Workers at risk: Panel data evidence on the COVID-19 labor market crisis in India

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December 10th, 2020

Turin Centre on Emerging Economies 6th Workshop: Emerging economies during and beyond the COVID crisis: insights and perspectives

Introduction: Motivation

- Growing concern about the vulnerability of informal workers, who number more than 1.6 billion worldwide, to the adverse impacts of the COVID-19 crisis (World Bank, 2020; ILO 2020 a and b)
 - Lack access to formal social safety nets and typically characterized by short-term, daily contracts
 - Limited access to emergency COVID-19 relief measures (e.g., Busso et al., 2020)
 - Low savings and access to credit undermine capacity to cope with shocks
 - Potential scarring and long-term losses

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 - Low savings and access to credit undermine capacity to cope with shocks
 - Potential scarring and long-term losses
- Mounting evidence though largely from high income countries- that the labor market impacts of the COVID-19 crisis have been unequal
 - Less-educated or lower-wage workers (Adams-Prassl et al., 2020; Gulyas and Pytka 2020; Mattana et al 2020; Guven et al 2020; Kikuchi et al 2020)
 - Women (Deshpande 2020; Adams-Prassl et al., 2020; Kikuchi et al 2020)
 - Migrants (Guven et al 2020; Gulyas and Pytka 2020) and "contingent" workers (Kikuchi et al. 2020)

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 - Migrants (Guven et al 2020; Gulyas and Pytka 2020) and "contingent" workers (Kikuchi et al. 2020)
- Hints, in the context of urban India, that those in more informal work arrangements have been worse hit (Lee et. al 2020; Dhingra and Machin 2020)

Introduction: Questions

- Whose labor market outcomes has the COVID-19 shock affected more adversely, formal or informal workers?
- Which mechanisms could explain the differential impact of the COVID-19 shock on informal workers?
 - Is it just industry, occupation or location-specific heterogeneity of the COVID-19 shock, coupled with industry, occupation or location-specific heterogeneity of the extent of informality?
 - Or is it factors more intrinsic to informality, such as differences in labor regulations across formal and informal workers?
- Did consumption smoothing vary across formal and informal workers?
 - Differences in credit constraints and degree of interlinkages between production and consumption decisions (e.g., Rosenzweig and Wolpin, 1993) could lead to different consumption smoothing possibilities in the formal and informal sectors.

Main findings

• The COVID-19 shock has affected the labor market outcomes of informal workers more adversely

Mechanisms

- This differential impact cannot be fully explained by industry, occupation or location-specific heterogeneity in the COVID-19 shock
- Hints that employment protection laws in the formal sector regulation mattered: Compared to informal wage workers, formal wage workers have done better in states with more pro-worker labor regulations

Consumption smoothing: A puzzle

- Compared to formal workers, informal workers experienced a larger drop in income but a smaller drop in consumption expenditure
- Preliminary evidence that this is related to greater "forced saving" among formal households due to the lockdown of non-essential goods and services retail

Context 1: Global poverty impact of COVID-19



Source: Lakner, Yonzan, Gerszon Mahler, Castaneda Aguilar, Wu, Fleury (Nov 2020) "Updated estimates of the impact of COVID-19 on global poverty: The effect of new data"

Context 3: Lockdown intensity in India

COVID-19: Government Response Stringency Index



This is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest). If policies vary at the subnational level, the index is shown as the response level of the strictest sub-region.



Source: Hale, Webster, Petherick, Phillips, and Kira (2020). Oxford COVID-19 Government Response Tracker – Last updated 7 December, 03:01 (London time)

Note: This index simply records the number and strictness of government policies, and should not be interpreted as 'scoring' the appropriateness or effectiveness of a country's response.

OurWorldInData.org/coronavirus • CC BY

Context 4: GDP growth in India



Context 5: Unemployment in India

Unemployment rate (percent)



- Data:
 - Consumer Pyramids Household Survey (CPHS): a nationally-representative panel of over 170,000 households across India three times a year by CMIE.
 - The survey is typically conducted face-to-face but owing to the COVID lockdown in India after the third week of March, the face-to-face interview format was replaced with a telephonic one.
 - Although there was a substantial fall in the response rate for April 2020, sample weights are adjusted for non-response.
- Definitions:
 - Formal workers (base case): workers in permanent salaried employment;
 - Informal workers: daily-wage/casual workers and temporary salaried employees;
 - Self-employed workers;

Methods

Descriptive

- Labor market transitions
- Analytic: Difference in Difference regressions
 - Employment status
 - Income
 - Consumption

Descriptive Approach: Labor market transitions

Before COVID: Aug to Dec 2019



Aggregate unemployment trends mask considerable churning in the labor market



Before COVID: Aug to Dec 2019

Early-COVID: Dec 2019 to Apr 2020



Analytic Approach: DiD regressions

 $Employed_{it}$

 $= \alpha WorkerCategory_{i} + \beta POST + \gamma WorkerCategory_{i} \times POST + \sum_{i} \delta_{t} X_{j} + \varepsilon_{it}$

- *POST* is a dummy variable which is 1 for Apr 2020 and 0 for Dec 2019.
- WorkerCategory_i = {Informal_i, SelfEmployed_i} is the employment category in Dec 2019. Formal_i is the omitted category.
- $\sum_{i} \delta_t X_i$: (district × wave), (industry × wave), and (occupation × wave) fixed effects
- Coefficient of interest γ: the differential impact of the pandemic on the employment status of informal and self-employed workers relative to formal workers.

Summary statistics: employment

		Formal Self-	employed	Informal
% Employed	Dec 2019	79.7	79.0	74.7
	Apr 2020	64.7	60.9	38.3
	Δ in pp	-15.1	-18.2	-36.3

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		Formal Self-	employed	Informal
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Impact of COVID-19 on Employment: DID estimates

	(1)	(2)	(3)	(4)	(5)
Post	-0.15***				
	(0.011)				
(DailyWage + Tem)	-0.051***	-0.060***	0.0018^{**}	0.0020	0.0022*
	(0.0096)	(0.010)	(0.00090)	(0.0015)	(0.0012)
$Post\times(DailyWage{+}Tem)$	-0.21***	-0.20***	-0.072***	-0.034***	-0.021***
	(0.013)	(0.013)	(0.0079)	(0.0072)	(0.0070)
(Self Employed)	-0.0069	-0.015	0.0012	-0.00060	-0.00043
	(0.0093)	(0.0099)	(0.0011)	(0.0027)	(0.0026)
Post $ imes$ (Self Employed)	-0.031**	-0.054***	-0.011	-0.025***	-0.014*
	(0.012)	(0.013)	(0.0076)	(0.0074)	(0.0072)
District $ imes$ Wave FE	No	Yes	Yes	Yes	Yes
Industry $ imes$ Wave FE	No	No	Yes	No	Yes
Occupation $ imes$ Wave FE	No	No	No	Yes	Yes
Observations	37007	37007	37007	37007	37007

* p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parenthesis are clustered at the individual level. Post = 0 for Dec 2019 and 1 for April 2020. The dependent variable is an indicator variable that takes value 1 if the individual is employed and zero otherwise.

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Occupation $ imes$ Wave FE	No	No	No	Yes	Yes
Observations	37007	37007	37007	37007	37007

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$$\begin{split} & Employed_{it} \\ &= \alpha \ WorkerCategory_i + \beta \ POST + \gamma \ WorkerCategory_i \times \ POST + \eta \ POST \times Laborreg_s \\ &+ \tau \ POST \times Laborreg_s \times WorkerCategory_i + \sum_{j} \delta_t \ X_j \ + \ \varepsilon_{it} \end{split}$$

- $Laborreg_s$ is a measure of labor regulation in state
- Coefficient of interest τ: how the differential impact of the pandemic on the employment status of informal workers relative to formal workers varied by labor regulation
- Labor regulation captured by dummies for pro-worker and pro-employer states, with "neutral" states being the baseline group (Besley and Burgess, 2004)

Why are informal jobs more vulnerable to the pandemic shock?

	(1)	(2)
(DW+Temp)	0.00020	0.0022*
	(0.0015)	(0.0012)
Post \times (DW+Temp)	-0.0039	-0.021***
	(0.011)	(0.0070)
$(DW+Temp) \times ProWorker$	0.0042	
	(0.0042)	
$Post \times (DW+Temp) \times ProWorker$	-0.040**	
	(0.016)	
$(DW+Temp) \times ProEmployer$	0.00099	
	(0.0012)	
$Post \times (DW+Temp) \times ProEmployer$	-0.020	
	(0.016)	
District \times Wave FE	Yes	Yes
Industry \times Wave FE	Yes	Yes
Occupation \times Wave FE	Yes	Yes
Observations	34494	37007

* p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parenthesis are clustered at the individual level. Post = 0 for Dec 2019 and 1 for April 2020. The dependent variable is an indicator variable that takes value 1 if the individual is employed and zero otherwise. We follow Besley Burgess (2004) to categorize Indian states as proworker (prow), pro employer (proe) or neutral (Omitted dummy) in each year of our study.

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	(0.0042)	
Post \times (DW+Temp) \times ProWorker	-0.040**	
	(0.016)	
$(DW+Temp) \times ProEmployer$	(0.00099)	
Post v (DW Temp) v ProEmployer	(0.0012)	
$Post \times (DW + Temp) \times ProEmployer$	(0.020)	
	(0.010)	
District \times Wave FE	Yes	Yes
Industry \times Wave FE	Yes	Yes
Occupation \times Wave FE	Yes	Yes
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Summary statistics: income and consumption

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% Employed	Dec 2019	79.7	79.0	74.7	-
	Apr 2020	64.7	60.9	38.3	-
	Δ in pp	-15.1	-18.2	-36.3	
Household	Dec 2019	31784	24189	16678	24585
Income (Rupees)	Apr 2020	20880	14523	8133	18910
	% change	-34.3	-40.0	-51.2	-23.1
Household	Dec 2019	16322	12183	9863	12487
Consumption (Rupees)	Apr 2020	8657	7595	6710	8040
	% change	-47.0	-37.7	-32.0	-35.6

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Impact of COVID-19 on total HH income: DID estimates

	(1)	(2)	(3)	(4)	(5)
Post	-0.96***				
	(0.064)				
(DailyWage+Tem)	-0.61***	-0.49***	-0.38***	-0.32***	-0.30***
	(0.023)	(0.023)	(0.029)	(0.030)	(0.031)
$Post\times(DailyWage{+}Tem)$	-0.61***	-0.50***	-0.38***	-0.42***	-0.38***
	(0.078)	(0.078)	(0.085)	(0.085)	(0.087)
(Self Employed)	-0.40***	-0.31***	-0.15***	-0.17***	-0.15***
	(0.024)	(0.022)	(0.029)	(0.043)	(0.044)
Post $ imes$ (Self Employed)	-0.22***	-0.24***	-0.28***	-0.30***	-0.27***
	(0.073)	(0.072)	(0.080)	(0.085)	(0.086)
District $ imes$ Wave FE	No	Yes	Yes	Yes	Yes
Industry $ imes$ Wave FE	No	No	Yes	No	Yes
Occupation $ imes$ Wave FE	No	No	No	Yes	Yes
Observations	15208	15203	15203	15203	15203

* p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parenthesis are clustered at the HH level. Post = 0 for Dec 2019 and 1 for April 2020. The dependent variable is the log of total household income.

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District $ imes$ Wave FE	No	Yes	Yes	Yes	Yes
Industry $ imes$ Wave FE	No	No	Yes	No	Yes
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Observations	15208	15203	15203	15203	15203

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Impact of COVID-19 on total HH consumption: two period DID estimates

	(1)	(2)	(3)	(4)	(5)
Post	-0.56***				
	(0.018)				
(DailyWage+Tem)	-0.45***	-0.35***	-0.27***	-0.20***	-0.19***
	(0.018)	(0.016)	(0.022)	(0.022)	(0.023)
$Post\times(DailyWage{+}Tem)$	0.22***	0.15***	0.092***	0.042*	0.038
	(0.021)	(0.019)	(0.024)	(0.025)	(0.025)
(Self Employed)	-0.27***	-0.19***	-0.084***	-0.079***	-0.072**
	(0.017)	(0.015)	(0.022)	(0.030)	(0.030)
Post $ imes$ (Self Employed)	0.15***	0.094***	0.0096	0.00042	-0.0029
	(0.020)	(0.018)	(0.024)	(0.031)	(0.032)
District $ imes$ Wave FE	No	Yes	Yes	Yes	Yes
Industry $ imes$ Wave FE	No	No	Yes	No	Yes
Occupation $ imes$ Wave FE	No	No	No	Yes	Yes
Observations	16062	16059	16059	16059	16059

* p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parenthesis are clustered at the HH level. Post = 0 for Dec 2019 and 1 for April 2020. The dependent variable is the log of total household consumption.

Impact of COVID-19 on total HH consumption: two period DID estimates

	(1)	(2)	(3)	(4)	(5)
Post	-0.56***				
	(0.018)				
$(DailyWage{+}Tem)$	-0.45***	-0.35***	-0.27***	-0.20***	-0.19***
	(0.018)	(0.016)	(0.022)	(0.022)	(0.023)
$Post imes (DailyWage{+}Tem)$	0.22***	0.15***	0.092***	0.042*	0.038
	(0.021)	(0.019)	(0.024)	(0.025)	(0.025)
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	(0.020)	(0.018)	(0.024)	(0.031)	(0.032)
District imes Wave FE	No	Yes	Yes	Yes	Yes
Industry $ imes$ Wave FE	No	No	Yes	No	Yes
Occupation \times Wave FE	No	No	No	Yes	Yes
Observations	16062	16059	16059	16059	16059

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A puzzle: consumption falls by less for poorer, more vulnerable informal workers, even as their incomes fall by a larger proportion

Change in income and consumption for informal workers after the pandemic



Three potential explanations of the consumption smoothing puzzle

- 1. Forced saving
- 2. Differential price changes
- 3. Differential adjustment to the pandemic shock

Consumption shares: Formal vs. Informal workers



Impact of COVID-19 on consumption: food vs. recreation

	(1)Food	(2) Recreation
Post	-0.22***	-3.70***
	(0.014)	(0.13)
Daily wage $+$ Temp	-0.26***	-0.59***
	(0.014)	(0.073)
$Post \times Daily wage + Temp$	0.11^{***}	0.95***
	(0.016)	(0.15)
Self-employed	-0.15***	-0.60***
	(0.014)	(0.071)
Post \times Self-employed	0.074^{***}	1.13***
	(0.015)	(0.14)
Observations	16062	16062
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. S	tandard errors in parenthe	sis are clustered at the

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Self-employed	-0.15***	-0.60***
	(0.014)	(0.071)
Post \times Self-employed	0.074^{***}	1.13^{***}
	(0.015)	(0.14)
Observations	16062	16062

hyperbolic sine transformation of household consumption.

Conclusion

• The COVID-19 shock has affected the labor market outcomes of informal workers more adversely

Mechanisms

- This differential impact cannot be fully explained by industry, occupation or location-specific heterogeneity in the COVID-19 shock
- Hints that employment protection laws in the formal sector regulation mattered: Compared to informal wage workers, formal wage workers have done better in states with more pro-worker labor regulations

Consumption smoothing: A puzzle

- Compared to formal workers, informal workers experienced a larger drop in income but a smaller drop in consumption expenditure
- Preliminary evidence that this is related to greater "forced saving" among formal households due to the lockdown of non-essential goods and services retail