Hit Harder, Recover Slower? Unequal Employment Effects of the Covid-19 Shock*

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April 5, 2021

Abstract

The destructive economic impact of the Covid-19 pandemic was distributed unequally across the population. Gender, race and ethnicity, age, education level, and a worker's industry and occupation all mattered. We analyze the initial negative effect and its lingering effect through the recovery phase, across demographic and socioeconomic groups. The initial negative impact on employment was larger for women, minorities, the less educated, and the young, whether or not we account for the industries and occupations they worked in. As of February 2021, however, the differential impact across such groups has gotten much smaller overall and has entirely vanished once the different industries and occupations they work in are taken into account. In particular, the differential impact between men and women does not exist any more even when the industry and occupation compositions are not factored in, allaying the fear that women's progress in the labor market over the past decades had been wiped out by the pandemic. Across race and ethnic groups, Hispanics and Asians were the worse hit but made up for most of the lost ground, while the initial impact on Blacks was smaller but recovery slower.

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As late as February 2020, the US labor market was booming. The unemployment rate stood at 3.5 percent, a record low since December 1969. Covid-19 struck out of the blue at unprecedented speed and ferocity. US unemployment spiked to 14.7 percent in April, although it came down below 7 percent since October 2020 to date.

Covid-19's attack on the labor market was multi-faceted, but broadly materialized through two channels. The first was through the voluntary reduction in consumer and business activities, especially contact-intensive ones, out of fear of infection. The other was through governments' containment policies, such as various social distancing measures and lockdowns of large swaths of the economy, especially targeted toward jobs categorized as "non-essential."

Jobs differ by contact intensity and the ease with which they can be performed remotely, in addition to their essential or non-essential classification (Hensvik et al., 2020; Aum et al., 2020b, 2021). Warnings abound that the economic toll of the pandemic would be unevenly distributed and exacerbate pre-existing inequality across demographic and socio-economic groups, because women and minorities were more likely to work in the more vulnerable jobs (Alon et al., 2020; Blundell et al., 2020). At the onset of the pandemic, near real-time data revealed that women lost more jobs and were forced to work less, both in the US and the UK (Cajner et al., 2020; Adams-Prassl et al., 2020a,b). It also became apparent that minorities were disadvantaged not only because of the types of jobs they worked in, but also because they were more likely to face employment reductions even within the same jobs (Montenovo et al., 2020; Cowan, 2020; Gezici and Ozay, 2020).

In this paper, we analyze how the initial economic impact of the pandemic and the subsequent recovery differed along numerous dimensions, including gender, race and ethnicity, age, educational attainment, industry, occupation, and state-level policies and state-wide Covid-19 infections. The main contribution to the literature is our analysis of the recovery phase through February 2021, as many researchers have documented the early impact of the pandemic in the spring of 2020.[1]

Our main findings can be summarized as follows.

- Minorities were hit harder by the pandemic, largely due to an industry-occupation composition effect—e.g., their disproportionate presence in leisure/hospitality and other service industries.

- Many demographic and socio-economic groups that were hit harder initially have also recovered faster, especially once industry and occupation compositions are taken into account.

[1]The paper most closely related to ours is Couch et al. (2020), which compares the experience of Blacks, Hispanics and Asians relative to whites, from April to June 2020. Our results complement theirs with data from later months and show new evidence for the recovery phase.

- More specifically, the pandemic's *differential* effects across gender, age and education have vanished in February 2021, when industry and occupation effects are controlled for.

- The differential effect between men and women has disappeared even when the industry and occupation compositions are not considered, allaying the fear that women's progress in the labor market over the last few decades had been wiped out by the pandemic.

- Black workers were the least affected by the initial shock among all racial groups, but their recovery is the slowest, even when industry and occupation effects are controlled for.

- In April 2020, local employment was hit hard in states which had high levels of infection, with containment policies having no significant effect. In February 2021, the severity of the epidemic has no systematic effect on employment.

- Urban areas, especially city centers, were hit hardest and the effects still remain.

We now describe the data and our methodology (Sections 1 and 2), before discussing the results in more detail (Section 3).

1 Data

We use the monthly Current Population Survey (CPS) from the Bureau of Labor Statistics (BLS). We limit the sample to 20 to 65 year-olds and consider four variables of interest: (i) unemployment, (ii) jobless unemployment, (iii) furlough or recall unemployment, and (iv) non-participation (not in the labor force). Unemployment and non-participation are directly recorded by the BLS. Jobless unemployment and recall unemployment are sub-categories of unemployment. The identification of jobless unemployed and recall unemployed relies on the definition in Hall and Kudlyak (2020). Respondents are asked if they are currently on layoff. If yes, they are asked whether they were given a return date to work or any indication that they would be called back to work within the next 6 months. If the answer is again yes, they are asked whether they can return if/when recalled. If the answer to this last question is also yes, then the respondent is classified as recall unemployed, i.e., one who has a job to return to. On the other hand, if a respondent did not work during the survey week, is not currently on layoff, and has been actively looking for work, then he or she is classified as

jobless unemployed.[2]

For demographic and socioeconomic characteristics, we consider gender (male, female), race and ethnicity (white, Black, Hispanic, Asian), age (20–35, 36–50, 51–65), educational attainment (high school or less, some college, 4-year college or more), industry, occupation, and urban/rural residence. We classify industries and occupations into 14 and 11 categories respectively, based on Major Industry Recodes and Major Occupation Group Recodes provided by the BLS. The CPS has information about whether respondents live in a central city, outside a central city but still in a metropolitan area, or outside a metropolitan area.

We also consider infection levels by state and state governments' policy responses to the pandemic. Daily case counts from the Centers for Disease Control and Prevention (CDC) COVID Data Tracker are used to calculate the number of cases per 1,000 people.[3] We group states into low, medium, and high risk, with equal number of states in each category. In addition, we group states by their policy responses to Covid-19 following the Oxford Covid-19 Government Response Tracker (OxCGRT).[4] OxCGRT reports 14 time-varying indicators to measure the policy responses of several governments, including the 50 US states and the District of Columbia. Each indicator is classified as "containment and closure," "economic response," "health systems," or "miscellaneous," and is used for creating a score for the overall government response (Hale et al., 2020).[5] Based on these scores, states are grouped into three categories: (i) robust response states, which adopted and maintained robust containment, testing and contact tracing policies, (ii) rapid rollback states, which adopted a robust response initially but then rolled back policies relatively quickly, and (iii) low response states, which never adopted particularly restrictive containment measures or robust testing and contact tracing systems.

2 Estimation

The panel dimension of the CPS is short, so it is not possible to track individuals over the course of a year.[6] We instead estimate the following individual-level linear regression

[2]The union of recall unemployment and jobless unemployment is smaller than unemployment, but the difference is small.

[3]`https://covid.cdc.gov/covid-data-tracker`

[4]`www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker`

[5]The online repository provides detailed coding information: `https://github.com/OxCGRT/covid-policy-tracker/blob/master/documentation/codebook.md`.

[6]The CPS has outgoing rotation samples and the BLS interviews each household for 4 consecutive months. The household leaves the sample for the next 8 months and returns for another 4 months. The sample collecting process happens every month, so only a quarter of the sample can be tracked from one month to the next.

model to capture the factors correlated with the labor market impact of the pandemic:

$$Y_{it}^{s} = \alpha + \alpha_1 \chi_{t=t'} + X_{it}^{s}[\beta + \beta_1 \chi_{t=t'}] + \epsilon_{it}^{s}. \tag{1}$$

We run the regression separately for $s = 4$ (April 2020) or 14 (February 2021), where $t = 2019$ and 2020 for $s = 4$ and $t = 2020$ or 2021 for $s = 14$. For each s, the t' indicates the latter, post-Covid year.

April 2020 was when the pandemic's economic impact was at its peak, and February 2021 was the most recent sample available from the CPS to gauge the recovery process; It is also the last month we can compare annual differences between pre- and post-Covid months. Comparing the same months of 2019 and 2020 or 2020 and 2021 is informative about the economic effect of the pandemic, seasonally adjusted. The dependent variable Y_{it}^{s} is a binary variable of individual i's employment status in month s in year t, and we run separate regressions for jobless unemployment, recall unemployment, unemployment, and nonemployment (unemployment plus non-participation).[7]

The vector of regressors X_{it}^{s} includes group dummies on gender, race and ethnicity, education, age, industry, occupation, and geographic location. The location variables include (i) urban/rural residence, (ii) state-wide new Covid-19 cases per 1,000 people during the preceding month (to be precise, cumulative counts through April 15 for the April 2020 regression and January 15 to February 15 for the February 2021 regression, since CPS interviews are conducted during the week that contains the 19th of each month), and (iii) the state government's policy response. For April 2020, states policy responses are categorized only as robust or low response (because there was no rapid-rollback state), while February 2021 further includes rapid-rollback states.

For each pair of years for the same month, the indicator function $\chi_{t=t'}$ equals the latter year (February 2021 or April 2020) and zero otherwise. In this specification, β_1 is the parameter of interest, which captures the differential effect of the pandemic on each demographic and socioeconomic group.

3 Results

3.1 Unemployment by Gender, Race/Ethnicity, Age and Education

Before we report the estimation results, we first show the evolution of labor market outcomes as a whole, and then by gender, race and ethnicity, age and educational attainment.

[7] We have analyzed all months October 2020 onward. From November 2020 onward, there are almost no differences in our estimates. The earlier version of this paper (Lee et al., 2021) has the results through November 2020.

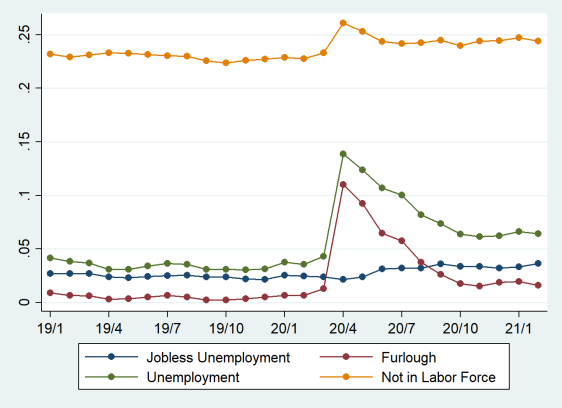
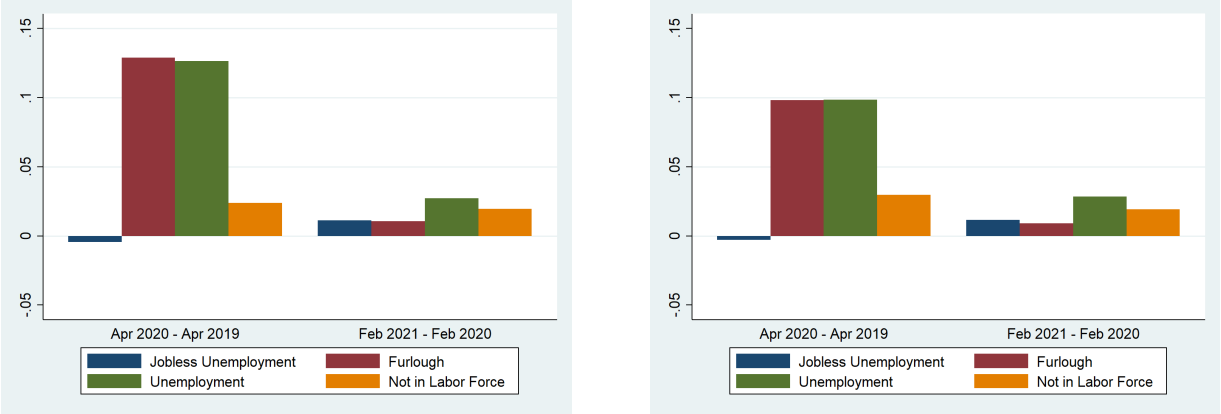


Figure 1: Aggregate Unemployment and Non-employment

Figure 1 plots the non-participation rate ("Not in Labor Force"), unemployment rate, jobless unemployment rate and recall unemployment rate from January 2019 onward. The pandemic hit the economy hard in April 2020, when the unemployment peaked at 14.8 percent. The economy has since been recovering towards the pre-pandemic level. Note that the unemployment jump is almost entirely accounted for by recall unemployment (or furlough), which came down fast in the following months (but still 1 percentage point higher in February 2021 than in the same month of the previous year). This is broadly consistent with the findings of Hall and Kudlyak (2020). On the other hand, the jobless unemployment rate began to rise only in July 2020, and more than two-fifths of the current elevated level of the unemployment rate is explained by higher jobless unemployment (1.2 p.p. out of 2.9 p.p.) as of February 2021. The pace of recovery has slowed markedly since October 2020. At the time of writing, the unemployment rate in March was 6 percent, down less than 1 p.p. from 6.9 percent in October 2020.

Figure 1 also shows that some workers dropped out of the labor force (instead of entering unemployment) when the pandemic hit. The non-participation rate increased by 3.1 percentage points between March and April 2020. This is the largest monthly increase ever recorded. For comparison, after the onset of the Great Recession, it took nearly 6 years for the non-participation rate to rise by 3.1 percentage points (from December 2007 to October 2013). The recovery in the non-participation rate has stalled since June 2020, and is still 1.7 percentage points higher in February 2021 than in February 2020.

Figure 2 shows the impact of the pandemic on the employment status of men and women, not controlling for any other variable. In the left panel, the first four bars show the change in jobless unemployment, recall unemployment (furlough), unemployment and non-participation rates between April 2019 and April 2020 for women, capturing the peak impact of the pandemic. The next four bars are the changes in these four rates between

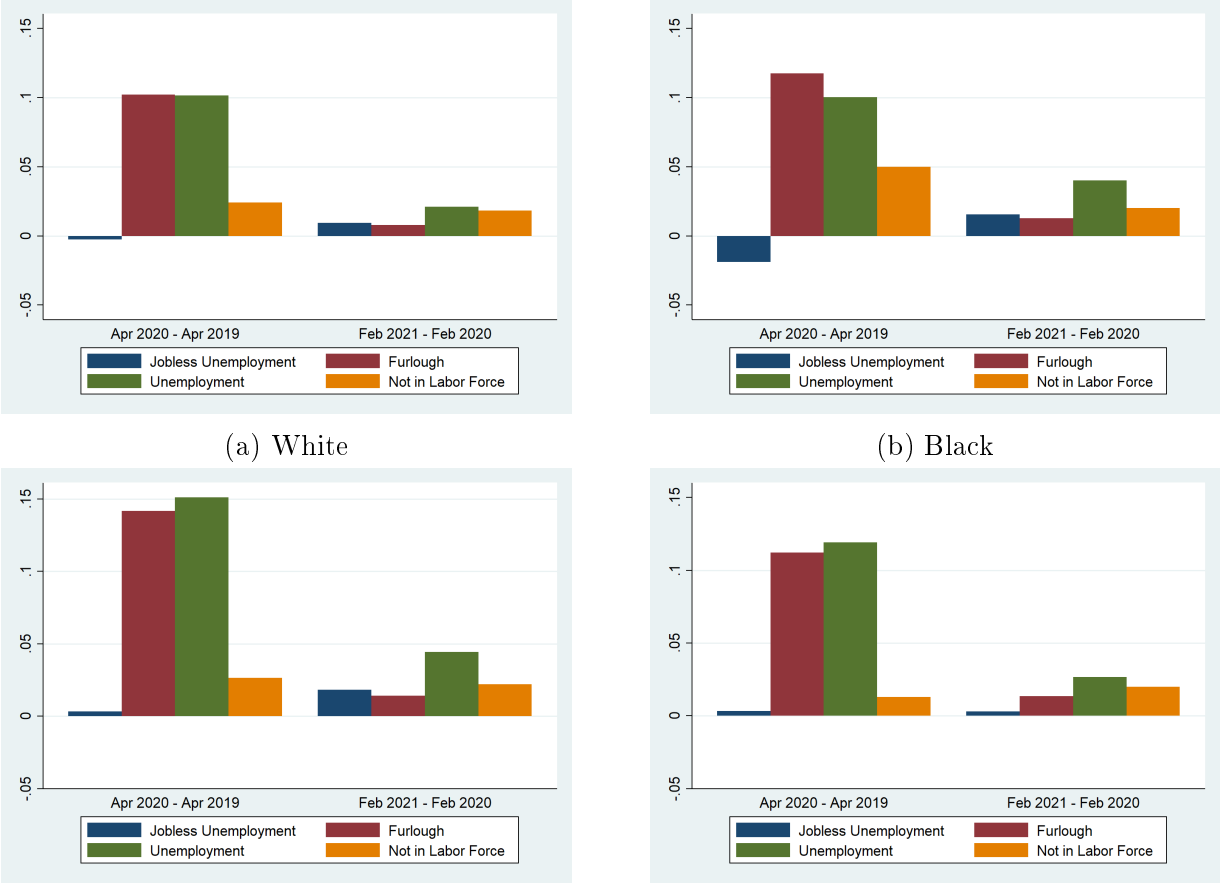


(a) Female (b) Male

Figure 2: Labor Market Impact of Covid-19 by Gender

February 2020 and February 2021. The right panel is for men. Comparing the two panels, we see that women were hit harder by the pandemic than men (April unemployment up by 12.7 vs. 9.9 p.p.), all driven by the rise in recall unemployment. This was a unique phenomenon: Typically men are more adversely affected by recessions than women (Alon et al., 2020). Non-participation, on the other hand, rose slightly more for men than for women in April (3.0 vs. 2.4 p.p.). But in February 2021, this gender gap completely disappeared. If anything, it reversed: men's unemployment rate in February 2021 is up by 2.9 p.p. relative to February 2020, but women's by 2.7 p.p. (The year-on-year change in the non-participation rate is the same for women and men in February 2021: 1.9 p.p.) In summary, the pandemic hit women harder initially, but what remains of the pandemic's effect on nonemployment is the same for men and women. We again see that the initial impact and the ensuing recovery in unemployment all came through recall unemployment.

Figure 3 shows the employment impact across race and ethnicity. Comparing the year-on-year change in the unemployment rate in April, it is clear that Hispanics were hit harder than any other group (unemployment up by 15.1 p.p.), followed by Asians (12.0 p.p). Blacks' unemployment rose the least among all groups, including whites' (10.0 vs. 10.2 p.p.), but their non-participation rate rose by 5 p.p., double the increase for whites and Hispanics. Comparing the year-on-year change in February, we see that whites' unemployment rate in February 2021 is only 2.1 p.p. higher than in February 2020, a smaller negative effect compared to Blacks' 4.0 p.p., Hispanic's 4.4 p.p. and Asians' 2.7 p.p. year-on-year change in unemployment. It is clear that minorities were hit harder economically by the pandemic, and they are also recovering more slowly. The remaining effect on the non-participation rate is also larger for minorities, although the magnitude is smaller. The year-on-year change in the February non-participation rate is 2.2, 2.0 and 2.0 p.p. for Hispanics, Asians and Blacks,



(a) White

(b) Black

(c) Hispanic

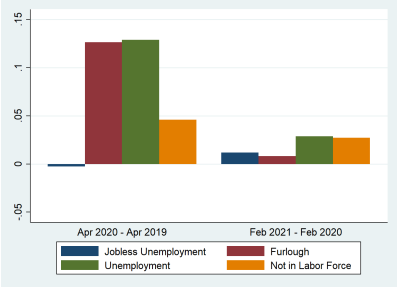
(d) Asian

Figure 3: Labor Market Impact of Covid-19 by Race/Ethnicity

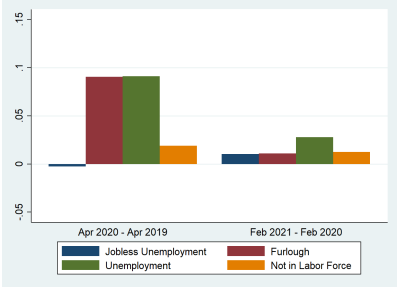
compared to 1.8 p.p. for whites.

Figure 4 shows how the employment outcomes of different age groups were affected by the Covid-19 shock. Clearly, the young (20 to 35 years old) were hit the hardest in April 2020: their year-on-year increase in the unemployment rate and the non-participation rates were 12.9 p.p. and 4.6 p.p., respectively. However, in February 2021, the unemployment effect of the pandemic are fairly similar across all three age groups, except that the youngest group's non-participation rate has not recovered as much, 2.7 p.p. year-on-year change compared to 1.2 and 0.9 p.p. for the two older groups.

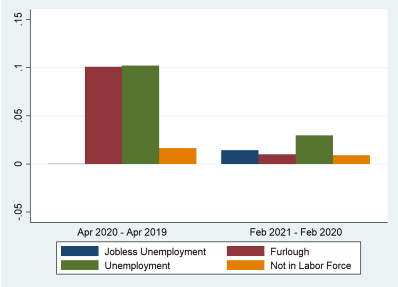
Figure 5 shows the negative employment effects by educational attainment: high school graduates or those with less education, those with some college education but without a 4-year degree, and those with a 4-year degree or more. Consistent with the general findings in the labor literature (e.g., Lee et al., 2015), the patterns for high school graduates and some college are broadly similar. High school graduates' unemployment rate was higher by 15.0 p.p. in April 2020 than in April 2019, and some college's by 13.6 p.p., while college



(a) Age 20 to 35

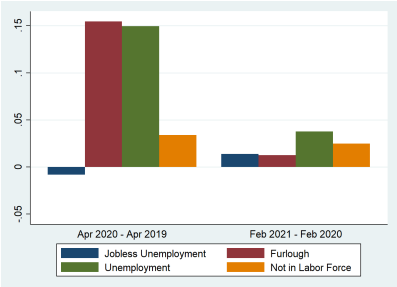


(b) Age 36 to 50

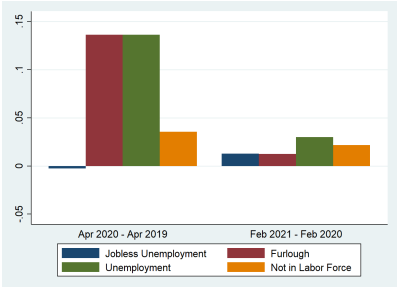


(c) Age 51 to 65

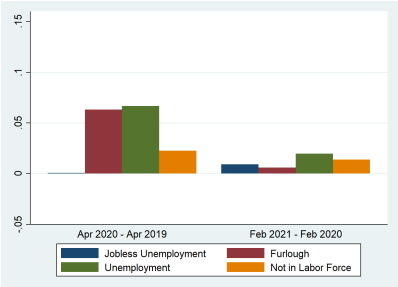
Figure 4: Labor Market Impact of Covid-19 by Age



(a) High School or Less



(b) Some College



(c) Bachelor Degree or More

Figure 5: Labor Market Impact of Covid-19 by Education Attainment

graduates' were only 6.7 p.p. higher. (The magnitude is smaller, but the pattern is similar for the non-participation rate.) By February 2021, all groups have experienced significant recovery, again due to the drop in recall unemployment. The unemployment rate in February 2021 is higher than in February 2020 by 3.8 and 3.0 p.p. for high school graduates and some college, respectively, and by 2.0 p.p. for college graduates. The picture is clear that those with more education were economically less affected by the pandemic.

3.2 Estimation Results

We now turn to the estimates from equation (1). Although the figures in the previous section offer a snapshot of the unequal employment effect of the pandemic across demographic and socio-economic groups, the effects shown there were confounded by the overlapping compositions across those groups, as well as their distribution across industries, occupations, and geographic areas that were all hit differently by the pandemic. Regression (1) can isolate the effect that is specific to each group, which is captured by the coefficient β_1.

The estimated β_1 for each group (other than the reference group, by construction) is reported in Table 1 for the year-on-year change in April 2020. A significant *positive* estimate means that the employment outcomes of a given group were *worse* than the reference group's.

Columns (1)-(3) are the estimates for when the outcome variable Y_{it}^s is jobless unemployment, recall unemployment, and unemployment, including industry and occupation fixed effects. Since the majority of CPS individuals who do not participate in the labor market do not record their previous industry or occupation, we cannot include such fixed effects for nonemployment (again, unemployment plus non-participation) in column (5). So for ease of interpretation, we also estimate (1) for unemployment without industry and occupation fixed effects, in column (4). The coefficients on the industry and occupation fixed effects for columns (1)-(3) are relegated to the tables in the appendix.

This is a saturated regression, and the excluded group is male, white, high school or less education, aged between 20 and 35, and living in a city center of a state with robust Covid response and low risk. For regressions with industry and occupation fixed effects, the added excluded group is the public administration industry and the management, business, and financial occupation.

The year-on-year increase in the aggregate unemployment rate for April 2020 was 11.1 p.p. The magnitude of the estimated coefficients in the table can be interpreted relative to this number.

Table 1 – *Covid-19 Shock: April 2020*

	(1) Jobless Unemployment	(2) Furlough	(3) Unemployment	(4) Unemployment	(5) Nonemployment
[Gender] Male					
Female × 20/4	-0.00109	0.0332***	0.0333***	0.0353***	0.00517
	(0.00278)	(0.00415)	(0.00504)	(0.00474)	(0.00633)
[Race] White					
Black × 20/4	-0.0113**	-0.0127*	-0.0230***	-0.0188**	0.00167
	(0.00521)	(0.00674)	(0.00851)	(0.00873)	(0.0109)
Hispanic × 20/4	0.00543	0.00397	0.0127*	0.0251***	0.0228**
	(0.00364)	(0.00586)	(0.00701)	(0.00719)	(0.00927)
Asian × 20/4	0.00302	0.0107	0.0165**	0.0252***	0.00325
	(0.00445)	(0.00699)	(0.00835)	(0.00867)	(0.0126)
[Education] High or less					
Some College × 20/4	0.00170	0.00617	0.00783	-0.0133*	-0.00598
	(0.00360)	(0.00585)	(0.00693)	(0.00698)	(0.00860)
College × 20/4	0.00343	-0.0301***	-0.0252***	-0.0856***	-0.0657***
	(0.00370)	(0.00579)	(0.00693)	(0.00610)	(0.00783)
[Age] Aged 20 to 35					
Aged 36 to 50 × 20/4	-0.00127	-0.0160***	-0.0205***	-0.0350***	-0.0465***
	(0.00305)	(0.00459)	(0.00558)	(0.00577)	(0.00765)
Aged 51 to 65 × 20/4	0.00114	-0.00829*	-0.0117**	-0.0297***	-0.0556***
	(0.00307)	(0.00475)	(0.00576)	(0.00595)	(0.00797)
[Policy] Robust COVID Response State					
Low Response State × 20/4	-0.00221	-0.00123	-0.00536	-0.000794	-0.0136
	(0.00377)	(0.00641)	(0.00752)	(0.00782)	(0.0107)

[COVID Cases] Low Risk State					
Medium Risk State × 20/4	0.000964	0.0119**	0.0119**	0.0146**	0.0228***
	(0.00317)	(0.00482)	(0.00586)	(0.00604)	(0.00824)
High Risk State × 20/4	-0.00133	0.0304***	0.0286***	0.0317***	0.0401***
	(0.00297)	(0.00460)	(0.00555)	(0.00572)	(0.00767)
[City] Central City					
Outside Central City × 20/4	0.00499*	-0.000871	0.00352	-0.000968	0.0000180
	(0.00294)	(0.00437)	(0.00533)	(0.00550)	(0.00732)
Not in Metropolitan Area × 20/4	-0.00198	-0.0240***	-0.0270***	-0.0320***	-0.0286***
	(0.00388)	(0.00620)	(0.00743)	(0.00744)	(0.0101)
Ind. and Occ. control	Yes	Yes	Yes	No	No
Observations	78051	78051	78051	78179	103457
R^2	0.015	0.123	0.107	0.063	0.083

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Consistent with the results in Section 3.1, we find that the negative employment effects at the peak of the pandemic was larger for women (than men), for Hispanics and Asians (than whites and Blacks), for the less educated, and for young workers, controlling for all other factors. These differential effects are smaller with industry and occupation fixed effects (column 3) than without (column 4), but they do exist even within occupations and industries. There are two remarkable findings. First, Blacks were significantly less likely to be unemployed than whites, with or without industry and occupation fixed effects. Second, despite the larger point estimate, Hispanics were not significantly more likely to be unemployed than whites (at the 10-percent significance level), once industry, occupation, and other effects are controlled for, implying that Hispanics were economically exposed to the pandemic by virtue of the types of jobs that they held.[8]

Table 1 also shows how state-level policy responses and the extent of the pandemic in the preceding month are correlated with employment outcomes. Somewhat surprisingly, state-level containment policies have no significant effect on employment. On the other hand, the number of newly confirmed Covid-19 cases leads to (or "Granger causes") more unemployment and nonemployment, suggesting that people's voluntary reduction of economic activities out of fear is an important channel through which the pandemic hampers the economy.[9]

The final few rows show that those living outside metropolitan areas sustained fewer job losses, even controlling for all other factors. One explanation is that in April 2020, urban areas on average had more stringent lockdowns. (Our policy variables are constructed at the state level.) In addition, with a lower population density, even the same social distancing measures represent less of a restriction on economic activities in rural areas.

[8]The appendix table for April 2020 shows that by industry, leisure/hospitality and other services were hit the hardest, while service, construction and production occupations suffered more than other occupations.

[9]This is consistent with evidence from other countries. See Aum et al. (2020a) for example.

Table 2 – *Covid-19 Shock: February 2021*

	(1) Jobless Unemployment	(2) Furlough	(3) Unemployment	(4) Unemployment	(5) Nonemployment
[Gender] Male					
Female × 21/2	0.00350	0.00471**	0.00881**	0.00400	-0.000816
	(0.00324)	(0.00189)	(0.00404)	(0.00370)	(0.00616)
[Race] White					
Black × 21/2	0.00223	0.00346	0.0150**	0.0164**	0.0109
	(0.00631)	(0.00278)	(0.00746)	(0.00758)	(0.0109)
Hispanic × 21/2	0.00168	0.00131	0.00834	0.0141***	0.00830
	(0.00415)	(0.00271)	(0.00537)	(0.00546)	(0.00874)
Asian × 21/2	-0.0146***	0.00577**	-0.00536	-0.00291	-0.0189
	(0.00480)	(0.00287)	(0.00626)	(0.00655)	(0.0122)
[Education] High or less					
Some College × 21/2	0.00491	0.00278	0.00315	-0.00534	-0.00741
	(0.00440)	(0.00269)	(0.00556)	(0.00553)	(0.00853)
College × 21/2	0.00651	-0.00211	0.00475	-0.0183***	-0.0268***
	(0.00431)	(0.00248)	(0.00539)	(0.00481)	(0.00760)
[Age] Aged 20 to 35					
Aged 36 to 50 × 21/2	-0.000868	0.00232	-0.0000986	-0.00314	-0.0194***
	(0.00358)	(0.00206)	(0.00446)	(0.00456)	(0.00733)
Aged 51 to 65 × 21/2	0.00516	0.00316	0.00645	0.00200	-0.0174**
	(0.00361)	(0.00219)	(0.00458)	(0.00466)	(0.00784)
[Policy] Robust COVID Response State					
Rapid Rollback State × 21/2	0.000713	-0.00485**	-0.00578	-0.00606	-0.0146**
	(0.00352)	(0.00205)	(0.00437)	(0.00447)	(0.00737)

Low Response State × 21/2	0.00869*	0.00222	0.00745	0.00922	-0.00799
	(0.00487)	(0.00258)	(0.00601)	(0.00610)	(0.0107)
[COVID Cases] Low Risk State					
Medium Risk State × 21/2	-0.0103**	-0.00418*	-0.0139***	-0.0125**	-0.0132
	(0.00412)	(0.00230)	(0.00508)	(0.00519)	(0.00928)
High Risk State × 21/2	0.00134	0.00501**	0.00725	0.00915*	0.0133
	(0.00386)	(0.00225)	(0.00478)	(0.00489)	(0.00850)
[City] Central City					
Outside Central City × 21/2	-0.00661*	-0.00269	-0.0107**	-0.0125***	-0.0112
	(0.00338)	(0.00193)	(0.00421)	(0.00430)	(0.00701)
Not in Metropolitan Area × 21/2	-0.0146***	-0.00562*	-0.0266***	-0.0302***	-0.0296***
	(0.00497)	(0.00311)	(0.00619)	(0.00612)	(0.0103)
Ind. and Occ. control	Yes	Yes	Yes	No	No
Observations	73926	73926	73926	74031	96511
R^2	0.021	0.017	0.036	0.020	0.071

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table 2 shows the estimation result for the change between February 2020 and February 2021, 10 months into recovery and the last month we can compare year-on-year with the pre-pandemic statistics. The year-on-year increase in the aggregate unemployment rate was 2.7 p.p., or only a quarter of the increase in April 2020 over April 2019. This number can help interpret the magnitude of the estimated coefficients in Table 2.

Consistent with Figure 2, the differential effect of the pandemic on men and women's unemployment has all but disappeared by February. The differential impact on women's furloughs and unemployment controlling for industries and occupations is statistically significant, but the magnitude is small.

As for minorities, only Blacks exhibit a larger shock to unemployment with industry and occupation fixed effects (column 3). Since Blacks were hit less hard than even whites in April 2020, this shows that Blacks were slowest to recover. Hispanics still have somewhat higher unemployment effect in column (4), implying that they tend to work for industries and occupations that are recovering slowly. However, in terms of nonemployment, there is no difference across these groups even when industry and occupation compositions are not considered.

We also see that by February 2021, the difference in the impact across education groups and across age groups has evaporated, when industries and occupations are controlled for.[10] The larger effects on the nonemployment of the young and the less educated (column 5) shows that this is a compositional effects: The industries and occupations they are over-represented are recovering more slowly that other industries and occupations.[11]

Table 2 also shows that state-level policies do have some effect on employment outcomes in February 2021, but the differences are negligible once industries and occupations are controlled for. At the same time, somewhat surprisingly, medium risk states have better outcomes and high-risk states only slightly worse outcomes than low-risk states. This suggests that the fear effect evident in April 2020 may not be operating as it once did, possibly because people have re-assessed infection risks or adopted other ways of mitigating the risk (e.g., wearing masks).[12]

Finally, the employment of city center residents is the slowest to recover. The most likely

[10]The result that by February 2021 the impact on more educated and less educated workers was similar is consistent with Forsythe et al. (2021), which shows that labor market tightness has converged for college-educated and high-school workers.

[11]Among industries, leisure/hospitalities have not recovered from the shock. There is not much of a pattern across occupations, except that service occupations still show a significantly higher unemployment rate from its February 2020 level.

[12]These estimates are different from November 2020 estimates. In the November data, states that rolled back containment policies or implemented less restrictive policies had a smaller year-on-year rise in unemployment than the states with more restrictive policies. Furthermore, state-wide infection rates in the preceding month were uncorrelated with employment outcomes.

explanation is that remote work reduced not only the number of workers in city centers but also these workers' demand for local consumer service businesses, further worsening the employment prospect of city center residents (Eckert et al., 2020).

4 Concluding Remarks

The economic impact of the pandemic was unequal across demographic and socio-economic groups. The initial shock hit women harder than men, but the differential effect has disappeared by February 2021. Similarly, Hispanics and Asians were hit harder than Blacks and whites in April 2020, but both groups have recovered quite a bit, especially Hispanics. Blacks on the other hand, in spite of the smaller initial shock than all other racial groups, experienced slower recovery in their employment outcomes. These results remain even after controlling for all other factors, including industries, occupations, state-level pandemic and policies, and urban/rural residence. In this context, it is not clear what explains the slower reduction of Black unemployment. One possibility is that our industry and occupation classifications are not detailed enough (a choice we made in recognition of the sample size of the CPS), and we are not fully capturing the compositional effects. We leave this question for future research but note that the remaining effect on Black nonemployment rate is not significantly different from whites' in February 2021.

By education attainment, the less educated were hit worse than the more educated in April 2020. By February 2021, this differential effect across education groups has gotten smaller but still remains due to the different industries and occupations they work in.

In addition, while the young were harder hit initially, by February 2021, there was no systematic difference in the employment impact of the pandemic across age groups, except that the young in certain industries and occupations have left the workforce altogether.

Our findings call for a careful investigation of the mechanism through which different demographic and soci-economic groups were affected unequally by the pandemic, not only on impact but also during the recovery.

Appendix

Table A1 – *Covid-19 Shock: 2020 April*

	(1) Jobless Unemployment	(2) Furlough	(3) Unemployment
[Industry] Public administration			
Mining × 20/4	0.0268	0.0170	0.0559**
	(0.0174)	(0.0163)	(0.0258)
Construction × 20/4	-0.0138*	0.0731***	0.0609***
	(0.00742)	(0.0108)	(0.0134)
Manufacturing × 20/4	0.00407	0.0660***	0.0728***
	(0.00528)	(0.00810)	(0.0102)
Wholesale and retail trade × 20/4	-0.000744	0.0747***	0.0756***
	(0.00596)	(0.00860)	(0.0109)
Transportation and utilities × 20/4	-0.00757	0.0619***	0.0539***
	(0.00673)	(0.00997)	(0.0124)
Information × 20/4	0.0145	0.0494***	0.0706***
	(0.0104)	(0.0119)	(0.0171)
Financial activities × 20/4	0.000417	0.0186***	0.0220**
	(0.00550)	(0.00698)	(0.00936)
Professional and business services × 20/4	0.00407	0.0384***	0.0444***
	(0.00480)	(0.00681)	(0.00872)
Educational and health services × 20/4	0.00476	0.0620***	0.0678***
	(0.00396)	(0.00649)	(0.00794)
Leisure and hospitality × 20/4	0.0146**	0.245***	0.274***
	(0.00705)	(0.0120)	(0.0136)
Other services × 20/4	0.00738	0.134***	0.150***
	(0.00613)	(0.0125)	(0.0142)
Agriculture, forestry, fishing, and hunting × 20/4	0.00247	0.0153	0.0206
	(0.0134)	(0.0132)	(0.0186)
[Occupation] Management, business, and financial			
Professional and related × 20/4	-0.00624*	0.0332***	0.0260***
	(0.00344)	(0.00453)	(0.00587)
Service × 20/4	-0.00722	0.115***	0.112***
	(0.00480)	(0.00787)	(0.00926)
Sales and related × 20/4	-0.0114*	0.0668***	0.0643***
	(0.00586)	(0.00787)	(0.0101)
Office and administrative support × 20/4	-0.0105**	0.0395***	0.0330***
	(0.00476)	(0.00643)	(0.00822)
Farming, fishing, and forestry × 20/4	-0.0492**	0.0622**	0.00959
	(0.0223)	(0.0256)	(0.0330)
Construction and extraction × 20/4	0.0147*	0.0881***	0.111***
	(0.00856)	(0.0122)	(0.0152)
Installation, maintenance, and repair × 20/4	-0.0132*	0.0573***	0.0462***
	(0.00705)	(0.0123)	(0.0146)
Production × 20/4	-0.0163**	0.102***	0.0922***
	(0.00691)	(0.0112)	(0.0134)
Transportation and material moving × 20/4	-0.00136	0.0738***	0.0784***
	(0.00733)	(0.00995)	(0.0125)
Observations	78051	78051	78051
R^2	0.015	0.123	0.107

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Table A2 – *Covid-19 Recovery: 2021 February*

	(1) Jobless Unemployment	(2) Furlough	(3) Unemployment
[Industry] Public administration			
Mining × 21/2	0.0360	0.0208	0.107**
	(0.0310)	(0.0155)	(0.0415)
Construction × 21/2	0.00689	0.00644	0.0257**
	(0.00735)	(0.00547)	(0.0103)
Manufacturing × 21/2	-0.000880	-0.00187	0.00222
	(0.00600)	(0.00370)	(0.00793)
Wholesale and retail trade × 21/2	0.0155**	-0.000155	0.0245***
	(0.00683)	(0.00370)	(0.00851)
Transportation and utilities × 21/2	0.0135*	0.00607	0.0315***
	(0.00800)	(0.00502)	(0.0104)
Information × 21/2	0.0276**	0.00458	0.0365***
	(0.0111)	(0.00494)	(0.0135)
Financial activities × 21/2	0.0103*	-0.000209	0.0127
	(0.00628)	(0.00328)	(0.00792)
Professional and business services × 21/2	0.00861	0.00175	0.0144*
	(0.00586)	(0.00382)	(0.00763)
Educational and health services × 21/2	-0.00221	-0.00126	-0.00240
	(0.00461)	(0.00290)	(0.00609)
Leisure and hospitality × 21/2	0.0294***	0.0132***	0.0610***
	(0.00852)	(0.00498)	(0.0107)
Other services × 21/2	0.0159**	0.00665	0.0326***
	(0.00774)	(0.00459)	(0.0102)
Agriculture, forestry, fishing, and hunting × 21/2	-0.0201*	0.0281*	0.0165
	(0.0116)	(0.0159)	(0.0203)
[Occupation] Management, business, and financial			
Professional and related × 21/2	0.000910	-0.000328	0.000796
	(0.00378)	(0.00177)	(0.00458)
Service × 21/2	0.0181***	0.00693**	0.0386***
	(0.00581)	(0.00342)	(0.00727)
Sales and related × 21/2	-0.00559	0.00591*	0.00232
	(0.00655)	(0.00334)	(0.00788)
Office and administrative support × 21/2	0.00439	-0.000337	0.0115*
	(0.00534)	(0.00264)	(0.00664)
Farming, fishing, and forestry × 21/2	0.0350	-0.0349	0.000413
	(0.0257)	(0.0243)	(0.0363)
Construction and extraction × 21/2	0.0156*	0.00963	0.0266**
	(0.00905)	(0.00732)	(0.0128)
Installation, maintenance, and repair × 21/2	0.00224	0.00160	0.0134
	(0.00742)	(0.00441)	(0.0102)
Production × 21/2	0.00208	0.00183	0.0109
	(0.00856)	(0.00507)	(0.0108)
Transportation and material moving × 21/2	0.0135*	0.0114**	0.0267***
	(0.00787)	(0.00490)	(0.0100)
Observations	73926	73926	73926
R^2	0.021	0.017	0.036

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Tables A1 and A2 report the coefficients on the industry and occupation fixed effects in the regressions (1)-(3) of Tables 1 and 2 in the main text.

By industry, we see that leisure/hospitality and other services were hit the hardest, and they have still not recovered even in February 2021. However, taking into account the large, negative initial hit it took, other services showed the fastest recovery. On the other hand, public administration and agriculture not only suffered less but also recovered faster than most other industries. Since most agricultural work can be done outdoors with ample room for social distancing, this finding is not surprising. Although the initial impact of the shock was hard on manufacturing and education/health services, their speed of recovery surpassed even that of public administration. The financial activities industry was relatively safe, which contrasts with the 2008 crisis.

Looking into occupations, we see service and construction occupations were hit hardest and recovered slowest. Production occupations also suffered initially but recovered faster than other occupations. Management/business/financial, office/administrative support and professional and related occupations suffered the least and also recovered fast. This may have been thanks to their ability to work remotely, which is in line with results from Montenovo et al. (2020).

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