Review of Economic Analysis 14 (2022) 221-252 1973-3909/2022221

Gender Impacts of COVID-19 on the Labor Market and Household Wellbeing in Pakistan

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This study examines the gender impacts of the COVID-19 pandemic on the labor market and household wellbeing, using an online survey of the users of Pakistan's largest online job platform. The analysis shows that the pandemic led to an unprecedented level of economic insecurity for employees and employers alike, resulting in widespread job loss, business closures, a slowdown in business activity, and reduced working hours. The sectors where female workers are heavily concentrated, such as education, were more severely affected. The pandemic has also led to a disproportionate increase in women's unpaid care work and increased their reported rates of stress and anxiety. These findings suggest that the pandemic had significant wellbeing impacts on women in Pakistan, including a decline in the female labor force participation rate, which is already among the world's lowest.

Keywords: COVID-19, labor market, income, unpaid work, Pakistan.
JEL Classifications: J22, J23, I30

* The corresponding author is Tanima Ahmed (tahmed9@worldbank.org). The authors thank the Rozee.pk team for providing access to the database and for implementing the online COVID-19 survey. Feedback on earlier versions of this paper by Maria Beatriz Orlando, Uzma Qureshi, Ahmed Durani, and the participants of a webinar organized by the World Bank South Asia Gender Innovation Lab and the Gender Inequality Conference, organized by the International Centre for Economic Analysis (ICEA), are also gratefully acknowledged. Any remaining errors belong to the authors.

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1 Introduction

The COVID-19 pandemic has caused unprecedented disruptions to labor markets around the world. As lockdowns were put in place to mitigate the spread of the disease, economic activity plummeted, resulting in large drops in employment in virtually every country. It has been projected that the number of hours worked across the globe in 2021 was 4.3 percent lower than the pre-pandemic levels, an equivalent of 125 million full-time jobs being lost (International Labor Organization 2021). The pandemic has also led to an estimated 97 to 167 million more people falling into poverty in 2020 (measured by the number of people living on $1.90 per day and $5.50 per day, respectively), undoing an equivalent of four years of progress in the reduction of extreme poverty (Mahler et al. 2021). As the pandemic continues to unfold, labor market recovery is appearing to stall with significant divergence between developed and developing economies, partly reflecting inequalities in access to vaccines and in the ability of governments to roll out social assistance or fiscal stimulus programs.

Economic shocks of this magnitude often have differing impacts on men and women, even if the net effects of the shock may conceal these differences. For instance, workers concentrated in sectors that are insulated from the shock may be protected from the impacts of the crisis (Rubery 2010; Rubery and Rafferty 2013). Since most labor markets exhibit occupational segregation by gender, effects on men and women can be different, depending on how hard their respective sectors get hit. Because women are overrepresented in insecure and low-paying jobs, they are often the first to be fired and last to be hired during economic downswings (Cho and Newhouse 2011), although female labor force participation can grow if households that need the additional income ask female family members to look for work (Rubery 2010; Starr 2014). To the extent that norms dictate preservation of men's "breadwinner" status during economic downswings, women are likely to bear the brunt of job losses when jobs get scarce (Elson 2010).

Crises like COVID-19 can also worsen gender inequalities within households (Floro, Taş, and Törnqvist 2010). Loss of income and employment often requires households to adjust expenditures to cope with the crisis. Within households, women usually take responsibility for the survival of household members by cutting back on consumption or increasing unpaid work as an alternative to purchasing household goods (Elson 2010). In countries where women's primary role is perceived to be caregiving and homemaking, women face an added burden of home production, childcare, eldercare, and other domestic responsibilities (Karamessini and Rubery 2013). Since the beginning of the COVID-19 pandemic in 2020, lockdowns that required adults to work from home and children to attend school remotely added disproportionate amounts of unpaid work on women's shoulders (United Nations 2020).

While the far-reaching consequences of COVID-19 are still unfolding, several studies have examined the pandemic's impacts on labor markets and wellbeing in developing countries

(Shafi, Liu and Wenju 2020; Hayashi and Matsuda 2020; Malik and Naeem 2020; Mustafa et al. 2021; Shahbaz et al. 2021; Wang et al. 2021). The emerging evidence suggests that because of poor planning and lack of preparation to deal with the crisis, the micro, small, and medium-sized enterprises (MSMEs) have been severely affected and faced financial constraints, supply chain disruptions, and overall declines in demand, sales, and profits (Shafi, Liu and Wenju 2020). It has also been documented that women workers struggled the most in managing household chores and childcare along with their jobs (Malik and Naeem 2020; Mustafa et al. 2021), which led to higher stress levels among women than men (Wang et al. 2021). Although both women and men experienced a fall in household income due to the pandemic, evidence suggests that women's limited income has led to a decline in daily nutrient intake among female-headed households, more so than the male-headed households (Shahbaz et al. 2021).

This paper contributes to this growing literature by examining the gender impacts of COVID-19 on the labor market and household well-being in Pakistan, where women's labor force participation is among the world's lowest. Women account for 49.2 percent of Pakistan's population (Pakistan Bureau of Statistics, Labor Force Survey), but their labor market participation rate, at 23 percent, is considerably lower than that of men's, which has fluctuated around 82 percent for nearly three decades (Amir et al. 2018; Pakistan Bureau of Statistics 2019). Although women's overall labor force participation rate increased steadily from 13 percent in 1992 to 25 percent in 2015, before declining back to 23 percent in 2018, most of this increase was fueled by unpaid work in agriculture in rural areas. In contrast, female labor force participation in urban areas remained persistently low, only rising from 7 percent to 11 percent in nearly three decades. Many explanations have been offered for these trends, including limited human capital, concerns about women's safety and mobility, workplace discrimination, marriage, and disproportionate domestic responsibilities (Amir et al. 2018). Any disproportionate gender impacts resulting from the COVID-19 pandemic might reinforce women's restricted role in the economy, putting the limited gains of the last few decades at even greater risk.

The analysis in this paper examines a unique survey of jobseekers and employers that was conducted during July-August 2020 among the registered users of Pakistan's largest online job platform, Rozee.pk. The online survey covered about 9,000 jobseekers and 500 employers, primarily living in four metropolitan cities of Pakistan—Lahore, Karachi, Islamabad, and Rawalpindi—that account for 85 percent of the job postings on Rozee.pk. Online job platforms like Rozee.pk are becoming increasingly common across developing countries as job postings move from print media to websites (Matsuda, Ahmed, and Nomura 2019). The administrative database of Rozee.pk, for example, contained about 75,000 job advertisements and 7.5 million job applicants during January-August 2019 and January-August 2020, two comparator periods used for tracking labor market activity before and after the pandemic. In the absence of official

labor market statistics in the early phases of COVID-19, the platform provided access to a large pool of employers and jobseekers for the specialized online survey, enabling a just-in-time assessment of the pandemic's multidimensional impacts in urban centers.

The paper proceeds as follows. The next section describes the data source and the methodology. The third section discusses the main findings under three headings, focusing on impacts on labor demand, labor supply, and household wellbeing. The last section concludes with a brief summary and a discussion of policy implications. Supplementary tables and results are listed in the annexes.

2 Data and Methodology

2.1. Data

This paper uses a specialized online COVID-19 survey of the registered users of Rozee.pk, Pakistan's largest online job platform. The survey includes detailed information about the socioeconomic status, labor market activity, and coping strategies of about 9,000 jobseekers and 500 employers. The online survey data was collected between July-August 2020 using Rozee's registered users as the sampling frame. Hence, it is not representative of the entire labor market of Pakistan; it focuses on a top tier of the labor force who are educated, live in urban areas, and have access to the internet.[1]

The dataset includes two parts. The employer survey captures information about the operational status of businesses during COVID-19, as well as basic information such as the size, industry, and location of the firms. If the businesses remained open during the pandemic, the survey also collected additional information about number of workers, day-to-day operations and human resource management in response to the crisis. The analysis in this paper focuses on a subsample of firms that reported the number of entry-level workers and female workers. Once these restrictions are imposed, the final sample analyzed in this paper includes 281 businesses, 137 of which reported to have remained open during the pandemic.

The jobseeker survey collected information about jobseekers' experiences in the labor market before and after the pandemic with February 2020 serving as the cutoff date.[2] The latter include changes in their earnings, employment status, job search behavior, coping strategies, and any government support received during COVID-19. Because different parts of the

[1] See Matsuda, Ahmed, and Nomura (2019) for a more detailed discussion about the demographic comparison between the Pakistan labor force survey and Rozee.pk's online platform users.

[2] COVID-19 was first confirmed in Pakistan at the end of February 2020, and the cumulative number of confirmed cases hit half a million by December 2020. As a containment measure, federal and provincial governments closed schools in mid-March and started a lockdown on March 21, 2020. The first lockdown lasted until May 9, 2020; thereafter, sporadic temporary lockdowns continued until the writing of this study. The analysis in this note covers the period until August 2020.

jobseeker survey were administered to three subsamples of jobseekers to manage the survey length, and because the participants had the choice of skipping questions, the number of observations across survey questions is not uniform. The analysis in this paper focuses on jobseekers for whom the dataset includes complete information on job status (before and during the pandemic) and key social and demographic characteristics. Once these factors are taken into consideration, the final sample includes 2,127 individuals (550 women and 1,577 men), 641 of whom reported working during the pandemic, 396 reported losing their jobs, 118 reported finding a job, and 972 reported not working in either period.

2.2 Methodology

The empirical approach in this paper estimates separate econometric models to assess the pandemic's impacts on labor demand, labor supply, and household wellbeing. First, we analyze the demand side of the labor market using a multinomial logit model to examine the effect of COVID-19 on the operational status of businesses after controlling for key characteristics. The model is given by (1):

$$Y_{ij} = \beta_0 + \beta_{Cj} C_i + \varepsilon_{ij} \quad Y_{ij} = \begin{cases} 1, & Y_{ij}^* = \max[Y_{i1}^*,\ Y_{i2}^*,\ Y_{i3}^*] \\ 0 \end{cases} \tag{1}$$

where Y represents categorical dependent variables =1 if the business remained open, 2 if the business closed temporarily, and 3 if the business closed permanently; C represents a vector of firm characteristics, including industry (information communication technology, manufacturing, retail and wholesale, hotels, restaurants and food service, transportation, finance, education, health, and other industries), size (micro: 1-10 employees, small: 11-50 employees, medium: 51-300 employees, and large: 301+ employees), and region (Islamabad, Karachi, Lahore, Rawalpindi, and others); and ε is a vector of residuals.

For firms that remained open during the pandemic, we further examine the effect of COVID-19 on their day-to-day operational status and human resource management. We consider nine different outcome variables including whether or not the firms experienced: (a) a reduction in demand, (b) a reduction in revenue, (c) a slowdown in activities, (d) worker absenteeism, (e) temporary lay-off of workers without pay, (f) permanent lay-off of workers without pay, (g) wage cuts, (h) delayed wage payments, and (i) a reduction of business hours. The linear probability model is given by (2):

$$O_i = \beta_0 + \beta_C C_i + \beta_E E_i + \varepsilon_i \tag{2}$$

where, O represents the nine dependent variables listed above; E represents a vector of firm's employee composition before the pandemic (40 percent or more of firms' employees were female or entry-level workers); and C and ε are defined as before.

Turning to the labor supply side, we examine the impacts of COVID-19 on jobseekers by analyzing their probability of (a) working both before and during the pandemic, (b) losing a job during the pandemic (conditional on being employed before the pandemic), and (c) finding a job during the pandemic (conditional on being unemployed before the pandemic). To estimate the net effect of the pandemic on jobseekers' probability of working, we first estimate the probability of working before and during the pandemic using the full sample of jobseekers. Then, we estimate the probability of job loss and the probability of finding a job during the pandemic, respectively, using the two subsamples of jobseekers who were employed before the pandemic and of jobseekers who were unemployed before the pandemic. The linear probability model is given by (3):

$$W_i = \beta_0 + \beta_1 T_i + \beta_2 F_i + \beta_3 (T_i \times F_i) + \beta_4 J_i + \beta_X X_i + \varepsilon_i \quad (3)$$

where W represents the three binary dependent variables listed above; T =1 for the post-COVID-19 period and 0 otherwise; F =1 for female respondents and 0 otherwise; $T \times F$ is the interaction of time period and respondents' sex capturing the gender-differentiated effect of the pandemic; J is a set of individual control variables including the primary industry of employment (information communication technology, manufacturing, retail and wholesale, hotels, restaurants and food service, transportation, finance, education, health, and other industries); type of organization (private company, non-government organization, government, and family business); and type of work (manager, general office worker, production worker, transport/delivery worker, construction worker, shop/restaurant worker, and others); X is a vector of individual, household, and regional control variables including the lifecycle stage (age and age-squared), marital status, education, conservativeness (belief that men should have priority for employment during economic hardship), household composition (household size and whether live with elderly/children), financial stability (had savings before COVID-19 to cover food and basic household expenditure for at least a month), and location (Islamabad, Karachi, Lahore, Rawalpindi, and others); and ε is a vector of residuals.

Finally, we estimate linear probability models to analyze the impact of the pandemic on broader wellbeing outcomes, on the probability of doing unpaid work, and on reported symptoms of stress and anxiety. We examine a range of binary dependent variables capturing: (a) decrease in household income, (b) insufficiency of household income for consumption, (c) reduction in the number of meals, (d) reduction in spending in education, durables, clothes and/or tobacco, (e) obtainment of a loan, (f) receipt of external assistance, (g) increase in household chores, (h) increase in caregiving, (i) increase in children's home-schooling, and (j) experienced at least one stress symptoms including getting angry quickly, getting into frequent arguments, frequently praying, inability to sleep, inability to concentrate, and feeling anxious or depressed. The model is given by (4):

$$H_i = \beta_0 + \beta_1 F_i + \beta_X X_i + \varepsilon_i \quad (4)$$

where, H represents the ten dependent variables listed above; F is the sex of the respondent; X is a vector of individual, household, and regional control variables; and ε is a vector of residuals, as defined above.

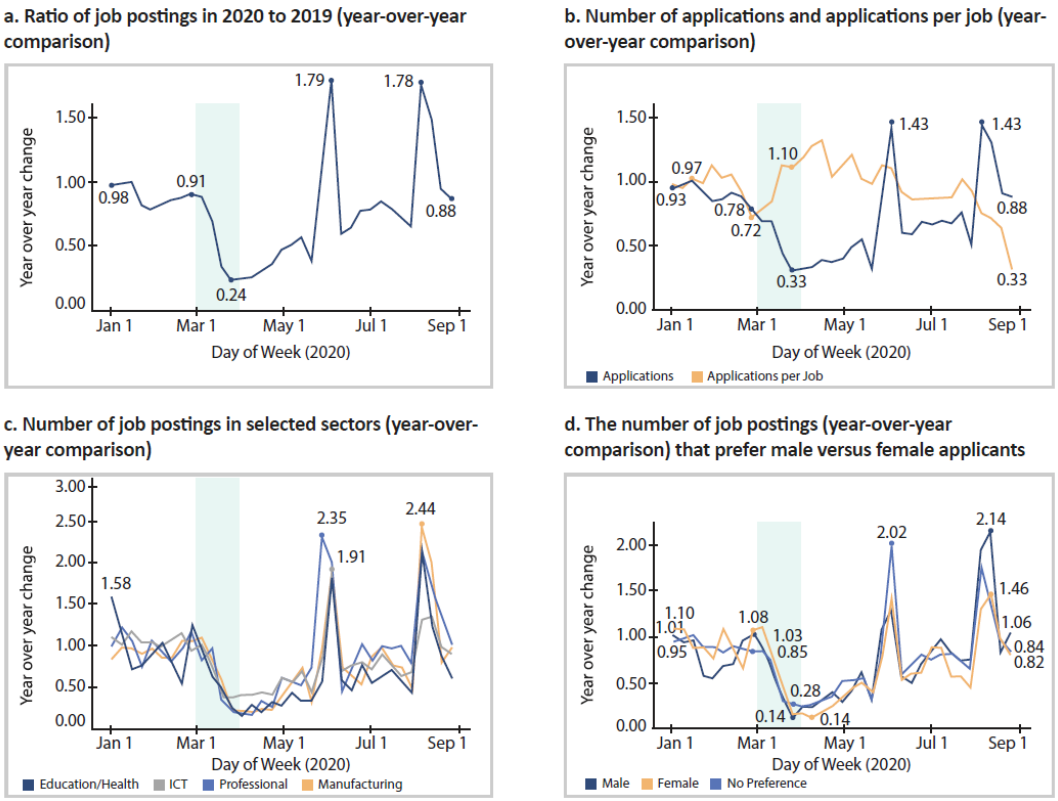
Because of the relatively small sample sizes, particularly in the employer survey, we also estimate models (1)-(4) with Generalized Maximum Entropy (GME) estimator to check the robustness of the linear and multinomial maximum likelihood estimators. The GME estimator re-parameterizes the model such that the unknown parameters and unknown errors take the form of probabilities. It provides a method for selecting the probability distribution that maximizes uncertainty remaining in the distribution, subject to the information known about the distribution. Instead of making assumptions about the underlying distribution and estimating point estimates, GME views them as the mean values of well-defined random variables and estimates their full distributions. It only uses information contained in the data and the model structure and it is more stable and robust than maximum likelihood in small samples, resulting in precise estimates (Golan, Judge, and Miller 1996). The GME results provided in Appendix A confirm that the findings are qualitatively similar and consistent with those discussed in the following sections.

3 Empirical Findings

The administrative database of the Rozee.pk platform, based on about 75,000 real transactions between employers and jobseekers, revealed that the COVID-19 pandemic resulted in a sudden and stark drop in the demand for labor, while the competition for jobs among jobseekers increased. When countrywide lockdown measures were introduced in mid-March 2020, the number of job advertisements plunged by 76 percent compared to the same period in 2019 (Figure 1, panel a). With fewer jobs available, the number of job applications fell sharply to 33 percent of the previous year in March 2020, while the average number of applications per job increased (Figure 1, panel b). In other words, the labor market became increasingly competitive for jobseekers, a pattern that persisted even when the number of job advertisements recovered to 36 percent of the previous year by the end of August 2020.

Although the fall in job postings affected all population groups, the industries in which female employment is concentrated (outside of agriculture) in Pakistan, including manufacturing, education, health, and professional services, saw the sharpest declines. Job postings in these industries dropped to 24 percent of the previous year's level (Figure 1, panel c). There was no noticeable difference in the pandemic's impacts on the number of job

Figure 1. Job Postings and Applications on Rozee.pk (year-over-year comparison)



Source: Based on data taken from the Rozee administrative database, 2019–2020. N=74,663 job postings and applications.

advertisements that specifically sought male versus female applicants (as reported by the employers, who specified in job advertisements whether they are looking for a male or a female candidate), but the post-pandemic recovery was faster for jobs that sought male applicants.

While job postings that sought men and women declined in late March 2020 to 14 percent and 17 percent of the previous year's levels, respectively, jobs preferring male applicants rebounded to 149 percent of the previous year as compared to female-preferred jobs that rebounded to only 114 percent (Figure 1, panel d).

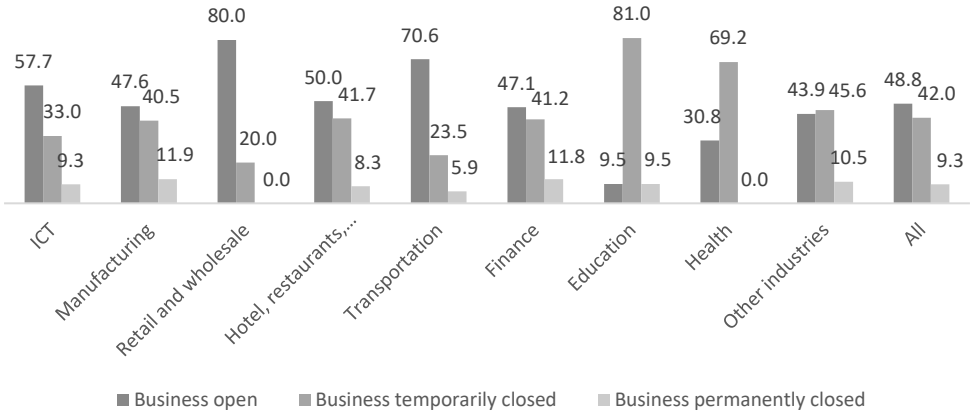
The analysis of the online COVID-19 survey data, which constitutes a subsample of the registered users (employers and jobseekers) using the Rozee.pk platform for job advertisement and job search reveals additional insights about the pandemic's multidimensional impacts across the relevant segment of the Pakistani labor market. These findings are discussed next.

3.1 Impacts on Labor Demand: Reduced Business Activity

The online COVID-19 survey reveals the far-reaching impacts of the pandemic on businesses across Pakistan, including their closures, reduced working hours, and the slowdown in activities. The survey of employers shows that only 48.8 percent of the 281 businesses in the sample remained open during the pandemic, whereas 42 percent were temporarily closed, and another 9.3 percent were permanently closed (Figure 1). The impacts of the pandemic were disproportionately felt in the health and education industry, where women's formal wage employment is heavily concentrated. Specifically, 69.2 percent of the firms in the health industry reported being temporarily closed—among the highest rates for firms reporting temporary closures (Figure 1). In addition, 81 percent of the companies in the education sector were temporarily closed—the highest among all industries—and another 9.5 percent were permanently closed (Figure 2).[3]

Aside from business closures, the pandemic had adverse impacts on businesses that remained operational during the pandemic. Of the 137 firms that remained open during the pandemic, 47.4 percent reported a reduction in the demand for their products, while 58.4 percent reported a decline in their revenues. After experiencing a major decline in their demand and revenue, 19 percent of the open businesses reported slowing down their activities either very much or

Figure 2. Firms' operational status after COVID-19 by industries



Source: Rozee online COVID-19 survey of employers. N=281.

[3] According to the World Development Indicators (WDI), women's share in primary school teaching was 55.6 percent in 2019. The WDI indicator includes both public and private schools, while most education institutions on the Rozee platform were private.

immensely. In addition, 61.3 percent of these firms reported worker absenteeism as an impediment in operating during the pandemic.

To cope with the reduced demand and revenues, firms resorted to tough measures to cut down costs. Of the firms that remained open, 21.9 percent reported laying-off employees temporarily without pay, and 16.1 percent permanently laying-off employees without pay due to low market demand and reduced revenues. Around 27.7 percent of the firms reduced wages, and 26.3 percent delayed paying their employees. Further, 46 percent of these firms cut the work hours, which is much more apparent in the education sector.

The multinomial logit model examining the determinants of firms' operational status during the pandemic (Table 1) confirms these patterns, suggesting that businesses in the health industry were 35 percentage points more likely to report temporary closures than those in the reference category (i.e., information communication technology or ICT). The estimated probability of experiencing temporary closures is even higher for the education industry, where schools and educational institutions were 70 percentage points more likely to report temporary closure than those in the ICT sector. These findings are consistent with previous reports documenting that many schools were closed in support of social distancing (Geven and Amer 2020) and many healthcare services unrelated to COVID-19 were suspended during the pandemic (World Health Organization 2020).

The pandemic also had adverse impacts on businesses that remained open during the pandemic. The linear probability model estimates in Table 2 show that the firms in the manufacturing sector are 36 and 27 percentage points more likely to report a reduction in demand and revenue than those in the ICT. Consistent with the previous findings, the linear probability model estimates in Table 2 also highlight that the probability of reporting a reduction in the revenue is 56 percentage points higher for firms that remained open in the education sector than those in the ICT sector. Similarly, the probability of experiencing a slowdown in activities is also 60 percentage points higher for firms that remained open in the education sector, with educational institutions are 29 percentage points more likely than ICT firms to report difficulties in running their operations due to workers' absenteeism.

The results in Table 3 show similar patterns. The linear probability model estimates suggest that firms in the education sector that remained open during the pandemic are 44 percentage points more likely to cut work hours than those in the ICT sector. Interestingly, even though a sizable percentage of firms in the health sector reported temporary closures, the ones that remained open are 22 percentage points less likely to lay off their employees permanently than those in the ICT sector. This could be related to the fact that healthcare workers remained essential in responding to the pandemic.

Table 1. Marginal estimates of the Multinomial Logit Model of firms' operational status after COVID-19

	Business open	Business temporarily closed	Business permanently closed
Ref: Industry: Information Communication Technology (ICT)			
Manufacturing	-0.06	0.07	-0.002
	(0.11)	(0.11)	(0.004)
Retail and Wholesale	0.30	-0.21	-0.09***
	(0.30)	(0.30)	(0.02)
Hotels, restaurants, and food service	-0.11	0.11	0.002
	(0.16)	(0.16)	(0.01)
Transportation	0.10	-0.10	-0.002
	(0.15)	(0.16)	(0.01)
Finance	-0.06	0.06	-0.004
	(0.17)	(0.17)	(0.01)
Education	-0.70***	0.70***	0.003
	(0.19)	(0.19)	(0.01)
Health	-0.26	0.35**	-0.09***
	(0.16)	(0.16)	(0.02)
Other industries	-0.15*	0.15*	0.001
	(0.09)	(0.09)	(0.004)
Ref: Size of Firms: Micro (1- 10 employees)			
Small (11- 50 employees)	0.10	-0.10	0.002
	(0.08)	(0.08)	(0.004)
Medium (51- 300 employees)	-0.004	-0.001	0.01
	(0.10)	(0.10)	(0.004)
Large (301+ employees)	0.10	-0.10	0.01**
	(0.13)	(0.13)	(0.004)
Ref: Company Location: Islamabad			
Karachi	0.03	-0.11	0.08***
	(0.12)	(0.12)	(0.02)
Lahore	-0.08	-0.01	0.09***
	(0.11)	(0.11)	(0.02)
Rawalpindi	-0.08	-0.01	0.09***
	(0.18)	(0.18)	(0.02)
Other cities	-0.27**	0.18	0.09***
Observations	281	281	281

*** 1%, ** 5%, and * 10% level of significance.

Table 2. Linear probability model estimates of the effect of COVID-19 on the day-to-day operations of firms remained open

	Demand reduced=1	Revenue reduced=1	Activity slowed down: very or extreme=1	Worker absenteeism is a problem=1
Ref: Industry: Information Communication Technology (ICT)				
Manufacturing	0.36**	0.27*	0.25**	0.28**
	(0.15)	(0.14)	(0.12)	(0.14)
Retail and Wholesale	0.18	0.26*	0.23	0.02
	(0.22)	(0.15)	(0.22)	(0.30)
Hotels, restaurants, and food service	0.12	0.07	0.10	-0.09
	(0.20)	(0.24)	(0.15)	(0.19)
Transportation	0.44***	0.17	0.07	0.17
	(0.13)	(0.14)	(0.10)	(0.16)
Finance	0.03	0.14	0.42**	0.27*
	(0.17)	(0.22)	(0.20)	(0.16)
Education	0.30	0.56***	0.60**	0.29*
	(0.31)	(0.18)	(0.27)	(0.16)
Health	-0.24	0.13	0.08	0.15
	(0.22)	(0.29)	(0.20)	(0.26)
Other industries	0.24*	0.41***	0.32***	0.16
	(0.12)	(0.11)	(0.11)	(0.13)
Ref: Size of Firms: Micro (1- 10 employees)				
Small (11- 50 employees)	-0.07	0.08	-0.12	-0.09
	(0.11)	(0.10)	(0.09)	(0.11)
Medium (51- 300 employees)	-0.19	-0.20	-0.18	-0.25*
	(0.14)	(0.13)	(0.11)	(0.15)
Large (301+ employees)	-0.31*	0.01	-0.31***	-0.01
	(0.16)	(0.14)	(0.10)	(0.12)
Before COVID: Percentage of female workers 40 percent and above	0.14	-0.14	0.15	0.01
	(0.13)	(0.15)	(0.13)	(0.14)
Before COVID: Percentage of entry level workers 40 percent and above	0.10	0.05	0.05	0.20*
	(0.12)	(0.11)	(0.09)	(0.10)
Ref: Company Location: Islamabad				
Karachi	0.04	0.20	0.16*	-0.12
	(0.12)	(0.13)	(0.09)	(0.13)
Lahore	0.24*	0.31**	0.22**	-0.06
	(0.13)	(0.13)	(0.09)	(0.13)
Rawalpindi	0.40*	0.35*	0.07	-0.06
	(0.21)	(0.20)	(0.10)	(0.20)
Other cities	-0.09	-0.10	-0.01	-0.22
	(0.18)	(0.18)	(0.14)	(0.17)
Constant	0.27**	0.24**	-0.01	0.62***
	(0.12)	(0.11)	(0.08)	(0.14)
Observations	137	137	137	137

*** 1%, ** 5%, and * 10% level of significance.

Table 3. Linear probability model estimates of the effect of COVID-19 on the human resource management of firms remained open

	Temporary lay-off without pay=1	Permanent lay-off without pay=1	Wage cut=1	Delayed wage=1	Hour cut=1
Ref: Industry: Information Communication Technology (ICT)					
Manufacturing	0.19	-0.09	0.21	0.07	-0.02
	(0.13)	(0.10)	(0.15)	(0.12)	(0.14)
Retail and Wholesale	0.16	0.14	0.27	0.19	0.21
	(0.24)	(0.25)	(0.29)	(0.24)	(0.30)
Hotels, restaurants, and food service	-0.05	-0.30***	-0.14	0.37*	-0.09
	(0.20)	(0.11)	(0.19)	(0.19)	(0.18)
Transportation	0.14	-0.03	-0.01	0.02	0.17
	(0.16)	(0.12)	(0.15)	(0.13)	(0.18)
Finance	0.13	-0.02	-0.06	0.14	0.39*
	(0.15)	(0.13)	(0.15)	(0.17)	(0.20)
Education	0.21	0.11	0.18	0.25	0.44***
	(0.41)	(0.42)	(0.47)	(0.34)	(0.16)
Health	-0.14	-0.22*	-0.08	0.15	0.33
	(0.12)	(0.12)	(0.20)	(0.32)	(0.28)
Other industries	0.14	0.05	-0.01	0.24**	0.19
	(0.11)	(0.09)	(0.11)	(0.11)	(0.12)
Ref: Size of Firms: Micro (1- 10 employees)					
Small (11- 50 employees)	0.09	0.02	0.04	-0.11	0.06
	(0.08)	(0.07)	(0.10)	(0.10)	(0.11)
Medium (51- 300 employees)	0.15	0.16	0.02	-0.02	-0.16
	(0.12)	(0.11)	(0.14)	(0.12)	(0.14)
Large (301+ employees)	0.16	0.08	0.15	-0.15	-0.12
	(0.13)	(0.11)	(0.15)	(0.13)	(0.14)
Before COVID: Percentage of female workers 40 percent and above	0.13	0.14	0.11	0.25*	-0.04
	(0.13)	(0.10)	(0.13)	(0.14)	(0.14)
Before COVID: Percentage of entry level workers 40 percent and above	0.17	0.34***	0.04	0.27**	0.15
	(0.11)	(0.11)	(0.10)	(0.11)	(0.12)
Ref: Company Location: Islamabad					
Karachi	0.06	0.01	-0.06	0.13	-0.09
	(0.11)	(0.09)	(0.14)	(0.11)	(0.15)
Lahore	0.10	0.10	-0.05	0.12	-0.14
	(0.10)	(0.08)	(0.14)	(0.09)	(0.14)
Rawalpindi	0.18	0.22	0.33	0.17	-0.21
	(0.16)	(0.16)	(0.22)	(0.17)	(0.20)
Other cities	-0.12	0.02	-0.05	0.03	-0.39**
	(0.13)	(0.15)	(0.19)	(0.13)	(0.17)
Constant	-0.04	0.003	0.22*	0.06	0.49***
	(0.08)	(0.07)	(0.12)	(0.09)	(0.14)
Observations	137	137	137	137	137

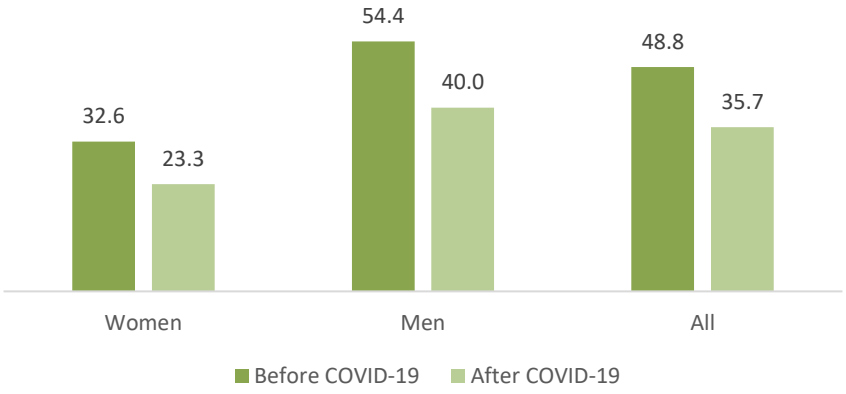
*** 1%, ** 5%, and * 10% level of significance.

3.2 Impacts on Labor Supply: Increased Unemployment and Job Search

The onset of the pandemic triggered a noticeable decline in employment and an increase in the number of people looking for jobs. The descriptive analysis of the 2,127 jobseekers sampled for the online COVID-19 survey indicated that the labor market became significantly tighter as soon as the pandemic hit, where the share of respondents working fell from 48.8 to 35.7 percent (Figure 3). Both women and men experienced a net decline, though a greater number of men lost their jobs given their overrepresentation among the employed. The percentage of men working during the pandemic declined from 54.4 to 40 percent, whereas the percentage of women working declined from 32.6 to 23.3 percent.

The magnitude of these changes is validated by the linear probability model measuring the net change in the probability of working before and after COVID-19 after controlling for individual, household, and regional characteristics (Table 4).[4] The estimates suggest that the probability of working among jobseekers fell by 14 percentage points. However, the probability of women participating in the labor market was lower than men by 16 percentage points, suggesting that the belief that men have more rights to jobs during times of scarcity may have become more prevalent during COVID-19.

Figure 3. Percentage of respondents working before and after COVID-19



Source: Rozee online COVID-19 survey of jobseekers. N=2,127.

[4] We also examine the probability of looking for jobs before and after the pandemic on a small subset of 370 jobseekers. Figure B1 in Appendix B suggests that the share of individuals looking for jobs increased from 83.8 to 88.4 percent of respondents after COVID-19. The linear probability model estimates in Appendix Table B1 show that the probability of job search increased by 6 percentage points after the pandemic hit.

These labor market patterns were triggered by substantial job losses across the economy, with disproportionate relative impacts on women. To have a fuller understanding of these impacts and to validate the robustness of previous findings, we divide the jobseekers into two groups: (a) those who were employed before the pandemic, and (b) those who were unemployed before the pandemic. The analysis of previously employed individuals who lost their jobs during the pandemic suggests that women were more likely to lose employment than men. The linear probability model estimates in Table 4 indicate that previously employed females were 8 percentage points more likely to lose their jobs than previously employed males.

Looking at the characteristics of jobs that were lost during the pandemic, the findings in Table 4 further suggests that the education sector that employs a high share of women witnessed a substantial number of job losses.[5] The linear probability estimates for job loss after controlling for individual, household, regional, and characteristics of jobs before the pandemic, indicate that people who worked in the female-dominated education sector were 21 percentage points more likely to lose their jobs during the pandemic than those working in the ICT sector. This finding is consistent with previous findings on the impact of COVID-19 on labor demand by industry. In addition, individuals who worked in family business or helped in the family business lost their jobs during the pandemic, which include a significant share of women who help family businesses to balance market work with care responsibilities. The multivariate estimates indicate that this group was 18 percentage points more likely to lose their jobs than those who worked in private companies.

Not only were women not insulated from job losses, but they were also less likely to find jobs during the pandemic. Before the pandemic, women were 21 percentage points less likely than men to be working, controlling for individual, household, and regional characteristics (Table 4, column titled "working"). These preexisting disparities did not insulate women from job losses during the pandemic. In fact, men and women experienced almost similar rates of job loss. The linear probability model estimates in Table 4 indicate that previously jobless women were 6 percentage points less likely than previously jobless men to find jobs during the pandemic. Women's relatively higher propensity to lose jobs after the pandemic, if it persists over time, is likely to worsen Pakistan's existing gender gap in employment.

[5] Other than the education sector, some male-dominated sectors were also hit hard by the pandemic, with 72 percent of those working in hotels, restaurants and food services, and 50 percent of those working in transportation losing their jobs. The multivariate estimates in Table 4 confirm that those who worked in hotels, restaurants, and food services were 43 percentage points more likely to lose their jobs than those who worked in ICT.

Table 4. Linear probability model estimates of the probability of working before and after COVID-19

	Working=1	Conditional on worked in Feb-2020 (before COVID-19)		Conditional on did not work in Feb-2020 (before COVID-19)
		Lost job after COVID=1	Lost job after COVID=1 controlling for initial job characteristics	Found job after COVID=1
After COVID-19=1	-0.14***	…	…	…
	(0.02)	…	…	…
Female	-0.21***	0.08*	0.03	-0.06***
	(0.02)	(0.04)	(0.04)	(0.02)
After COVID-19 x Female	0.05*	…	…	…
	(0.03)	…	…	…
Age	0.05***	-0.05***	-0.04***	0.01**
	(0.01)	(0.01)	(0.01)	(0.01)
Age-squared	-0.001***	0.001***	0.001***	-0.0002***
	(0.0001)	(0.0002)	(0.0002)	(0.0001)
Married=1	0.06***	0.06	0.05	0.03
	(0.02)	(0.04)	(0.04)	(0.03)
Ref: Education: Secondary or Less				
Higher secondary (HSS)	-0.06	0.17	0.20*	-0.15
	(0.05)	(0.12)	(0.11)	(0.10)
Diploma/Bachelor	-0.01	0.06	0.07	-0.19**
	(0.05)	(0.10)	(0.10)	(0.09)
Graduate	0.06	0.01	0.04	-0.20**
	(0.05)	(0.10)	(0.10)	(0.09)
Believe in men should get the job in economic hardship=1	0.01	0.02	0.02	-0.001
	(0.01)	(0.03)	(0.03)	(0.02)
Ref: Primary industry in Feb 2020: Information Communication Technology (ICT)				
Manufacturing	…	…	0.10	…
	…	…	(0.07)	…
Retail and Wholesale	…	…	0.12	…
	…	…	(0.08)	…
Hotels, restaurants, and food service	…	…	0.43***	…
	…	…	(0.09)	…
Transportation	…	…	0.22	…
	…	…	(0.16)	…
Finance	…	…	-0.01	…
	…	…	(0.06)	…
Education	…	…	0.21***	…
	…	…	(0.07)	…
Health	…	…	0.07	…
	…	…	(0.07)	…
Other industries	…	…	0.09	…
	…	…	(0.06)	…

	Working=1	Conditional on worked in Feb-2020 (before COVID-19)		Conditional on did not work in Feb-2020 (before COVID-19)
		Lost job after COVID=1	Lost job after COVID=1 controlling for initial job characteristics	Found job after COVID=1
Ref: Primary type of organization in Feb 2020: Private company				
Non-Government Organization (NGO)	…	…	-0.01	…
	…	…	(0.05)	…
	…	…	(0.05)	…
Family business/Help in family business	…	…	0.18*	…
	…	…	(0.10)	…
Type of work in Feb 2020: manager	…	…	-0.12**	…
	…	…	(0.05)	…
Type of work in Feb 2020: general office worker	…	…	-0.02	…
	…	…	(0.05)	…
Type of work in Feb 2020: production worker	…	…	0.02	…
	…	…	(0.07)	…
Type of work in Feb 2020: transport/delivery worker	…	…	-0.08	…
	…	…	(0.14)	…
Type of work in Feb 2020: construction worker	…	…	0.16*	…
	…	…	(0.10)	…
Type of work in Feb 2020: shop/restaurant worker	…	…	0.01	…
	…	…	(0.11)	…
Type of work in Feb 2020: other type of work	…	…	-0.002	…
	…	…	(0.07)	…
Household size	0.001	0.004	0.004	0.001
	(0.001)	(0.003)	(0.003)	(0.002)
Live with an elderly and/or child =1	0.002	0.03	0.02	-0.02
	(0.02)	(0.04)	(0.04)	(0.02)
Feb 2020: Had savings to cover food and basic household expenditure for at least a month =1	0.04**	0.06**	0.06*	0.01
	(0.01)	(0.03)	(0.03)	(0.02)
Ref: Cities lived in Feb 2020: Islamabad				
Karachi	0.04	0.03	0.04	0.08**
	(0.03)	(0.06)	(0.06)	(0.04)
Lahore	0.04	0.06	0.06	0.10***
	(0.03)	(0.05)	(0.05)	(0.03)
Rawalpindi	-0.03	0.14*	0.11	-0.002
	(0.04)	(0.08)	(0.08)	(0.04)
Other cities	-0.11***	0.18***	0.17***	0.04
	(0.03)	(0.05)	(0.05)	(0.03)
Constant	-0.45***	1.08***	0.85***	0.02
	(0.11)	(0.25)	(0.26)	(0.14)
Observations	2127	1037	1037	1090

*** 1%, ** 5%, and * 10% level of significance.

3.3 Impacts on Household Well-being

The labor market effects of COVID-19 were accompanied by coping strategies to mitigate the impact of income loss on household well-being. Descriptive analysis of 2,127 respondents shows that due to work loss during the pandemic, 70.2 percent of women and 63.5 percent of men experienced a decline in household income. With the decrease in income, households reported adjusting their consumption, with more than half of the women and men respondents reducing the number of meals. Although consumption smoothing was common across all respondents, a higher share of women (91.1 percent) reported reducing their spending on education, durables, clothes and/or tobacco compared to men (86.6 percent).

Women and men used different coping mechanisms to mitigate the effect of the pandemic. The descriptive analysis suggests that only 4.9 percent of women took loans during the pandemic, compared to 8.4 percent of men, but only 41.6 percent of women had access to social assistance as opposed to 51.6 percent of men. To balance their reduced budgets, both women and men increased their share of unpaid work, but women did so more than men. While 86.4 percent of the women experienced increased household chores during the pandemic, 80.2 percent of men experienced the same. Decreased income and consumption, combined with increased household chores, increased symptoms of stress more among women than men. In the online COVID-19 survey, 85 percent of women compared to 74.1 percent of men reported experiencing at least one of the stress symptoms, such as getting angry quickly, getting into frequent arguments, frequently praying, inability to sleep, inability to concentrate, and feeling anxious or depressed.

The linear probability estimates in Table 5 confirm the descriptive findings indicating that women were 9 percentage points more likely to report a decrease in household income than men during the pandemic. Additionally, women are 5 percentage points more likely to report a reduction in household expenditure on education, durables, clothes, and/or tobacco. Despite women's increased responsibility for household maintenance on shrunken budgets, the findings in Table 5 further suggest that women were less likely to take out loans or receive social assistance. The linear probability model estimates show that women are 5 percentage points less likely to take out loans and 3 percentage points less likely to receive assistance to balance their household expenditure, respectively, controlling for individual, household, and regional characteristics.

Alarmingly, the linear probability estimates in Table 5 also suggest that individuals living with elderly and children experienced significant deterioration in their well-being than those living with no elderly or children, suggesting compounding financial and domestic burden on families that need care support. In particular, individuals living with elderly and children are 5

percentage points more likely to report a reduction in household income, 6 percentage points more likely to report insufficiency of income to pay for consumptions, and 6 percentage points more likely to reduce meals to manage their shrunk budgets than those not living with the elderly and children. As a coping strategy, these individuals living with the elderly and/or children are also 13 percentage points more likely to report taking loans than those not living with the elderly and children, pointing to increased financial stress and debt burden.

Table 5. Linear probability model estimates of the effect of COVID-19 on income, consumption and obtaining external financial support

	Household income lowered=1	Income not sufficient to pay for consumption=1	Reduced meals=1	Reduced spending in education, durables, clothes and/or tobacco=1	Taken loan=1	Received assistance=1
Female	0.09***	0.02	0.001	0.05***	-0.05**	-0.03**
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.01)
Age	-0.004	0.01	0.01	0.004	0.01	-0.01**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age-squared	0.00004	-0.0001	-0.0001	-0.0001	-0.0001	0.0001*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Married=1	0.03	0.02	0.01	-0.02	0.07***	0.01
	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)
Ref: Education: Secondary or Less						
Higher secondary (HSS)	0.16**	0.04	-0.02	0.01	-0.02	-0.04
	(0.08)	(0.08)	(0.08)	(0.06)	(0.08)	(0.06)
Diploma/Bachelor	0.03	0.01	-0.09	0.01	-0.13*	-0.07
	(0.07)	(0.07)	(0.07)	(0.05)	(0.07)	(0.05)
Graduate	0.01	0.01	-0.13*	-0.01	-0.16**	-0.09*
	(0.07)	(0.07)	(0.07)	(0.05)	(0.07)	(0.05)
Believe in men should get the job in economic hardship=1	-0.01	-0.02	0.09***	0.02	0.04*	0.02*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Household size	0.01***	0.002	-0.002	0.002	-0.0002	-0.0001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Live with an elderly and/or child =1	0.05*	0.06**	0.06**	0.02	0.13***	0.01
	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.01)
Feb 2020: Had savings to cover food and basic household expenditure for at least a month=1	-0.05**	-0.15***	-0.09***	-0.01	-0.13***	-0.01
	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)
Ref: Cities lived in Feb 2020: Islamabad						
Karachi	0.02	-0.06	0.01	0.02	-0.07	0.004
	(0.05)	(0.04)	(0.05)	(0.03)	(0.04)	(0.02)
Lahore	0.07*	0.05	0.08*	0.03	0.11***	0.0001
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.02)
Rawalpindi	0.02	-0.003	-0.03	0.03	0.03	0.06*
	(0.06)	(0.06)	(0.06)	(0.04)	(0.06)	(0.03)
Other cities	0.14***	0.08**	0.13***	0.03	0.11***	0.04**
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.02)
Constant	0.50***	0.33*	0.42**	0.71***	0.39**	0.31***
	(0.17)	(0.17)	(0.17)	(0.12)	(0.17)	(0.10)
Observations	2127	2127	2127	2127	2127	2127

*** 1%, ** 5%, and * 10% level of significance.

Women's care work responsibilities increased disproportionately in households with children and elderly members. The linear probability model estimates in Table 6 show that women living with elderly and children were 3 percentage points more likely to report supporting children's home-based schooling. The care needs of these households are likely to be higher as they require women to attend to children's needs, particularly during lockdowns. Given the social norms in Pakistan, women are likely to bear the brunt of these additional childcare needs during the pandemic.

More generally, linear probability estimates in Table 6 above show that women are 8 percentage points more likely to report an increase in household work than men, controlling for individual, household, and regional characteristics. It is well-established that women perform more unpaid work than men globally, but this disparity is worse in Pakistan than in any other country in the world (UN Women 2020). According to UN Women, Pakistani women spend an additional 11 hours on unpaid household chores and caregiving for every hour men spend on the same activities. The analysis in this paper suggests that families needed to complement their coping strategies with unpaid work and women shouldered a disproportionately larger share of these additional unpaid activities.

Finally, as a consequence of reduced incomes, tightening of household expenditures, and increase in unpaid work, women reported experiencing more anxiety and stress during the pandemic than men. The linear probability estimates in Table 6 that women are 11 percentage points more likely to experience one of the stress symptoms than men (getting angry quickly, getting into frequent arguments, frequently praying, inability to sleep, inability to concentrate, and feeling anxious or depressed since the COVID-19 outbreak). Consistent with previous findings, linear probability estimates further suggest that individuals living with elderly and children are 7 percentage points more likely to experience stress symptoms. Taken together, these findings suggest that a large share of the adverse impacts resulting from the pandemic have been shouldered by women and those in dire need of financial and care support.

Table 6. Linear probability model estimates of the effect of COVID-19 on unpaid household work and experiencing stress symptoms

	Increased household chores=1	If lived with elderly/children		Experienced at least one of stress symptoms=1[a]
		Increase in caregiving=1	Children doing home-based schooling=1	
Female	0.08***	0.02	0.03*	0.11***
	(0.02)	(0.03)	(0.02)	(0.02)
Age	0.01	0.01	0.02**	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Age-squared	-0.0001	-0.0001	-0.0002**	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Married=1	-0.01	0.07**	0.02	0.002
	(0.02)	(0.03)	(0.02)	(0.02)
Ref: Education: Secondary or Less				
Higher secondary (HSS)	-0.07	0.09	0.01	0.004
	(0.06)	(0.08)	(0.07)	(0.07)
Diploma/Bachelor	-0.07	0.06	0.05	0.02
	(0.05)	(0.07)	(0.05)	(0.06)
Graduate	-0.13***	0.08	0.03	-0.02
	(0.05)	(0.07)	(0.05)	(0.06)
Believe in men should get the job in economic hardship=1	0.02	0.03	-0.01	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Household size	0.0001	-0.001	0.001	-0.0002
	(0.002)	(0.002)	(0.002)	(0.002)
Live with an elderly and/or child =1	0.03	…	…	0.07***
	(0.02)	…	…	(0.02)
Feb 2020: Had savings to cover food and basic household expenditure for at least a month =1	-0.01	0.001	0.04**	-0.03
	(0.02)	(0.02)	(0.01)	(0.02)
Ref: Cities lived in Feb 2020: Islamabad				
Karachi	-0.04	-0.01	-0.001	-0.08**
	(0.04)	(0.04)	(0.03)	(0.04)
Lahore	-0.01	-0.01	0.02	-0.08**
	(0.03)	(0.04)	(0.03)	(0.03)
Rawalpindi	-0.02	0.07	0.01	-0.04
	(0.05)	(0.05)	(0.04)	(0.05)
Other cities	0.01	0.01	0.003	-0.06**
	(0.03)	(0.04)	(0.03)	(0.03)
Constant	0.70***	0.60***	0.53***	0.70***
	(0.14)	(0.17)	(0.14)	(0.15)
Observations	2127	1682	1682	2127

Note: [a] To check the robustness and sensitivity of the findings, we estimate the linear probability models for each stress symptom - getting angry quickly, getting into frequent arguments, frequently praying, inability to sleep, inability to concentrate, and feeling anxious or depressed. The results are provided in Appendix C, Table C1. In addition, we create a stress symptom index combining all the symptoms by using the Principal Component Analysis (PCA). The Ordinary Least Square (OLS) estimate of the gendered effect of COVID-19 on stress symptom index is provided in Appendix C, Table C2.

[b] *** 1%, ** 5%, and * 10% level of significance.

4 Conclusion

The empirical findings discussed in this paper present some alarming trends that need to be considered in COVID-19 recovery efforts. As businesses closed with the onset of the COVID-19 pandemic, either temporarily or permanently, jobs have disappeared for both men and women. However, the sectors where women are more likely to be employed, such as education, were more severely affected than other sectors, resulting in greater relative losses for women than men. In addition, the pandemic has led to a disproportionate increase in women's unpaid care work, combined with significant declines in household income, limited access to social assistance, and mounting pressure to adopt cost-saving strategies to deal with the pandemic's economic consequences. The combination of these impacts are likely factors in the high prevalence of stress and anxiety reported by women.

The documented disproportionate impacts of the crisis can have long-term consequences. Labor force participation among Pakistani women, particularly in urban areas, is already among the lowest in the world. With the employment prospects being so unfavorable for women prior to the pandemic, any disproportionate gender effects of COVID-19 will likely worsen these gender gaps. If women endure the added burden of unpaid household and care work for a prolonged period, they are more likely to quit the labor market altogether. Similarly, the longer the economic recovery takes, the fewer women may remain in or return to the labor force. COVID-19 recovery efforts that do not address the disproportional impacts on women's employment will likely result in larger gender gaps after the pandemic. Future policy efforts must make use of these trends to design better targeted job creation and income support policies that address the specific needs of those who have been hardest hit, not just in terms of job loss, but also in terms of other economic and social impacts of the pandemic.

For sustained recovery from the COVID-19, there must be greater recognition of women's economic role and unpaid work, as well as a targeted social assistance and support services that address the care burden and other stresses women face at home. These services must be targeted toward women previously employed in sectors where the decline in employment was most severe, such as education. For example, firms can be incentivized to provide unemployment insurance and other temporary benefits to their workers, while those who have lost their jobs in these sectors can serve as frontline workers to roll out public COVID-19 response programs for contact tracing, testing, vaccination, and remote learning. In the short term, there is also a dire need to address the pandemic's toll on women's physical, emotional, and mental health, such as by investing in multi-purpose helplines and nongovernmental organizations that provide women with financial assistance and psychosocial support. Without such immediate and long-term interventions to establish work-family policies, it is possible that the labor market participation of women in Pakistan will decline even further, with the multidimensional costs borne disproportionately by women, setting in motion ripple effects across society. Future

research must continue to monitor the evolving impacts of the pandemic through the lens of gender, with a view to informing public policy debates and policies in order to promote inclusive recovery from the pandemic.

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Appendix A

Table A1. Marginal estimates of the Generalized Maximum Entropy (GME) models of firms' operational status after COVID-19

	Business open	Business temporarily closed	Business permanently closed
Ref: Industry: Information Communication Technology (ICT)			
Manufacturing	-0.04	0.06	-0.02
	(0.09)	(0.09)	(0.05)
Retail and Wholesale	0.26	-0.15	-0.09***
	(0.19)	(0.21)	(0.03)
Hotels, restaurants, and food service	-0.09	0.08	0.02
	(0.13)	(0.14)	(0.11)
Transportation	0.09	-0.07	-0.03
	(0.12)	(0.13)	(0.07)
Finance	-0.02	0.07	-0.04
	(0.13)	(0.13)	(0.06)
Education	-0.43***	0.45***	-0.01
	(0.07)	(0.08)	(0.06)
Health	-0.22*	0.30**	-0.09***
	(0.12)	(0.13)	(0.03)
Other industries	-0.12*	0.12	0.01
	(0.07)	(0.08)	(0.05)
Ref: Size of Firms: Micro (1- 10 employees)			
Small (11- 50 employees)	0.07	-0.09	0.03
	(0.07)	(0.07)	(0.05)
Medium (51- 300 employees)	-0.03	-0.03	0.07
	(0.08)	(0.08)	(0.07)
Large (301+ employees)	0.02	-0.13	0.14
	(0.10)	(0.09)	(0.09)
Ref: Company Location: Islamabad			
Karachi	0.04	-0.07	0.17
	(0.10)	(0.09)	(0.21)
Lahore	-0.09	-0.03	0.25*
	(0.08)	(0.09)	(0.15)
Rawalpindi	-0.09	-0.03	0.39
	(0.14)	(0.14)	(0.29)
Other cities	-0.25***	0.10	0.39*
	(0.10)	(0.11)	(0.22)
Constant	0.11	-0.09	-0.41***
	(0.09)	(0.09)	(0.14)
Observations	281	281	281

*** 1%, ** 5%, and * 10% level of significance.

Table A2. Marginal estimates of Generalized Maximum Entropy (GME) models on the effect of COVID-19 on the operations of firms remained open

	Demand reduced=1	Revenue reduced=1	Activity slowed down: very or extreme=1	Worker absenteeism is a problem=1	If use raw materials: price rise of raw material is a problem
Ref: Industry: Information Communication Technology (ICT)					
Manufacturing	0.31***	0.22**	0.28**	0.25**	0.05
	(0.10)	(0.10)	(0.13)	(0.10)	(0.13)
Retail and Wholesale	0.17	0.23	0.29	0.02	0.20
	(0.21)	(0.18)	(0.23)	(0.22)	(0.15)
Hotels, restaurants, and food service	0.11	0.06	0.14	-0.10	0.22***
	(0.21)	(0.18)	(0.21)	(0.21)	(0.08)
Transportation	0.38***	0.13	0.07	0.14	0.24***
	(0.11)	(0.13)	(0.16)	(0.13)	(0.08)
Finance	0.01	0.13	0.53***	0.24*	0.004
	(0.23)	(0.16)	(0.15)	(0.13)	(0.29)
Education	0.26	0.41***	0.64***	0.35*	-0.58
	(0.27)	(0.07)	(0.22)	(0.18)	(0.58)
Health	-0.22	0.13	0.11	0.12	0.13
	(0.22)	(0.20)	(0.24)	(0.23)	(0.27)
Other industries	0.22**	0.36***	0.34***	0.14	0.03
	(0.10)	(0.08)	(0.11)	(0.10)	(0.14)
Ref: Size of Firms: Micro (1- 10 employees)					
Small (11- 50 employees)	-0.07	0.09	-0.10	-0.09	-0.22*
	(0.09)	(0.10)	(0.07)	(0.10)	(0.13)
Medium (51- 300 employees)	-0.18	-0.18	-0.13**	-0.24*	-0.31*
	(0.12)	(0.13)	(0.06)	(0.13)	(0.17)
Large (301+ employees)	-0.27**	0.01	-0.20***	0.01	-0.42**
	(0.11)	(0.14)	(0.05)	(0.15)	(0.17)
Before COVID: Percentage of female workers 40 percent and above	0.13	-0.14	0.11	0.01	0.12
	(0.13)	(0.13)	(0.09)	(0.13)	(0.18)
Before COVID: Percentage of entry level workers 40 percent and above	0.10	0.06	0.06	0.22*	-0.03
	(0.11)	(0.10)	(0.08)	(0.13)	(0.12)
Ref: Company Location: Islamabad					
Karachi	0.04	0.20*	0.17	-0.12	0.07
	(0.12)	(0.10)	(0.12)	(0.13)	(0.14)
Lahore	0.23**	0.28***	0.24**	-0.06	0.10
	(0.12)	(0.10)	(0.10)	(0.13)	(0.14)
Rawalpindi	0.34**	0.28**	0.01	-0.06	0.22***
	(0.15)	(0.12)	(0.22)	(0.22)	(0.08)
Other cities	-0.09	-0.06	-0.01	-0.23	0.13
	(0.18)	(0.17)	(0.15)	(0.17)	(0.14)
Constant	-0.21	-0.27**	-0.43***	0.12	0.22
	(0.13)	(0.13)	(0.15)	(0.13)	(0.19)
Observations	137	137	137	137	65

*** 1%, ** 5%, and * 10% level of significance.

Table A3. Marginal estimates of Generalized Maximum Entropy (GME) models on the effect of COVID-19 on the human resource management of firms remained open

	Temporary lay-off without pay=1	Permanent lay-off without pay=1	Wage cut=1	Delayed wage=1	Hour cut=1
Ref: Industry: Information Communication Technology (ICT)					
Manufacturing	0.21	-0.08	0.20	0.07	-0.03
	(0.13)	(0.08)	(0.14)	(0.13)	(0.14)
Retail and Wholesale	0.16	0.15	0.27	0.23	0.20
	(0.25)	(0.20)	(0.25)	(0.24)	(0.21)
Hotels, restaurants, and food service	-0.04	-0.17***	-0.13	0.36*	-0.09
	(0.17)	(0.04)	(0.15)	(0.21)	(0.20)
Transportation	0.15	-0.03	-0.01	0.03	0.16
	(0.14)	(0.10)	(0.14)	(0.15)	(0.14)
Finance	0.10	-0.05	-0.06	0.16	0.36***
	(0.20)	(0.12)	(0.17)	(0.21)	(0.14)
Education	0.19	0.06	0.15	0.27	0.50***
	(0.32)	(0.22)	(0.36)	(0.33)	(0.19)
Health	-0.19*	-0.16***	-0.07	0.13	0.28
	(0.12)	(0.06)	(0.20)	(0.25)	(0.22)
Other industries	0.14	0.05	-0.02	0.25**	0.17
	(0.11)	(0.09)	(0.11)	(0.11)	(0.11)
Ref: Size of Firms: Micro (1- 10 employees)					
Small (11- 50 employees)	0.11	0.03	0.04	-0.11	0.05
	(0.09)	(0.08)	(0.10)	(0.08)	(0.10)
Medium (51- 300 employees)	0.17	0.16	0.02	-0.01	-0.15
	(0.13)	(0.12)	(0.13)	(0.10)	(0.12)
Large (301+ employees)	0.18	0.06	0.15	-0.13	-0.14
	(0.15)	(0.11)	(0.15)	(0.09)	(0.14)
Before COVID: Percentage of female workers 40 percent and above	0.13	0.11	0.10	0.20*	-0.04
	(0.10)	(0.09)	(0.12)	(0.11)	(0.13)
Before COVID: Percentage of entry level workers 40 percent and above	0.15*	0.26***	0.04	0.22**	0.15
	(0.09)	(0.09)	(0.10)	(0.10)	(0.11)
Ref: Company Location: Islamabad					
Karachi	0.08	0.02	-0.06	0.14	-0.07
	(0.12)	(0.11)	(0.11)	(0.13)	(0.12)
Lahore	0.11	0.11	-0.05	0.13	-0.12
	(0.12)	(0.10)	(0.11)	(0.11)	(0.12)
Rawalpindi	0.22	0.32	0.32	0.20	-0.17
	(0.24)	(0.24)	(0.22)	(0.23)	(0.17)
Other cities	-0.10	0.07	-0.05	0.04	-0.35***
	(0.13)	(0.17)	(0.14)	(0.17)	(0.11)
Constant	-0.48***	-0.36***	-0.23*	-0.38***	-0.001
	(0.17)	(0.14)	(0.13)	(0.14)	(0.12)
Observations	137	137	137	137	137

*** 1%, ** 5%, and * 10% level of significance.

Table A4. Marginal estimates of Generalized Maximum Entropy (GME) models on the probability of working before and after COVID-19

	Working=1	Conditional on worked in Feb-2020 (before COVID-19)		Conditional on did not work in Feb-2020 (before COVID-19)
		Lost job after COVID=1	Lost job after COVID=1 controlling for initial job characteristics	Gained job after COVID=1
After COVID-19=1	-0.14***	…	…	…
	(0.02)	…	…	…
Female	-0.20***	0.08*	0.03	-0.06***
	(0.02)	(0.04)	(0.04)	(0.02)
After COVID-19 x Female	0.03	…	…	…
	(0.03)	…	…	…
Age	0.05***	-0.05***	-0.04***	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Age-squared	-0.001***	0.001***	0.0004***	-0.0003**
	(0.0001)	(0.0002)	(0.0002)	(0.0001)
Married=1	0.05***	0.06	0.05	0.03
	(0.02)	(0.04)	(0.04)	(0.03)
Ref: Education: Secondary or Less				
Higher secondary (HSS)	-0.06	0.17	0.20*	-0.07**
	(0.05)	(0.12)	(0.12)	(0.03)
Diploma/Bachelor	-0.01	0.06	0.07	-0.14**
	(0.05)	(0.10)	(0.10)	(0.06)
Graduate	0.06	0.01	0.04	-0.13***
	(0.05)	(0.10)	(0.10)	(0.04)
Believe in men should get the job in economic hardship=1	0.01	0.02	0.02	-0.0001
	(0.01)	(0.03)	(0.03)	(0.02)
Ref: Primary industry in Feb 2020: Information Communication Technology (ICT)				
Manufacturing	…	…	0.11	…
	…	…	(0.08)	…
Retail and Wholesale	…	…	0.13	…
	…	…	(0.08)	…
Hotels, restaurants, and food service	…	…	0.43***	…
	…	…	(0.11)	…
Transportation	…	…	0.21	…
	…	…	(0.14)	…
Finance	…	…	-0.01	…
	…	…	(0.07)	…
Education	…	…	0.21***	…
	…	…	(0.07)	…
Health	…	…	0.08	…
	…	…	(0.08)	…
Other industries	…	…	0.10	…
	…	…	(0.07)	…
Ref: Primary type of organization in Feb 2020: Private company				
Non-Government Organization (NGO)	…	…	-0.01	…
	…	…	(0.05)	…
Government	…	…	-0.22***	…
	…	…	(0.06)	…
Family business/Help in family business	…	…	0.19**	…
	…	…	(0.10)	…

	Working=1	Conditional on worked in Feb-2020 (before COVID-19)		Conditional on did not work in Feb-2020 (before COVID-19)
		Lost job after COVID=1	Lost job after COVID=1 controlling for initial job characteristics	Gained job after COVID=1
Type of work in Feb 2020: manager	…	…	-0.12**	…
	…	…	(0.05)	…
Type of work in Feb 2020: general office worker	…	…	-0.01	…
	…	…	(0.05)	…
Type of work in Feb 2020: production worker	…	…	0.02	…
	…	…	(0.07)	…
Type of work in Feb 2020: transport/delivery worker	…	…	-0.07	…
	…	…	(0.15)	…
Type of work in Feb 2020: construction worker	…	…	0.15*	…
	…	…	(0.09)	…
Type of work in Feb 2020: shop/restaurant worker	…	…	0.01	…
	…	…	(0.10)	…
Type of work in Feb 2020: other type of work	…	…	0.01	…
	…	…	(0.06)	…
Household size	0.001	0.004	0.004	0.0003
	(0.001)	(0.003)	(0.003)	(0.002)
Live with an elderly and/or child =1	-0.001	0.03	0.02	-0.02
	(0.02)	(0.04)	(0.04)	(0.02)
Feb 2020: Had savings to cover food and basic household expenditure for at least a month=1	0.03**	0.06**	0.06*	0.01
	(0.01)	(0.03)	(0.03)	(0.02)
Ref: Cities lived in Feb 2020: Islamabad				
Karachi	0.04	0.03	0.05	0.13
	(0.03)	(0.06)	(0.06)	(0.09)
Lahore	0.04	0.07	0.07	0.16*
	(0.03)	(0.06)	(0.06)	(0.08)
Rawalpindi	-0.03	0.15*	0.12	0.001
	(0.04)	(0.08)	(0.08)	(0.07)
Other cities	-0.11***	0.19***	0.18***	0.07
	(0.03)	(0.06)	(0.06)	(0.05)
Constant	-0.97***	0.54**	0.30	-0.45***
	(0.12)	(0.26)	(0.26)	(0.17)
Observations	2127	1037	1037	1090

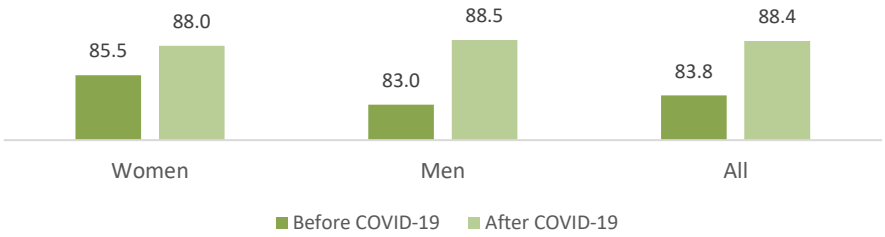
*** 1%, ** 5%, and * 10% level of significance.

Table A5. Marginal estimates of Generalized Maximum Entropy (GME) models on the effect of COVID-19 on income, consumption and obtaining external financial support

	Household income lowered=1	Income not sufficient to pay for consumption=1	Reduced meals=1	Reduced spending in education, durables, clothes and/or tobacco=1	Taken loan=1	Received assistance=1
Female	0.08***	0.02	0.001	0.05***	-0.05**	-0.03**
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.01)
Age	-0.01	0.01	0.01	0.004	0.01	-0.01*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age-squared	0.0002	-0.0001	-0.0001	-0.0001	-0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Married=1	0.03	0.02	0.01	-0.02	0.07***	0.01
	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.01)
Ref: Education: Secondary or Less						
Higher secondary (HSS)	0.15**	0.04	-0.02	0.01	-0.02	-0.02
	(0.06)	(0.08)	(0.08)	(0.05)	(0.08)	(0.03)
Diploma/Bachelor	0.03	0.01	-0.09	0.01	-0.13*	-0.05
	(0.07)	(0.07)	(0.07)	(0.04)	(0.07)	(0.03)
Graduate	0.01	0.01	-0.13*	-0.01	-0.15**	-0.07**
	(0.07)	(0.07)	(0.07)	(0.05)	(0.07)	(0.03)
Believe in men should get the job in economic hardship=1	-0.01	-0.02	0.09***	0.02	0.04*	0.02*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Household size	0.01***	0.002	-0.002	0.002	-0.0001	-0.00002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Live with an elderly and/or child =1	0.05*	0.06**	0.06**	0.02	0.13***	0.01
	(0.03)	(0.03)	(0.03)	(0.02)	(0.03)	(0.01)
Feb 2020: Had savings to cover food and basic household expenditure for at least a month=1	-0.05**	-0.15***	-0.09***	-0.01	-0.13***	-0.01
	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)
Ref: Cities lived in Feb 2020: Islamabad						
Karachi	0.01	-0.06	0.01	0.02	-0.07	0.01
	(0.04)	(0.05)	(0.04)	(0.03)	(0.05)	(0.03)
Lahore	0.07*	0.04	0.07*	0.03	0.11***	0.01
	(0.04)	(0.04)	(0.04)	(0.02)	(0.04)	(0.03)
Rawalpindi	0.02	-0.003	-0.03	0.02	0.03	0.09
	(0.05)	(0.06)	(0.06)	(0.03)	(0.06)	(0.06)
Other cities	0.13***	0.08**	0.13***	0.03	0.10***	0.05*
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)
Constant	0.003	-0.17	-0.08	0.06	-0.13	0.01
	(0.16)	(0.17)	(0.17)	(0.11)	(0.17)	(0.09)
Observations	2127	2127	2127	2127	2127	2127

*** 1%, ** 5%, and * 10% level of significance.

Appendix B Figure B1 Percentage looking for job before and after COVID-19



Source: Rozee online COVID-19 survey of jobseekers. N=370.

Table B1. Linear probability model estimates on the likelihood of looking for job before/after COVID-19

	Looking for jobs=1
After COVID-19=1	0.06*
	(0.03)
Female	0.02
	(0.04)
After COVID-19 x Female	-0.03
	(0.05)
Age	-0.002
	(0.01)
Age-squared	0.0001
	(0.0001)
Married=1	-0.04
	(0.04)
Ref: Education: Secondary or Less	
Higher secondary (HSS)	-0.11
	(0.11)
Diploma/Bachelor	-0.01
	(0.09)
Graduate	-0.01
	(0.10)
Believe in men should get the job in economic hardship=1	0.001
	(0.03)
Household size	0.001
	(0.003)
Live with an elderly and/or child =1	-0.004
	(0.03)
Feb 2020: Had savings to cover food and basic household expenditure for at least a month=1	-0.01
	(0.03)
Ref: Cities lived in Feb 2020: Islamabad	
Karachi	-0.04
	(0.06)
Lahore	-0.11*
	(0.06)
Rawalpindi	-0.05
	(0.08)
Other cities	-0.03
	(0.05)
Constant	0.91***
	(0.21)
Observations	370

Table A6. Marginal estimates of Generalized Maximum Entropy (GME) models on the effect of COVID-19 on unpaid household work and experiencing stress symptoms

	Increased household chores=1	If lived with elderly/children		Experienced at least one of stress symptoms=1
		Increase in caregiving=1	Children doing home-based schooling=1	
Female	0.08***	0.02	0.03*	0.11***
	(0.02)	(0.02)	(0.02)	(0.02)
Age	0.01	0.004	0.01**	0.004
	(0.01)	(0.01)	(0.01)	(0.01)
Age-squared	-0.0001	-0.0001	-0.0002**	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Married=1	-0.01	0.07**	0.02	0.0001
	(0.02)	(0.03)	(0.02)	(0.02)
Ref: Education: Secondary or Less				
Higher secondary (HSS)	-0.10	0.07	0.01	0.003
	(0.09)	(0.06)	(0.05)	(0.07)
Diploma/Bachelor	-0.07	0.06	0.04	0.01
	(0.07)	(0.06)	(0.04)	(0.06)
Graduate	-0.15**	0.07	0.02	-0.02
	(0.07)	(0.06)	(0.04)	(0.06)
Believe in men should get the job in economic hardship=1	0.02	0.03	-0.01	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Household size	0.0001	-0.001	0.001	-0.0002
	(0.002)	(0.002)	(0.001)	(0.002)
Live with an elderly and/or child =1	0.03	…	…	0.07***
	(0.02)	…	…	(0.02)
Feb 2020: Had savings to cover food and basic household expenditure for at least a month=1	-0.01	0.001	0.04**	-0.03
	(0.02)	(0.02)	(0.01)	(0.02)
Ref: Cities lived in Feb 2020: Islamabad				
Karachi	-0.04	-0.01	-0.001	-0.09*
	(0.04)	(0.04)	(0.03)	(0.05)
Lahore	-0.01	-0.01	0.02	-0.10**
	(0.03)	(0.04)	(0.03)	(0.04)
Rawalpindi	-0.02	0.07	0.01	-0.06
	(0.05)	(0.05)	(0.04)	(0.06)
Other cities	0.01	0.01	0.003	-0.07*
	(0.03)	(0.04)	(0.03)	(0.04)
Constant	0.12	0.07	-0.12	0.17
	(0.13)	(0.16)	(0.11)	(0.14)
Observations	2127	1682	1682	2127

*** 1%, ** 5%, and * 10% level of significance.