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# PRECARITY IN A TIME OF UNCERTAINTY: GENDERED EMPLOYMENT PATTERNS DURING THE COVID-19 LOCKDOWN IN INDIA

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*Sonalde Desai, Neerad Deshmukh, and Santanu Pramanik*

## ABSTRACT

India implemented one of the world's most stringent lockdowns in response to the COVID-19 crisis. This study examines whether the impacts of the lockdown on employment differed by gender in areas surrounding Delhi. An ongoing monthly employment survey between March 2019 and May 2020 allows for comparison before and after lockdown. Estimates based on random-effects logistic regression models show that for men, the predicted probability of employment declined from 0.88 to 0.57, while for women it fell from 0.34 to 0.22. Women's concentration in self-employment may be one reason why their employment was somewhat protected. However, when looking only at wage workers, the study finds that women experienced greater job losses than men with predicted probability of employment declining by 72 percent for women compared to 40 percent for men. The findings highlight the gendered impacts of macro crises and inform policy considerations through ongoing phases of lockdowns and relaxation.

## KEYWORDS

COVID-19, employment, employment discrimination, gender differences

JEL Codes: E24, J15, J16

## HIGHLIGHTS

- Ongoing survey data reveals gendered changes in employment before and during India's pandemic lockdown.
- Results show substantial decline in employment for men and women during the lockdown period.
- Absolute decline in employment was larger for men than for women.
- However, broad comparisons mask gender differences in impact on different industries and occupations.
- Comparing only wage workers, employment decline was far greater for women than for men.

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## INTRODUCTION

Responses around the novel coronavirus pandemic have varied across the globe. India implemented one of the most stringent responses, setting strict controls on physical movements and economic activities. On March 24, India's Prime Minister announced a lockdown that was initially designed to last for twenty-one days but was later extended to May 31. By mid-April, the country was divided into three zones: red districts, with the maximum number of COVID-19 cases, which observed very strict movement control for nonessential work; orange districts, with fewer COVID-19 cases, where many economic activities were restricted but more relaxed movement was allowed; and green districts, which were free from COVID-19 and hence enjoyed far greater freedom than their red and orange counterparts. The strict restrictions were relaxed in late April, allowing small retail shops to open and agricultural activities to proceed, and gradual reopening has continued since then.

In this paper, we examine whether this abrupt halt to the engine of the Indian economy interacted with gendered labor markets to differentially affect the employment patterns of men and women. Data for this analysis are drawn from an ongoing study carried out by the National Council of Applied Economic Research (NCAER), New Delhi, between March 2019 and May 2020. The NCAER National Data Innovation Centre initiated the Delhi Metropolitan Area Study (DMAS) in early 2019 to improve the measurement of women's employment. The sample is designed to be representative of the Delhi National Capital Region (Delhi NCR) and includes both urban and rural households. As part of this study, monthly telephone follow-up interviews of 1,098 men and 1,129 women have been conducted since March 2019 to track the employment status of men and women over time. The findings of the survey allow us to examine changes in labor market behaviors of this sample both before and during the lockdown, thereby offering a unique glimpse of gendered changes in employment during the lockdown.

Using these data, the present paper asks the following questions: (1) Do the employment impacts of the lockdown vary by gender? (2) Are specific types of employment more vulnerable to shutdown effects? (3) Is there an interaction between lockdown and employment status and other forms of vulnerability that have emerged as being relevant in the current state of the political economy? The results from individual-level random-effects models show that contrary to our expectations, though both men and women experienced a decline in employment during the lockdown, the impact was greater for men than for women.

This unexpected finding is primarily because men and women tend to work in different sectors; men are more likely to participate in wage work, while women are mainly concentrated in self-employment. Before the

lockdown, 58 percent of men workers in our sample area were employed in wage work, while only 36 percent of the women workers were employed as daily or monthly wage workers. Since the lockdown had a greater impact on wage work than on self-employment, women were somewhat protected from its negative impacts. However, when we focus only on wage work, we observe that women wage workers have a greater likelihood of being unemployed than their male counterparts.

A similar analysis by Ashwini Deshpande (2020) also examines the impact of the lockdown on the employment of men and women. Consistent with our findings, Deshpande also finds that individuals in industries dominated by wage employment (construction, manufacturing, and services) show far greater employment decline than those employed in the agricultural sector. However, as we discuss below, the data used by Deshpande fail to capture agricultural and other home-based employment fully; consequently, results in that paper are based mostly on wage workers and show a larger negative impact on women's employment than our data, which represent a larger share of the self-employed.

#### GENDERED LABOR MARKETS IN INDIA

Because of the recent and ongoing nature of the COVID-19 crisis and the paucity of empirical evidence, we are forced to look at prior financial crises for insights on gender differences in employment during crises. Here the evidence is mixed. The Asian economic crisis of 1997 resulted in a greater decline in women's employment in South Korea (Aslanbeigui and Summerfield 2000). However, in Indonesia, women increased their paid work hours to make up for men's unemployment (Aslanbeigui and Summerfield 2000). The Great Recession of 2008 led to greater declines in men's employment as compared to women's employment, though there is some evidence that the level of unemployment for some groups of women was much higher than the corresponding aggregate figures for men (Fukuda-Parr, Heintz, and Seguino 2013). Most importantly, the impact of the financial crisis was mediated by the differential concentration of men and women in different occupations and industries. During the 2008 recession, manufacturing jobs, where men were concentrated, were the hardest hit. However, it is possible that unlike the prior recessions, the COVID-19-related recession may disproportionately affect women's employment (Alon et al. 2020) since women are less likely to be employed in technologically advanced jobs that allow for telecommuting. Whether this argument applies to low- and middle-income countries is not clear and may well depend on preexisting labor market inequalities (Deshpande 2020). There is some evidence from the Ebola crisis that women in Sub-Saharan Africa were far more likely to be negatively impacted than men due to travel restrictions, and while men's economic activities returned to

pre-crisis levels shortly after the preventive measures subsided, the impacts on women's economic security and livelihoods lasted much longer (United Nations 2020).

Even without the crisis, women's employment in India recorded a substantial decline, and worker-to-population ratio for women ages 15 and above fell from 42 percent to 25 percent between 2004–05 and 2018–19 (National Statistical Office 2020). The causes of this decline remain hotly debated, with explanations suggesting declining data quality and increasing measurement error in national statistics (Deshmukh et al. 2020); rising incomes for men, leading to a decline in women's labor supply (Klasen 2015; Chatterjee, Desai, and Vanneman 2018); and lack of employment opportunities, particularly in rural areas (Chatterjee, Murgai, and Rama 2015; Lei, Desai, and Vanneman 2019).

This transformation has occurred in conjunction with a broader transformation of the labor markets. There has been a decline in agricultural work, a rise in informal sector work, and an increase in workers with no formal contracts (Bhandari and Dubey 2019). How these broader changes intersect with occupational sex segregation and mediate the impacts of the COVID-19-related lockdown deserves attention.

#### COVID-19 IN POLITICALLY CHARGED TIMES

SARS-CoV-2 entered the Indian panorama during an already charged environment of religious tensions and added a new dimension. On March 3, 2020, about three weeks before the lockdown was announced and when the novel coronavirus had not yet been declared a health emergency by government officials, an annual international event of a Muslim religious organization, the Tablighi Jamaat, took place in Delhi. Several international participants were later diagnosed as being infected with the SARS-CoV-2 virus, and this event came to be identified as a "super spreader," necessitating contact tracing and quarantining of participants (BBC 2020). This was not a unique situation. Similar events were held by other religious communities, and a Sikh guru, Baldev Bhagat Singh, who participated in crowded prayer gatherings between March 10–12, later died of COVID-19, which led to the quarantining of twenty-two villages. Nonetheless, it was only the Muslim community that was blamed and stigmatized for spreading the disease (Kolachalam 2020).

To what extent this stigmatization translates into economic impacts on the Muslim community has not been documented, but anecdotal evidence suggests that employers are likely to be concerned about Muslim maids and domestic workers bringing the disease to their homes and that customers may avoid Muslim shops. In this paper, we examine the interaction between the lockdown and religion and further analyze whether this relationship varies between men and women.

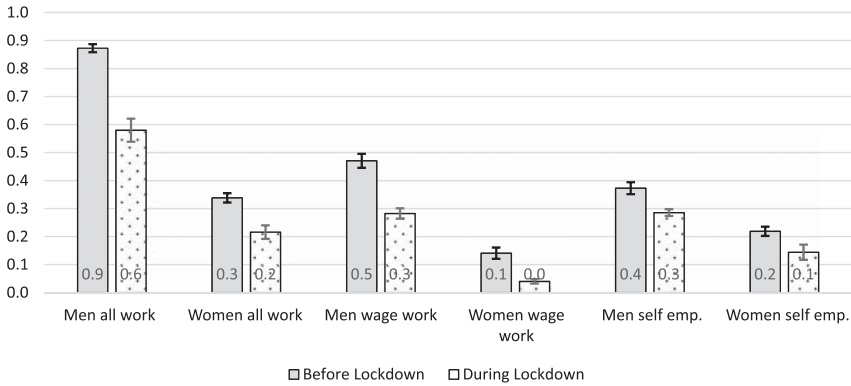
## DATA: THE DMAS

The DMAS was instituted in February 2019 to test innovations in survey design for improving data quality. In the baseline face-to-face survey, telephone numbers of 1,174 men and 1,209 women were obtained. A sample of 1,098 men and 1,128 women participated in one or more telephonic interviews as part of the Delhi Metropolitan Area Study Telephone Survey (DMAS-T), which consisted of a short questionnaire, taking about 5 minutes to administer, that was designed to explore the continuity in men's and women's employment. These monthly surveys continued through May 2020, with a short break in April 2020, and have provided information about the work status of the respondents during the lockdown between March 2020 and May 2020. While the methodological details about DMAS have been described elsewhere (Deshmukh et al. 2020), some features of DMAS-T deserve attention here.

The DMAS baseline (described in Supplemental Online Appendix A) consisted of face-to-face interviews carried out in early 2019, at which time initial contact was made with the respondents. After the baseline interviews, individuals were interviewed by telephone every month and were asked questions about their economic activities in the thirty days preceding the telephone call. To ensure that self-employment in agriculture and household enterprises was accurately captured, the telephone survey began by asking whether the respondent's household was engaged in farming and whether the respondent worked on the farm, whether the household conducted a business and whether the respondent worked in the business, and about the respondent's engagement in work for wage or salary. Individuals were interviewed monthly. Consequently, the data include repeated measurements of the same individual.

The DMAS-T sample has been randomly drawn from the Delhi National Capital Region (Delhi NCR), which comprises thirty-one districts spread across four states – Delhi, Haryana, Uttar Pradesh, and Rajasthan (see Online Appendix Figure 1). This is a highly diverse region spanning the metropolitan areas of Delhi as well as the rural areas of far-flung districts such as Alwar and Bharatpur in Rajasthan. Descriptive statistics are presented in Table 1. The sample is designed to be representative of the Delhi NCR.

The initial sample of 1,098 men and 1,129 women yields 21,917 monthly interviews. Not all individuals were interviewed in each round – sometimes phone contact was not feasible; at times, the respondents were not free to answer survey questions; and at other times they refused to participate in the survey at all. Attrition, however, does not seem to have had a great impact on sample selection. See Online Appendix B comparing baseline sample with the final sample.



*Figure 1* Predicted marginal probability of different types of work before and during the lockdown for men and women

*Notes:* Predicted probability calculated from random-effects logistic regression in Table 2, holding control variables at their mean value for men and women for different types of employment. Error bars indicate confidence interval with  $p < 0.05$ .

## MEASUREMENT OF WOMEN'S WORK

DMAS-T seeks to improve the measurement of women's work, particularly their participation in household enterprises, so the questions are designed to elicit information about wage work, work on household farms, work in household businesses, and care of animals. As a result, the work participation rates for women measured in this survey are higher than those measured through standard labor force surveys (Deshmukh et al. 2020).

Better measurement of women's work allows us to contribute to the discussion on the impact of the lockdown on gender inequality in employment in a unique way. An important nationwide study of lockdown impacts uses data from the Consumer Pyramids Household Survey (CPHS), collected by the Centre for Monitoring Indian Economy (Deshpande 2020). Since the questions in CPHS are worded differently, women in its sample indicate a work participation rate of only about 11 percent even before the lockdown. This is substantially less than the 25 percent work participation captured by the Periodic Labour Force Survey (PLFS), a part of National Sample Surveys (National Statistical Office 2020), and substantially lower than the 38 percent recorded by DMAS-T in pre-lockdown interviews. It seems likely that the way questions are worded in CPHS may be capturing participation in wage labor but may well be underestimating self-employment in agriculture. As reported in Deshpande (2020), only 23 percent of the sample is in agriculture. This is considerably lower than the 41 percent in agriculture indicated by PLFS (National Statistical Office 2020).<sup>1</sup>

PRECARITY IN A TIME OF UNCERTAINTY

*Table 1* Descriptive statistics for dependent and independent variables, men and women ages 20–60, India

<i>Dependent variables</i>	<i>Men</i>		<i>Women</i>	
	<b>Before lockdown</b>	<b>During lockdown</b>	<b>Before lockdown</b>	<b>During lockdown</b>
Proportion employed by activity				
Any work	0.86	0.61	0.38	0.25
Wage work	0.50	0.34	0.14	0.08
Self-employment	0.45	0.32	0.26	0.17
<b>Independent variables</b>				
Age		40.01		38.97
Unmarried		0.10		0.07
Completed education				
No education		0.12		0.40
Class 1–5		0.11		0.13
Class 6–8		0.17		0.15
Class 9–10		0.25		0.11
Class 11–12		0.15		0.10
Any college		0.20		0.11
Household asset quintile				
Poorest		0.18		0.18
2nd quintile		0.20		0.21
Middle quintile		0.20		0.20
4th quintile		0.21		0.21
Richest		0.20		0.20
Caste				
Forward/General/No caste		0.37		0.36
Other Backward Classes		0.35		0.36
Schedule Caste/Tribe		0.28		0.27
Religion				
Hindu, Christian, Sikh etc.		0.89		0.89
Muslim		0.11		0.11
Urban residence		0.50		0.49
State of residence				
Haryana		0.34		0.33
Delhi		0.23		0.23
Rajasthan		0.16		0.17
Uttar Pradesh		0.27		0.27
Sample size (Respondents)		1,098		1,128
Monthly records (total)		10,765		11,152
Monthly records (lockdown period)		951		992

*Note:* About 1.6 percent of women and 9 percent of men engaged in both wage employment and self-employment in a month.



For the present analysis, we focus on three dependent variables: (1) whether the individual participated in wage work, including agricultural and nonagricultural casual labor as well as regular salaried work; (2) whether the respondent worked on a family farm or in a family business, combined to create a category of self-employment; and (3) whether the respondent was employed in wage work or household enterprises, creating a superset of categories 1 and 2. Note that categories (1) and (2) are not mutually exclusive, as individuals could be both wage workers and workers in household enterprises. In our sample, about 1.6 percent of women and 9 percent of men were engaged in both wage work and self-employment in a given month. Estimates of employment before and after the lockdown are presented in Table 1.

### STATISTICAL METHODS

The monthly work participation status of individuals was analyzed using random-effects logistic regression estimated using the MELOGIT command in STATA.<sup>2</sup>

The equation we estimated takes the following form:

$$\ln \left( \frac{p_{ij}}{1 - p_{ij}} \right) = \beta_{0j} + \beta_{1j}X_{L,i} + \beta_{2j}X_{M,i} + \beta_{3j}X_{C,i};$$

$$\beta_{0j} = \delta_{00} + \mu_{0j}$$

where  $p_{ij}$  reflects the probability of being employed in the  $i^{\text{th}}$  month for  $j^{\text{th}}$  individual (woman or man). The logit of being employed is a function of a randomly varying individual-specific component  $\beta_{0j}$ . The individual-specific component is determined by the size of the random-effects term  $\mu_{0j}$ .  $X_L$  refers to whether the lockdown was in effect during the month of the interview,  $X_M$  refers to the calendar month in which the interview took place to control for seasonality in employment, and  $X_C$  refers to the control variables reflecting both individual and household characteristics.

We control for an array of individual, household, and community characteristics. Age, education, and marital status are the individual characteristics included as control variables. Caste of the household is divided into three categories: general/forward caste/no caste, Scheduled Caste or Scheduled Tribe, and Other Backward Classes (OBCs). Household religion is coded as Muslim and non-Muslim, and the household's socioeconomic status is measured by the asset ownership index (divided into five quintiles) collected at baseline. We also control for the residence location by including dummy variables for urban residence and state of residence. Seasonality is addressed by including dummy variables for the calendar month of the interview.

The small sample size forces us to combine some of the categories that may be treated as distinct in other studies with larger samples. For example, we combined the two most disadvantaged caste categories: Scheduled Castes and Scheduled Tribes; we also combined Hindus and those belonging to other minority religions such as Sikhs, Christians, and Jains into a non-Muslim category. Descriptive statistics for control variables are presented in Table 1.

### TRENDS IN EMPLOYMENT DURING THE LOCKDOWN

Table 1 shows the average work participation rates recorded by interviews conducted between March 15, 2019, and March 24, 2020, before the start of the lockdown. It also shows the work participation rate recorded in interviews between March 25–May 31, 2020, the period when the lockdown was in effect. The results indicate a sharp decline during the lockdown period, with lockdown-related declines being statistically significant at  $p < = 0.05$  for both men and women in all types of work as shown by non-overlapping confidence intervals. The monthly surveys conducted in the year preceding March 2020 show that about 86 percent of men were engaged in any kind of work; in contrast, the surveys conducted between March 25, 2020 (when the lockdown was initiated) and May 31, 2020 (when the lockdown was relaxed) indicate that this proportion had dropped to 61 percent. Since the data refer to the 30 days preceding the survey, interviews in late March 2020 and early April 2020 cover only part of the lockdown period. The work participation rate in May 2020, which covers the preceding 30 days when the lockdown was in effect, is even lower, at only 47 percent. For women, the work participation rate declined from 38 percent to 24 percent, with the figures in May 2020 showing an employment rate of 18 percent.

While the decline for men is far greater than that for women in absolute terms (26 percentage points for men versus 15 percentage points for women), in relative terms, it is greater for women (29 percent for men versus 34 percent for women). However, it is difficult to generalize from these comparisons due to the seasonality of employment in India. To address this seasonality, we control for the month of the interview in multivariate analyses, which is feasible for us to do since our dataset contains interviews conducted during March–May 2019 as well as March–May 2020.

Table 1 also highlights women's concentration in self-employment. While men are almost as likely to be in self-employment as in wage employment, two-thirds of the women workers are in self-employment. Hence, gender differences in employment may also reflect differential sectoral experiences during the lockdown period. We explore this issue through multivariate analyses.

## GENDER DIFFERENCES IN EMPLOYMENT

The results from random-effects logistic regression are presented in Table 2. Controls for calendar months are also included to control for the seasonality of employment but not shown in the table in the interest of parsimony. An individual-specific random term has been added to the model to account for the correlation in repeated measurements from the same individual. While we estimate separate models for men and women to facilitate ease of reporting, differences in coefficients for the two separate regressions are tested in a fully interacted model and reported in text where relevant.

**Overall employment**

The results show a sharp decline in employment for both men and women. The odds ratio comparing employment during the lockdown to pre-lockdown employment is 0.06 for men and 0.18 for women, with gender differences in the lockdown effect being statistically significant at  $p \leq 0.05$ . Given the well-established difficulties in comparing coefficients across nonlinear probability models (Breen, Karlson, and Holm 2018), we estimate the predicted probabilities for men and women separately for periods before and after the lockdown, holding all other variables at their mean value using the STATA MARGINS command. These results, presented in Figure 1, show that men experienced a decline in predicted employment probability of 0.29 compared to 0.12 for women, and gender differences are statistically significant at  $p \leq 0.05$  in a fully interacted model.

This discussion suggests that the type and nature of work may serve to mediate the impact of the lockdown, an issue that we explore below. Figure 1 presents the predicted employment probabilities from the random-effects logistic regressions using the same control variables that are included in Table 2.

*Wage Employment*

The overall employment impact of the lockdown is a combination of changes in both wage employment and self-employment. Table 2, estimating the impact of the lockdown on the odds ratio of being wage employed for men and women, shows interesting gender differentials. During the lockdown, men's odds of being employed are 0.1 compared to the pre-lockdown period; for women, they are 0.06, with gender differences being statistically significant at  $p \leq 0.1$ . As the predicted probabilities in Figure 1 show, for men, the probability of wage employment declined from 0.47 to 0.28 during the lockdown, a 19 percentage point decline, while for

Table 2 Random-effects logistic regression results for employment in various categories, men and women ages 20–60 in India, 2019–20

	<i>Any work</i>				<i>Wage employment</i>				<i>Self-employment</i>			
	<i>Men</i>		<i>Women</i>		<i>Men</i>		<i>Women</i>		<i>Men</i>		<i>Women</i>	
	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>
<b>Lockdown</b>	0.06***	0.01	0.18***	0.03	0.10***	0.02	0.06***	0.01	0.19***	0.03	0.32***	0.05
Age	0.97***	0.01	1.01	0.01	0.96***	0.01	1.02	0.01	1.02	0.01	1.00	0.01
Not married	0.16***	0.05	3.52***	1.36	0.15***	0.06	5.18***	2.34	0.52	0.22	0.98	0.43
Completed education (none omitted)												
Class 1–5	1.58	0.56	0.42***	0.13	0.70	0.32	0.49*	0.20	2.27	1.14	0.51*	0.18
Class 6–8	1.52	0.50	0.35***	0.11	0.85	0.36	0.39**	0.17	3.10**	1.48	0.37***	0.14
Class 9–10	1.68	0.53	0.41**	0.15	2.06*	0.83	0.35**	0.18	0.67	0.30	0.64	0.26
Class 11–12	1.32	0.49	0.57	0.22	2.17*	1.01	0.57	0.31	1.24	0.63	0.62	0.27
Class 12 and above	2.21***	0.81	1.69	0.67	7.20***	3.26	8.93***	4.40	0.52	0.26	0.39**	0.18
Household asset quintile (poorest omitted)												
2nd quintile	1.80**	0.52	0.92	0.30	0.48**	0.18	0.46**	0.17	6.23***	2.63	1.49	0.54
Middle quintile	2.85***	0.88	1.43	0.48	0.17***	0.06	0.14***	0.06	34.26***	15.64	4.21***	1.60
4th quintile	2.41***	0.75	0.74	0.26	0.17***	0.07	0.07***	0.03	26.76***	12.52	2.68**	1.07
Richest	3.13***	1.14	0.75	0.30	0.07***	0.03	0.08***	0.04	91.72***	49.82	2.73**	1.28
Caste (forward and none omitted)												
Other Backward Classes	0.86**	0.20	1.32	0.33	1.70*	0.47	2.11**	0.71	0.33***	0.10	0.85	0.23
Schedule Caste/Tribe	0.62	0.15	1.28	0.34	16.10***	4.97	15.36***	5.48	0.01***	0.00	0.15***	0.05

(Continued).

Table 2 Continued

	<i>Any work</i>				<i>Wage employment</i>				<i>Self-employment</i>			
	<i>Men</i>		<i>Women</i>		<i>Men</i>		<i>Women</i>		<i>Men</i>		<i>Women</i>	
	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>	<i>OR</i>	<i>SE</i>
Religion (Hindu/Christian/Sikh and others omitted)												
Muslim	0.30***	0.09	0.17***	0.06	0.70	0.28	0.77	0.33	0.20***	0.09	0.13***	0.06
Urban Residence	0.19***	0.05	0.12***	0.03	4.25***	1.20	2.42***	0.81	0.00***	0.00	0.03***	0.01
State (Haryana omitted)												
Delhi	1.18	0.34	0.28***	0.09	1.01	0.36	0.28***	0.12	1.23	0.50	0.53	0.21
Rajasthan	0.80	0.23	2.39***	0.75	0.23***	0.08	0.49*	0.19	15.46***	6.41	6.93***	2.31
Uttar Pradesh	1.14	0.29	0.44***	0.12	0.41***	0.12	0.44**	0.15	3.38***	1.13	0.72	0.21
Constant	65.03	36.55	- 0.24	0.58	2.24	1.53	0.00	0.00	0.37	0.28	0.27	0.18
Var (random effect)	5.98	0.54	0.78	0.46	17.47	1.69	19.32	2.42	28.41	3.62	14.39	1.48
Chi-Square (30df)	585		424		461		311		400		406	
Sample size	1,098		1,128		1,098		1,128		1,098		1,128	

Note: \*\*\*, \*\*, and \* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

women, it fell from 0.14 to 0.04, a 10 percentage point decline. Given the low level from which women started, this is in effect a decline of 72 percent for them as compared to 40 percent for men.

These results support the observation of other researchers who have looked at the impact of prior recessions on gender differences in employment outcomes. Instead of looking at simply men's or women's employment, it is important to understand the occupations and industries that are affected by the specific nature of the recession. In this case, the lockdown affected physical movement. Movements outside the local area were restricted, and these restrictions were particularly severe in the red districts. Since most of the urban areas in our sample fell in the red district categorization, the corresponding urban employment was particularly affected. About 34 percent of the urban residents in our sample worked in salaried jobs or in casual labor as compared to a corresponding figure of 27 percent for the rural residents.

These workers faced a variety of impediments in continuing their work. Large construction projects were halted, office buildings were locked down, and transportation arteries were shut down. Consequently, only essential workers – those working in the police, in communications services, in hospitals, and in the food distribution network – were able to continue working. Except for workers in the health services, most women do not typically work in occupations and industries classified under essential services. Thus, the opportunities for them to find waged work during the lockdown were fewer than those for their male counterparts. Women who worked as domestic help were particularly negatively affected as most resident welfare associations closed their gates to staff not living on the campus, and maids and cooks were not allowed to enter the buildings for fear of carrying contamination.

### *Self-employment*

In contrast to wage work, the reduction in the predicted probability of self-employment was smaller, as shown in Figure 1. The coefficient for the lockdown is smaller for women than for men, as seen in Table 2, as is the absolute decline in predicted probabilities. The predicted probability of wage employment for men fell from 0.37 to 0.29 during the lockdown, while that for women fell from 0.22 to 0.14. Gender differences in decline in self-employment associated with the lockdown are statistically significant at  $p \leq 0.1$ .

Among the self-employed, 80 percent of women and 65 percent of men are engaged in farming. While the business activities – delivering milk to the dairy, operating clothing or shoe shops, and providing services such as tailoring – were curtailed, following the initial phase of the lockdown, agricultural activities were permitted. Thus, while self-employed women

workers, due to their concentration in agriculture, were able to carry on working, and men farmers too could continue to work, men in small businesses could not. As a result, among the self-employed, women were less affected by the lockdown than men.

#### AT THE INTERSECTION OF RELIGION AND GENDER

Attitudinal research on the novel coronavirus suggests that knowledge about the virus, its virulence, and the role of social contact in its spread is almost universal in the Delhi NCR region (NCAER National Data Innovation Centre 2020). As noted earlier, the news of COVID-19-infected participants at a large Muslim religious gathering in New Delhi resulted in increased stigmatization of the Muslim population. Below, we examine the religious differences in employment decline to explore the possibility that this stigmatization may have had direct consequences for employment among the Muslim population in Delhi NCR.

The random-effects model presented in Table 2 has been expanded to include interaction with religion and the period of the lockdown. Due to its small sample size, the religion variable consists of only two categories; that is, Hindus are combined with members of other minority religions such as Christians, Sikhs, and Jains, and we contrast Muslims with non-Muslims.

The predicted probabilities from the multilevel logistic regression, presented in Table 3, show that during the lockdown period, the employment decline was substantially larger for the Muslim population than for Hindus. The predicted probability of employment for Hindu men was 0.88 before the lockdown, which declined to 0.61 during the period March–May 2020. In contrast, the employment probability for Muslim men fell from 0.79 to 0.37. The declines for Hindu women (0.36 to 0.23) and Muslim women (from 0.23 to 0.09) are smaller in absolute terms, but given the low level of work participation among Muslim women, these declines loom large in relative terms. It is important to note that while the lockdown affects all Muslims, it did not impose an additional burden on Muslim women. The three-way interaction term between being a woman, being Muslim, and living under the lockdown was not statistically significant at the 0.1 level. Nonetheless, the predicted probability of employment for Muslim women during the lockdown is only 0.09, so minuscule that it seems they are almost totally shut out of the labor markets.

It is important to note that our results are based on very small samples. Our sample contains only 119 Muslim men and 127 Muslim women. Moreover, the lockdown period coincided with the month of Ramadan, a period during which Muslim labor force participation rates usually decline. This may be particularly true in 2020 since Ramadan occurred in May, the hottest month of the year, and it may be prudent to stay indoors during the day while fasting without water. Thus, while these results are suggestive,

Table 3 Predicted probability of engaging in any type of work from random-effects logistic regression before and during lockdown by religion, residence, and asset ownership, men and women ages 20–60, India, 2019–20

	<i>Men</i>				<i>Women</i>			
	<i>Pred. probability</i>	<i>SE</i>	<i>Lower conf. interval</i>	<i>Upper conf. interval</i>	<i>Pred. probability</i>	<i>SE</i>	<i>Lower conf. interval</i>	<i>Upper conf. interval</i>
Religion and lockdown interaction								
Pre-lockdown								
Hindu & others	0.88	0.01	0.87	0.89	0.36	0.01	0.34	0.38
Muslim	0.80	0.03	0.74	0.85	0.23	0.02	0.18	0.27
During lockdown								
Hindu & others	0.61	0.02	0.57	0.65	0.23	0.01	0.21	0.26
Muslim	0.37	0.05	0.28	0.46	0.09	0.03	0.04	0.14
Residence and lockdown interaction								
Pre-lockdown								
Rural	0.91	0.01	0.90	0.93	0.44	0.02	0.40	0.48
Urban	0.81	0.01	0.79	0.84	0.26	0.01	0.24	0.28
During lockdown								
Rural	0.75	0.02	0.70	0.80	0.31	0.02	0.28	0.35
Urban	0.40	0.03	0.34	0.45	0.11	0.01	0.08	0.14
Asset class at baseline and lockdown interaction								
Pre-lockdown								
Poorest	0.81	0.02	0.77	0.85	0.34	0.02	0.30	0.39

(Continued).



Table 3 Continued

	<i>Men</i>				<i>Women</i>			
	<i>Pred. probability</i>	<i>SE</i>	<i>Lower conf. interval</i>	<i>Upper conf. interval</i>	<i>Pred. probability</i>	<i>SE</i>	<i>Lower conf. interval</i>	<i>Upper conf. interval</i>
2 <sup>nd</sup> quintile	0.86	0.02	0.83	0.89	0.34	0.02	0.30	0.37
Middle quintile	0.90	0.01	0.87	0.92	0.38	0.02	0.34	0.42
4 <sup>th</sup> quintile	0.88	0.01	0.85	0.91	0.32	0.02	0.29	0.35
Richest	0.90	0.02	0.87	0.93	0.32	0.02	0.28	0.35
During lockdown								
Poorest	0.50	0.04	0.41	0.59	0.22	0.03	0.17	0.27
2 <sup>nd</sup> quintile	0.55	0.04	0.48	0.63	0.22	0.02	0.17	0.26
Middle quintile	0.61	0.04	0.54	0.68	0.22	0.02	0.18	0.27
4 <sup>th</sup> quintile	0.60	0.04	0.53	0.68	0.19	0.02	0.14	0.23
Richest	0.63	0.04	0.55	0.71	0.25	0.03	0.19	0.30

Notes: Predicted probability from random-effects logistic regressions containing all variables included in Table 2 as well as 2-way interactions between lockdown and either religion or residence or asset class.

they should be treated cautiously until corroborated by a larger sample that is spread out over a longer duration.

### GENDER, CLASS, AND RESIDENCE

In separate analyses, we interacted household assets with the lockdown and gender of the respondent to explore whether particular groups were especially vulnerable to employment loss during the lockdown. The predicted probabilities from random-effects logistic regressions (Table 3) show a slightly higher impact of the lockdown on the decline in employment among the poorest men – a 31-percentage point drop in the predicted probability of being employed for the bottom quintile as opposed to a 27-percentage point drop for the top quintile. However, this difference is not statistically significant at the 0.05 level. For women, however, the protective effect of the upper-asset class is larger in magnitude and statistically significant. For the first four quintiles, predicted employment probability drops by about 12–15 percentage points; for the richest women, the drop is only 7 percentage points and confidence interval for pre- and post-lockdown employment overlap using 95 percent confidence intervals, that is, employment decline for the richest women is not statistically significant at  $p \leq 0.05$ . It seems likely that women from richer households are employed in activities that are under their control (for example, working on large family farms) or in formal sector jobs with greater employment protection and work-from-home possibilities (such as in government service), which allow them to continue working during the lockdown.

The rural residence also exercises substantial protective influence. Predicted employment probability (Table 3) dropped by 16 percentage points for rural men and about 42 percentage points for urban men, with the difference statistically significant at  $p \leq 0.01$ . A similar disadvantage accrues to urban women, where a decline in predicted employment for rural women is 12 percentage points compared to 16 percentage points for urban women (difference significant at  $p \leq 0.01$ ). This protective effect is consistent with other studies that have found lower economic distress in rural areas (NCAER National Data Innovation Centre 2020).

### IMPLICATIONS

Our results show a sharp decline in both overall employment and employment in wage work and, to a lesser extent, in self-employment for both men and women. Overall, men's employment is far more negatively impacted than women's employment. However, this advantage for women is illusory. Much of it is due to women's concentration in agricultural work, which was largely exempted from movement restrictions during the

lockdown. When we compare access to wage work, we find that women are more likely to be shut out of employment than men.

Greater employment loss in the waged sector has far-reaching economic impacts on the gender wage gap. Self-employment in farming or business has relatively low financial returns (Desai et al. 2010), and incomes often accrue to the whole family rather than individually to women. Thus, losing wage employment has tremendous consequences for women's lives. These implications could become severe if employment loss coincides with the advent of disease in the family. As an editorial in the journal the *Lancet* notes, "It is unclear whether women or men are more likely to become infected, but more men are dying from COVID-19" (Lancet 2020). If this is indeed true, women's financial responsibilities are likely to increase while their access to independent income declines.

Our results also suggest heterogeneity in the employment consequences of the lockdown by religion. Muslim men and women were disproportionately less likely to be employed during the lockdown than men and women from other religious communities. While our findings are tentative and need to be examined by using larger samples and outside the window of Ramadan, if further validated, they would suggest an urgent need to counter the stigmatization of specific communities as "super spreaders" to curb the discrimination against these communities.

Class and residence also mediate the impact of the lockdown. Rural residence reduces the impact of the lockdown on both men's and women's employment. Women from the social upper class, as measured by asset ownership at the baseline, are also somewhat protected from the impact of the lockdown.

While the research presented in this paper is based on data collected from the Delhi NCR region and does not encompass all of India, this paper's insights contribute to both theoretical literature on gendered impacts of macro crises and considerations for policy formation by the Indian government as the country passes through various phases of the lockdown and its relaxation. Conceptual insights suggest that future literature on gendered impacts of crises must take occupational and industrial structure into account since different sectors may be differentially affected, and occupational gender segregation may mediate these impacts. Policy implications of these results for India are particularly salient since different parts of India are shutting down at a differential pace as the disease moves across the country and districts transition from being green to red or orange zones. Delhi and Mumbai were the two areas first affected by the advent of COVID-19. Hence, our Delhi-based sample provides a site where the pandemic impact appeared well before other areas. However, as the disease moves across the country, regionally specific lockdowns continue to be implemented in previously unaffected areas. Therefore, we may see similar processes at play in other parts of the

country. Recognition of the vulnerability of women wage workers may allow us to devise employment protection and safety nets in a way that protects them, well before a lockdown is put in place.

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## ARTICLE

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## NOTES

- <sup>1</sup> For a detailed evaluation of CPHS against other data sources see Surajit S. Bhalla and Tirthatanmoy Das (2018).
- <sup>2</sup> Results are not sensitive to selection of alternative functional forms.

## REFERENCES

- Alon, Titan M., Matthias Doepke, Jane Olmstead-Rumsey, and Michèle Tertilt. 2020. "The Impact of Covid-19 on Gender Equality." NBER Working Paper No. 26947. National Bureau of Economic Research, Cambridge, MA.
- Aslanbeigui, Nahid and Gale Summerfield. 2000. "The Asian Crisis, Gender, and the International Financial Architecture." *Feminist Economics* 6(3): 81–103.
- BBC. 2020. "Tablighi Jamaat: The Group Blamed for New Covid-19 Outbreak in India." *BBC News: India*, April 2. <https://www.bbc.com/news/world-asia-india-52131338>.
- Bhalla, Surajit S. and Tirthatanmoy Das. 2018. "All You Wanted to Know about Jobs in India – But Were Afraid to Ask." Background Report for Economic Advisory Council of the Prime Minister (EACPM), New Delhi, India. <https://eacpm.gov.in/wp-content/uploads/2018/07/all-you-wanted-to-know-about-employment-in-India-EACPM-omega-July-9-2018.pdf>.
- Bhandari, Laveesh and Amaresh Dubey. 2019. "Emerging Employment Patterns of 21st Century India." Indicus Foundation. <https://www.indicus.org/pdf/Emerging-Employment-Patterns-in-21st-Century-India-v181019.pdf>.
- Breen, Richard, Kristian Bernt Karlson, and Anders Holm. 2018. "Interpreting and Understanding Logits, Probits, and Other Nonlinear Probability Models." *Annual Review of Sociology* 44(1): 39–54.
- Chatterjee, Esha, Sonalde Desai, and Reeve Vanneman. 2018. "Indian Paradox: Rising Education, Declining Women's Employment." *Demographic Research* 38(31): 855–78.
- Chatterjee, Urmila, Rinku Murgai, and Martin Rama. 2015. "Job Opportunities along the Rural-Urban Gradation and Female Labor Force Participation in India." Policy Research Working Paper 7412, Poverty Global Practice Group, World Bank, Washington, DC.
- Desai, Sonalde B., Amaresh Dubey, Brij Lal Joshi, Mitali Sen, Abusaleh Shariff, and Reeve Vanneman. 2010. *Human Development in India: Challenges for a Society in Transition*. New Delhi: Oxford University Press.
- Deshmukh, Neerad, Sonalde Desai, Santanu Pramanik, and Dinesh Tiwari. 2020. "Improving the Measurement of Women's Work: Sensitivity of Work Participation Rates to Survey Design." NCAER National Data Innovation Centre Measurement Brief No. 2020-1, National Council of Applied Economic Research, New Delhi, India. [http://www.ncaer.org/publication\\_details.php?PID=321](http://www.ncaer.org/publication_details.php?PID=321).
- Deshpande, Ashwini. 2020. "The Covid-19 Pandemic and Lockdown: First Effects on Gender Gaps in Employment and Domestic Work in India." Working Papers 30, Department of Economics, Ashoka University.
- Fukuda-Parr, Sakiko, James Heintz, and Stephanie Seguino. 2013. "Critical Perspectives on Financial and Economic Crises: Heterodox Macroeconomics Meets Feminist Economics." *Feminist Economics* 19(3): 4–31.

- Klasen, Stephan. 2015. "What Explains the Stagnation of Female Labor Force Participation in Urban India?" *World Bank Economic Review* 29(3): 449–78.
- Kolachalam, Namrata. 2020. "Indian Muslims Are Being Scapegoated for the Coronavirus." *Slate*, April 9. <https://slate.com/news-and-politics/2020/04/tablighi-jamaat-india-muslims-coronavirus.html>.
- Lancet. 2020. "The Gendered Dimensions of COVID-19." *Lancet* 395(10231): 1168.
- Lei, Lei, Sonalde Desai, and Reeve Vanneman. 2019. "The Impact of Transportation Infrastructure on Women's Employment in India." *Feminist Economics* 25(4): 94–125.
- National Statistical Office. 2020. "Annual Report of Periodic Labour Force Survey (PLFs), July 2018–June 2019." Ministry of Statistics and Programme Implementation, National Statistical Office, Government of India, New Delhi.
- NCAER National Data Innovation Centre. 2020. "Delhi NCR Coronavirus Telephone Survey, Round 1 (April 3–6): Preliminary Report." National Council of Applied Economic Research, New Delhi. <https://ncaer.org/Image/Userfiles/File/Ndic-Tel/Dcvts%20results%202020-04-12-Final.Pdf>.
- United Nations. 2020. "Policy Brief: The Impact of COVID-19 on Women." [https://www.un.org/sites/un2.un.org/files/policy\\_brief\\_on\\_covid\\_impact\\_on\\_women\\_9\\_apr\\_2020\\_updated.pdf](https://www.un.org/sites/un2.un.org/files/policy_brief_on_covid_impact_on_women_9_apr_2020_updated.pdf).