Labor market shocks, Social Protection and Women's Work

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Abstract

In this study we focus on the lockdown in response to the Covid-19 pandemic that highlighted the vulnerabilities faced by women in labor markets - globally and domestically. We investigate whether public policy measures mitigate these vulnerabilities. In particular, we study the implications of lockdown triggered reverse migration on Labor Force Participation of rural women, focusing on mandated provisions under MGNREGA and GKRA. We find evidence of complementarity of the two social employment schemes and rule out any crowding out of NREGA person-days by GKRA. Our analysis shows that despite these schemes rural women lost employment due to competition from men. Their share in NREGA person-days fell by 0.4% during the pandemic. Interestingly, the mandated provisions for women in NREGA works helped women preserve their employment status. Our findings underscore the need for special provisions and targeted programs for women to reduce their withdrawal and enhance their participation in the labor market. Our results are robust to seasonality patterns in rural employment and MGNREGA. Furthermore, we validate our findings using monthly individual-level employment data from Consumer Pyramids Household Survey (CPHS), CMIE.

JEL classification: J08, J16, O15

Keywords: Covid-19, Rural labor market, Gender, Reverse migration, NREGA, GKRA

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1. Introduction

The COVID-19 pandemic adversely affected economies across the globe. With no precedence to this sudden shock, most nations resorted to restrictions on the mobility of the masses while some went under complete lockdown to contain the spread of the virus. In effect, the economic activities were severely hit resulting in a precipitous fall in employment. However, the adverse effects have been more pronounced for certain demographic groups. For instance, cross-country analyses of the impact of the COVID 19 shock on the employment rates find that women jobs were at 19% greater risk and 1.8 times more vulnerable than men's jobs. In addition, women also faced higher burden of unpaid care work due to COVID-19 crisis.[1] Studies based on developed countries show this gendered-differentiated impact to be driven by the concentration of women in industries that suffered greater losses due to the pandemic (e.g., Alon et al. (2020) - U.S, Dang and Nguyen (2020) - China, Italy, Japan, South Korea, U.K., and U.S., Andrew et al. (2020) - UK, Farre et al. (2020) - Spain).

Likewise in developing countries, women were more severely hit. Deshpande (2020), Abraham et al. (2021) show that conditional on being employed in the pre-pandemic period, chances of women losing work are higher in the pandemic period relative to men. CMIE data highlights disproportionate job losses for women at 14% as opposed to 1% for men between December 2019-2020. This worsening gender gap is explained by the lack of fallback options and it may further exacerbate the existing gender inequities (ibid). The gendered effect on labor market outcomes may also ensue from the reinforcement of the male breadwinner norm at the household level, especially when there is scarcity of earning opportunities and higher burden of household logistics. Thus, we focus on fall back options and their implications on women's employment amidst the pandemic, which was a huge shock to the demand and supply of the labor.

We exploit the unanticipated labor market shock during the pandemic in one of the worst affected economies across the globe – India, to investigate the impact of a shortage of employment opportunities on the employment of women.[2] Specifically, we examine the effect of the pandemic

[1] Source: https://www.mckinsey.com/featured-insights/future-of-work/covid-19-and-gender-equality\-countering-the-regressive-effects

[2] India witnessed one of the strictest nationwide lockdowns in March 2020 with almost all economic activities coming to a halt, with a few exceptions of necessary services like sale and purchase of household non-durable goods, medical and defense.

triggered reverse migration and the participation of rural women relative to men in one of the largest employment guarantee schemes, i.e., the Mahatama Gandhi National Rural Employment Guarantee Scheme (MG-NREGA) in India. Furthermore, we explore the role of mandated provisions (i.e., fallback option) for women under this scheme.

We begin by showing the overall increased dependence on the government employment scheme during the pandemic. The MG-NREGA person-days increase by 6% post the lockdown period in 2020 (April 2020 - March 2021) relative to 2019 (April 2019 - March 2020). Our analysis show that the share of rural women in the public works program fell by 0.4% during the pandemic. Interestingly, districts that were historically below the mandated reservation of one-third of public works for women show an increase in the share of women by 2.6% while the districts below this threshold experience a fall in the share of women.

Since we expect competition among labour to be fiercer in districts experiencing a greater exodus of migrants, we take into account additional employment generation program, i.e, GKRA (Garib Kalyan Rojgar Abhiyan). The central government had introduced GKRA for 125 days in districts with 25000 and more returning migrants without any special provisions for women. We examine the intersection of mandated bound under MGNREGA and availability of additional employment generation scheme to find that the women's share in overall person-days generated fell by 2.4% in GKRA districts above the reserved threshold for women due to the pandemic. The Non-GKRA districts, on the other hand, had no significant impact on their women's share during the pandemic.

We also document a seasonality in the dependence on the NREGA scheme with a greater burden during the o-peak agricultural seasons compared to the peak Kharif season in May-June. To account for this seasonality and better quantify the impact of the different phases of the pandemic, the second part of our analysis uses monthly district-level data and combines it with individual-level employment data from Consumer Pyramids Household Survey (CPHS) collected by CMIE. Our findings are similar when we dis-aggregate timeline into different lockdown phases that coincides with ease of mobility and thus availability of employment opportunities.

To the best of our knowledge, our paper is first to examine the role of mandated provision in public works programs during COVID-19 on women's LFP. It is closest in spirit to Afridi et al. (2022) which highlights the cushioning effect of MGNREGA on the LFP of rural women. In addition, we also look at GKRA that didn't have any special provision for women but may impact

women's share in MGNREGA either through complementary or substitution effects. We extend the studies by Deshpande (2020), Abraham et al. (2021) by looking at the existence of *"fallback options"* since these papers attribute fall in conditional employment of women to lack of fallback options.

We add to the bigger debate regarding women's participation in paid economic activity and measures to retain and enhance their labor force participation. COVID 19 shock shows that any crisis having adverse labor market implications is likely to aggravate the extant problem of low and stagnant labor force participation rates (LFPR) of women in developing countries. Our paper confirms this in the context of rural labor market and further shows that this may play out even in historically feminized sector (such as MGNREGA). We advocate the need of special/targeted policies to mitigate women vulnerabilities and thereby overall loss in household's welfare.

The remainder of the paper is organized as follows. In section 2, we describe employment generation schemes in rural India and briefly summarize recent trends. Section 3 discusses estimating equation and results. We discuss results in 4. Section 5 concludes and discusses caveats.

2. Background

2.1. Women and MG-National Rural Employment Guarantee Act (MGNREGA)

The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) launched in 2005, is a pan-rural India demand-based employment generation program. Under this act, each rural household has the right to manual work for 100 days (all adults per household in total) on publicly funded projects (usually for rural development) (Afridi et al. (2022)). It has been lauded as one of the largest anti-poverty programs (safety net) and empirical evidence shows it to be particularly attractive to rural women. Studies underscore the role of MGNREGA in enhancing female labor force participation. Women find some of its features like- guarantee of work near home, equal pay promise to men and women, and one-third reservation for women, quite desirable as they help in overcoming barriers to participation in paid economic activity (e.g: preference of guaranteed work identified by Dhingra and Machin (2020), mobility restrictions identified by Afridi et al. (2020)).

Moreover, evidence shows other welfare implications of the program. For instance, the minimum

wage set under the scheme has been shown to cause a substantial increase in the private-sector casual wages for women, reducing the gender disparity. This reduced the dependence of women on men for personal savings and consumption. The ensuing economic independence enhances the say of women in household decision making and translates into better household nutrition, increased expenditure on child care and health services (see Sangwan and Kumar (2021), Maity (2019), Zimmermann (2012)). Additionally, a recent study by Rodriguez (2022) shows that increased participation of women in MGNREGA leads to an increase in credit demand and savings and a fall in violence against them.

Three facts regarding MGNREGA and LFPR are worth mentioning here. First, while overall FLP in India is approximately 25%, it is quite remarkable that women's share in MGNREGA work generated is more than 50%.[3] Second, overall FLP has been declining and in recent years this decline has been driven mainly by rural women (Deshpande (2020)). However, inclusion of some of the (routine) non-paid farm activities in MG-NREGA's ambit has increased women participation. Third, men migrate to urban areas in search of better opportunities, leaving behind women who turn to guaranteed MG-NREGA for work near home.[4] However, reverse migration to rural areas may increase demand of work under MGNREGA by men and may impact rationing rates and thus women participation.

Our paper is built around this disequilibrium created by the pandemic. More people demanded work under MGNREGA as other employment opportunities dried up especially in urban India that led to mass reverse migration to rural India. For instance, nearly 133 million people demanded work in 2020-21 - a 43% increase compared to the previous year. Up to 110 million people worked in the program in 2020-21, compared to an average of 78 million in four years to 2019-20. While the government increased the MGNREGA budget by INR 400000 million for 2020-21 to address increased demand, it was considerably less than the estimated required allocation.[5]

[3]Despite having considerable gains in female education levels, a decrease in fertility rates, and high economic growth in the pre-pandemic period, India has one of the lowest FLP rates in the world. In fact, in 2017, India had one of the lowest female labor force participation rates across the globe and the lowest since her Independence in 1947. Source: https://www.newsclick.in/female-labour-force-in-India-declining

[4]https://www.downtoearth.org.in/blog/how-women-seized-nrega-2282

[5]Source:https://www.indiaspend.com/governance/migrant-workers-no-reliable-data-or-policy-737499

2.2. Garib Kalyan Rojgar Abhiyaan (GKRA)

Another employment scheme - GKRA (Garib Kalyan Rojgar Abhiyaan), was launched with an aim to provide social protection to the "*returning migrants and similarly affected rural population*" in June 2020 by the Government of India. The GKRA was introduced in 116 selected districts across 6 states namely Bihar, Jharkhand, Odisha, Rajasthan, Madhya Pradesh, and Uttar Pradesh. Districts with 25,000 and more returnee migrant workers were selected with a focus on 25 works to be coordinated by 12 different departments/ministries with a resource envelope of INR 500 billion. Figure A.1 shows distribution of GKRA districts.[6] [7]

There was a significant overlap between activities under MGNREGA and GKRA with 13 (17) out of 25 activities falling under MGNREGA (Ministry of Rural Development). Moreover, one of the objectives of GKRA was to "*saturate villages with public infrastructure and assets*", similar to MG-NREGA (GoI (2021)). The wages for these activities came from the allocated INR 500 billion. Thus, GKRA worked under the capacity of existing schemes and may either complement or substitute their benefits.[8]

Thus, steps were taken to meet the increasing demand for work in the rural economy but these were inadequate. For instance, allocation of GKRA was unequal with states like Odisha and Jharkhand getting proportionately lesser funds as compared to their share in returnee migrants. Also, states of Chattisgarh and Jharkhand were ignored altogether. By design, GKRA catered to about two-thirds of returning migrants.[9] Wages were increased by 11% but around 15 states did not comply with the mandated increase. In all, 507.8 million person-days under GKRA and 2950 million person-days under MGNREGA were generated (till January 2021), clearly less than the demanded person-days (CPR (2022)).

Undoubtedly, there was intense competition not only in quantity but skill level as well which may imply limited employment opportunities for women. To some extent, the provision of $1/3^{rd}$ of jobs for women may act as a cushion. Since the pre-pandemic average share of women (49% in

[6] Source: https://rural.nic.in/press-release/garib-kalyan-rojgar-abhiyan

[7] Reverse migration started as soon as the nationwide lockdown was announced in March 2020 and therefore announcement of GKRA in June is unlikely to affect this phenomenon (https://www.indiaspend.com/governance/migrant-workers-no-reliable-data-or-policy-737499).

[8] For details of work/activities under GKRA refer to **??**, Appendix A

[9] (https://www.insightsonindia.com/social-justice/welfare-schemes/schemes-under-ministry-of-rural-development/garib-kalyan-rojgar-abhiyaan-launched/)

2019) is above the reservation, women may lose employment when the rationing of jobs becomes more intense. As mentioned earlier, it is quite remarkable that the proportion of women participating in MGNREGA is more than double India's overall FLFP. Over the years, women's share in MGNREGA has surpassed the mandated provision in the majority of districts across India. In Figure A.1, Appendix A, we show the distribution of districts by 33% bound in the year 2019 (pre-pandemic).

Our focus in this study is whether MGNREGA preserved its proven legacy of safeguarding women's employment in face of higher competition from men. Additionally, we examine the complementary role of the GKRA scheme in achieving this objective. We add to the renewed debate around the requirement of safety nets and gender-specific policies sparked by the deepening of gender inequality due to the pandemic. Importantly, returning male migrants not only increase the competition for existing jobs, even if we account for scaling up the spending under MGNREGA and GKRA, but their homecoming may lead to an increase in caregiving responsibilities and unpaid domestic duties of the rural women. A crisis like this may not just affect the supply of labor or household responsibilities but may also reinforce gender norms around breadwinners when unemployed men live under the same roof as the women of the household. There is also a possibility of revoking of this norm, in a situation where women have a higher probability of employment due to mandated provision or household take a collective decision where men work under GKRA and women work under MGNREGA. Therefore, it is imperative to consider alternate schemes that did not have any specific provision for women.

2.3. MG-NREGA during pandemic

Figure 1 plots the district-level average person-days generated per rural inhabitant during 2011-2020.[10] We find a steady increase in the national average since 2017 and a sudden surge in the pandemic year (2020). The generation of MGNREGA person-days is lower in the GKRA districts throughout compared to the national average and follows the same trend as the national average. Interestingly, we find that the pandemic narrows down this gap as the generation of employment surges at a faster rate in the GKRA districts relative to the national average in the year 2020.

[10]The district-level rural population is taken from Census (2011). And throughout the analysis, we use the NREGA person-days normalised by the rural population of that district.

Further, Figure 2 plots the share of women in MGNREGA person-days (per rural inhabitant). As one can see, the share of women is larger in the GKRA districts compared to the national average highlighting a higher uptake of public work. This is in line with the increased the feminisation of agriculture resulting from a greater out-migration from GKRA districts.[11] We find a greater reduction in the share of women in 2020 in the GKRA districts compared to the national average. These trends are summarized in Table 1. Due to data limitations, our data consist of 578 rural districts among which 110 districts were also covered under GKRA.[12]

In Figure 3, we document a seasonality in the dependence on the NREGA scheme with a greater burden during the off-peak agricultural seasons compared to the peak *Kharif* season in May-June. Both, GKRA as well as Non-GKRA districts follow this seasonal trend. We are able to discount these trends as discussed in the latter part of the section section 3.

3. Methodology and results

To quantify the effect of the pandemic, we consider a district-level panel of MGNREGA workdays for the 2019-2021 period. The 2020 (April 2020-March 2021) data represents the pandemic year that perfectly overlaps with the start of the pandemic and the subsequent lockdown from 24th March in India while 2019 (April 2019-March 2020) is the base year. For our data analysis, we exploit the fact that lockdown was an unanticipated exogenous shock and GKRA was announced much after the reverse migration incidents. Thus, our baseline specification is the standard first difference equation given as follows. .

3.1. Estimating equations

Our baseline estimation equation is:

$$Y_{dt} = \beta_0 + \boldsymbol{\beta_1} Post_t + DFE + \epsilon_{dt} \tag{1}$$

where Y_{dt} is person-days per rural inhabitant in district d in time period t, $Post$ takes value

[11] Source:http://www.indiaenvironmentportal.org.in/files/file/economic%20survey%202-17-18%20-%20vol.%202.pdf

[12] Data on GKRA employment generation is publicly unavailable and therefore we cannot use the exact number of person-days generated under GKRA.

1 for year 2020-2021, 0 otherwise. We include district fixed effects (DFE) to account for any district-specific unobserved heterogeneities[13]

We replace the outcome variable in equation (1) with the share of women in district d in time period t to measure changes in employment shares of women due to reverse migration. We check for the role of mandated one-third reservation for women in employment generation under MGNREGA by dividing our sample into two groups depending on whether the mandated bound of one-third reservation had been exhausted or not in the pre-pandemic period. Thus, we get two subgroups – 1) below bound (i.e., those districts where the share of women was below 33% in 2019), 2) above bound (i.e., those districts where the share of women exceeded the quota of 33% in 2019).[14]

For measuring the role of GKRA, we augment equation (1) to a differences-in-differences (DID) equation given as follows.

$$Y_{dt} = \beta_0 + \beta_1 Post_t + \boldsymbol{\beta_2} Post_t \times GKRA_d + DFE + \epsilon_{dt} \quad (2)$$

, $GKRA_d$ takes value 1 if GKRA was introduced in district d. For each district with GKRA we construct a counterfactual by taking average number of annual person days per rural inhabitant across all bordering neighboring districts that did not have $GKRA$. We adapt equation (2) for checking impact of GKRA on womens' share and in above and below mandated bound districts.

β_1 and β_2 are our coefficients of interest in equations (1) and (2), respectively. All specifications are with district fixed effects and use robust standard errors clustered at the district level.

3.2. Results

3.2.1. Role of special provisions for women

Table 2 shows results from our baseline specifications in Panel A. We see a significant increase in the number of person-days per rural inhabitant in the post lockdown period (Col 1). We find that the generation of MGNREGA person-days (per rural inhabitant) increased by 0.26 or 6% in 2020 relative to 2019. We also see a similar increase when we look at districts above and below

[13] We acknowledge that districts fixed effects may not fully take care of state-specific policies (e.g. income transfers) that came up as a response to Covid-19 shocks which may have bearing on MGNREGA since it is a demand-driven program. One can use data for multiple time periods and introduce state/district specific time trends but it will come at the cost of efficiency of estimates.

[14] See Figure A.1.

the mandated bound according to the pre-lockdown share of women. Interestingly increase is greater in magnitude in districts where mandated bound had not been exhausted pre-lockdown. The regression coefficients compare changes in the dependent variables pre (2019) and post (2020) pandemic.

The share of women as shown in Panel B, on the other hand, fell by 0.002 or 0.4% during the pandemic compared to 2019. Further, this decline is driven by districts where mandated bound had been exhausted earlier (col (3)).

3.2.2. Role of GKRA

Table 3 shows results for estimating equation (2). We find a positive impact of GKRA when counterfactual is based on all the neighboring (i.e., bordering districts) irrespective of state. However, when we restrict counterfactual to the same state as the GKRA district to keep state-specific policies concern at bay, we find that the impact is still positive albeit insignificant (see col(2)). We find no significant impact of GKRA on the share of women.

Now we turn to the intersection of the GKRA scheme and bound cushion to examine the effects on women's share. We find that the results by mandated provision shown in Table 2 get repeated. From columns (1) and (2) in Table 4 we see that there is a convergence towards mandated bound in GKRA districts. So, irrespective of a complementary program, women's employment status finds refugee in the mandated provision. We see similar trends in the rest of India but magnitudes are statistically insignificant.

3.2.3. Monthly trends

Since GKRA functioned from 20$^{\text{th}}$ June to October end, it's imperative that we control for monthly trends and examine particular months.[15] We turn to the number of person-days generated per month per rural inhabitant in a district to look at the role of MGNREGA and GKRA more closely. We modify our baseline equation to a triple difference equation as follows.

$$\begin{aligned} Y_{mdt} = \alpha + \beta_0 Post_t + \beta_1 Post_t \times Pandemic_m + \beta_2 Pandemic_m \times GKRA_d \\ + \beta_3 Post_t \times GKRA_d + \beta_4 Post_t \times Pandemic_m \times GKRA_d + DFE + MFE + \epsilon_{mdt} \end{aligned} \tag{3}$$

[15] Since monthly level MGNREGA data doesn't give person-days by gender, we are unable to do similar checks for women reservation bound.

$POST$ takes value 1 for the year 2020, 0 otherwise and $Pandemic_m$ takes value 1 for Covid-19 months, i.e., from April - December 2020, and, 0 otherwise. β_4 is our coefficient of interest. Table 5 presents results for baseline specification in column 1 with the outcome variable as the number of person-days in a district per month normalized by the rural population. All specifications hold with districts (DFE) and month fixed effects (MFE) with robust standard error clustered at the district level. We show only relevant coefficients due to a lack of space. As expected we find a significant increase in the number of person-days under MGNREGA per month in post-pandemic months as compared to 2019. In column (2), we present estimates for equation (3) by breaking the pan-India MGNREGA coefficient into districts with and without GKRA. The districts with GKRA show a significant increase in monthly person days under MGNREGA.

We replace $Pandemic_m$ with specific month dummies (April, May, June to August, September to December) in equation (3) and present results in column (3). Dis-aggregation at the month level is in accordance with lockdown restrictions and GKRA stages – April (strictest lockdown, no MGNREGA activity), May (strictest lockdown continues but MGNREGA activities allowed), June - August (unlocking of economic activities in a phased manner, strict restriction in contaminated zones, MGNREGA activities allowed and GKRA introduced), September-December (further easing of restrictions resulting into full unlocking, GKRA ends, urban economies re-open in full swing).

Additionally, these month categories help us in controlling seasonality and ally concerns related to agricultural cycles. The coefficient on $APRIL$ is negative, which is not surprising as all economic activities related to non-essential services were on hold. We see a significant rise in the number of person-days in subsequent months coinciding with the easing of restrictions on MGNREGA works and the introduction of GKRA in June-August. We see an increase in the number of person-days generated per rural inhabitant by 0.28 in June-August of 2020. In all the months, the differential number of person-days under MGNREGA in GKRA districts is positive and significant. Thus, our monthly estimates establish that the introduction of GKRA complemented person-days generation under MGNREGA.

4. Discussion

The key takeaway from tables 2 - 4 is that overall there is an increase in employment generation under MGNREGA due to demand shock but women's share fell. This fall in share is significantly driven by districts where one-third bound had been exhausted in the pre-pandemic period. This holds for GKRA districts too i.e., even with GKRA, women's share fell if the bound of one-third had been exhausted. Districts where bound of one third had not been exhausted irrespective of GKRA saw a rise in women's share. Thus, mandated provision played an important role when competition from men increased in rural economies, and the existence of complementary programs also led to the crowding out of women from MGNREGA.

Results for GKRA are weak when we look at annual data. However, GKRA functioned for 120 days, and therefore looking at annual data may hide short-run trends. Thus, we check for specific month trends in Table 5 to find that GKRA complemented MGNREGA and did not lead to crowding out of MGNREGA person-days. One limitation of looking at MGNREGA monthly data is that we cannot observe women's share. Therefore, we turn to CMIE individual-level employment in rural areas data for the years 2019-2020 as a validation check.

We modify equation (3) to give an individual level probability of employment, given that they were employed in the last quarter just before the pandemic. The dependent variable takes value 1 if individual i from household h, in district d is employed in the time period t.[16] We use household fixed effects instead of district fixed effects now. Our LPM estimates in Table 6, column (1) show that the probability of employment is significantly less (21% lesser) during the pandemic. However, individuals in GKRA districts (col (2)) are more likely to be employed. When we dis-aggregate pandemic into month categories, we see significantly increased employment probabilities for districts with GKRA in the months of June to August and September to December, perfectly overlapping with GKRA months. This is in contrast with other districts across rural India, where individuals are significantly less likely to be employed throughout pandemic months as compared to 2019.

Dividing this sample into women (col (4)-(6)) and men (col (7)-(9)), we see that women's probability of conditional employment falls irrespective of being in GKRA districts. For men, the

[16] We restrict our analysis to a balanced panel of 136,860 individuals from 42,449 rural households, who were surveyed in both 2019 and 2020. Our results are robust to household attrition (results omitted for brevity and are available on request). The data does not capture migrant households or members. Thus, the analysis is informative about the effect on employment outcomes of rural households.

coefficient against GKRA is positive, albeit insignificant (Col (8), col(9)), indicating there is no significant change in the probability of employment in GKRA districts for men as compared to 2019.

We examine conditional employment estimates further by restricting the sample to casual employment in rural India since work under MGNREGA and GKRA comes under the umbrella of casual work. We get similar patterns regarding GKRA and the rest of India's districts, with individuals in GKRA districts significantly more likely to be employed (by 6.4%) as shown by Table 7. Again, we see that this significance is driven by the months of June to August and September to December 2020 (see col (3)).[17] Probability of conditional casual employment is lesser for women and higher for men in GKRA districts as compared to non-pandemic months of 2020 and 2019, albeit insignificant. Thus, we can safely say that GKRA assisted in the social protection provided by MGNREGA.

Now, we do similar checks at individual employment levels to look at the role of one-third reservation under MGNREGA. In Table 8 we break the sample into GKRA and non-GKRA within each gender. We find that the probability of employment is higher in districts where the bound of 33% had not been exhausted in the pre-pandemic period. However, the coefficient for the same is insignificant and negative for the GKRA subsample (col (2)). We see a positive but insignificant change in the probability of conditional employment for rural women sub-sample Pan-India and in GKRA districts, despite facing higher competition in the districts where the bound of 33% had not reached, unlike the male sub-sample.

5. Concluding remarks: policy lessons

Our analysis finds an overall greater dependence on public works programs during the pandemic year as the fallback option in the rural economy. Additionally, it establishes vulnerabilities faced by women due to the pandemic and the role of special provisioning in mitigating such vulnerabilities. Using data from social safety nets - MGNREGA and GKRA, we find a positive role of one-third reservation for women. However, additional assistance under GKRA without any mandated provision for women did not help in preserving the employment status of women.

[17] Results in Table 6 and Table 7 hold with individual fixed effects.

The estimates are even more concerning because we are looking at conditional estimates â i.e., those women who had overcome various barriers and were a part of the labor force. This would have *adverse* bearing on household welfare as suggested by the existing literature on women's participation in paid economic activity. Our results echo the need for targeted special programs to help women cope with the increased competition as they tend to lose employment due to higher competition for limited jobs by men. Of course, multiple mechanisms could result in such a trend along with the societal pressure to take full responsibility for domestic chores, older family members, and children, leading to the withdrawal of women from the labor force. Our results suggest that special provisioning (as seen in MGNREGA districts where one-third reservation is binding) helps in resisting these norms to some extent.

We are able to study the impact of the first wave of Covid-19 as the period coincided with the annual data availability of work undertaken in MGNREGA. There is a need for more transparent data (also of works under GKRA) to fully understand the impact of reverse migration and second wave to prepare ourselves for upcoming waves or any such unanticipated shocks. Reverse migration was mainly due to distress caused by economic activity shutdown and lack of safety nets (like MGNREGA) in urban India. Thus, our analysis also supports the need for fallback options in urban India to reduce the burden on rural safety nets and thereby women's welfare.

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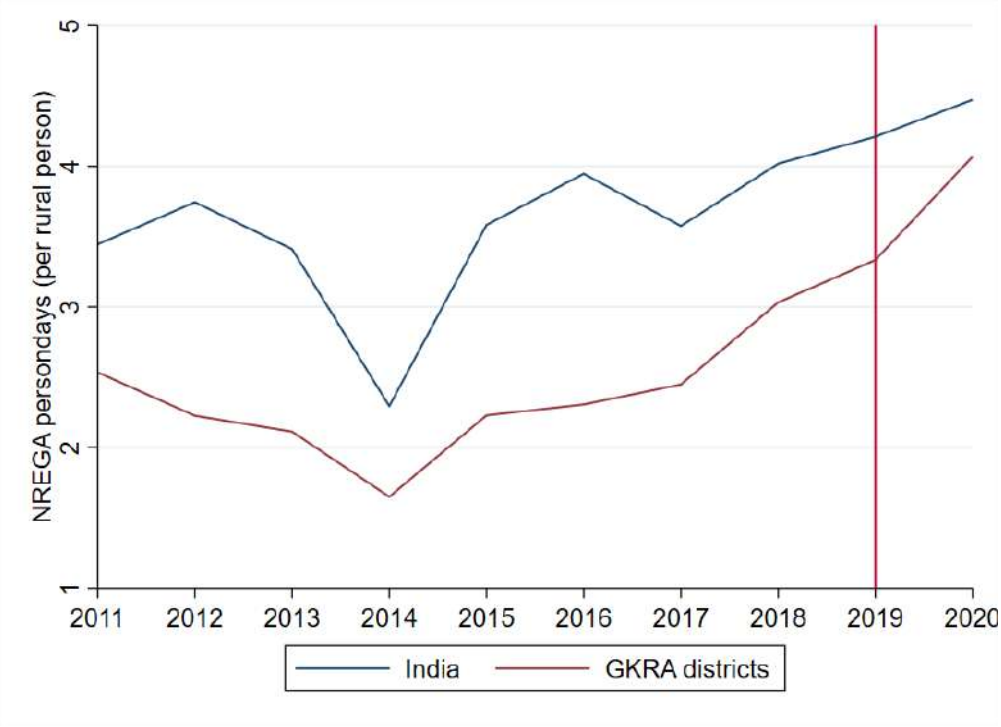
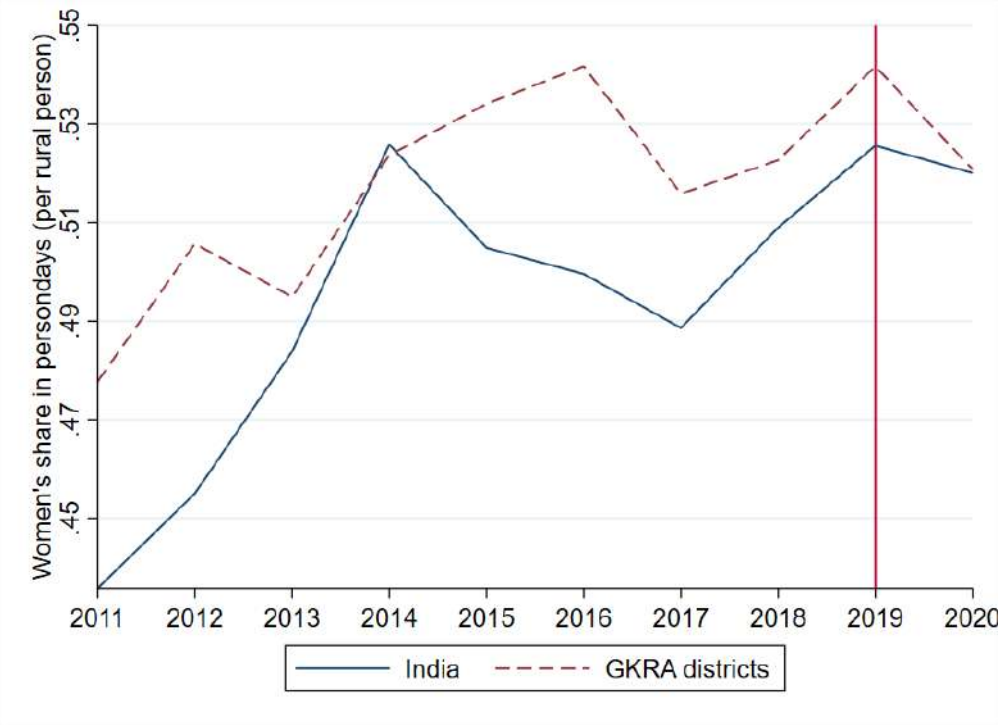
Figure 1: Employment generation in rural India under MGNREGA (per rural inhabitant)



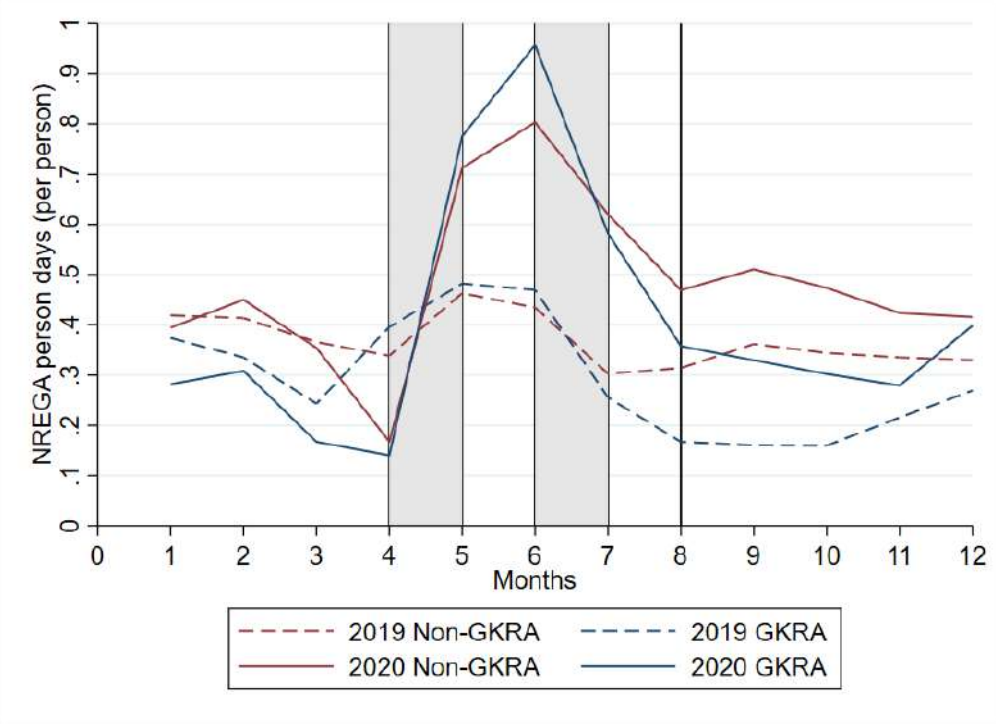
Source: NREGS Public Data Portal (2011-2020) and GKRA Portal.

Figure 2: Women's share in employment generation in rural India under MGNREGA (per rural inhabitant)



Source: NREGS Public Data Portal (2011-2020) and GKRA Portal.

Figure 3: Seasonality in Monthly NREGA person-days (per rural inhabitant) by GKRA



Source: NREGS Public Data Portal (2011-2020) and GKRA Portal.

Table 1: MGNREGA trends (district-annual level, per rural inhabitant)

	Pan India		GKRA districts	
	Pre (2019-2020)	Post (2020-2021)	Pre (2019-2020)	Post (2020-2021)
Average no. of persondays	4.21	4.47	3.33	4.07*
Women share	0.49	0.49	0.50	0.49
N	569	569	110	110

Source: NREGA Public Data Portal (2019-2020) and GKRA Portal.
Note: The NREGA data on the annual persondays are constructed by aggregating persondays from April (2019) - March (2020) and April (2020) - March (2021) for the 'Pre' and 'Post' years, respectively. Therefore, 'Post' period overlaps perfectly with the nationwide lockdown period in India from April 2020.

Table 2: Role of reservation for women in NREGA persondays

Category	Overall (1)	Below bound (2)	Above bound (3)
Panel A: Persondays			
POST	0.262***	0.427***	0.234***
	(0.058)	(0.122)	(0.065)
Observations	1,138	166	972
R-squared	0.983	0.980	0.983
Mean Y	4.34	3.15	4.54
District FE	✓	✓	✓
Panel B: Share of women			
POST	-0.002**	0.007**	-0.004***
	(0.001)	(0.003)	(0.001)
Observations	1,136	166	970
R-squared	0.993	0.939	0.992
Mean Y	0.49	0.27	0.53
District FE	✓	✓	✓

Source: NREGA Public Data Portal (2019-2020).
Note: Panel A reports the estimates for NREGA persondays (per rural inhabitant) and Panel B reports the share of women persondays. Column (1) has the 'Overall' estimates for the full sample and its bifurcation into 'Below' and 'Above' the 33.33% reservation cut-off for women are in Columns (2) and (3), respectively. This classification is based on the pre-pandemic (2019) share of women in a district. 'Mean Y' denotes the mean value of the dependent variable. All specifications have district fixed effects. Standard errors clustered at District level are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Table 3: Role of GKRA

VARIABLES	Person days		Share of women	
	All States	GKRA States	All States	GKRA States
	(1)	(2)	(3)	(4)
POST * GKRA	0.320**	0.197	-0.003	0.000
	(0.148)	(0.134)	(0.004)	(0.004)
Observations	352	220	352	220
R-squared	0.714	0.758	0.880	0.904
Mean Y (GKRA)	3.88	3.38	0.49	0.46
Mean Y (Non-GKRA)	3.54	3.31	0.44	0.42
District FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Source: NREGA Public Data Portal (2019-2020) and GKRA Portal.
Note: Columns (1)-(2) report the estimates for NREGA persondays (per rural inhabitant) and Columns (3)-(4) report the share of women persondays. In Columns (1) and (3), the counter-factual of GKRA districts is constructed by taking an average of the dependent variables across all of it's non-GKRA neighbouring districts (irrespective of the State of the district). In Columns (2) and (4), the construction of the counter-factual is restricted to the non-GKRA neighbouring districts within the State of the GKRA district. 'Mean Y (GKRA)' denotes the mean value of the dependent variable in GKRA districts while 'Mean Y (Non-GKRA)' denotes it for the counter-factual. All specifications have district and year fixed effects. Standard errors clustered at District level are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Table 4: Share of women in NREGA by GKRA and NREGA reservation

	GKRA		Non-GKRA	
NREGA reservation	Below bound	Above bound	Below bound	Above bound
	(1)	(2)	(3)	(4)
POST	0.016*	-0.012***	0.006	-0.002
	(0.008)	(0.003)	(0.004)	(0.001)
Observations	20	200	146	770
R-squared	0.929	0.986	0.937	0.993
Mean Y	0.3	0.51	0.26	0.53
District FE	✓	✓	✓	✓

Source: NREGA Public Data Portal (2019-2020) and GKRA Portal.
Note: The dependent variable is the share of women in the NREGA persondays. Columns (1)-(2) report the estimates for GKRA districts while Columns (3)-(4) have the Non-GKRA districts. The districts are split by the pre-pandemic (2019) share of women in NREGA persondays into - 'Below' and 'Above' the 33.33% mandated reservation. Columns (1) and (3) have the estimates for the districts that were below this threshold while Columns (2) and (4) are for above this cut-off. 'Mean Y' denotes the mean value of the dependent variable. All specifications have district fixed effects. Standard errors clustered at District level are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Table 5: Impact of GKRA on NREGA persondays (per rural inhabitant)

	(1)	(2)	(3)
2020	-0.013	-0.001	-0.001
	(0.015)	(0.017)	(0.017)
2020×*pandemic*	0.170***	0.155***	
	(0.014)	(0.016)	
2020×*pandemic* × *GKRA*		0.082**	
		(0.034)	
2020×*Apr*			-0.171***
			(0.019)
2020×*Apr* × *GKRA*			-0.019
			(0.030)
2020×*May*			0.249***
			(0.026)
2020×*May* × *GKRA*			0.110***
			(0.042)
2020×*Jun_Aug*			0.282***
			(0.024)
2020×*Jun_Aug* × *GKRA*			0.118**
			(0.054)
2020×*Sep_Dec*			0.117***
			(0.023)
2020×*Sep_Dec* × *GKRA*			0.074*
			(0.038)
Observations	13,850	13,850	13,850
R-squared	0.583	0.583	0.593
Mean Y	0.35		
Mean GKRA		0.29	0.29
Mean Non-GKRA		0.37	0.37
District FE	✓	✓	✓
Month FE	✓	✓	✓

Source: NREGA Public Data Portal (2019-2020) and GKRA Portal.
Note: Columns report the monthly estimates for NREGA persondays (per rural inhabitant). 'Mean Y' denotes the mean value of the dependent variable all districts.'Mean GKRA' denotes the mean value of the dependent variable in GKRA districts while 'Mean Non-GKRA' denotes it for the non-GKRA districts. All specifications have district and month fixed effects. Standard errors clustered at District level are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Table 6: Impact on the Individual Employment (Conditional)

Category	Overall			Female			Male		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2020	0.098***	0.095***	0.095***	0.293***	0.281***	0.281***	0.072***	0.063***	0.063***
	(0.004)	(0.005)	(0.005)	(0.023)	(0.023)	(0.023)	(0.003)	(0.003)	(0.003)
2020×*pandemic*	-0.214***	-0.226***		-0.582***	-0.574***		-0.167***	-0.169***	
	(0.006)	(0.007)		(0.036)	(0.038)		(0.005)	(0.005)	
2020×*pandemic* × *GKRA*		0.048***			-0.163**			0.006	
		(0.012)			(0.078)			(0.011)	
2020×*Apr*			-0.398***			-0.701***			-0.346***
			(0.030)			(0.086)			(0.026)
2020×*Apr* × *GKRA*			0.077			0.064			0.034
			(0.058)			(0.147)			(0.056)
2020×*May*			-0.290***			-0.541***			-0.246***
			(0.018)			(0.059)			(0.019)
2020×*May* × *GKRA*			-0.002			-0.181			-0.034
			(0.045)			(0.129)			(0.046)
2020×*Jun_Aug*			-0.194***			-0.552***			-0.137***
			(0.008)			(0.042)			(0.006)
2020×*Jun_Aug* × *GKRA*			0.054***			-0.093			0.011
			(0.013)			(0.101)			(0.012)
2020×*Sep_Dec*			-0.203***			-0.567***			-0.143***
			(0.007)			(0.037)			(0.005)
2020×*Sep_Dec* × *GKRA*			0.040***			-0.240***			-0.003
			(0.011)			(0.088)			(0.011)
Observations	267,578	267,578	267,578	30,894	30,894	30,894	236,609	236,609	236,609
R-squared	0.268	0.269	0.276	0.477	0.478	0.480	0.270	0.271	0.281
Mean Y	0.42			0.11			0.69		
Mean GKRA		0.38	0.38		0.02	0.02		0.66	0.66
Mean Non-GKRA		0.44	0.44		0.14	0.14		0.70	0.70
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: NREGA Public Data Portal (2019-2020) and GKRA Portal.

Note: The dependent variable in all columns is an indicator for conditional employment that takes a value of one for employed individuals and is zero otherwise, conditional on these individuals being employed in the pre-pandemic quarter (i.e., December 2019 - March 2020). Columns (1)-(3) report the overall estimates, Columns (4)-(6) report it for women and Columns (7)-(9) report it for men. 'Mean Y' denotes the mean value of the dependent variable all districts.'Mean GKRA' denotes the mean value of the dependent variable in GKRA districts while 'Mean Non-GKRA' denotes it for the non-GKRA districts. All specifications have household and month fixed effects. Standard errors clustered at District level are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Table 7: Impact on the Individual Employment (Conditional) of Casual Labor

Category	Overall			Female			Male		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2020	0.094***	0.091***	0.090***	0.277***	0.266***	0.266***	0.066***	0.053***	0.053***
	(0.006)	(0.008)	(0.008)	(0.029)	(0.029)	(0.029)	(0.005)	(0.005)	(0.005)
2020 $\times pandemic$	-0.226***	-0.245***		-0.565***	-0.563***		-0.175***	-0.178***	
	(0.009)	(0.011)		(0.041)	(0.042)		(0.007)	(0.008)	
2020 $\times pandemic \times GKRA$		0.064***			-0.080			0.007	
		(0.016)			(0.084)			(0.015)	
2020 $\times Apr$			-0.464***			-0.710***			-0.409***
			(0.044)			(0.107)			(0.036)
2020 $\times Apr \times GKRA$			0.108			0.030			0.060
			(0.071)			(0.187)			(0.066)
2020 $\times May$			-0.341***			-0.556***			-0.294***
			(0.028)			(0.075)			(0.028)
2020 $\times May \times GKRA$			0.007			-0.120			-0.034
			(0.060)			(0.133)			(0.060)
2020 $\times Jun\_Aug$			-0.203***			-0.533***			-0.138***
			(0.012)			(0.045)			(0.009)
2020 $\times Jun\_Aug \times GKRA$			0.066***			0.054			0.007
			(0.018)			(0.102)			(0.017)
2020 $\times Sep\_Dec$			-0.209***			-0.550***			-0.136***
			(0.010)			(0.042)			(0.008)
2020 $\times Sep\_Dec \times GKRA$			0.054***			-0.171*			-0.007
			(0.015)			(0.099)			(0.014)
Observations	141,605	141,605	141,605	18,735	18,735	18,735	122,839	122,839	122,839
R-squared	0.309	0.312	0.322	0.487	0.490	0.492	0.305	0.307	0.323
Mean Y	0.42			0.11			0.69		
Mean GKRA		0.38	0.38		0.02	0.02		0.66	0.66
Mean Non-GKRA		0.44	0.44		0.14	0.14		0.70	0.70
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: NREGA Public Data Portal (2019-2020) and GKRA Portal.

Note: The dependent variable in all columns is an indicator for conditional employment that takes a value of one if an individual is employed and is zero otherwise, conditional on these individuals being employed in casual work (as wage labor, agricultural labor or small farmers) in the pre-pandemic quarter (i.e., December 2019 - March 2020). Columns (1)-(3) report the overall estimates, Columns (4)-(6) report it for women and Columns (7)-(9) report it for men. 'Mean Y' denotes the mean value of the dependent variable all districts.'Mean GKRA' denotes the mean value of the dependent variable in GKRA districts while 'Mean Non-GKRA' denotes it for the non-GKRA districts. All specifications have household and month fixed effects. Standard errors clustered at District level are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

Table 8: Role of special provisions for women on their Employment (Conditional)

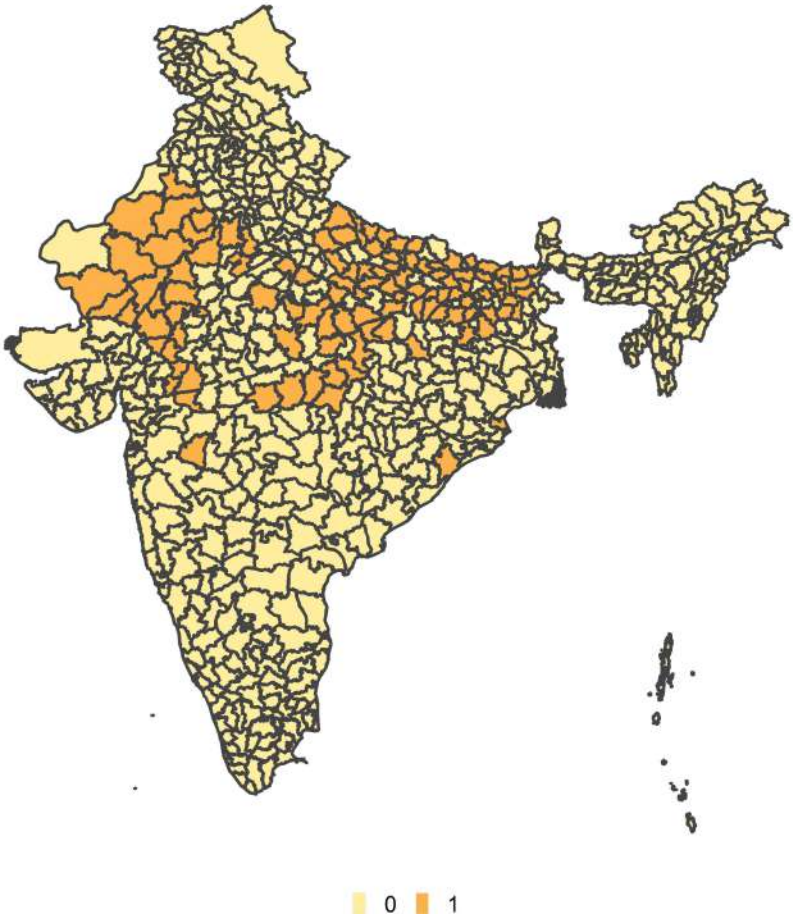
Category	Overall			Female			Male		
GKRA	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2020	0.098***	0.101***	0.101***	0.293***	0.535***	0.536***	0.062***	0.091***	0.091***
	(0.007)	(0.010)	(0.010)	(0.026)	(0.060)	(0.060)	(0.004)	(0.010)	(0.010)
2020×*pandemic*	-0.238***	-0.171***		-0.618***	-0.709***		-0.171***	-0.158***	
	(0.009)	(0.012)		(0.041)	(0.059)		(0.006)	(0.013)	
2020×*pandemic* × below bound	0.047***	-0.025		0.035	0.081		-0.002	-0.025	
	(0.013)	(0.024)		(0.071)	(0.137)		(0.011)	(0.025)	
2020×*Apr*			-0.299***			-0.629***			-0.292***
			(0.073)			(0.156)			(0.074)
2020×*Apr* × below bound			-0.052			-0.110			-0.051
			(0.100)			(0.327)			(0.102)
2020×*May*			-0.313***			-0.653***			-0.307***
			(0.049)			(0.131)			(0.050)
2020×*May* × below bound			0.106			-0.262			0.120*
			(0.066)			(0.198)			(0.066)
2020×*Jun_Aug*			-0.132***			-0.596***			-0.122***
			(0.014)			(0.098)			(0.014)
2020×*Jun_Aug* × below bound			-0.013			0.106			-0.012
			(0.022)			(0.146)			(0.023)
2020×*Sep_Dec*			-0.148***			-0.793***			-0.132***
			(0.010)			(0.077)			(0.010)
2020×*Sep_Dec* × below bound			-0.042*			0.124			-0.045**
			(0.022)			(0.167)			(0.022)
Observations	191,259	59,329	59,329	24,792	1,524	1,524	166,466	57,804	57,804
R-squared	0.087	0.056	0.064	0.255	0.328	0.336	0.068	0.055	0.065
Mean below bound	0.39	0.39	0.39	0.04	0.04	0.04	0.68	0.68	0.68
Mean Non-below bound	0.43	0.43	0.43	0.12	0.12	0.12	0.70	0.70	0.70
Household FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Month FE	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: NREGA Public Data Portal (2019-2020) and GKRA Portal.

Note: The dependent variable in all columns is an indicator for conditional employment that takes a value of one if an individual is employed and is zero otherwise, conditional on these individuals being employed in the pre-pandemic quarter (i.e., December 2019 - March 2020). Columns (1)-(3) report the overall estimates, Columns (4)-(6) report it for women and Columns (7)-(9) report it for men. Columns (1), (4) and (7) report the estimates from the Non-GKRA districts while Columns (2)-(3), (5)-(6) and (8)-(9) report it for the GKRA districts. 'Mean Y' denotes the mean value of the dependent variable all districts.'Mean below bound' denotes the mean value of the dependent variable in districts below the reserved threshold of 33% while 'Mean Non-below bound' denotes it for the districts above this threshold. All specifications have household and month fixed effects. Standard errors clustered at District level are reported in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$).

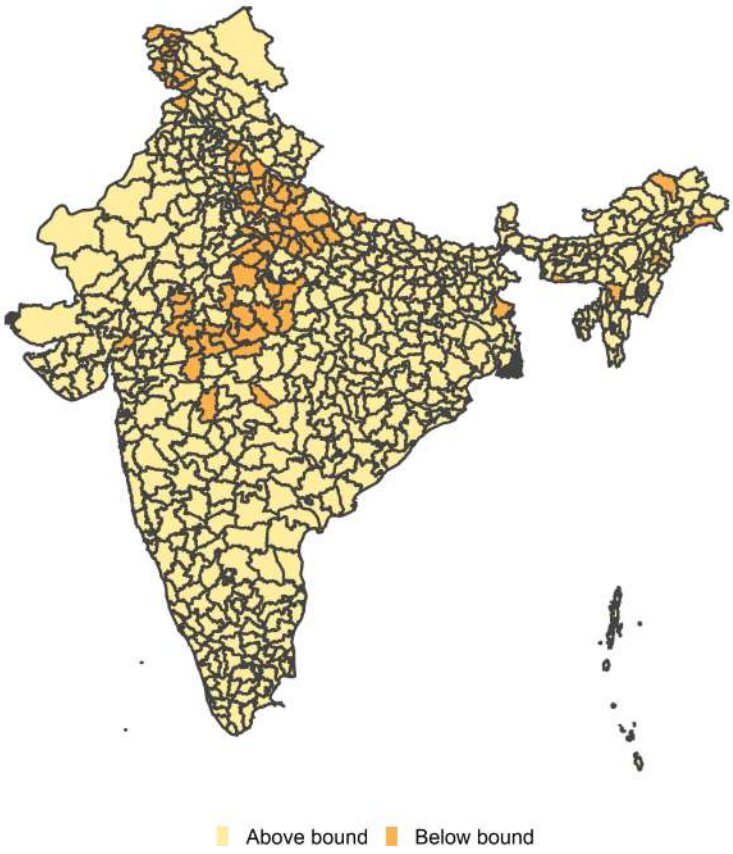
Appendix A

Figure A.1: Distribution of GKRA districts



Source: GKRA Portal.

Figure A.2: Distribution of districts by mandated share of women in MGNREGA in 2019



Source: NREGS

Table A.1: Works under GKRA

S.No	Work/Activity	Scheme	Ministry
1	Community Sanitary Complexes	Swachh Bharat Mission-G (ODF+)	Drinking water & Sanitation
2	Gram Panchayat Bhawans	Finance commission Funds/MG-NREGA	Panchayati Raj/ Rural Development
3	Works under Finance Commission funds	Finance commission Funds	Panchayati Raj/ Rural Development
4	National Highway works	Bharatmala & others	Road transport & Highways (NHAI)
5	Water conservation & Harvesting works	MG-NREGA	Rural Development
6	Wells	MG-NREGA	Rural Development
7	Plantation works (including CAMPA Funds)	MG-NREGA/CAMPA	Rural Development
8	Horticulture	MG-NREGA	Rural Development
9	Anganwadi Centers	MG-NREGA/ WCD	Rural Development/ DoWCD
10	Rural housing works (PMAY-G)	PMAY-Gramin	Rural Development
11	Rural connectivity works (PMGSY)	PMGSY	Rural Development
12	Railway works	–	Railways
13	Shyama Prasad Mukherjee RURBAN Mission	Shyama Prasad Mukherjee RURBAN Mission	Rural Development
14	PM KUSUM works	PM KUSUM	New & Renewal Energy
15	Laying of Optic Fiber under Bharat Net	Bharat Net	Telecommunication
16	Works under Jal Jeevan Mission	Jal Jeevan Mission - MG-NREGA & Har Ghar Nal se Jal	Rural Development/ Drinking water & Sanitation
17	PM Urja Ganga Project	PM Urja Ganga Project	Petroleum & Natural Gas
18	Training through KVK for Livelihoods	–	Agriculture Research & Education
19	Works through District Mineral Fund	DMFT	Mines
20	Solid and liquid waste management works	MG-NREGA	Rural Development
21	Farm ponds	MG-NREGA	Rural Development
22	Cattle sheds	MG-NREGA	Rural Development
23	Goat Sheds	MG-NREGA	Rural Development
24	Poultry sheds	MG-NREGA	Rural Development
25	Vermi-composting	MG-NREGA	Rural Development

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