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Economic impacts of Coronavirus-19 on workers in Bangladesh's garment sector

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1 Introduction

The COVID-19 pandemic struck the global apparel value chain extremely hard from multiple directions. Workers employed in apparel sectors in developing countries, which play critical roles in these countries' industrialization and economic growth, were arguably most vulnerable to this shock. In Bangladesh, where the apparel sector constitutes more than 80 percent of exports, the Bangladesh Garments Manufacturers and Exporters Association (BGMEA) reported that exports during the first 15 days of April 2020 were 84 percent lower than the corresponding period in 2019.

At the beginning of the COVID-19 crisis, most garment factories shut down for the official government-mandated closure period and for the

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BGMEA's recommended closure period afterward. During factories' reopening toward the end of April, there was a great deal of criticism of the move and skepticism about factories' ability and willingness to adhere to COVID-19 safety guidelines (Daily Star; April 30, 2020). At the same time, economists emphasized that the costs to workers' livelihoods of factories' remaining closed might outweigh the risks associated with reopening (with appropriate protocols) (Barnett-Howell and Mobarak, 2020). Since late April, though, factories have been operating.

In this research, we aim to make three contributions: First, we aim to document the overall impacts of COVID-19 on garment workers' employment, income, consumption, health, and migration. Second, we aim to characterize how workers' experiences during COVID-19 vary based on characteristics of their factory. Third, we aim to make a methodological contribution on sampling protocols in the absence of a sample frame by developing a randomized respondent-driven sampling (RDS) protocol to achieve a population-representative sample of respondents.

In this report, we provide preliminary evidence on the first two questions. We currently have access to five waves of survey data, with the latest finished in June 2021. We document that while 13% of garment workers experienced layoffs, on the whole, garment work appears to be superior to alternatives, at least during a pandemic. Garment workers' earnings declined approximately 39% at the height of the pandemic but have since recovered; in contrast, those who left the sector since January 2020 appear to experience more permanent declines in income. Finally, we document high reported adoption of a small number of core COVID-19 prevention practices among employers, but wide variation in adoption of other prevention measures known to be important for reducing spread. Employers' adoption of COVID-19 prevention practices is negatively correlated with workers' experience of COVID-19, even controlling for workers' personal characteristics. Related Literature

This research contributes to the literature on firm-level heterogeneity, which points out that similar workers receive different compensation in different firms in both developed (Krueger and Summers 1988; Brown and Medoff 1989; Abowd, Kramarz and Margolis 1999) and developing (Teal 1996; El Badaoui, Strobl and Walsh 2008) countries. Indeed, this heterogeneity may be even greater in developing countries, where government interference and market imperfections prop up inefficient firms (Banerjee and Duflo, 2005). Minimal workplace safety regulations and other legal protections for workers further contribute to the between-firm variation in non-wage benefits. In Boudreau, Heath and McCormick (2021), we document variation in wages and working conditions between firms within an industry, and propose a theory emphasizing the role of matching in explaining how workers are matched to these heterogeneous firms. In this research, we explore how establishment-level variation in response to a crisis affects workers' outcomes.

This research also contributes to an emerging literature on the role of global trade in influencing working conditions in developing countries. Harrison and Scorse (2010) show that anti-sweatshop campaigns led the Indonesian government to raise minimum wages, which caused large real wage increases with some costs for firms but no significant effects on employment. Tanaka (forthcoming) provides evidence of trade-induced social upgrading among firms in Myanmar. Boudreau (2021) provides experimental evidence that multinational-provided enforcement can improve compliance among Bangladeshi apparel producers. While not the primary focus of this report, once we have our full sample, we aim to provide evidence on to what extent heterogeneity in buyers' response to the pandemic plays a role in explaining establishment-level heterogeneity in responses, and subsequently, workers' outcomes.

Finally, we contribute to the literature on RDS methodology. RDS is a common approach for finding and recruiting difficult-to-reach popula-

tions for research studies. It suffers the problem, though (among other issues), that a limited number of referrals are often requested, which contributes to selection bias in the referral process. Randomized contact tracing regimes, in which individuals' networks are elicited, contacts are randomly sampled, and then this process is repeated for multiple rounds, have been shown to approximate a Markov Chain on the population graph (Goel and Salganik, 2009, Baraff, McCormick and Raftery, 2016). This means that later referral waves have the similar characteristics to a simple random sample. Empirical tests of this methodology, however, remain scarce. We have conducted a randomized RDS sampling methodology in order to recruit respondents for this survey. Concurrently, we have collected and followed up with some of respondents' preferred referrals, which facilitates comparison of our sample to what we would have obtained using a standard RDS approach. We will provide evidence on the performance of randomized versus traditional RDS approaches in terms of their population representativeness.

The remainder of this report is organized as follows. Section 2 provides more information on the randomized RDS method and on our sample. Section 3 provides preliminary analysis of workers' outcomes during the pandemic and on variation in employers' responses.

2 Data and empirical strategy

In this section, we explain the describe our randomized RDS method and provide information on the characteristics of workers in our sample.

2.1 Survey and sampling method

Our research objective is to examine factory-level heterogeneity in the response to COVID-19. In order to examine this heterogeneity, we require

a representative sample of workers employed in the sector prior to the pandemic. For practical purposes, we define January 2020 as prior to the pandemic.[1] The central methodological challenge that we face is to recruit a representative sample of garment workers without entering into the community due to the COVID-19 restrictions.

To overcome this challenge, we developed what we refer to as a randomized RDS (RRDS) method. At a high level, this approach entails starting with a seed sample of respondents, eliciting their networks, randomly sampling members of their network to follow-up with, and then repeating this process for several rounds. This procedure approximates a Markov Chain on the population graph, so later waves have similar characteristics to a simple random sample (Goel and Salganik, 2009, Baraff, McCormick and Raftery, 2016). In collaboration with Tyler McCormick, we will compare our sample drawn using the RRDS method to one resulting from a standard respondent-driven sampling method (e.g., one in which respondents give three referrals directly).

To implement our RRDS approach, we started with two seed samples of garment workers with phone numbers. The first sample includes 1100 workers surveyed in 2017 by (Kabeer, Huq and Sulaiman, 2020). Among this group, we randomly choose half to be initial seeds and half to be sampled with the rest of the sample. The second sample includes 60 workers whom our team surveyed in January 2020 as part of a pilot survey for a separate research project. Both of these samples, when recruited, were geographically representative of garment-producing areas in the Dhaka Division of Bangladesh, which is home to 80% of the country's garment factories.

From each seed, we elicited the network of garment workers with whom

[1] We justify this decision based on the fact that this was when the Chinese Government began to respond to the virus in earnest. While China is a major supplier of raw materials to Bangladesh, given shipment times, production disruptions due to the COVID-19 outbreak in China would not affect Bangladesh until after January 2020.

they speak on the phone. We offered referral incentives of 10 Bangladeshi Taka (BDT) per referral for up to 10 referrals. From each seeds' referrals, we randomly sampled up to three garment workers, whom we refer to as "intermediate links." We called the randomly selected intermediate links, verified their identities and conducted a short survey, and then implemented an identical referral module. We repeated this process for many rounds, until we recruited a pool of approximately 8,400 potential respondents. We then sampled from this pool to obtain our second wave of respondents. As of March 2020, we have completed our main survey with 1,552 garment workers, and we are in the process of conducting an additional round of referrals in order to reach our target sample size of 2,800 respondents. We will provide more details on our sampling method in the academic paper.

2.2 Survey respondents

In this report, we present findings for 3,561 garment workers. We currently present results without sample weights, but we aim to show results separately by subgroup. Table 1 presents summary statistics. 49% of respondents are female. Respondents have about 6.88 years of experience in the garment sector. Consequently, their pre-COVID earnings, approximately 13,351 BDT (approximately US$156) in January 2020, is well above Bangladesh's minimum wage for garment workers (BDT 8000). In terms of respondents' pre-pandemic health, 9% of respondents report experiencing one or more symptom associated with COVID-19 during January 2020.[2] *During the pandemic, 8% report COVID-19 symptoms during April 2020, and 16% report COVID-19 during the past month. Bangladesh was on a "public holiday" that essentially entailed a lockdown, for most of April, which may contribute to the lower incidence of symptoms. 95%*

[2]COVID-19 symptoms listed include: Fever, coughing, diarrhea, fatigue, weakness/body ache. These symptoms are also associated with chronic diseases that are common among poor populations, such as anemia.

of respondents were surveyed during the second wave of the survey, which took place in February through June of 2021. The first wave was conducted in November 2020. 87% of the respondents are sampled through intermediate links and referrals, while 10% are from the 2017 survey.

Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Female	0.49	0.5	0	1	3541
Age	27.5	6.12	15	65	3541
Total experince (yrs)	6.88	4.74	0.08	35.75	3385
Education (yrs)	8.38	3.8	0	18	3541
Earnings, Jan 20	13351.52	5061.38	999	90200	2960
COVID symptoms, Jan 20	0.09	0.29	0	1	3518
COVID symptoms, Apr 20	0.08	0.26	0	1	3518
COVID symptoms, past month	0.16	0.37	0	1	3518
Wave 2 Indicator	0.95	0.23	0	1	3547
2017 survey	0.1	0.3	0	1	3547
Jan 2020 pilot	0.01	0.08	0	1	3547
intermediate links incl referrals	0.87	0.33	0	1	3547

3 Preliminary results

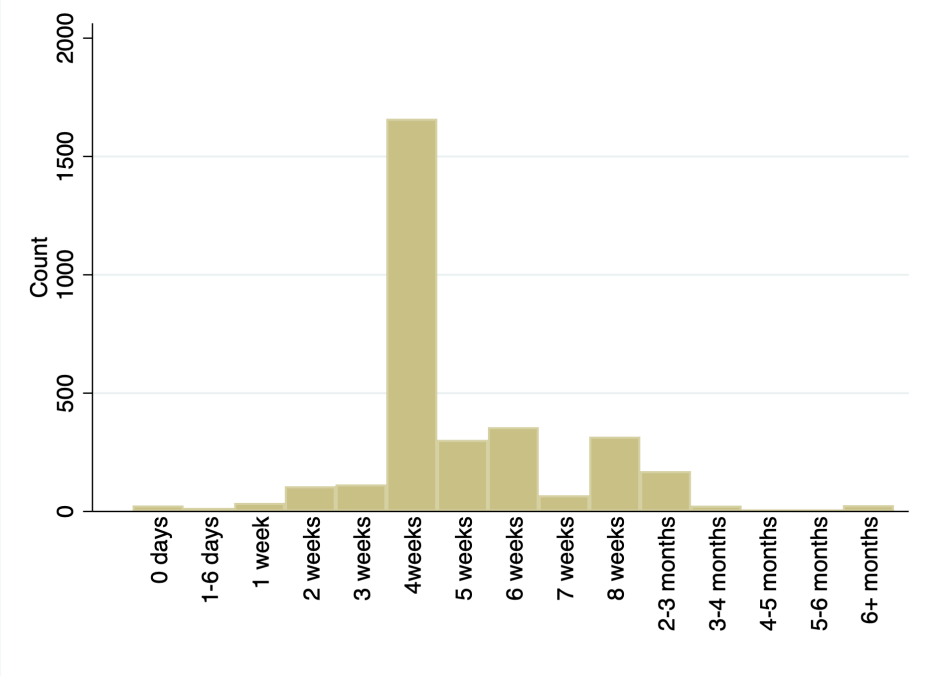
In this section, we present preliminary evidence from the survey. First, we present evidence of the pandemic's effects on garment workers' livelihoods. Then, we turn to examining employers' responses, with a focus on exploring heterogeneity in employers' responses.

3.1 Employment and Income

As shown in Figure 1, COVID-19 did not led to widespread, prolonged factory closures in Bangladesh. While the government's policy was not

completely clear, we identify March 26-April 4 as the official government-mandated closure period (with exceptions for factories producing essential medical equipment). The BGMEA recommended gradual re-opening of factories starting April 26. This date coincides with the mode of 4 weeks duration of factory closures in the survey data.

Figure 1: Factory closures, all waves

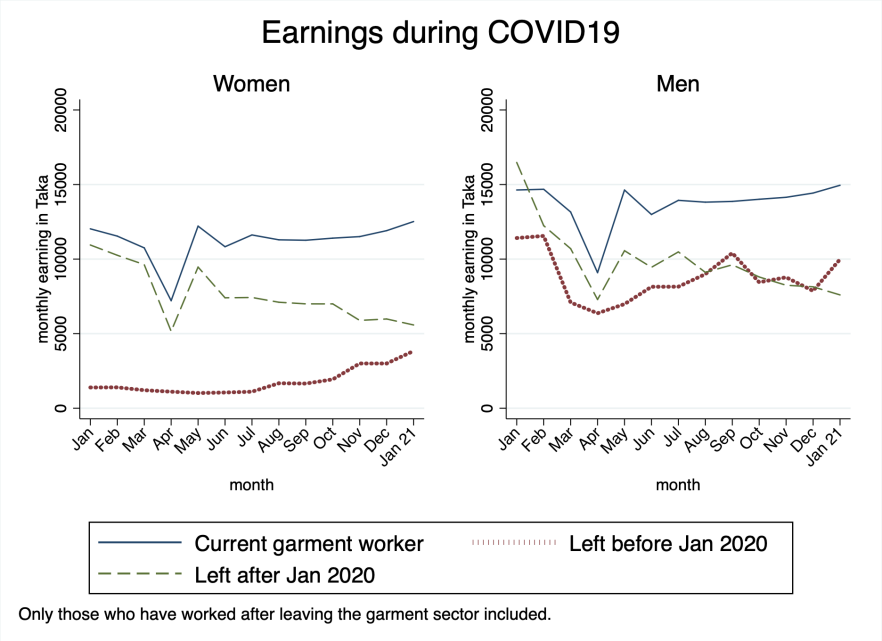


While factories did not close, they did face large, negative shocks: 46% of garment factories in Bangladesh report that "a lot" to "most" of their orders as of March 2020 were canceled (Anner, 2020).

Turning to earnings, Figures 2 present earnings dynamics during COVID-19. It shows similar earnings dynamics for women and for men over the pandemic. Among workers who remain in the garment sector, incomes fall by about 33% between January and April but then begin to recover to their pre-pandemic levels. Among those who leave the sector, earnings display a prolonged decline

and converge to the earnings levels of respondents who left the sector prior to 2020. While garment workers who leave the sector and those who remain in the sector are on similar trends prior to and at the beginning of the pandemic, a large gap in their earnings emerges later in the pandemic; garment workers appear to do much better in terms of earnings compared to alternatives. Starting in January 2021, garment workers who left the sector before the pandemic are earning more than those who left during the pandemic. Of course, part or all of these differences could be due to workers' exiting the labor force, which may have happened even in the absence of COVID-19.[3] *Finally, while women and men's incomes exhibit similar dynamics, on average, women earn less than men throughout the period.*

Figure 2: Monthly earnings, all waves



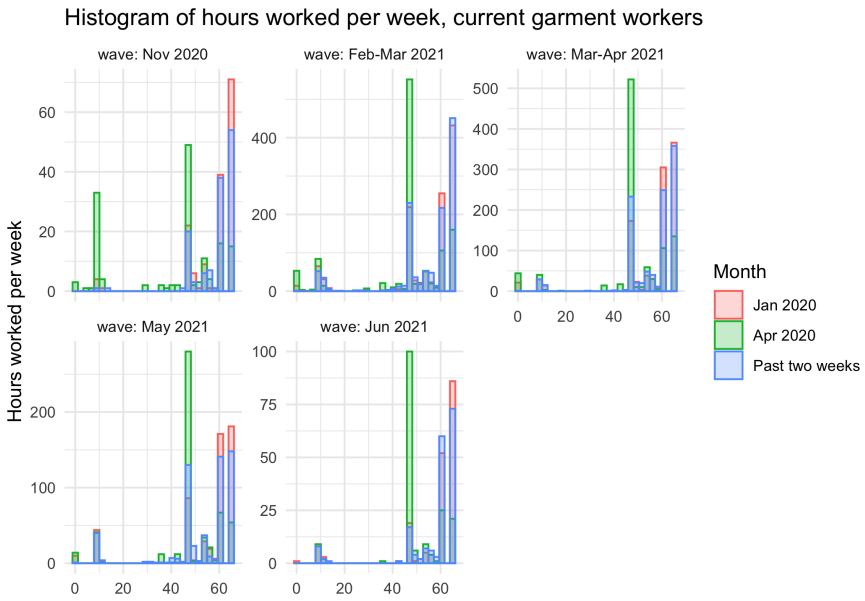
Among those who remain in the sector, we examine their hours and other job attributes over the course of the pandemic. Figure 3 presents the

[3]COVID-19 may also induce workers with plans to exit the labor force in the near future to do so earlier.

reported number of hours worked per week over the course of the pandemic. For April 2020, we asked workers their average weekly working hours *after* their factory re-opened (if closed), so the question conditions on a factory being open. The question is censored at 60+ hours, so the final bar at the right of the histogram should be interpreted as such. Prior to the pandemic, most workers report 60 or more working hours per week.

Working hours display a large decline between January and April 2021, with workers much more likely to report fewer than 60 hours of work per week. For Wave 1, by November 2020, workers' hours have started to recover, and by March 2021, they are indistinguishable from pre-pandemic levels. However, from April to June 2021, working hours drop again probably due to new waves of infections.

Figure 3: Hours worked per week, current garment workers



Beyond reductions in working hours, between 2.5-5% of garment workers report reductions in hourly wages or piece-rates, and between 7.5-12% report reductions in other non-pecuniary benefits (e.g., employer-provided meals or trans-

portation) at the beginning of the pandemic. The proportion of workers reported continuing experiences of these reductions have gradually fallen since April 2021 (Figure 4). In terms of COVID-19 prevention practices, workers who remain in the sector report near universal adoption of medical leave (either paid or unpaid), hand-washing facilities, and masks for wearing at work. There is variation across adoption of other practices, with between 80-85% of employers checking employees' temperature upon entry, 60-65% having provided some amount of COVID-19 prevention training, around 50% providing medical assessments of suspected COVID-19 cases, and fewer adjusting shifts/start times to physically distance workers or COVID-19 testing. As the pandemic continues, more factories are adopting all of these prevention practices especially checking temperature.

Figure 4: Job characteristics, previous month

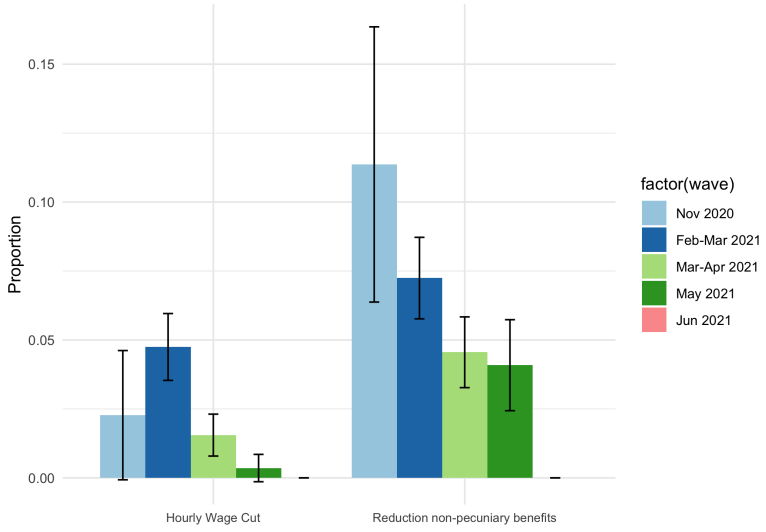
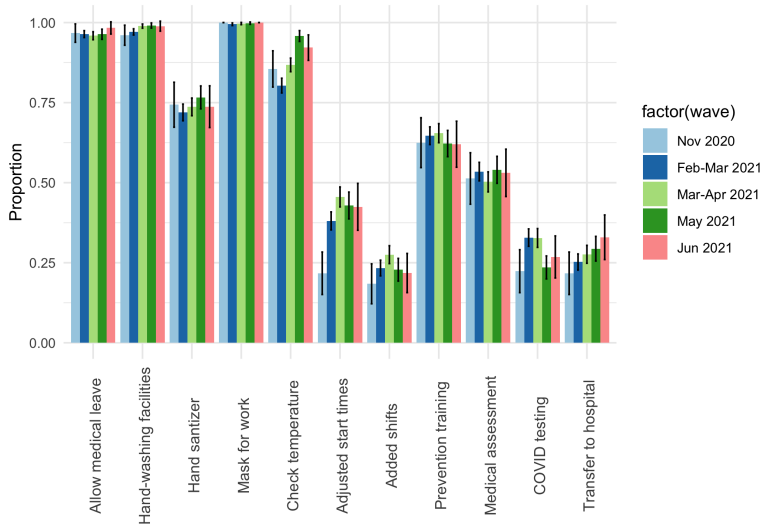


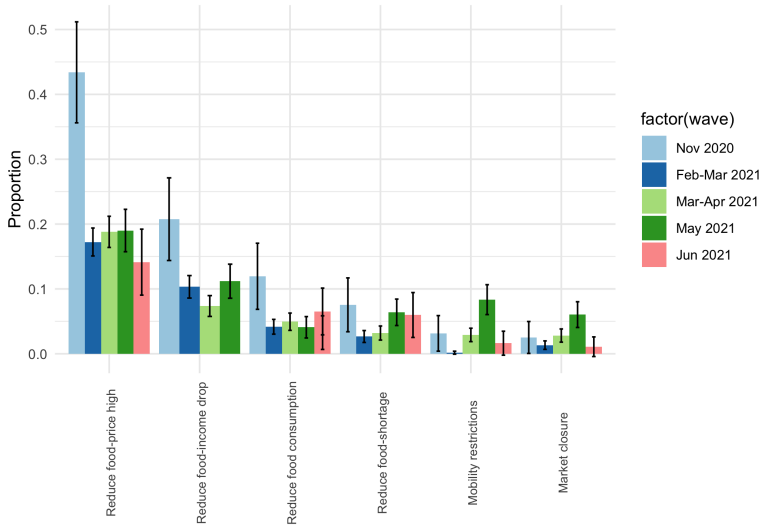
Figure 5: Employer's COVID-19 prevention practices, current



3.2 Broader Measures of Welfare, including IGC COVID-19 Worker Survey Questions

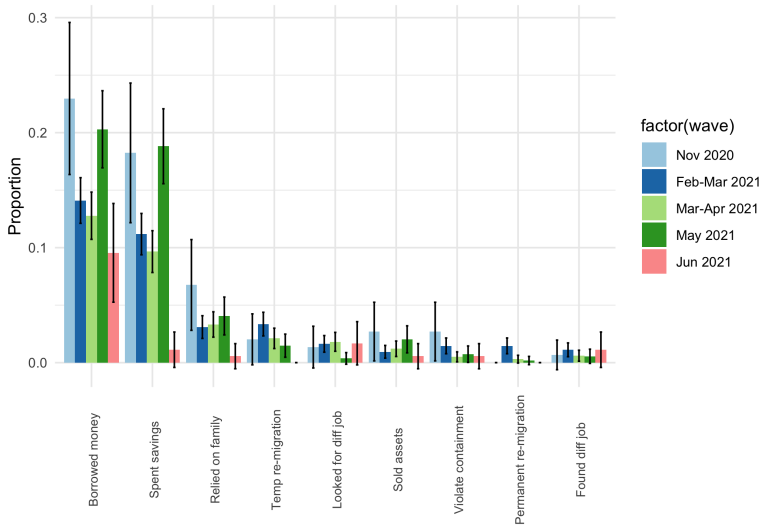
Survey respondents report that their households are facing other challenges to their well-being due to COVID-19. Figure 6 shows challenges related to food consumption. In particular among wave 1 respondents in November 2020, substantial shares report reducing food purchases due to high prices (44%) or to income drops (22.5%). Among respondents in later waves, the proportions experiencing these difficulties are lower, but still meaningfully high.

Figure 6: Household experience of challenge, previous week



Turning to coping measures taken by households, Figure 7 shows that 22% of wave 1 respondents and 15% of wave 2 respondents report borrowing money, while 17% and 12%, respectively, report spending savings in March 2021. The need for money falls back in April and increases again in May. Evidently, many households continue to struggle to get by during the COVID-19 pandemic.

Figure 7: Household coping measures, previous month



We asked survey respondents about their experience of COVID-19 symptoms at two points in time: April 2020 and the month prior to the survey. We also asked whether they had been tested for COVID-19 and had received a positive test. As fewer than 6% of respondents report being tested for COVID-19, we expect that this measure of COVID-19 rates underestimates the true rate. Further, since we only measure symptoms at two points in time, we miss cases that happened outside of these time periods. Our most complete measure of COVID-19 experiences takes the union of experiencing symptoms at either point in time or testing positive for COVID.

Table 2 presents the results. We find that women are 3 percentage points more likely to report COVID-19 symptoms, even controlling for experiencing symptoms during January 2020 and other characteristics. The most predictive variable is experience of symptoms associated with COVID-19 in January 2020, which may suggest that our measure captures poor health more broadly, that those with poor health are more vulnerable to COVID-19, or both of these factors.

Table 2: COVID symptoms or positive test, April 2020 or previous month

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female	0.01							0.03	0.03
	(0.01)							(0.02)	(0.02)
Age		0.00						-0.00	-0.00
		(0.00)						(0.00)	(0.00)
Education (yrs)			0.00					0.00	0.00
			(0.00)					(0.00)	(0.00)
Total experince (yrs)				0.00				0.00	0.00
				(0.00)				(0.00)	(0.00)
COVID symptoms, Jan 20					0.16***			0.15***	0.15***
					(0.03)			(0.03)	(0.03)
Log(Jan 20 Income)						-0.00		-0.00	-0.00
						(0.01)		(0.01)	(0.01)
Wave 2 Indicator							-0.11**	-0.09*	
							(0.03)	(0.04)	
2017 survey									0.07
									(0.05)
Jan 2020 pilot									0.05
									(0.12)
intermediate links incl referrals									0.03
									(0.05)
Observations	3,518	3,518	3,518	3,385	3,518	3,238	3,518	3,213	3,213
R-squared	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01

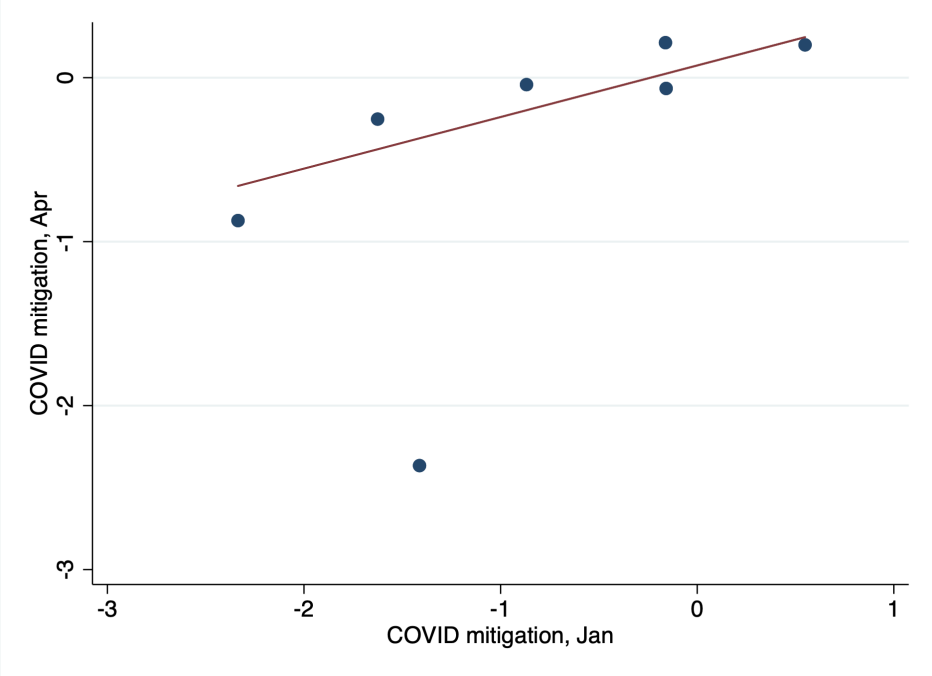
*

3.3 Heterogeneity in Employer Responses

Returning to garment factories' responses, as Figure 5 shows, many employers adopted COVID-19 prevention practices during the pandemic. But as the Figure also shows, employers varied in their adoption of many policies beyond a small set of core prevention practices. In this section, we examine heterogeneity in employers' responses.

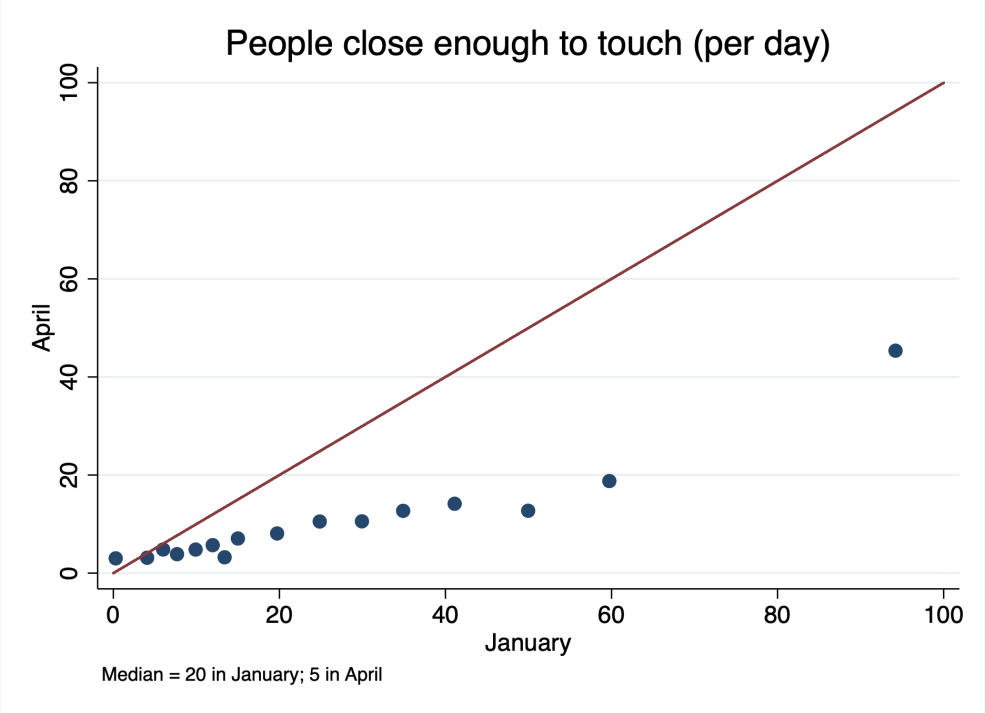
Figure 8 shows the correlation in employers' adoption of three occupational health policies that may help to prevent COVID-19 outbreaks at work: Medical leave (paid or unpaid), paid medical leave, and hand-washing facilities with soap and running water. As the Figure shows, on the whole, employers significantly increase adoption of these policies between January and April 2021. In January 2020, the mean (median) adoption rate was 72% (67%) of the three policies, and in April it is 89% (100%).

Figure 8: Employer COVID Prevention Index, January and April 2020



Turning to physical distancing, which is a key public health measure for reducing COVID-19 spread, workers report significant declines in the number of people with whom they work in close proximity. Figure 9 shows this downward shift; workers report being close enough to touch an average (median) of 70 (20) workers in January, which declines to 26 (5) in April. While this is a large decline, it also highlights that even at the height of the pandemic, garment workers worked in very close proximity to each other; many workers report being in close proximity to tens or even hundreds of others every day. Further, as the figure shows, there is a large amount of variation in workers' proximity to others, with some workers reporting increases in the number of others whom they work nearby to in April relative to January.

Figure 9: Number of workers close enough to touch, January and April 2020



Finally, we examine how factories' COVID-19 mitigation practices correlate

with workers' reports of suspected COVID-19 cases among their coworkers on their sewing line/in their section. Table 3 reports the results. We regress the number of reported cases on an index of standardized measures of factories' occupational health policies in January 2020 (same variables as above). We find that the correlation between employers' practices and COVID-19 cases is large and negative: A one sd increase in the occupational health index is associated with 0.1 fewer COVID-19 cases. Given average COVID-19 cases is 0.6, this is a sizable difference.

We next turn to a more detailed index of COVID-19 prevention measures as of April 2020; this index includes several additional measures, which are listed in Figure 5. The association is larger (column (2)): A one sd increase in adoption of prevention practices is associated with 0.3 fewer COVID cases. In contrast, the correlation between several of workers' personal characteristics and reported coworkers' COVID-19 cases are smaller or approximately zero. In column (8) and (9), we control for the correlation between employers' response and other variables and find that the coefficients on pre- and immediate post-COVID-19 occupational health measures remain negative.

Table 3: Known COVID Cases among Coworkers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Occ. Health Index, Jan 20	-0.14							-0.05	-0.05
	(0.18)							(0.11)	(0.11)
Occ. Health Index (det), Apr 20		-0.31						-0.28	-0.29
		(0.37)						(0.35)	(0.35)
Female			-0.18					-0.12	-0.12
			(0.12)					(0.08)	(0.08)
Age				0.00				0.00	-0.00
				(0.01)				(0.01)	(0.01)
Education (yrs)					0.02			0.02	0.02
					(0.02)			(0.02)	(0.02)
Total experince (yrs)						-0.00		0.00	0.00
						(0.01)		(0.02)	(0.02)
Wave 2 Indicator							-0.78	-0.95	
							(0.67)	(0.78)	
2017 survey									0.53
									(0.42)
Jan 2020 pilot									0.49
									(0.43)
intermediate links incl referrals									0.16
									(0.11)
Observations	3,043	3,043	3,043	3,043	3,043	3,018	3,043	3,018	3,018
R-squared	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00

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