA can increase because of NREGA raising private casual wages in rural India.

This paper is organized as follows: Section II describes the related literature on NREGA and the contribution of this paper in the context of the existing literature; Section III outlines the institutional background of NREGA and particularly in Andhra Pradesh, as it is the state on which this study is based; Section IV describes the data used; Section V presents the estimation framework and empirical strategy; Section VI presents the results and Section VII concludes.

II. Related Literature

The literature on NREGA has focused on a number of different outcomes. For example, on the one hand, Azam (2012), Imbert and Papp (2015), Mahajan (2015), Zimmermann (2015), and Berg et al. (2018) have studied the impact of NREGA on casual wages in rural labor markets (including agricultural wages). On the other hand, Shah (2013), Bhargava (2014), and Gehrke (2019) have studied the impact of NREGA on agricultural technology use and crop choice in favor of riskier but higher-yielding crops by farmers. Still other studies have analyzed the impact of wage increase on corruption and leakage (Niehaus and Sukhtankar 2012, 2013) and whether technological innovations in wage disbursements can reduce leakage in the context of NREGA (Muralidharan, Niehaus, and Sukhtankar 2016). This paper is closer to the literature that attempts to analyze the impact of NREGA on consumption spending, poverty rates, individual time use, and human capital accumulation.

Some studies have documented the importance of NREGA on household consumption spending, nutrition, and poverty rate. Klonner and Oldiges (2014) study the impact of NREGA on monthly per capita consumption spending and the poverty head count ratio. Deininger and Liu (2019) analyze the effect of NREGA on household consumption spending and protein intake in Andhra Pradesh, whereas Bose (2017) studies the effect of NREGA on mainly household consumption spending along with spending on different food and nonfood items for the country overall. However, these studies have largely estimated the "intent-to-treat" effect of the program by comparing households living in districts that implemented the program earlier in relation to those that implemented it later before and after program implementation using a difference-in-differences estimation strategy.[2] Ravi and Engler (2015), however, compare consumption spending, food security, savings, and health outcomes between households that received work under NREGA with those households that sought work but were denied employment on account of job rationing in Andhra Pradesh.

[2] However, a difference-in-differences estimation strategy needs to be performed with caution as the rollout of the program was not random and the program was first implemented in poorer districts.

This paper differs from the existing literature on NREGA in several ways. First, unlike most of the previous studies, this paper uses an IV estimation strategy to estimate the treatment effect of the program. Although with this approach I am unable to estimate the effect of the introduction of the program, this approach attempts to overcome the limitations of a difference-in-differences estimation strategy arising because of a nonrandom program rollout. Second, this paper attempts to document the importance of plausibly exogenous administrative bottlenecks in job provision and the potential impact on household welfare. To the best of my knowledge, Ravi and Engler (2015) is the only other study to quantify the importance of such bottlenecks on household well-being. Third, this paper also differs from much of the existing literature on NREGA that studies the effect of participation versus nonparticipation in the program (i.e., along the extensive margin) or intent-to-treat effect of the program by studying the effect of the number of days worked under NREGA on household welfare instead (i.e., along the intensive margin).[3] Finally, the aforementioned studies have not analyzed how household consumption expenditure and food security are likely to be affected because of women's participation in the program relative to that of men.[4] To the best of my knowledge, the gender aspect of NREGA has remained relatively understudied in the literature in the context of consumption spending and this paper attempts to make a contribution to that end.

Some studies have focused on the impact of NREGA on children's educational outcomes. Li and Sekhri (2013) estimate the intent-to-treat effect of NREGA by comparing early and late implementation districts and find that enrollment in private schools rises whereas that in public schools declines in early implementation districts after program implementation relative to late implementation districts. Grade repetition is also found to increase in private schools because of NREGA in their study. Shah and Steinberg (2016) also estimate the intent-to-treat effect of the program and find negative impact of the program on

[3] In this context, it might be important to mention why it is potentially important to study the effect of the program along the intensive margin. Some studies have indicated that the demand for workdays under NREGA is far from falling. Using microdata such as the NSS, Dutta et al. (2012) demonstrate that many households wanted more days of employment than what they were provided with in almost all states of India; Mukhopadhayay (2012) illustrates the same for the state of Rajasthan. The media has claimed that there has been demand for increasing the number of workdays under NREGA in the state of Tamil Nadu, there has been an increase in the number of days under NREGA from 100 to 150 in Rajasthan, and the government of India had raised the number of NREGA days to 150 from 100 for tribal households throughout the country in February 2014. These studies and claims in the press, therefore, provide motivation to analyze the effect of the number of days worked under the program on household welfare in contrast to the existing studies that focus on the extensive margin or attempt to estimate the intent-to-treat effect of the program.

[4] Bose (2017) conjectures that increased spending on milk in households with children is likely on account of women's participation under NREGA. However, this hypothesis has not been tested in Bose (2017) and the author mentions that this is a likely possibility.

school enrollment and math scores mainly for older children. However, Afridi, Mukhopadhyay, and Sahoo (2016) find that NREGA has improved women's access to the labor market, which in turn is found to raise children's school enrollment, grade progression, and education expenditure in Andhra Pradesh. Mani et al. (2014) estimate the intent-to-treat effect of the program and find positive impacts of NREGA on grade progression as well as on learning outcomes in Andhra Pradesh. However, few studies have investigated the impact of NREGA on adults' and children's time spent performing activities such as domestic chores and agricultural work apart from children's time spent studying. One of the studies in this context is by Islam and Sivasankaran (2015) who provide intent-to-treat effect estimates of the impact of NREGA on children's time use. Islam and Sivasankaran (2015) also provide correlations between the number of days worked under the program and children's time use. This paper complements the analysis by Islam and Sivasankaran (2015) but differs from their analysis in three key ways. First, this paper attempts to provide causal estimates of the impact of adults' number of days worked under NREGA by instrumenting for the number of days worked on children's time allocation to various activities. Second, this paper also tries to analyze whether NREGA has had any impact on adults' major activity patterns by their gender. This can be potentially important in helping us understand whether the availability of NREGA has reduced the burden of domestic duties for adult women or if women have ended up effectively working more in the sense that they now have to work both inside and outside the house. This analysis can provide an important insight into understanding whether cultural norms that require women to be primarily responsible for performing domestic chores, especially in rural India, are likely to be altered in the event of paid employment opportunities for women under NREGA. Finally, increased time spent studying on account of adult participation in NREGA appears to hold only for younger girls in this paper in contrast to both younger boys and girls as in Islam and Sivasankaran (2015). Further, although both this paper and the analysis by Islam and Sivasankaran (2015) find that older boys appear to engage in activities outside their homes because of availability of NREGA work for adults, this paper specifically finds that older boys are likely to engage in agricultural tasks because of a plausible reduction of adults' engagement in agricultural work due to NREGA. This can provide a clearer exposition of how children can potentially substitute for adults when alternative employment opportunities for adults become available.

III. Institutional Background of NREGA

A. NREGA in India

Enacted by the Parliament of India in 2005, NREGA aims to provide at least 100 days of employment to members of rural households who are willing to

perform unskilled, manual work. The act was implemented in phases. It was first implemented in the 200 poorest districts of the country in 2006; thereafter, an additional 130 districts received coverage in 2007, and the act was extended to the entire country by early 2008.

The act gave a pivotal role to India's decentralized elected rural bodies, called the Panchayati Raj, in the implementation of the program. Households in a village could apply for a "job card" by submitting a written or oral application to their elected village council, called the Gram Panchayat (GP). The GP issues the job card to the household free of cost, which is used to record the details of the work received by each adult member, the number of days of work provided, and the type of NREGA projects in which the member worked as well as wages received. A household can apply for work, almost at any time during the year, after receiving the job card. Applications are submitted to the GP and the law mandates that employment should be provided within 15 days of registration, failing which households are eligible to receive an unemployment allowance. The daily unemployment allowance is mandated to be set at not less than one-fourth of the wage rate for the first 30 days and subsequently at half of the wage rate for the rest of the financial year. Further, NREGA workers should receive wages weekly, and wage payments should not be delayed beyond 2 weeks. The act mandates that not more than 40% of the total project expenditures can be devoted to materials and capital. Therefore, the bulk of the expenditure for each NREGA project is earmarked for labor wage payments (Ministry of Law and Justice, Government of India 2005). In addition, about 50% of NREGA projects are to be planned and executed by the GP. The projects are to be prepared through consultation with the GP residents. The GP forwards the list of recommended projects to the subdistrict program officer, who in turn forwards it to the district program officer for final technical and financial approval (Afridi, Iversen, and Sharan 2017).

During the 2013–14 financial year at the all-India level, about 51.7 million households were allotted work under NREGA (comprising about 99% of the number of households that applied for work, according to the administrative data, not survey data). The act stipulates that one-third of the workers should be women. Rural households are free to choose how the 100 days of work are to be allocated among household members, providing women in the household the opportunity to participate in the program. One of the most important provisions of the act is equal wages for men and women. This provision is especially important because women often receive lower wages in rural labor markets relative to men, as table A1 depicts. The act also requires the provision of childcare facilities at work sites where there are more than five children younger than 6 years of age and that work should be predominantly provided within the village.

Significant differences in women's participation in NREGA, however, exist across states, as table A2 depicts. The proportion of total person-days generated during 2013–14 attributable to women workers was around 52% for India. Dreze and Khera (2009) find from their survey in six North Indian states that 79% of women workers collected their own wages, and 69% of them kept their wages earned from the program. Although an all-India study is unavailable on the extent to which women NREGA workers control their earnings, the previously mentioned field survey documents that a large fraction of women workers are likely to control their wages earned from the program. In general, the expenditure on labor comprised 75% of the total spending on NREGA projects (Mahatma Ghandi NREGA public data portal, http://www.nrega.nic.in/netnrega/home.aspx). However, as reported by the press, unemployment allowances are not paid out in a large number of states even when prospective workers were not provided with work under the program within 15 days of registration (Naqshbandi 2009; Tewari 2010).

B. NREGA in Andhra Pradesh

The current study is based on household and individual survey data, called the Young Lives Survey (YLS), collected from the South Indian state of Andhra Pradesh. Andhra Pradesh has been lauded as one of the leading performers in the implementation of NREGA in the country (Afridi, Iversen, and Sharan 2017). The state provided employment to 3.4 million households during financial year 2013–14, according to administrative data. During this period, 5,948,234 individuals from the state received employment in NREGA projects. Of them, 3,184,172 (or 54%) were women workers. The share of NREGA expenditures on wage payments was 72%, and the remaining share was on capital and materials.[5] Further, Andhra Pradesh is known to conduct regular social audits in contrast to most other Indian states. Therefore, the state has often been praised for its attempt to maintain a high standard of accountability in the implementation of NREGA. Although the act stipulates that households are entitled to receive 100 days of wage employment in a financial year, a number of households have worked for more than 100 days under NREGA in Andhra Pradesh, as can be seen from the administrative data. I find that 687,479 households worked for more than 100 days during 2013–14 (Management Information System reports show the number of households working for more than 100 days in Andhra Pradesh).

[5] Management Information Systems reports are available at http://www.nrega.ap.gov.in/Nregs. These computations on Andhra Pradesh exclude the districts of Andhra Pradesh that were transferred to the state of Telangana in 2014.

As in other states, NREGA is implemented in Andhra Pradesh through the three-tier elected Panchayati Raj system. There are three tiers of administration for NREGA projects in Andhra Pradesh: the district, the subdistrict or *mandal*, and the village, which is the lowest administrative unit. Afridi, Iversen, and Sharan (2017) depict the officials at the different tiers of the decentralized village-level government who are responsible for implementation of the program. Village councils or GP in Andhra Pradesh are reportedly less powerful than GPs in other states, such as Kerala or Rajasthan (Afridi, Mukhopadhyay, and Sahoo 2016). Unlike other states, the role of the GPs is largely limited to recommending the list and overseeing the implementation of the projects. The subdistrict or mandal official called the Mandal Parishad Development Officer, assisted by the assistant program officer, plays a major role in sanctioning funds and providing technical approval for NREGA projects in Andhra Pradesh. Therefore, the mandal officials play a key role in implementing NREGA, unlike other states where the GPs play a very important role (Mukhopadhyay 2012; Maiorano 2014; Afridi, Iversen, and Sharan 2017). Imbert and Papp (2015) report the 2011 findings of the World Bank in their paper: "In practice, very few job card holders formally apply for work while the majority tends to wait passively for work to be provided" (238). They also note that implementation of the program depends on administrative capacity and political will because administrators have to deal with a large number of issues, such as preparing a shelf of work to be undertaken, getting the shelf approved, and deciding the budget for undertaking works, all of which require significant administrative capacity. Maiorano (2014) and Afridi, Mukhopadhyay, and Sahoo (2016) also note that NREGA in Andhra Pradesh is supply rather than demand driven; that is, instead of demand for work from villagers influencing the functioning of NREGA (as it was envisaged), the proficiency of NREGA's functioning largely depends on the quality of the administrators.

IV. Data

The data used for analysis in this paper are from round 3 (2009–10) of the YLS. The YLS is a child-level panel survey conducted in the state of undivided Andhra Pradesh (Andhra Pradesh was bifurcated, and some of its districts were transferred to form the new state of Telangana in 2014).[6]

[6] Round 1 (2002) is largely not comparable with rounds 2 and 3. Round 2 (2007) corresponds to the first year of the implementation of NREGA. However, the survey does not provide detailed information on NREGA in round 2. It was only in round 3 that detailed information on NREGA had been collected, namely, whether the household was provided with work within 15 days of registration, the household was paid wages within 15 days of completion of work, childcare facilities were present at the work site, and whether single women were denied employment as well as the number of days each

The YLS survey was designed to cover three major agroclimatic regions of Andhra Pradesh. The survey covers the districts of Anantapur, Kadapa, Karimnagar, Mahbubnagar, Srikakulam, West Godavari, and Hyderabad. The survey covers 20 blocks (mandals) across these seven districts, of which 15 blocks are rural. Of the seven districts, Hyderabad is predominantly urban and NREGA has never been implemented there. Out of the remaining six districts, the program has been in operation in Anantapur, Kadapa, Karimnagar, and Mahbubnagar from 2006, in Srikakulam from 2007, and in West Godavari from 2008. By the time round 3 of the survey was conducted, the program was operational in all six survey districts in Andhra Pradesh. The survey follows a "sentinel site" methodology for sampling similar to health surveillance studies, a sentinel being a block here. Although this sampling methodology is likely to represent a certain type of population, the YLS followed this methodology to keep track of households over time. Further, the YLS ranked districts according to their economic, human development, and infrastructure indicators, and sentinel sites in the survey included a mixture of different geographic regions and levels of development in the state. The YLS also states that the sample covers a variety of children and their households in terms of socioeconomic characteristics similar to national data sets (description of YLS study sites in India can be found at https://younglives-india.org/our-sample-and-survey-methods).

The working sample includes households in rural areas (excluding the district of Hyderabad altogether) that have not moved since 2007 and were registered under the program during the past 12 months (therefore having at least one adult member who had participated, that is, sought work under the program). First, I include only households residing in rural areas and exclude the district of Hyderabad altogether because the program was implemented only in the rural areas excluding Hyderabad. Second, I restrict the households to include only those that have not changed their location of residence since 2007. This can mitigate the possibilities of selective migration (especially to localities where the program is likely to be well implemented).[7] Information on whether the household was provided with work within 15 days of registration (the proposed instrument for the number of days worked) is available for households that

adult household member worked under the program or the reasons for not participating in the program at all. Such detailed information is not provided in round 2 of the survey; thus, it is difficult to use round 2 for the current analysis.

[7] Around 92% of households that had at least one adult member who had participated in the program report not having worked under NREGA outside the geographical area administered by their GP. Therefore, it is largely uncommon that some household members migrate in response to NREGA jobs available elsewhere. This is consistent with the NREGA's requirement that employment largely needs to be provided within one's GP.

TABLE 1
SHARE OF NREGA EARNINGS IN HOUSEHOLD INCOME

	Mean	Standard Deviation	Observations
	A. No Crop Income		
Sale of livestock products	.07	.17	1,409
Agricultural wages	.39	.32	1,409
Regular wages/salary	.13	.27	1,409
Casual wages	.15	.26	1,409
NREGA wages	.25	.25	1,409
Selling commodities	.02	.13	1,409
	B. With Crop Income		
Sale of livestock products	.05	.13	1,411
Agricultural wages	.33	.30	1,411
Regular wages/salary	.12	.26	1,411
Casual wages	.13	.25	1,411
NREGA wages	.19	.20	1,411
Selling commodities	.02	.11	1,411
Crop income	.17	.25	1,411
	C. With Transfers		
Sale of livestock products	.05	.12	1,413
Agricultural wages	.31	.26	1,413
Regular wages/salary	.11	.25	1,413
Casual wages	.12	.23	1,413
NREGA wages	.18	.18	1,413
Selling commodities	.02	.11	1,413
Transfers	.20	.16	1,413

Source. Round 3 of the Young Lives Survey (2009–10).
Note. All observations are at the household level. Share of income computed on the basis of earnings during the reference period of past 12 months. Transfers include social subsidy, interest on bank account, and those from friends/relatives not belonging to the household. The mean share need not exactly add up to 1 due to rounding. Sample contains rural households (excluding district of Hyderabad) that have not moved since 2007 and for which number of days worked under NREGA was available. NREGA = National Rural Employment Guarantee Act.

were registered under the program.[8] About 86% of households were registered under NREGA. Therefore, the program has wide coverage in Andhra Pradesh. It is also important to note that NREGA earnings constitute an important fraction of household income. Table 1 shows that around 20% of the household earnings in rural Andhra Pradesh can be attributed to NREGA, even taking into account earnings from crops and transfers.

[8] The survey asks households whether they have been provided with employment within 15 days of registration. Now households may seek work at different times of the year. When households respond that they have been provided with work within 15 days of registration, this likely indicates that on all or most of the occasions that the household sought employment under the program, employment was provided within 15 days of registration. Thus, the question of whether households were provided with work within 15 days of registration seeks to capture the overall frequency of the timely provision of work for each household in the past year in accordance with the act's requirement.

A. Outcome Variables

The outcome variables at the household level correspond to consumption expenditures and measures of household food security. The household-level outcome variables pertaining to consumption expenditures are monthly real per capita food, nonfood, and total consumption expenditure of the household (i.e., imputed using 2006 prices). Further, real per capita consumption expenditures on a variety of food items are considered. These include rice, pulses, dairy products, proteins (e.g., eggs, fish, and meat), vegetables and fruits, salt and spices, sugar, edible oils, alcohol, and tobacco products (e.g., cigarettes). The expenditures on these food items are reported as values of these food items bought and consumed by the household. In this regard, it might be interesting to know whether buying and consuming foods is important. Table 2 reports the mean and standard deviation of the share of each of the foods bought and consumed out of what is bought, consumed out of own stock, and received as transfers by the household. I find that the mean of the share of foods bought and consumed out of what is bought, consumed out of own stock, and received as transfers ranges from a minimum of 46% (for rice) to a maximum of 98% (for alcoholic beverages). Therefore, focusing on how much a household bought and consumed could likely capture a household's overall consumption expenditure pattern as the share of foods bought and consumed is a large fraction of how much was bought, consumed out of own stock, and consumed out of transfers. Table 3 reports that the average per capita monthly spending for households on food is around Rs 413.43, on nonfood items is Rs 395.04, and aggregate consumption expenditure is Rs 808.47 (in 2006 prices). These amounts correspond to an expenditure of Rs 2,067.15 (around US$34.45) on foods, Rs 1,975.20 (around US$32.92) on nonfood items, and Rs 4,042.35 (around US$67.37) per month for an average household consisting of five members. Table 3 also reports the mean and standard deviation of per capita

TABLE 2

SHARE OF FOODS BOUGHT OUT OF WHAT IS BOUGHT, CONSUMED OUT OF OWN STOCK, AND RECEIVED IN TRANSFERS

	Mean	Standard Deviation	Observations
Share of rice bought	.46	.41	1,410
Share of pulses bought	.66	.37	1,354
Share of milk bought	.80	.40	1,242
Share of proteins bought	.97	.14	1,003
Share of vegetables and fruits bought	.95	.17	1,411
Share of salt, spices, oil, and sugar bought	.80	.21	1,413
Share of alcohol bought	.98	.11	628

Source. Round 3 of the Young Lives Survey (2009–10).

Note. All observations are at the household level. "Share of each food item bought" implies the share of the item bought out of what is bought, consumed out of own stock, and received in transfers by the household.

TABLE 3

DESCRIPTIVE STATISTICS OF OUTCOME AND CONTROL VARIABLES: PROPOSED INSTRUMENT

	Mean	Standard Deviation	Observations
	A. Outcome Variables		
Per capita spending (at 2006 prices):			
Food per month	413.43	245.41	1,413
Nonfood per month	395.04	641.90	1,413
Total consumption per month	808.47	729.75	1,413
Rice	22.60	31.51	1,412
Pulses	10.15	9.26	1,413
Dairy	7.41	9.34	1,410
Proteins	24.48	22.58	1,395
Vegetables and fruits	30.14	21.12	1,411
Salt, sugar, edible oil, and spices	24.87	15.59	1,413
Alcohol	18.41	39.20	1,401
Tobacco	15.72	23.09	1,412
No food situation	.04	.19	1,413
Lowering the number of meals	.08	.27	1,413
Amount spent on girls (in rupees in past 12 months):			
Clothing	1,164.06	1,267.48	1,330
Footwear	158.60	159.04	1,329
School uniforms	309.03	505.68	1,309
School fees/donations	460.38	2,443.08	1,328
Amount spent on boys (in rupees in past 12 months):			
Clothing	1,084.14	999.98	1,373
Footwear	186.54	195.25	1,378
School uniforms	364.55	469.91	1,382
School fees/donations	1,290.24	5,910.12	1,406
Days in a month for adults in:			
Agriculture as major activity	9.03	10.68	5,349
Nonagriculture as major activity	4.10	8.99	5,349
Domestic chores as major activity	1.40	5.93	5,349
Hours in a day for children in:			
Sleeping	9.00	1.03	2,707
Domestic tasks	.66	.99	2,707
Caring for others	.30	.68	2,706
Working in household enterprise	.29	1.40	2,705
In school	6.91	2.48	2,706
Playing	4.87	2.27	2,707
	B. Explanatory Variables		
Number of NREGA days worked	58.19	57.13	1,413
Household size	5.39	2.08	1,413
If Scheduled Caste	.25	.43	1,413
If Scheduled Tribe	.17	.38	1,413
If Other Backward Class	.48	.50	1,413
If Hindu	.98	.15	1,413
If Muslim	.01	.12	1,413
If Christian	.01	.09	1,413
Land owned (acres)	2.52	16.20	1,413
Proportion of literate adults	.37	.35	1,413
If has access to public distribution system	.99	.09	1,413
Male household head	.93	.25	1,413
Age of household head (years)	40.31	9.49	1,413
If head lives in household	.98	.15	1,413
Average household age (years)	26.21	6.04	1,413

TABLE 3 (*Continued*)

	Mean	Standard Deviation	Observations
Household age squared	723.50	332.79	1,413
Proportion of males	.48	.15	1,413
Knows social audit	.55	.50	1,413
Earnings (no NREGA)	20,515.79	26,453.97	1,413
Crop earnings	7,317.57	29,874.56	1,413
If got work "on time"	.63	.48	1,413

Source. Round 3 of the Young Lives Survey (2009–10).
Note. Among outcome variables, only the variables on food security situation are binary variables that assume the value 1 if the variable description is true and 0 otherwise. Among explanatory variables "number of NREGA days worked," "household size," "land owned," "proportion of literate adults," "age of household head," "average household age," "household age squared," "proportion of males," "earnings (no NREGA)," and "crop earnings" are continuous variables; all other variables are binary variables. "Earnings (no NREGA)" is household earnings from sources listed in table 1, except from NREGA, in real 2006 rupees earned during the household's reference period of the past 12 months. "Crop earnings" is household earnings from crops in real 2006 rupees earned during the past agricultural year (2008–9). NREGA = National Rural Employment Guarantee Act.

real biweekly expenditures on different commodities. I find that the average per capita spending (in 2006 prices) on rice is Rs 22.60, on pulses is Rs 10.15, on dairy products is Rs 7.41, on proteins is Rs 24.48, on vegetables and fruits is Rs 30.14, and on oil and spices is Rs 24.87. The per capita spending on alcohol and tobacco products is Rs 18.41 and 15.72, respectively (in 2006 prices). I also consider overall household food security situations as outcome variables of interest. In particular, table 3 finds that, on average, 4% of households in the sample have faced a situation in which they could not purchase any food due to scarcity of money, and around 8% of households had to lower the number of meals consumed due to shortage of money. The expenditures on some nonfood items are also considered as outcome variables. They include household spending on clothing, footwear, school uniforms, and school fees or donations for all girls and boys in the household separately during the past 12 months. I find that the average spending on clothing, footwear, school uniforms, and school fees or donations for girls is around Rs 1,164.06, Rs 158.60, Rs 309.03, and Rs 460.38, respectively. The average household spending on clothing, footwear, school uniforms, and school fees or donations for boys is Rs 1,084.14, Rs 186.54, Rs 364.55, and Rs 1,290.24, respectively.

The individual-level outcome variables correspond to time use. The survey asks the most important activity that individuals performed during the past 12 months. The individuals are then asked the number of days in a month this activity was done. Because the individual's age is reported in the survey, it is possible to categorize the time-use data according to adults (18 years of age or older) and children (less than 18 years of age). The time spent on different activities includes agricultural activities (such as self-employed in agriculture,

earning agricultural wages, being annual farm servants, and any other agricultural work), nonagricultural activities (such as self-employed in manufacturing, business, services, other nonagricultural pursuits; receive wages for nonagricultural work and who are in regular salaried employment), and household chores. Table 3 shows that an average of 9.03 days in a typical month are spent performing agriculture, 4.10 days are spent performing nonagricultural tasks, and 1.40 days are spent performing domestic chores as major activity by adults. For children the survey collects additional information on how many hours per day a child typically spends sleeping, doing domestic tasks, caring for others, working in a household enterprise, attending school, and playing or general leisure. The information on these detailed child-level activities has also been used as outcome variables. Table 3 shows that the average number of hours in a day spent by children sleeping is around 9.00, performing domestic tasks is 0.66, caring for others is 0.30, working in the household enterprise is 0.29, in school is 6.91, and playing is 4.87.

B. Explanatory Variable of Interest and Other Controls

The main explanatory variable of interest is the number of days worked by adult household members and the ratio of the days worked by women to men in a household under NREGA in an alternative specification. I compute this information from the household member level survey on the number of NREGA days worked and aggregate it to the household level. The average NREGA days worked by households is around 58 (SD = 57 days), as reported in table 3.[9] Around 63% of households in the working sample report having received employment within 15 days of registration (table 3).

The summary statistics on other covariates that are used as controls in the empirical analysis are provided in table 3. I find that the average household has around five members, 25% of households are Scheduled Castes (SCs), 17% are Scheduled Tribes (STs), 48% are Other Backward Classes (OBCs), and the remaining are non-SC/ST/OBC (which includes upper castes). In addition, 98% of the households are Hindus, and the remaining 2% households are Muslims and Christians. The average landholding is around 2.5 acres, which is low. About 37% of adult household members are, on average, literate. Around 99% of households are also found to access the public distribution system (PDS) that sells subsidized food grains. On average, 93% of household heads are male and 98% of household heads live in the household. The average

[9] Although I find that there are a few households that have completed more than 100 days of work from the YLS data, it must be noted that this average number is reflective of the administrative data obtained for Andhra Pradesh.

age of the household head is around 40 years, whereas the average household age is around 26 years. About 48% of household members are male, and 55% of households are aware of social audits under NREGA. The average earnings of households excluding NREGA wages are Rs 20,515, and real crop earnings are around Rs 7,317 in real 2006 rupees (with large standard deviations).

V. Estimation Framework and Empirical Strategy

A. Baseline OLS

Baseline OLS estimation strategy is used in this analysis. The following estimation equation is used for household-level outcome variables:

$$y_{hv} = \alpha + \beta \text{NREGAdays}_{hv} + \gamma X_{hv} + \phi_v + \varepsilon_{hv}. \quad (1)$$

The outcome variable y_{hv} corresponds to household h in community v (which can be thought of as similar to a village). NREGAdays_{hv} is the explanatory variable of interest. It is the number of days worked by adult members of the household in the program during the past 12 months (from July 2008 to June 2009). The variable X_{hv} includes household-level controls that can likely influence the outcome variables. I include household size, proportion of literate adults, amount of land owned, age of the household head, average age of household members and age squared, and the proportion of males in the household. I also include dummy variables to control for whether the household is SC, ST, or OBC, as well as if it is Hindu, Muslim, or Christian; whether it has access to PDS; whether the household head is male; whether the household head lives in the household; and whether household members are aware that NREGA is subject to social audit. I control for household's income in real 2006 rupees from major sources excluding NREGA over the preceding 12 months and crop income from the past agricultural year (results remain unchanged even if I do not control for household earnings from major sources and crops). I also control for years because the program has been in place in each district to account for district-specific administrative learning regarding program implementation. The variable ϕ_v is village fixed effects, and ε_{hv} is the regression disturbance term clustered at the village level. For outcome variables at the individual level such as time use, I also include a dummy variable for whether the individual is female and is literate, as well as age in years. Standard errors are clustered at the household level for these regressions.

B. Empirical Strategy: Instrumental Variable

The OLS results may be biased because the number of NREGA days worked by a household in a year can likely be endogenous. Further, the OLS results

may overestimate the association between spending on cheaper sources of calories such as rice and pulses and may underestimate the association between spending on proteins, vegetables, and dairy products that are more nutritious but relatively expensive sources of diet and number of days worked. This is likely because poorer households typically spend more on cheaper sources of calories relative to more nutritious, expensive ones and may also choose to work more under NREGA. The OLS estimates may also underestimate the possible decline in the engagement in domestic chores by adults because of the number of NREGA days worked, as it is likely that adults (particularly women) who have fewer alternative paid employment opportunities (and spend more time performing unpaid activities such as domestic chores) would want to work more under the program. Other unobserved characteristics of household members may influence the number of days households would want to work and may likely bias OLS results. This motivates me to use the IV estimation strategy to deal with the potential endogeneity in NREGAdays_{hv}. I exploit the variation that some households were provided with work within 15 days of registration and others were not to identify the effect of the number of days worked in the program on the outcome variables of interest. I argue that this variation is largely because of administrative reasons and, therefore, potentially exogenous to the household. The proposed instrument is, therefore, a binary variable that assumes the value 1 if a household received work within 15 days of registration and is 0 otherwise.

The empirical specification for IV is as follows, where Z_{hv} is the instrument:

$$\text{NREGAdays}_{hv} = \alpha_o + \eta Z_{hv} + \gamma_o X_{hv} + \phi_{ov} + \omega_{hv} \text{ (first stage)}; \quad (2)$$

$$y_{hv} = \alpha_1 + \beta_1 \widehat{\text{NREGAdays}_{hv}} + \gamma_1 X_{hv} + \phi_{1v} + \upsilon_{hv} \text{ (second stage)}. \quad (3)$$

The issue of obtaining work within 15 days of registration or on time needs further exploration and is likely associated with the notion of job rationing under NREGA. Ravi and Engler (2015), in a study of rural households in Medak district of Andhra Pradesh, have found incidence of job rationing under the program. Job rationing implies that households were willing to participate in NREGA but were not provided with work. However, they do not find evidence to support that job rationing was systematically based on a household's socioeconomic characteristics but rather depended on the scattered nature of work sites. That is, either villages did not have enough work sites or existing work sites did not have enough work to provide. This was because work had not started simultaneously in all villages of the district, especially during the early phases of the program in 2007. Dutta et al. (2012) use the NSS data from 2009

to 2010 to understand the incidence of job rationing across different states in India. The authors note that many households were likely rationed in the sense that they wanted more days of employment than what they were provided. Given the limitation imposed by the data, the authors focus on rationing under NREGA as implying households not being provided with work at all despite being registered.[10] The authors find little evidence that rationing is biased against the poor and the scheme still appeared to reach out to marginalized sections of the village, such as the SC/ST. Imbert and Papp (2015) mention that the process of providing work is complex (a list of works to be undertaken needs to be prepared, the list needs to be approved, funds are to be allotted and approved, etc.), all of which require significant administrative capacity. The authors conclude that how well NREGA functions largely depends on "supply side factors" such as administrative capacity and political will, rather than "demand side factors" such as poverty or characteristics of villagers who are the potential beneficiaries of the program. Sheahan (2016) finds from field visits to villages in Andhra Pradesh that households have very little control over the timing or the type of work provided to them under NREGA, reaffirming the top-down nature of NREGA implementation in the state.

Clearly, for the instrument to be valid, it should be correlated with the endogenous explanatory variable of interest, NREGAdays_{hv}, and should satisfy the exclusion restriction. Although the first-stage regression shows whether the instrument is relevant, the exclusion restriction cannot be tested in the situation of one endogenous variable and one instrument. The exclusion restriction requires that the proposed instrument be orthogonal to the unobserved regression disturbance term, conditional on the controls. Although the existing literature suggests that administrative bottlenecks are likely to result in job rationing under NREGA, it might still be important to check whether households that were provided with work on time systematically differed from households that did not receive timely provision of work.

First, one might be worried that households that have political connections and social capital may be more likely to receive employment on time. Afridi, Iversen, and Sharan (2017) and Maiorano (2014) note the important role played by a village-level administrative official, the field assistant (FA), in the implementation of NREGA. In general, villagers cannot choose who would

[10] Dutta et al. (2012) find that administrative data from government websites report almost no unmet demand for NREGA work. This is largely because state and local governments do not have incentive to report unmet demand as, in that case, unemployment allowance must be paid out, the cost of which would have to be exclusively borne by the state governments. They emphasize the importance of household surveys instead of administrative data to understand the constraints on work supply under NREGA.

be appointed as the FA. However, in practice, the FA could be appointed according to the preference of the presiding Member of the Legislative Assembly (MLA; Maiorano 2014) and households with political affiliation similar to those of the FA/MLA may be favored. Table 4 shows that there appears to be

TABLE 4
HOUSEHOLD AND VILLAGE CHARACTERISTICS BY GETTING NREGA WORK ON TIME

	Did Not Get Work on Time	Got Work on Time	Equivalence of Means
	A. Household Characteristics		
Household access to public distribution system	.99 (.004)	.99 (.003)	.001 (.005)
If held position of authority (including political)	.03 (.01)	.03 (.01)	.002 (.01)
Number of years position held	.12 (.05)	.14 (.05)	−.02 (.07)
Member of a group (e.g., self-help group)	.59 (.02)	.59 (.02)	−.001 (.03)
Group leader	.10 (.01)	.12 (.01)	−.02 (.02)
Attended frequent meetings	.58 (.02)	.58 (.02)	.001 (.03)
Talked about problems in community	.25 (.02)	.28 (.01)	−.03 (.02)
Voted in national elections	.98 (.01)	.98 (.004)	−.005 (.01)
Voted in local elections	.98 (.01)	.99 (.004)	−.01 (.01)
Gave cash or gifts to groups or political parties	.06 (.01)	.06 (.01)	−.01 (.01)
Took action against problem in community	.17 (.02)	.19 (.01)	−.02 (.02)
Participated in awareness-raising campaigns	.15 (.02)	.17 (.01)	−.02 (.02)
Participated in protest march or demonstrations	.07 (.01)	.07 (.01)	−.002 (.01)
Observations	543	919	
	B. Village Characteristics		
Access to paved road	.39 (.02)	.35 (.02)	.04 (.03)
Electricity connection in village	.99 (004)	.98 (.004)	.01 (.01)
Nationalized banks in village	.07 (.01)	.08 (.01)	−.01 (.02)
Program for construction and repair of schools in village	.69 (.02)	.67 (.02)	.02 (.03)
Indira Kranthi Patham in village	.49 (.21)	.47 (.17)	.02 (.28)
Land titling program in village	.64 (.02)	.66 (.02)	−.02 (.03)
Microcredit program in village	.69 (.02)	.69 (.02)	−.01 (.02)
Other credit programs in village	.04 (.01)	.03 (.005)	.01 (.01)
Animal Health Services program in village	.94 (.01)	.93 (.01)	.01 (.01)
Rajiv Aarogyasri program in village	.98 (.01)	.98 (.004)	−.01 (.01)
National Maternity Benefit program in village	.98 (.01)	.98 (.004)	−.01 (.01)
Widow Pensions program in village	.98 (.01)	.97 (.01)	.01 (.01)
Indiramma program in village	.89 (.01)	.90 (.01)	−.003 (.02)
Sarva Shiksha Abhiyan program in village	.91 (.01)	.91 (.01)	.002 (.02)
National Midday Meal program in village	.99 (.005)	.99 (.003)	−.01 (.005)
Public distribution system program in village	1.00 (0)	1.00 (0)	0 (0)
Integrated Child Development Services Scheme program in village	1.00 (0)	1.00 (0)	0 (0)
Observations	521	886	

Source. The variables such as positions held (political or apolitical), group membership (e.g., self-help groups, cooperative societies), group leadership, and attendance at frequent meetings are from round 2 of the Young Lives Survey (2007). For all other variables, the data source is round 3 of the Young Lives Survey (2009–10).

Note. Sample is restricted to include only those households that are in rural areas of undivided Andhra Pradesh (excluding Hyderabad), have not moved since 2007, and have sought work under NREGA. Standard errors are reported in parentheses. None of the values are statistically significant. NREGA = National Rural Employment Guarantee Act.

no significant difference, on average, between households that got and did not get employment on time under NREGA in terms of having any household member who held positions of authority (including political positions) and the number of years for which such positions were held. Table 4 also shows that households receiving and not receiving work on time under NREGA do not significantly differ in terms of engagement of household members in the community or politics or past voting behavior. For example, no significant difference is found, on average, between households in terms of whether any household member talked about problems faced by the village with other residents of the village, took action to solve problems in the village, gave cash donations or gifts to community groups or political parties, or participated in any awareness-raising campaigns or protest marches or demonstrations during the past 3 years. Further, the likelihood of voting in national and local elections is high among households and there appears to be no significant difference between households that received and those that did not receive employment on time in terms of past voting behavior as seen from table 4. Thus, political connections or social capital that could be associated with power or influence in the village do not appear to be correlated with timely provision of work under NREGA. These findings are also supported by Sheahan et al. (2014) who find no evidence of vote buying prior to the 2009 legislative assembly and parliamentary elections in Andhra Pradesh.[11] In addition, elections to GPs in Andhra Pradesh had occurred in 2006, almost 2–3 years before the period of this analysis. Therefore, changes in political institutions at the village, subdistrict, or district level that could likely influence the timely provision of NREGA work are not of concern for this analysis.

Second, it could be that more motivated households are more likely to receive employment on time as they could be more aware of their rights and could bargain for timely work provision. Andhra Pradesh has a history of having SHGs and, given the powerlessness of village councils in the state, the SHGs have played an important role in building awareness about workers' rights under NREGA (Reddy 2011). Therefore, membership in these groups can potentially contribute to raising awareness about workers' rights under NREGA. Table 4 shows that there appears to be no significant difference, on average, between households that received and those that did not receive work on time in terms of being members of village-level groups, such as SHGs or cooperative societies, attending frequent meetings of such groups, or holding

[11] The authors find some evidence of political patronage in the form of NREGA funds distribution after the 2009 legislative assembly and parliamentary elections. However, these effects are small and are not of concern here because the elections occurred after the period of the current analysis.

leadership positions in these groups. In this context, Reddy (2011) notes that although SHGs have played an important role in raising awareness levels about NREGA entitlements, households and SHGs were not aware that wage seekers are entitled to compensation if no work was provided within 15 days of registration, indicating that "this was probably because even those responsible for creation of awareness did not anticipate . . . failure of provision of work" (32). Therefore, it is unlikely that belonging to SHGs could create a systematic bias in which households got work on time, as table 4 shows. Further, unionizing NREGA workers to raise their awareness about their entitlements was started by the Andhra Pradesh government only from 2012. Therefore, the concern that households with higher motivation or increased awareness are the ones that are likely to get employment within 15 days of registration is unlikely to hold during the period of this analysis, as table 4 also confirms.

Third, there might be some concern that households' access to NREGA may be correlated with their access to other government programs. In particular the PDS, which distributes food grains to households at subsidized prices, is the largest social welfare scheme in India. Kaul (2014) notes that the planned outlay for PDS was larger than that for NREGA and even for all social welfare programs combined. Further, access to PDS often makes a household eligible for other welfare schemes (e.g., government-sponsored health insurance and housing). Table 4 finds that there appears to be no significant difference in the fraction of households that have access to PDS between households that received and those that did not receive employment on time under NREGA. Table 4 also reports whether households receiving and not receiving employment on time systematically differ in terms of whether different social welfare programs have been operational in their villages. I find that between households that received and did not receive work on time under NREGA, there appear to be no significant differences, on average, in the proportion of households residing in villages where the Indira Kranthi Patham program (for strengthening SHGs to enhance livelihood opportunities for the poor), land titling program, microcredit program that provides bridge loans, other credit programs, and animal health services program are operational (table 4). Further, there appear to be no significant differences between households regarding timely provision of NREGA work in terms of the fraction of households that live in villages where the Rajiv Aarogyasri program (presently called Aarogyasri program that provides health insurance coverage to poor families), the National Maternity Benefit program (monetary transfers to pregnant women to support their nutritional requirements), widow pensions program, the Indiramma program (that provides housing schemes for poor, rural households), the Sarva Shiksha Abhiyan program (for achieving universal primary

education) as well as other nutrition programs such as the National Midday Meal Scheme (that provides free school lunches), the PDS program, and the Integrated Child Development Services Scheme are in operation. These indicate that the households' access or potential access to other government programs is plausibly uncorrelated with whether households receive employment on time under NREGA. Table 4 also finds that, on average, households that received employment on time are not significantly more or less likely to live in villages that have paved road access, electricity connection, nationalized banks, or a program for construction and repair of schools relative to their counterparts that did not receive employment on time. These findings indicate that timely provision of NREGA work is potentially uncorrelated with provision of public goods in villages.

Last, it is to be noted that the sample of analysis is restricted to include those households that have not changed their location since 2007, which mitigates the possibility of selective migration to villages or blocks where NREGA is likely to be well implemented. Further, village fixed effects have been controlled for in the regressions to account for any unobserved village characteristics that could influence timely provision of work under NREGA. District-specific time trends have also been controlled for in the regression specifications to account for administrative learning in the implementation of NREGA.

Therefore, conditional on the controls included in the regression specifications, the proposed instrument—that is, whether a household received employment within 15 days of registration—is unlikely to be correlated with household characteristics that are indicators of motivation, awareness, having influence or power in the village, prevalence of other social welfare programs, and availability of public goods.

VI. Results

I present the results of my analysis on consumption expenditure and time-use outcome variables in this section.

A. Consumption Expenditure Outcome Variables

Table 5 reports the OLS and IV results on overall consumption expenditure patterns at the household level.

Panels A, B, and C of table 5 report the IV and OLS results when the outcome variables of interest are per capita monthly expenditure on food, nonfood, and aggregate consumption in real 2006 prices, respectively. The lowermost panel C of table 5 reports the first-stage estimation results of the IV regression. I find that the instrument is strongly positively correlated with NREGAdays_{hv}. In other

TABLE 5

PER CAPITA REAL MONTHLY EXPENDITURE ON VARIOUS ITEMS

	(1)	(2)	(3)
	A. Food Expenditure		
IV:			
Number of NREGA days	4.28***	3.13*	3.18*
	(1.35)	(1.62)	(1.66)
OLS:			
Number of NREGA days	.20	.14	.14
	(.13)	(.12)	(.11)
Mean of dependent variable	413.43	413.43	413.43
	B. Nonfood Expenditure		
IV:			
Number of NREGA days	1.26	−1.72	−1.84
	(2.48)	(4.96)	(5.12)
OLS:			
Number of NREGA days	−.04	−.22	−.20
	(.28)	(.38)	(.36)
Mean of dependent variable	395.04	395.04	395.04
	C. Total Expenditure		
IV:			
Number of NREGA days	5.55*	1.41	1.33
	(3.09)	(5.47)	(5.64)
OLS:			
Number of NREGA days	.16	−.08	−.07
	(.31)	(.38)	(.37)
Mean of dependent variable	808.47	808.47	808.47
First stage of IV:			
Number of NREGA days (excluded instrument = "if got work on time")	16.71***	12.18***	11.65***
	(2.98)	(3.07)	(3.05)
F-stat on excluded instrument	29.02	15.88	15.33
Village fixed effects	No	Yes	Yes
Observations	1,411	1,411	1,411

Source. Round 3 of the Young Lives Survey (2009–10).

Note. All observations are at the household level. Robust standard errors clustered at the village level are in parentheses. Column (1) includes controls for caste, religion, land ownership, access to public distribution system, and proportion of literate adults in the household as well as controls for whether the household head is male, the age of the household head, the average age of the household and age squared, the proportion of males in the household, whether the household is aware of social audits under NREGA, and district-specific number of years since NREGA was operational in that district with reference to 2008–9. Column (2) includes controls as in col. (1) along with village fixed effects. Column (3) includes controls as in col. (2) along with controls for net real earnings from sources apart from NREGA as well as from crop cultivation. "Caste controls" include dummy variables for Scheduled Caste, Scheduled Tribe, and Other Backward Classes. "Religion controls" include dummy variables for Hindu, Muslim, and Christian. Early districts include Anantapur, Kadapa, Karimnagar, Mahbubnagar, and Srikakulam. The district of West Godavari first implemented NREGA during 2008–9. IV = instrumental variables; NREGA = National Rural Employment Guarantee Act; OLS = ordinary least squares.

* $p < .10$.

*** $p < .01$.

words, households that received employment within 15 days of registration are more likely to work a greater number of days under the program relative to those that did not receive work on time. Further, the first-stage *F*-stat on the excluded instrument is around 15 when I include all controls (as in col. [3] of table 5), and therefore the instrument does not appear to suffer from the weak instruments problem.

On the one hand, table 5, panel A, shows that a greater number of days worked under NREGA is significantly found to increase per capita monthly food expenditure by households from the IV regressions. On the other hand, the OLS estimates are small in magnitude and are statistically insignificant indicating that working under NREGA has no significant impact on monthly per capita food expenditure. The OLS estimates potentially indicate that households that have lower food expenditures are likely to work more under NREGA and, therefore, underestimate the impact of NREGA on food-related spending. I find that inclusion of village fixed effects in columns (2) and (3) in table 5, panel A, lowers the magnitude of the IV coefficient on the number of NREGA days worked; however, it continues to remain statistically significant (albeit at the 10% level of significance, likely because of the inclusion of a large number of village fixed effects). I focus on column (3) for the purpose of interpretation of the IV coefficient on the number of days worked under NREGA, as it contains the full set of controls, including village fixed effects, and earnings from non-NREGA sources, including crops. I find that working an additional 10 days under the program raises per capita monthly food expenditure by Rs 31.8 (in 2006 prices). Relative to the mean, this signifies an increase of monthly per capita expenditure on food by nearly 7.6% whenever members of a household work an additional 10 days under the program.

Table 5, panel B, shows us that a greater number of days worked under NREGA has no significant influence on per capita monthly nonfood consumption spending from the IV estimation results. Table 5, panel C, reports the impact of the number of NREGA days worked on per capita monthly aggregate consumption spending in 2006 prices. After inclusion of the full set of controls, including village fixed effects, and earnings from non-NREGA sources, including crops, column 3 in table 5, panel C, shows that there appears to be no significant impact of the number of days worked under NREGA on monthly per capita aggregate consumption spending by household from the IV estimation. These findings indicate that a greater number of days worked under NREGA has no significant impact on per capita monthly aggregate consumption spending or spending on nonfood items, although it is found to raise household per capita monthly spending on food. It could be that households are spending

more on food per capita instead of nonfood items. However, it would be important to see whether the increased per capita monthly expenditure on food items is because of increased spending on cheaper sources of calories (e.g., rice, other cereals, and pulses) or more expensive sources of calories (e.g., dairy products, proteins, vegetables, and fruits) that also have a higher nutrition content. Therefore, even if I do not find any significant increase in the per capita monthly expenditure of nonfood items, whether the potential increase in income from NREGA is likely being spent on more nutritious but expensive food groups needs to be examined.

Table 6, panels A and B, presents the IV results of the impact of the number of days worked on the biweekly spending on different food items. I find that a larger number of days worked under NREGA increases per capita expenditures on dairy products, proteins, vegetables, and fruits as well as on salt, sugar, and edible oil but has no significant impact on spending on rice and pulses from the IV estimation. In particular, the IV estimates show that working an additional 10 days under the program increases per capita household spending on dairy products by Rs 1.7, proteins by Rs 3.2, vegetables and fruits by Rs 4.1, and spices, sugar, and edible oil by Rs 3 (in 2006 prices). Relative to their respective means, this translates to an increase in the per capita real spending on dairy products by nearly 23%, proteins by 13%, vegetables and fruits by 14%, and spices, salt, sugar, and edible oils by 12% whenever households work an additional 10 days under the program. Therefore, the IV estimates show us that households are likely to raise their expenditure on more expensive sources relative to cheaper sources of foods. Further, table 6, panel B, does not find any significant impact of the number of days worked under NREGA on per capita monthly spending on adult goods such as alcohol and tobacco products from the IV estimate.[12]

Table 6, panel C, presents the IV estimates of the impact of the number of days worked under NREGA on different measures of household food security. I find that a greater number of days worked under the program significantly lowers the household's likelihood of facing a situation in which no food is available for consumption because of lack of money, the frequency of facing such a situation as well as the frequency of needing to lower the number of meals consumed in a day because of scarcity of money. Specifically working an additional 10 days under the program decreases the probability that a household would

[12] I have also added fixed effects for the season and month of survey in alternative specifications to account for plausible seasonality in consumption expenditure patterns, such as the occurrence of harvest periods or festivals. The coefficients on spending patterns remain almost unaffected even after the inclusion of season or month of survey fixed effects and, hence, are not presented here.

TABLE 6
PER CAPITA REAL SPENDING ON DIFFERENT FOODS AND FOOD SECURITY SITUATION

	A. Spending on Food Items			
	Rice	Pulses	Dairy	Proteins
IV:				
NREGA days	.03	.05	.17**	.32*
	(.16)	(.06)	(.07)	(.17)
Mean of dependent variable	22.60	10.15	7.41	24.48
Observations	1,410	1,411	1,408	1,393
	B. Spending on Food Items			
	Vegetables and Fruits	Spices, Salt, Sugar, and Oil	Alcohol	Tobacco
IV:				
NREGA days	.41***	.30***	−.04	−.02
	(.15)	(.12)	(.18)	(.10)
Mean of dependent variable	30.14	24.87	18.41	15.72
Observations	1,409	1,411	1,399	1,410
	C. Implications for Household Food Security			
	No Food Situation	Often No Food Situation	Lower Number of Meals	Frequently Lower Number of Meals
IV:				
NREGA days	−.002**	−.001**	−.001	−.003**
	(.001)	(.0006)	(.0013)	(.001)
Mean of dependent variable	.04	.02	.08	.04
Observations	1,411	1,411	1,411	1,411

Source. Round 3 of the Young Lives Survey (2009–10).
Note. Each cell represents a separate regression. "Proteins" include fish, meat, and eggs; expenditure on all food items in real 2006 rupees. Food security questions are binary variables that assume the value of 1 if the variable description is true and 0 otherwise. "No food situation" is food scarcity due to lack of money, "Often no food situation" is frequent food scarcity due to lack of money, "Lower number of meals" is reducing the number of meals taken, and "Frequently lower number of meals" is frequent lowering of the number of meals consumed. All observations are at the household level. Robust standard errors clustered at the village level are reported in parentheses. Regression specification is as in col. (3) of table 5. IV = instrumental variables; NREGA = National Rural Employment Guarantee Act.
* $p < .10$.
** $p < .05$.
*** $p < .01$.

face a situation in which there is no food by 2 percentage points, frequently face a situation in which there is no food by 1 percentage point, and frequently lower the number of meals consumed in a day because of scarcity of money by 3 percentage points.

Table 7 presents the IV estimates of the impact of the number of NREGA days worked on household expenditure on all children by their gender during the past 12 months. In particular, panel A presents the results where the outcome variables are total household expenditure on the clothing, footwear,

TABLE 7
HOUSEHOLD EXPENDITURES ON DIFFERENT ITEMS FOR ALL CHILDREN, BY GENDER, OVER THE PAST 12 MONTHS

	Clothing	Footwear	School Uniform	School Fees/Donations
	A. Spending on Girls			
IV:				
NREGA days	27.17**	3.63**	.55	−1.07
	(13.68)	(1.52)	(2.22)	(8.29)
Mean of dependent variable	1,164.06	158.60	309.03	460.38
Observations	1,135	1,132	1,114	1,133
	B. Spending on Boys			
IV:				
NREGA days	11.06	1.68	−3.12	.98
	(7.98)	(1.24)	(3.41)	(27.59)
Mean of dependent variable	1,084.14	186.54	364.55	1,290.24
Observations	1,177	1,182	1,185	1,204

Source. Round 3 of the Young Lives Survey (2009–10).
Note. Each cell represents a separate regression. Outcome variables are measured in rupees. All observations are at the household level. Robust standard errors clustered at the village level are reported in parentheses. Regression specification is as in col. (3) of table 5. IV = instrumental variables; NREGA = National Rural Employment Guarantee Act.
** $p < .05$.

school uniforms, and school fees or donations for all girls in the household. Panel B presents analogous results for boys in the household. Panel A shows that a greater number of days worked under NREGA results in an increase in household expenditure on clothing and footwear of girls in the household. However, working under NREGA does not appear to significantly increase household spending on school uniforms and fees of all girls in the household. In terms of the magnitude of the coefficients, panel A shows that working an additional 10 days under NREGA results in an increase in household expenditure on girls' clothing by Rs 271.70 and on girls' footwear by Rs 36.30. Although these magnitudes may appear small, it is to be noted that spending on clothing and footwear is only done occasionally. Relative to their respective means, working an additional 10 days under NREGA is found to result in an increase in expenditure on girls' clothing and footwear by 23% and 22%, respectively. However, panel B shows that working under NREGA has no significant effect on household expenditure on clothing, footwear, school uniforms, and fees of boys in the household. Because the means of spending on the different items for girls and boys are largely similar (except the spending on school fees), these results are unlikely to be driven by the presence of a greater number of girls relative to boys in the household or a higher relative price of girls' clothing and footwear.

B. Relative Contribution of Women's Days Worked to Men's Days Worked

Table 8, in panels A and B, presents the IV estimate results for outcome variables presented in table 5 by using the number of days worked by women alone, number of days worked by men alone, as well as the ratio of the days worked by women to that by men from the household as alternate explanatory variables, instead of the total number of days worked by the household overall as the explanatory variable of interest. I find from my sample that on average, for each day worked by men, women are found to work nearly 6 days under the program. Women typically receive lower wages than men in the rural, casual labor markets in India, and Andhra Pradesh is no exception (see table A1). Deininger, Jin, and Nagarajan (2013) also document that the gender gap in wages is higher in the informal labor markets in India, in which the majority of the country's rural population is employed, than in the formal sector. However, NREGA mandates equal wages for men and women. From table A1, I find that there would be nearly a 20% increase in the daily female wage if women were to work a day under NREGA in the rural casual labor market. Further, the law regarding NREGA mandates that work needs to be provided within 5 kilometers of one's GP, preferably within one's own village. This provision, therefore, mitigates the necessity to travel longer distances for work. Further, sociocultural norms often discourage women from traveling long distances for work in rural India. Therefore, the provision under NREGA that requires work to be provided close to one's residence is especially conducive for women's participation under the program as women are also often required to perform domestic chores and the necessity of traveling long distances for work can be a severe impediment to women's participation in the labor market. These provisions might provide potential explanations as to why one might observe larger participation of women under the program relative to that by men in the sample. Table A2 also shows us that female share of person-days under NREGA is around 58% during 2008–9 in Andhra Pradesh, higher than that for India.

Table 8, in panels A and B, reports the IV estimate results of the impact of the number of days worked by women alone, by men alone, and the number of days worked by women to men on per capita real monthly food and nonfood expenditures, respectively. From table 8, panel A, I find that a greater number of days worked by women alone is found to increase monthly real per capita food expenditure, whereas there appears to be no significant effect on food expenditure on account of number of days worked by men alone. To compare these estimates with those found in table 5, one finds that whereas working an additional 10 days under the program by the household raises monthly per capita food expenditure by Rs 31.8 (col. [3] in table 5, panel A), the corresponding magnitude when one

TABLE 8

WOMEN'S TO MEN'S CONTRIBUTION

	A. Food Expenditure			
	Women's Days Worked	Men's Days Worked	Women's Days to Men's Days Worked	
IV:				
Explanatory variable	6.46*	7.17	11.07**	
	(3.67)	(4.52)	(5.52)	
	B. Nonfood Expenditure			
	Women's Days Worked	Men's Days Worked	Women's Days to Men's Days Worked	
IV:				
Explanatory variable	−3.75	−6.48	−11.82	
	(11.16)	(14.84)	(27.04)	
Observations	1,352	1,207	1,154	
	C. Per Capital Spending on Food Items			
	Rice	Pulses	Dairy	Proteins
IV:				
Women's days to men's days worked	−.19	.10	.56*	.96*
	(.68)	(.22)	(.30)	(.58)
Observations	1,153	1,154	1,151	1,139
	D. Per Capital Spending on Food Items			
	Vegetables and Fruits	Spices, Salt, Sugar, and Oil	Alcohol	Tobacco
IV:				
Women's days to men's days worked	1.35**	1.31**	−.16	−.03
	(.53)	(.58)	(.83)	(.51)
Observations	1,152	1,154	1,145	1,153
	E. Implications for Household Food Security			
	No Food Situation	Often No Food Situation	Lower Number of Meals	Frequently Lower Number of Meals
IV:				
Women's days to men's days worked	−.01*	−.01*	−.01	−.01**
	(.005)	(.004)	(.01)	(.01)
Observations	1,154	1,154	1,154	1,154
	F. Household Spending on Girls			
	Clothing	Footwear	School Uniform	School Fees
IV:				
Women's days to men's days worked	108.07**	12.88**	−3.69	−1.86
	(53.88)	(6.56)	(8.80)	(31.72)
Observations	934	931	920	932

TABLE 8 (*Continued*)

	G. Household Spending on Boys			
	Clothing	Footwear	School Uniform	School Fees
IV:				
Women's days to men's days worked	44.51	3.28	−8.10	53.63
	(37.54)	(4.97)	(12.91)	(98.76)
Observations	964	969	971	984
First stage of IV:				
Women's days to men's days worked (excluded instrument = "if got work on time")	16.71***			
	(2.98)			
F-stat on excluded instrument	6.68			

Note. Outcomes are per capita real overall food and nonfood expenditure, per capita real spending on different foods, food security situation, and spending on girls and boys in the household. For explanations regarding variable definition, clustering of standard errors corresponding to panels A and B, please see table notes of table 5. The regression specification is analogous to col. (3) of table 5 for panels A and B. For explanations regarding variable definition, regression specification, clustering of standard errors corresponding to panels C–G, please see table notes of tables 6 and 7. IV = instrumental variables.
* $p < .10$.
** $p < .05$.
*** $p < .01$.

considers the days worked by women alone is around Rs 64.6 from table 8, panel A. Further, table 8, panel A, also shows that a greater number of days worked by women relative to men increases per capita real monthly food expenditures, which appears to be largely driven because of women's participation in the program. However, table 8, panel B, finds that there appears to be no significant impact of women's days worked, men's days worked, or women's to men's days worked under the program on per capita monthly real nonfood expenditure. These findings appear to be qualitatively similar to those found in column (3) of table 5, panel B, where the total number of days worked by all household members has been considered as the explanatory variable of interest.

Table 8, in panels C–G, presents the IV estimation results of the impact of the relative number of days worked by women to that by men from the household under NREGA on per capita real spending on different food items and household food security as well as household spending on different items for girls and boys separately.[13]

[13] Narayanan and Das (2014) find from NSS large-scale household survey data that among households that got employment under NREGA, about 22.3% of these households in Andhra Pradesh

I find that qualitatively the findings in table 8, panels C and D, are similar to that found in table 6, panels A and B. In other words, an increase in the number of days worked by women relative to that by men from the household under NREGA increases per capita real expenditures on dairy products, proteins, vegetables, and fruits as well as spices, salt, sugar, and edible oils. As in table 6, panel B, I do not find any significant impact of the number of days worked by women to that by men on per capita real spending on adult goods such as alcohol and tobacco products in table 8, panel D. A doubling of the number of days worked by women, keeping the number of days worked by men unchanged (so that it doubles the ratio of the number of days worked by women relative to that by men), increases per capita real spending on dairy products by 15%, proteins by 7%, vegetables and fruits by 8%, and spices, salt, sugar, and edible oils by 10% relative to their respective means. Table 8, panel E, also finds that a greater number of days worked by women relative to that by men results in improved food security by the households as in table 6, panel C. Therefore, it appears that women's participation relative to that of men under NREGA has a beneficial impact on household nutrition. Desai, Vashishtha, and Joshi (2015) have found that women's participation in NREGA likely improves their autonomy as measured by their ability to freely seek health care and control household resources. The results found in table 8, panels C–E, could be because of women's greater autonomy in household decision-making (here, in terms of food expenditures) as Desai, Vashishtha, and Joshi (2015) have documented. As animal sources of foods are important sources of nutrition especially for children (Neumann, Harris, and Rogers 2002; DeBoer, Agard, and Scharf 2015), increased expenditures on these food groups and especially women's participation relative to that of men under the program indicate potential improvement in children's nutrition. These findings are also somewhat analogous to Qian (2008) who documents the impact of female earnings in relation to male earnings on child outcomes in China. Table 8, in panels F and G, shows that a greater number of days worked by women relative to men raises household spending on clothing and footwear of female children but does not significantly affect expenditures on male children, a finding analogous to table 7.

Now, the lowermost panel of table 8 reports the first-stage estimates where the ratio of the days worked by women to men has been regressed on whether

sent only their female members to work under NREGA, whereas the proportion of households in the state from which only male members participated under the program was only 0.6%. For around 77% of households participating under NREGA in Andhra Pradesh, both men and women are found to participate under the program. Therefore, I focus on the ratio of women's to men's days worked for each household as the explanatory variable of interest to capture the relative contribution of both women and men under the program for the detailed expenditure and food security outcomes.

the household got work on time as the instrument. Although I find that getting work on time is associated with a significant increase in the ratio of the days worked by women to men (likely because timely work provision especially within close proximity to one's residence and equal wages across genders can stimulate female employment relative to that of males), the *F*-stat on the excluded instrument is lower than 10. This finding may raise some concern regarding weak instruments here, as weak instruments can lead to biased estimates. Although this concern is more likely to arise in overidentified models, one must be cautious in interpreting the two-stage least squares (2SLS) estimates here. Angrist and Pischke (2008) and Chernozhukov and Hansen (2008) suggest looking at the reduced-form estimates where the dependent variable is regressed on all exogenous variables, including the instrument, as these estimates are likely to be unbiased. Chernozhukov and Hansen (2008) have shown that if the coefficient on the instrument in the reduced form is insignificant, then likely no causal relationship exists in the structural equation. Therefore, the sign and statistical significance of the coefficient on the instrument can potentially assure us of the existence of a causal relationship in the structural equation (see Mahajan and Ramaswami 2017 for a similar analysis). Table A3 reports the reduced-form estimates where the outcome variables in table 8 are regressed on the instrument and other exogenous variables in the model. I find that the coefficient on the instrument is statistically significant and the sign is in the desired direction, thereby providing some assurance that the issue of weak instruments is unlikely to be a problem when interpreting the 2SLS estimates from table 8.

C. Time-Use Outcome Variables

Here I study the effect of NREGA on the time-use patterns of adults and children. I also analyze the differences in time-use patterns by gender of individuals as well as by age groups for children.

1. Major Activity Patterns of Adults

Table 9 depicts the effect of NREGA on major activity patterns of adults in the household. Adults were asked what their major activity was during the past 12 months, and they were then asked how many days in a typical month they spent performing that activity. In particular, table 9 reports the effect of the number of days worked under NREGA on the number of days in a typical month an adult spent performing the activity as his or her major activity. The IV estimates in table 9, panel A, show that the engagement of adults in nonagricultural activities as their major activity is found to increase, whereas engagement in domestic chores is found to decline in households where adults worked a greater number of days under the program. However, there appears to be no significant

TABLE 9
MAJOR ACTIVITY PATTERNS OF ADULTS AS A WHOLE AND BY GENDER

	Agricultural Work	Nonagricultural Work	Domestic Chores
	A. Days Per Month		
IV:			
NREGA days	.01	.07**	−.03**
	(.03)	(.03)	(.02)
OLS:			
NREGA days	.004	.004	−.002
	(.004)	(.004)	(.002)
Mean of dependent variable	9.03	4.10	1.40
Observations	3,931	3,931	3,931
	B. Women		
IV:			
NREGA days	.04	.08**	−.07**
	(.03)	(.03)	(.03)
Mean of dependent variable	8.96	2.70	2.63
Observations	2,047	2,047	2,047
	C. Men		
IV:			
NREGA days	−.005	.06	.003
	(.03)	(.04)	(.002)
Mean of dependent variable	9.10	5.60	.07
Observations	1,884	1,884	1,884

Note. Each cell represents a separate regression. Robust standard errors clustered at the household level are reported in parentheses. Regression specification is col. (3) of table 5 and includes controls for age and whether a participant is female and literate. IV = instrumental variables; NREGA = National Rural Employment Guarantee Act; OLS = ordinary least squares.
** $p < .05$.

correlation between the number of days worked under NREGA and the number of days in a typical month spent performing agricultural activities by an adult as his or her major activity. In particular, working an additional 10 days under NREGA increases the number of days spent by an adult in a typical month performing nonagricultural tasks as his or her major activity by nearly 1 day (0.7 day). Therefore, a 33% increase in the number of NREGA days worked in a month (10 out of 30 days) is found to increase the number of days in a month spent in nonagricultural work as a major activity by adults by 3% (1 day out of 30 days). However, working an additional 10 days under NREGA decreases the number of days spent by an adult in a typical month performing domestic chores as his or her major activity by 0.3 day. Therefore, a 33% increase in the number of NREGA days worked reduces the number of days in a typical month spent performing domestic chores as a major activity by adults by 1%. It appears that availability of NREGA work is associated with altering major activity patterns of adults in the household. Importantly, I find that engagement in domestic chores as a major activity is found to decline. This motivates

me to study the association between NREGA work and the activity patterns of adults by their gender.

2. Effect on Women's versus Men's Major Activity Patterns

Table 9, in panels B and C, presents the association between the number of days worked under NREGA and the number of days spent in a typical month performing agricultural work, nonagricultural work, and domestic chores as a major activity. Table 9, panel B, shows us that working an additional 10 days under NREGA is associated with an increase in engagement in nonagricultural tasks as a major activity for women by nearly 1 day (0.8 day), whereas it results in a decline in the engagement of women in domestic chores as their major activity by nearly a day (0.7 day). In other words, a 33% increase in the number of NREGA days worked in a month is found to increase the number of days spent by women performing nonagricultural work as their major activity by nearly 3% and results in the decline in the number of days spent performing domestic chores as their major activity by roughly the same magnitude. Therefore, it appears that a decrease in engagement in domestic chores as a major activity is compensated by an increase in engagement in nonagricultural work as a major activity by women on account of NREGA. Further, there appears to be no impact of the number of days worked under NREGA on the engagement of women in agricultural tasks as their major activity. Table 9, panel C, finds no significant association between the number of days worked under NREGA and the major activity patterns of men. These findings suggest that changes in major activity patterns of adults on account of NREGA is largely because of changes in major activity patterns of women and not that of men. Although the magnitude of the changes in time allocation to major activity patterns on account of NREGA appears to be modest, these findings are important as they imply that NREGA can potentially alter time allocation of rural women by altering their labor market opportunities. In general, women in India (and in rural areas in particular) face greater restrictions on their mobility than men, and social norms about the gender division of labor in the household imply that women often face impediments while accessing labor markets relative to men. Therefore, the finding that NREGA affects women's time use is an important finding.

3. Major Activity Patterns of Children

I now turn to the major activity patterns of children. Table 10 shows the impact of NREGA on major activity patterns of children in the household. Children are not legally mandated to participate in NREGA. Therefore, the number of days worked (which is the explanatory variable of interest) refers to the number

TABLE 10
MAJOR ACTIVITY PATTERNS OF CHILDREN AS A WHOLE AND BY GENDER

	Agricultural Work	Nonagricultural Work	Domestic Chores
	A. Days Per Month		
IV:			
NREGA days worked by adults	.02*	.01	−.01
	(.01)	(.01)	(.01)
OLS:			
NREGA days worked by adults	.001	−.002**	.003**
	(.002)	(.001)	(.001)
Observations	3,835	3,835	3,835
	B. Girls		
IV:			
NREGA days worked by adults	.02	.003	−.005
	(.02)	(.01)	(.02)
Observations	1,991	1,991	1,991
	C. Boys		
IV:			
NREGA days worked by adults	.03**	.01	−.004
	(.02)	(.01)	(.01)
Observations	1,844	1,844	1,844

Note. Each cell represents a separate regression. Robust standard errors clustered at the household level are reported in parentheses. Regression specification is col. (3) of table 5 and includes controls for age and whether a participant is female and literate. IV = instrumental variables; NREGA = National Rural Employment Guarantee Act; OLS = ordinary least squares.
* $p < .10$.
** $p < .05$.

of NREGA days worked by adults in the household. Thus, this table attempts to present the effect of adult's participation in the program on children's major activity patterns.

The IV estimates in table 10, panel A, show that a greater number of days worked by adults in the household results in a greater engagement of children in agricultural work as their major activity. Working an additional 10 days under the program by adults increases the number of days in a typical month children are engaged in agricultural work as their major activity by around 0.2 day. This implies that a 33% increase in the number of days worked under NREGA by adults is associated with an increase in the number of days in a typical month spent by children performing agricultural tasks as their major activity by close to 1%. However, no significant impact of adult participation in the program is found on children's engagement in nonagricultural work or domestic chores as their major activities.[14]

[14] Media reports indicate the government's willingness to defer the starting time for NREGA work in the morning by an hour for women workers in recognition of the situation that women workers are also largely responsible for performing household chores. Further, around 23% of the households in the working sample report that a childcare facility was available at their last NREGA work site. Most

4. Effect on Time-Use Patterns of Girls versus Boys

In this section, I study the effect of adults working under NREGA on major activity patterns and time allocation of children by gender and age groups.

Table 10, in panels B and C, presents the IV estimate results of the effect of adult participation under NREGA on the major activity patterns of children by gender. Table 10, panel B, finds that adult participation in NREGA as measured by the number of days worked under the program appears to have no significant impact on major activity patterns of girls in the household. However, table 10, panel C, shows that a larger number of days worked by adults under the program increases the number of days worked in a typical month by boys in agricultural tasks as their major activity, although it has no significant impact on the engagement of boys in nonagricultural tasks and domestic chores as their major activities. Specifically, working an additional 10 days by adults under NREGA is found to increase the number of days in a typical month spent by boys in agricultural work as their major activity by nearly 0.3 day. This implies a 1% increase in the number of days in a typical month spent by boys performing agricultural work as their major activity when adults increase their participation under NREGA by 33% in a typical month.

The findings on the major activity patterns of children as reported in table 10, panels B and C, are potentially interesting and important. This is because, on the one hand, although it is reassuring that girls are not found to engage in domestic chores despite social norms about gender roles, on the other hand, the engagement of boys in agricultural work appears to go up on account of greater adult participation under NREGA. This implies that boys are potentially substituting for adults in performing agricultural work when adults, particularly women, work under NREGA.

I also investigate whether the findings on the impact of adult participation under NREGA on children's major activity patterns as reported in table 10 differ by the age groups of children to understand which cohort of children is likely to be affected by adult participation under the program. For this purpose, I divide my sample of children into two age groups: a younger age group that consists of children who are 9 years of age or younger and an older age group that consists of children who are 10–18 years of age. I report the IV estimates of the impact of the number of days worked by adults under the program on major activity patterns of children by their gender and age groups in table 11.

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of the households in my sample have grandparents residing with the family, which is not unusual particularly in rural India. Therefore, older adults could also help in performing domestic chores to some extent. Thus, flexible working hours under NREGA, the availability of childcare facilities in some NREGA work sites, and the presence of grandparents in the household could likely explain why I do not find children substituting for adults in performing domestic tasks when adults participate under NREGA.

TABLE 11

POTENTIAL DIFFERENTIAL EFFECTS: YOUNGER VERSUS OLDER CHILDREN AND GIRLS VERSUS BOYS

	Younger	Older
	A. Girls	
IV:		
Agriculture:		
NREGA days worked by adults	−.003	.02
	(.01)	(.03)
Nonagriculture:		
NREGA days worked by adults	−.002	.01
	(.002)	(.02)
Domestic chores:		
NREGA days worked by adults	.00002	.01
	(.0002)	(.04)
Observations	950	1,041
	B. Boys	
IV:		
Agriculture:		
NREGA days worked by adults	−.001	.12*
	(.004)	(.06)
Nonagriculture:		
NREGA days worked by adults	.001	.02
	(.002)	(.04)
Domestic chores:		
NREGA days worked by adults	−.004	.001
	(.004)	(.02)
Observations	984	860

Note. See table notes of table 10 for variable definitions, data sources, controls included, and other details. Younger children are aged 9 years or less; older children are 10–18 years old. IV = instrumental variables; NREGA = National Rural Employment Guarantee Act.

* $p < .10$.

Panel A of table 11 reports the findings for younger and older cohorts for girls, and panel B reports analogous results for the sample of boys. I find that a greater number of days worked by adults under the program has no significant impact on the major activity patterns of girls regardless of their age groups. However, table 11, panel B, finds that although adult participation in NREGA has no significant impact on the major activity patterns of younger boys, a greater adult participation under NREGA is found to raise the number of days in a typical month worked by older boys in agricultural work as their major activity. Therefore, it appears that the impact of a greater number of days worked by adults under NREGA on children's major activity patterns is largely being driven by older boys.

I also study the impact of the number of days worked by adults under NREGA on time allocation of children in a typical day to various activities. This is in contrast to tables 10 and 11 where my outcome variables of interest are days in a typical month spent by children performing different tasks as their major activities. Time allocation of children to various activities may be interesting

to study because it can inform us as to how children are able to allocate their time to various activities in contrast to how their engagement in their major activity has been affected on account of NREGA. Table 12 presents the IV estimate results of the effect of the number of days worked by adults in the household under NREGA on time allocated to various activities in a typical day by children by their gender and age groups. As in table 11, I categorize children into two age groups: a younger age group that consists of children who are 9 years of age or younger and an older age group that consists of children who are 10–18 years of age. Panel A of table 12 presents the results for girls, and panel B presents the results for boys.

The column on the right in table 12, panel A, shows us on the one hand that a greater number of days worked by adults under NREGA has no significant impact on the time allocated to various activities by older girls. On the other hand, the column on the left in panel A finds that adult participation under NREGA significantly influences the time allocation in a typical day for younger girls in the household. In particular, a greater number of days worked by adults under NREGA is found to raise the number of hours in a typical day spent by younger girls in caring for others in the household and in school, while reducing their time spent playing. An additional 10 days worked by adults under the program is associated with an increase in the time spent by younger girls in caring for others by 6 minutes (0.1 hour) and in school by 24 minutes (0.4 hour), whereas it reduces the time spent playing by 36 minutes (0.6 hour) in a typical day. Although I find a marginal increase in the time spent by younger girls in caring for others in the household, it might be perplexing that I do not find an analogous finding for older girls. A plausible explanation could be that as older girls are already likely to spend a greater number of hours caring for others, on average, in the household relative to their younger counterparts (as is also evident from the mean of this outcome variable reported in table 12, panel A), the marginal impact of greater adult participation under NREGA on the time spent caring for others is likely to be small for older girls. However, it is also reassuring that a significantly greater amount of time is being spent by younger girls in school and the decline in their time spent playing is likely to be largely offset by the increase in time spent by them in school.

I now turn to the time allocation of boys in a typical day as reported in table 12, panel B. The column on the right in panel B finds that adult participation under NREGA has no significant impact on the time allocation of older boys in the household. Given my findings in table 11, it might be surprising as to why I do not find any significant impact on the time allocation of older boys on account of adult participation under NREGA. Now, I find that adult participation under NREGA results in a positive but insignificant impact on the number

TABLE 12

POTENTIAL DIFFERENTIAL EFFECTS: TIME ALLOCATION OF A CHILD IN A TYPICAL DAY BY GENDER AND AGE

	Younger	Older
	A. Girls	
IV:		
Sleeping:		
NREGA days worked by adults	−.004	−.001
	(.01)	(.005)
Mean of dependent variable	9.27	8.65
Domestic tasks:		
NREGA days worked by adults	.01	.001
	(.005)	(.01)
Mean of dependent variable	.38	1.35
Caring for others:		
NREGA days worked by adults	.01*	.004
	(.005)	(.004)
Mean of dependent variable	.23	.53
Working in household enterprise:		
NREGA days worked by adults	.002	.01
	(.002)	(.01)
Mean of dependent variable	.01	.46
School:		
NREGA days worked by adults	.04**	−.01
	(.02)	(.02)
Mean of dependent variable	7.23	6.36
Playing:		
NREGA days worked by adults	−.06**	.01
	(.03)	(.01)
Mean of dependent variable	5.24	4.29
Observations	731	663
	B. Boys	
IV:		
Sleeping:		
NREGA days worked by adults	.02	−.02
	(.01)	(.01)
Mean of dependent variable	9.27	8.64
Domestic tasks:		
NREGA days worked by adults	.0004	−.01
	(.004)	(.01)
Mean of dependent variable	.23	.65
Caring for others:		
NREGA days worked by adults	.01	.01
	(.005)	(.01)
Mean of dependent variable	.18	.29
Working in household enterprise:		
NREGA days worked by adults	−.001	.01
	(.002)	(.02)
Mean of dependent variable	.05	.77
School:		
NREGA days worked by adults	.02	−.02
	(.02)	(.02)
Mean of dependent variable	7.42	6.86

TABLE 12 (*Continued*)

	Younger	Older
Playing:		
NREGA days worked by adults	−.07**	.002
	(.03)	(.02)
Mean of dependent variable	5.17	4.62
Observations	758	545

Note. The outcome variables refer to number of hours in a day a child does a specific activity. Younger children are aged 9 years or less; older children are 10–18 years old. See table notes of table 10 for data sources, controls included, and other details. IV = instrumental variables; NREGA = National Rural Employment Guarantee Act.
* $p < .10$.
** $p < .05$.

of hours spent working in household enterprises by older boys. It could be that household enterprises involve both agricultural and nonagricultural activities. However, I do not have information on the type of household enterprises that children are working in, that is, whether they involve farm or nonfarm activities. Therefore, it is possible that household enterprises that also include nonfarm activities is a likely reason as to why I find a positive but statistically insignificant impact of the number of days worked by adults under NREGA on time spent working in household enterprises by older boys (because no significant impact is found on the engagement of older boys in nonagricultural tasks as their major activity on account of a greater number of days worked under NREGA as reported in table 11). The column on the left in table 12, panel B, indicates that an additional 10 days worked by adults under NREGA significantly reduces the time spent in a typical day by younger boys playing by 42 minutes (0.7 hour). Although I do not find a significant impact of adult participation under NREGA on the number of hours spent performing other activities by younger boys, it is possible that the decline in playing time is because of relatively small increases in the time spent in school and sleeping in a typical day for younger boys.

VII. Conclusion

In this paper, I have studied the effect of the number of days worked by a household under India's NREGA on consumption expenditure patterns and individual time-use patterns through IV estimation strategy.

I find increased spending on food and especially nutritious items such as milk, proteins, vegetables, and fruits along with some "luxury" food items such as salt, spices, sugar, and edible oils because of a greater number of days worked under the program but no effect on the spending on adult goods such as tobacco and alcohol. Household food security is also found to improve because of a greater number of days worked under the program. Further, I find that households that work a greater number of days under NREGA increase their spending

on clothing and footwear of girls only. Most of these findings are on account of women's greater participation in the program relative to that of men. These findings are consistent with the literature that women and men have distinct preferences and are likely to spend their incomes on different commodities, with women being more likely to spend on goods that can raise children's welfare.

In terms of time-use outcomes, I find a reduction in the engagement of women in domestic chores as their major activity and an increase in the time spent performing nonagricultural work in households that work a greater number of days under NREGA with no associated effect for men. This finding is particularly important as it indicates that NREGA can potentially impact women's time-use patterns in rural India where women face significant impediments in accessing labor markets because of social norms that restrict women's mobility and emphasize women's role in primarily performing domestic chores. However, these findings for adult women do not appear to translate into greater time spent performing chores for female children, contrary to one's expectations. But I find an increase in engagement in agricultural work as a major activity for male children. Leisure time and time to play are found to be lower for both girls and boys in households where adults work a greater number of days under NREGA. However, time spent in school is found to increase for younger girls. Reassuringly, time spent performing domestic tasks by girls is not found to increase on account of the program. However, increased engagement of boys in agricultural tasks is a plausible unintended negative consequence of the program.

Appendix

TABLE A1
AVERAGE NREGA WAGE AND CASUAL WAGE IN RURAL INDIA

State	Average NREGA Wage	Average Casual Wage Overall	Casual Wage Males	Casual Wage Females	Male-Female Difference
Andhra Pradesh	**91.9**	**98.5**	**115.4**	**75.7**	**39.7**
Bihar	97.5	79.4	81	65.8	15.2
Chhattisgarh	82.3	68.8	70.8	65.5	5.3
Gujarat	89.3	83.3	87.3	71	16.3
Haryana	150.9	139.6	146.1	99.1	47
Himachal Pradesh	109.5	139.6	141.4	110.2	31.2
Jharkhand	97.7	101.2	103.6	82.2	21.4
Karnataka	86	84.5	96.9	62.8	34.1
Kerala	120.6	206.5	226.6	119.3	107.3
Madhya Pradesh	83.7	69	74.5	58.1	16.4
Maharashtra	94.3	75.2	86	58.2	27.8
Orissa	105.9	75.6	81	59.1	21.9
Punjab	123.5	130.4	133.5	91.8	41.7
Rajasthan	87.4	125.7	132.3	94.3	38
Tamil Nadu	71.6	110.8	132.1	72.6	59.5
Uttarakhand	99	118.7	122.1	96.7	25.4
Uttar Pradesh	99.5	94.3	97	69.2	27.8

TABLE A1 (*Continued*)

State	Average NREGA Wage	Average Casual Wage Overall	Casual Wage Males	Casual Wage Females	Male-Female Difference
West Bengal	90.4	85.3	87.8	65.9	21.9
India	90.2	93.1	101.5	68.9	32.6

Source. "MGNREGA Sameeksha 2006–2012" published by the Ministry of Rural Development, Government of India (2012).
Note. Wages are reported as Rs/day. Andhra Pradesh refers to undivided Andhra Pradesh, the state I study in this paper (values reported in bold). NREGA = National Rural Employment Guarantee Act.

TABLE A2

FEMALE SHARE OF EMPLOYMENT IN NREGA: TOTAL PERSON-DAYS (%) PER FISCAL YEAR (FY)

State	FY 2006–7	FY 2007–8	FY 2008–9	FY 2009–10	FY 2010–11
Andhra Pradesh	**55**	**58**	**58**	**58**	**57**
Bihar	17	28	30	30	28
Chhattisgarh	39	42	47	49	49
Gujarat	50	47	43	48	44
Haryana	31	34	31	35	36
Himachal Pradesh	12	30	39	46	48
Jharkhand	39	27	29	34	33
Karnataka	51	50	50	37	46
Kerala	66	71	85	88	90
Madhya Pradesh	43	42	43	44	44
Maharashtra	37	40	46	40	46
Orissa	36	36	38	36	39
Punjab	38	16	25	26	34
Rajasthan	67	69	67	67	68
Tamil Nadu	81	82	80	83	83
Uttarakhand	30	43	37	40	40
Uttar Pradesh	17	15	18	22	21
West Bengal	18	17	27	33	34
India	40	43	48	48	48

Source. "MGNREGA Sameeksha 2006–2012" published by the Ministry of Rural Development, Government of India (2012).
Note. Each fiscal year begins April 1 and ends March 31 the following year. Andhra Pradesh refers to undivided Andhra Pradesh, the state I study in this paper (values reported in bold). NREGA = National Rural Employment Guarantee Act.

TABLE A3

REDUCED-FORM RESULTS FOR WOMEN'S TO MEN'S CONTRIBUTION: OUTCOMES

	A. Overall Expenditures			
	Food		Nonfood	
OLS:				
If got work on time	32.43*		−34.45	
	(16.83)		(79.50)	
Observations	1,153		1,153	
	B. Spending on Food Items			
	Rice	Pulses	Dairy	Proteins
OLS:				
If got work on time	−.54	.32	1.69**	2.92*
	(2.11)	(.68)	(.72)	(1.62)
Observations	1,152	1,153	1,150	1,138

TABLE A3 (*Continued*)

	C. Spending on Food Items			
	Vegetables and Fruits	Spices, Salt, Sugar, and Oil	Alcohol	Tobacco
OLS:				
If got work on time	4.01***	3.89***	−.46	−.14
	(1.33)	(1.14)	(2.61)	(1.57)
Observations	1,151	1,153	1,144	1,152
	D. Implications for Household Food Security			
	No Food Situation	Often No Food Situation	Lower Number of Meals	Frequently Lower Number of Meals
OLS:				
If got work on time	−.03**	−.02**	−.02	−.04***
	(.01)	(.01)	(.02)	(.01)
Observations	1,153	1,153	1,153	1,153
	E. Household Spending on Girls			
	Clothing	Footwear	School Uniform	School Fees
OLS:				
If got work on time	322.89**	37.57***	−13.54	−6.96
	(126.61)	(14.59)	(30.35)	(114.19)
Observations	933	930	919	931
	F. Household Spending on Boys			
	Clothing	Footwear	School Uniform	School Fees
OLS:				
If got work on time	121.65	9.39	−23.80	149.53
	(91.33)	(14.96)	(36.81)	(305.62)
Observations	963	968	970	983

Note. Outcomes are per capita real overall food and nonfood expenditure, per capita real spending on different foods, food security situation, and spending on girls and boys in the household. For explanations regarding variable definition, and clustering of standard errors corresponding to panel A, please see table notes of table 5. The regression specification is analogous to col. (3) of table 5 for panel A. For explanations regarding variable definition, regression specification, and clustering of standard errors corresponding to panels B–F, please see table notes of tables 6 and 7. OLS = ordinary least squares.

* $p < .10$.

** $p < .05$.

*** $p < .01$.

References

Afridi, Farzana, Vegard Iversen, and M. R. Sharan. 2017. "Women Political Leaders, Corruption and Learning: Evidence from a Large Public Program in India." *Economic Development and Cultural Change* 66, no. 1 (October): 1–30.

Afridi, Farzana, Abhiroop Mukhopadhyay, and Soham Sahoo. 2016. "Female Labour Force Participation and Child Education in India: Evidence from the National Rural Employment Guarantee Scheme." *IZA Journal of Labor and Development* 5:7.

Angrist, Joshua D., and Jorn-Steffen Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press.

Azam, Mehtabul. 2012. "The Impact of Indian Job Guarantee Scheme on Labor Market Outcomes: Evidence from a Natural Experiment." IZA Discussion Paper no. 6548, World Bank and IZA, Bonn.

Berg, Erlend, Sambit Bhattacharyya, Rajasekhar Durgam, and Manjula Ramachandra. 2018. "Can Public Works Increase Equilibrium Wages? Evidence from India's National Rural Employment Guarantee." *World Development* 103(C):239–54.

Bhargava, Anil K. 2014. "The Impact of India's Rural Employment Guarantee on Demand for Agricultural Technology." IFPRI Discussion Paper no. 01318, International Food Policy Research Institute, Washington, DC.

Bose, Nayana. 2017. "Raising Consumption through India's National Rural Employment Guarantee Scheme." *World Development* 96:245–63.

Chernozhukov, Victor, and Christian Hansen. 2008. "The Reduced Form: A Simple Approach to Inference with Weak Instruments." *Economics Letters* 100, no. 1:68–71.

DeBoer, Mark D., Hannah E. Agard, and Rebecca J. Scharf. 2015. "Milk Intake, Height and Body Mass Index in Preschool Children." *Archives of Disease in Childhood* 100:460–65.

Deininger, Klaus, Songqing Jin, and Hari Nagarajan. 2013. "Wage Discrimination in India's Informal Labor Markets: Exploring the Impact of Caste and Gender." *Review of Development Economics* 17, no. 1:130–47.

Deininger, Klaus, and Yanyan Liu. 2019. "Heterogeneous Welfare Impacts of National Rural Employment Guarantee Scheme: Evidence from Andhra Pradesh, India." *World Development* 117:98–111.

Desai, Sonalde, Prem Vashishtha, and Omkar Joshi. 2015. *Mahatma Gandhi National Rural Employment Guarantee Act: A Catalyst for Rural Transformation*. New Delhi: National Council of Applied Economic Research.

Dreze, Jean, and Reetika Khera. 2009. "The Battle for Employment Guarantee." *Frontline* 26, no. 1:3–16.

Dutta, Puja, Rinku Murgai, Martin Ravallion, and Dominique Van De Walle. 2012. "Does India's Employment Guarantee Scheme Guarantee Employment?" *Economic and Political Weekly* 42, no. 16:55–64.

Gehrke, Esther. 2019. "An Employment Guarantee as Risk Insurance? Assessing the Effects of the NREGS on Agricultural Production Decisions." *World Bank Economic Review* 33, no. 2 (June): 413–35.

Imbert, Clement, and John Papp. 2015. "Labour Market Effects of Social Programs: Evidence from India's Employment Guarantee," *American Economic Journal: Applied Economics* 7, no. 2:233–63.

Islam, Mahnaz, and Anitha Sivasankaran. 2015. "How Does Child Labor Respond to Changes in Adult Work Opportunities? Evidence from NREGA." Working paper, Public Policy, Harvard University.

Kaul, Tara. 2014. "Household Responses to Policy and Social Norms in India." PhD diss., University of Maryland, College Park.

Khera, Reetika, and Nandini Nayak. 2009. "Women Workers and Perceptions of the National Rural Employment Guarantee Act." *Economic and Political Weekly* 44, no. 43:49–57.

Klonner, Stefan, and Christian Oldiges. 2014. "Safety Net for India's Poor or Waste of Public Funds? Poverty and Welfare in the Wake of the World's Largest Job

Guarantee Program." Working paper, Department of Economics, University of Heidelberg, Heidelberg.

Li, Tianshu, and Sheetal Sekhri. 2013. "The Unintended Consequences of Employment Based Safety Net Programs." Working paper, Department of Economics, University of Virginia, Charlottesville.

Mahajan, Kanika. 2015. "Farm Wages and Public Works: How Robust Are the Impacts of the National Rural Employment Guarantee Scheme?" *Indian Growth and Development Review* 8, no. 1:19–72.

Mahajan, Kanika, and Bharat Ramaswami. 2017. "Caste, Female Labor Supply, and the Gender Wage Gap in India: Boserup Revisited." *Economic Development and Cultural Change* 65, no. 2 (January): 339–78.

Maiorano, Diego. 2014. "The Politics of the Mahatma Gandhi National Rural Employment Guarantee Act in Andhra Pradesh." *World Development* 58:95–105.

Mani, Subha, Jere R. Behrman, Shaikh Galab, and Prudhvikar Reddy. 2014. "Impact of the NREGS on Schooling and Intellectual Human Capital." Grand Challenges Canada Economic Returns to Mitigating Early Life Risks Project Working Paper no. 2014–10. https://repository.upenn.edu/gcc_economic_returns/10.

Ministry of Law and Justice, Government of India. 2005. *The Gazette of India: The National Rural Employment Guarantee Act, 2005*. New Delhi: Ministry of Law and Justice, Government of India.

Ministry of Rural Development, Government of India. 2012. MGNREGA Sameeksha: An Anthology of Research Studies on the Mahatma Gandhi National Rural Employment Guarantee Act, 2005, 2006–2012. New Delhi: Ministry of Rural Development, Government of India.

Mukhopadhyay, Abhiroop. 2012. "Mahatma Gandhi National Rural Employment Guarantee Scheme: Falling Demands or Funds Crunch?" http://www.ideasforindia.in/article.aspx?article_id=29.

Muralidharan, Karthik, Paul Niehaus, and Sandip Sukhtankar. 2016. "Building State Capacity: Evidence from Biometric Smartcards in India." *American Economic Review* 106, no. 10:2895–929.

Naqshbandi, Aurangzeb. 2009. "No Unemployment Allowance under NREGA in India. OneWorld South Asia." November 17. http://southasia.oneworld.net/news/no-unemployment-allowance-under-nrega-in-india.WQ7W5NKGPIU.

Narayanan, Sudha, and Upasak Das. 2014. "Women Participation and Rationing in the Employment Guarantee Scheme." *Economic and Political Weekly* 49, no. 46:46–53.

Neumann, Charlotte, Dianne M. Harris, and Lisa M. Rogers. 2002. "Contribution of Animal Source Foods in Improving Diet Quality and Function in Children in the Developing World." *Nutrition Research* 22, no. 1–2:193–220.

Niehaus, Paul, and Sandip Sukhtankar. 2012. "The Marginal Rate of Corruption in Public Programs: Evidence from India." *Journal of Public Economics* 104:52–64.

———. 2013. "Corruption Dynamics: The Golden Goose Effect." *American Economic Journal: Economic Policy* 5, no. 4:230–69.

Pankaj, Ashok, and Rukmini Tankha. 2010. "Empowerment Effects of the NREGS on Women Workers: A Study in Four States." *Economic and Political Weekly* 45, no. 30:45–55.

Qian, Nancy. 2008. "Missing Women and the Price of Tea in China: The Effect of Sex-Specific Income on Sex Imbalance." *Quarterly Journal of Economics* 123, no. 3:1251–85.

Ravi, Shamika, and Monika Engler. 2015. "Workfare as an Effective Way to Fight Poverty: The Case of India's NREGS." *World Development* 67:57–71.

Reddy, Narasimha D. 2011. "Functioning of National Rural Employment Guarantee Scheme (NREGS) in Andhra Pradesh." Unpublished manuscript, University of Hyderabad, Hyderabad.

Shah, Manisha, and Bryce Millett Steinberg. 2016. "Workfare and Human Capital Investment: Evidence from India." NBER Working Paper no. 21543, National Bureau of Economic Research, Cambridge, MA.

Shah, Vivek. 2013. "Essays in Development Economics." PhD diss., University of Pennsylvania, Philadelphia.

Sheahan, Megan. 2016. "From the Top to the Bottom of MNREGA." http://www.ideasforindia.in/article.aspx?article_id=1564.

Sheahan, Megan, Yanyan Liu, Christopher B. Barrett, and Sudha Narayanan. 2014. "The Political Economy of MGNREGS Spending in Andhra Pradesh." IFPRI Discussion Paper no. 01371, International Food Policy Research Institute, Washington, DC.

Tewari, Ruhi. 2010. "Unemployment Allowance under Job Scheme Paid in Only 7 States." March 31. Livemint. http://www.livemint.com/Politics/x9V7Uzp5yBuI570X7qCEnJ/Unemployment-allowance-under-job-scheme-paid-in-only-7-state.html.

World Bank. 2012. "World Development Report: Jobs." Washington, DC. https://openknowledge.worldbank.org/handle/10986/11843.

Zimmermann, Laura. 2015. "Why Guarantee Employment? Evidence from a Large Indian Public-Works Program." Working paper, Department of Economics, University of Georgia, Athens.