Disparities in the Impact of COVID-19 on Employment, Human Capital and Consumption

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Abstract

This paper investigates the sociodemographic differences in household responses to the COVID-19 pandemic regarding employment, education, and consumption. We find that the significant racial disparities documented initially in terms of employment during the pandemic can be explained, in part, by differences in household income and composition, respondents' education, and occupational sorting. Nonetheless, we document pervasive racial, income, and educational gradients when focusing on the immediate education disruptions experienced by children, household food insecurity, and reliance on social insurance programs and other forms of government assistance during the pandemic. Overall, our results highlight that the disparities observed for household income and respondents' education tend to be the most significant and most pervasive following the onset of the COVID-19 crisis.

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1 Introduction

Since the onset of the COVID-19 pandemic, households have experienced significant disruptions in many aspects of their lives that could potentially have long-lasting economic and social implications. In particular, it is well documented that the pandemic has had an unequal impact on employment with respect to income, race, and education that have contributed to a widening of pre-existing disparities.[1] In this paper, we adopt a more comprehensive approach by investigating how these employment gaps relate to sociodemographic gradients in the impact of the pandemic on children's education and household consumption which, to the best of our knowledge, remains an open question. Specifically, we find significant differences across racial, income, and education groups regarding the education disruptions faced by school-aged children during the pandemic. We also find persistent racial disparity in food insecurity and the reliance on social insurance programs and other government assistance during the pandemic.

To implement our approach, we rely on data obtained from the first 23 weeks of the Census Bureau's Household Pulse Survey containing information on employment, housing, food sufficiency, spending patterns, and educational changes.[2] We supplement this survey data with information on state-level COVID-19 cases and death counts and average mobility changes relative to February 2020 for each corresponding week captured in the Pulse retrieved from the COVID Tracking Project and Google's Mobility Reports, respectively. Furthermore, we use the Current Population Survey data to control for pre-pandemic trends when focusing on outcomes for which there is information available before the onset of the COVID-19 pandemic. Combining these data sources, we identify the differential impact of the pandemic across sociodemographic groups by implementing a regression-based methodology that allows us to control for differences in other individual and household characteristics and state-specific differences related to differences in the containment of the virus across states.

First, we focus on trends in employment and earnings losses experienced during the pandemic. We find significant disparities in earnings losses with respect to house-

[1] An overview of the existing evidence on the effect of COVID-19 on employment can be found in Adams-Prassl et al. (2020), Alon et al. (2020), Angelucci et al. (2020), Montenovo et al. (2020), Mongey, Pilossoph and Weinberg (2020), and Wozniak et al. (2020).

[2] As will be discussed in further detail in Section 2, we use a mix of household-level and individual-level information provided in the survey. Therefore, when focusing on outcomes reported at the household level, the sociodemographic characteristics of interest are related to those of the respondents who completed the survey.

hold income and respondents' education and race that persist even after controlling for other household and respondents' characteristics. This finding is consistent with the sociodemographic differences in the decline in employment rates observed during the pandemic. Furthermore, we find that racial and education disparities in employment and earnings losses go away once we control for household income. The elimination of the racial gap in earning loss during the pandemic once we control for household income can be attributable to the strong relationship between household income and workers' ability to work from home documented in Mongey, Pilossoph and Weinberg (2020) and Blau, Koebe and Meyerhofer (2020). To substantiate this argument, we corroborate those individuals living in households at the lower quintiles of the income distribution and without a college degree were significantly less likely to experience a switch to telework during the pandemic, which persists even after controlling for occupation. This result is in line with the decomposition results in Montenovo et al. (2020) indicating that a significant part of the sociodemographic gradients in employment losses is because of differences in pre-pandemic occupational sorting, which is strongly related to workers' ability to work from home.

Second, we analyze the different types of non-employment related to the pandemic. We find that non-employment due to business responses to the pandemic and symptoms associated with COVID-19 was more prevalent among black and Hispanics, individuals living in households in the bottom quintiles of the income distribution, and individuals without a college degree. These disparities persist even after controlling for other sociodemographic and household characteristics and respondents' occupations. The patterns observed regarding non-employment due to business responses to the pandemic are consistent with the sociodemographic gradients reported in Adams-Prassl et al. (2020), and Montenovo et al. (2020) related to job losses and layoffs experienced during the pandemic. Similarly, the patterns observed in non-employment due to symptoms associated with COVID-19 are attuned with the disparities documented by Angelucci et al. (2020) and Papageorge et al. (2020) in individuals' adoption of self-protective behavior and reflective of the uneven spread of the virus across sociodemographic groups, primarily when focusing on racial differences.

We also find similar income and education gradients in the impact of the pandemic on non-employment as it relates to the childcare needs of the household. However, differences in household composition across race explain the racial disparity originally observed in childcare needs inducing non-employment. Furthermore, the pandemic has

widened a pre-existing gender gap in non-employment because of the need to provide childcare for children in the households. Women were significantly more likely to report that childcare needs were the reason for non-employment during the pandemic than their male counterparts, even after controlling for pre-pandemic trends. This finding corroborates that, besides differences in occupational sorting, the increased demand for home child care has contributed to the adverse impact of the pandemic on women's employment rates documented in Alon et al. (2020) and Montenovo et al. (2020).

Third, we analyze changes in learning format experienced by children in respondents' households at the onset of and during the pandemic. Notably, we focus on documenting differences in the incidence with which children's classes were either canceled altogether or switched to remote at the onset of the pandemic (relating to the 2019-2020 academic year). These statistics potentially reflect differences in the ability of school districts to adapt to lockdowns which, in turn, reflect pre-existing socioeconomic differences across these districts. Furthermore, we also focus on documenting sociodemographic differences in access to active learning resources, particularly computers. Overall, we are interested in understanding whether there exist significant gaps in children's ability to adapt to the different education disruptions caused by the pandemic that might ultimately affect their human capital accumulation.[3]

We find that children in households of non-white respondents were significantly more likely to have their classes canceled at the onset of the pandemic and considerably less likely to have their classes switched to a remote format. We document a similar pattern for household income (when comparing households in the bottom quintile of the income distribution and families in the top quintile) and the respondents' education (when comparing households of respondents without a college degree and those of college graduates). Moreover, our results indicate that children in families of non-white respondents, poorer households, and respondents without a college degree were significantly less likely to have access to a computer for educational purposes. The observed income and education gradient resemble the strong association between income and active home learning resources documented by Andrew et al. (2020) in the UK. More importantly,

[3]The focus on these two outcomes related to children's education is motivated by the literature that investigates the impact of natural disasters like hurricanes on children's educational outcomes. It can be argued that the pandemic has caused education disruptions comparable to the ones prompted by natural disasters in the sense that it has thwarted students' ability to receive in-person instruction at their regular schools. Furthermore, it is expected that their ability to adjust to these education disruptions will play an essential role in their long-run educational outcomes, as it has been documented in Sacerdote (2012) when focusing on the case of hurricanes.

we find that among households in which children have access to a computer, those in the aforementioned sociodemographic groups were more likely to rely on schools as the primary providers of this resource.

Lastly, we consider two main aspects related to consumption. The first one pertains to the incidence with which households experienced food insufficiency during the pandemic. The second one relates to the sources of spending income used by households during the pandemic as losses in employment income became more pervasive. We find that households of blacks and Hispanics, of respondents without a college degree and living in households at the lower quintiles of the income distribution were more adversely impacted by the pandemic in terms of food insufficiency. We follow Moffitt and Ziliak (2020) and Ziliak (2020) in using information from the December Food Security Supplement of the CPS to corroborate that such adverse impact documented among these sociodemographic groups during the pandemic has significantly worsened pre-pandemic disparities in food insecurity, particularly when focusing on differences across income quintiles and education groups.

We then focus on investigating the different buffers used by households to face the income shock generated by the pandemic. We find that the sociodemographic groups with a higher share of households experiencing employment income losses during the pandemic relied significantly more on borrowing from family and friends and the economic impact payment (EIP) than households that less adversely affected in terms of employment income losses. When investigating how the EIP was spent, we find that a relatively higher share of households in these sociodemographic groups used this money to cover food expenditures and utilities. We find similar gaps in the share of households saving this additional income as this share increases monotonically with household income and respondents' education and is higher for white respondents' households than for their non-white counterparts.

Given that the reliance on UI as a spending income source does not reflect the disparities documented in terms of employment income losses, we analyze differences in the demand for and receipt of these benefits. We find that while the education, income and race gradients documented in terms of the share of respondents applying for UI benefits are consistent with the disparities documented in terms of employment income losses, these disparities are actually reversed when we focus on the share of respondents who reported receiving UI benefits conditional on applying for these. This is aligned with the criticism raised in Bitler, Hoynes and Schanzenbach (2020) that social insurance

programs in the US have not effectively responded to the unmet needs of relatively more disadvantaged households during the pandemic. The authors argue that such shortcoming of these programs is mostly attributable to delays, coverage gaps and magnitude of benefits, particularly related to UI.

The remainder of the paper is organized as follows. Section 2 describes the data sources and empirical strategy used in our analysis. Section 3 presents trends in employment during the pandemic. In Section 4, we discuss the different patterns observed in terms of the education disruptions experienced by school-aged children in respondents' households. Section 5 describes our findings related to the incidence of food insufficiency and the different spending income sources used by households during the pandemic. Section 6 concludes.

2 Data and Empirical Strategy

2.1 Data Description

The dataset used in the analysis implemented throughout this paper is obtained from the public use files covering weeks 1-36 of the Household Pulse Survey, spanning the time period of April 23, 2020-August 30,2021.[4] The Household Pulse is an online survey created by the U.S. Census Bureau in collaboration with other federal agencies to collect timely data on household responses to the COVID-19 pandemic regarding employment, housing, food sufficiency, spending patterns, travel plans, housing, application and receipt of social security benefits, and educational changes.[5] The survey has been carried out in three main phases and is nationally representative when using the weights provided by the Census Bureau.[6] Thus, we primarily use the combination of household-level and

[4]The public use files and technical documentation can be retrieved from https://www.census.gov/programs-surveys/household-pulse-survey/datasets.html .

[5]Due to the limitations imposed by lockdowns on data collection, other papers documenting the economic impact of COVID-19 rely on alternative data collection methods. Adams-Prassl et al. (2020) use the COVID Inequality data which was collected around April 9-14 for the US, UK and Germany with sample sizes of 4,000, 4,931 and 4,002, respectively. It is argued to be comparable to nationally representative data such as the CPS (US), LFS (UK), and SOEP (Germany).Angelucci et al. (2020) use 9 waves of the Understanding America Study which is a nationally-representative online panel of 6,922 US adults spanning March 10-July 21, 2020. For the analysis of consumption, the use of transaction data is common. Baker et al. (2020) use transaction-level data from a nonprofit company called SaverLife spanning from August 2016 and March 2020.

[6]Phase 1 was collected between April 23, 2020 and July 21, 2020, Phase 2 between August 19, 2020 and October 26, 2020, and Phase 3 collected between October 28, 2020 and extending to March 29, 2021. The

individual-level information on employment, educational arrangements and consumption provided in the Pulse to document socio-demographic disparities in the pandemic's impact.

We control for state-level differences in the spread of the virus and the containment measures in our analysis by supplementing the Pulse data with state-level information on the number of COVID-19 cases and of mobility obtained from the COVID Tracking Project, the CDC Case Surveillance public use data, and Google's Mobility Reports, respectively. The latter have been used for cross-country capturing changes in mobility in response to lockdowns as a way to assess degree of compliance with this type of containment measure as in (Bargain and Aminjonov (2020)). Trends by sociodemographic groups and region are presented in Appendix A. We also supplement the Pulse information with data from the Current Population Survey (CPS) from January 2019-August 2021 for outcomes captured in both datasets. This allows us to control for pre-pandemic trends in these variables in order to capture how the pandemic has widened pre-existing gaps.

The disparities we explore relate to respondents' educational background, race, gender and income quintile (based on their reported household income). Specifically, the income quintiles we use in the analysis are defined using the income brackets provided in the Pulse and following the 2019 mean quintile incomes in the January 13, 2021 update of Donovan, Labonte and Dalaker (2016): (ii) Bottom Quintile includes the income bracket with household income lower than $25,000, (ii) Second Quintile includes the income brackets with household income between $25,000 and $50,000, (iii) Third Quintile includes the income bracket with household income between $50,000 and $75,000, (iv) Fourth Quintile includes the income brackets with household income between $75,000 and $150,000, and (v) Top Quintile includes the income brackets with household income higher than $150,000.

To analyze trends in employment during the pandemic, we use the data available in the Pulse regarding job losses, changes in work arrangements and employment interruptions. Similar to Mongey, Pilossoph and Weinberg (2020) and Montenovo et al. (2020), we also use data from the CPS to document how these trends have differed before and after the onset of the pandemic and to control for occupation-specific fixed effects. For employment interruptions associated with the pandemic, we focus on three main types of non-employment experienced during the pandemic. These relate to non-employment

projects was expanded to continue collecting data throughout the remaining months of 2021 in Phases 3.1 and 3.2 which cover the period spanned by April and August.

due to business responses to the pandemic, due to the onset of COVID-19 symptoms, and associated with meeting child care needs. Even though information on individuals' employment status was collected throughout the 36 weeks we use from the Pulse, information on the three types of non-employment we focus on throughout the analysis is available until week 27 (ending on March 29, 2021).

For trends in education, we use the information available in the Pulse regarding education disruptions, computer and internet availability and the extent to which schools have been able to provide access to educational material during the pandemic. While information on education disruptions is available during all weeks, the academic year of reference switched at the start of the 2020-2021 academic year started. This allows us to capture the types of education disruptions experienced by children during two academic years and the extent to which schools were able to adjust to the social distancing measures adopted for the containment of the virus at the start of the 2020-2021 academic year.

Regarding consumption, we focus on three important aspects collected in the Pulse. The first one pertains to the incidence with which households experienced food insufficiency during the pandemic. For this outcome, we follow a similar approach to the one implemented in Ziliak (2020), Moffitt and Ziliak (2020) and Bitler, Hoynes and Schanzenbach (2020) in supplementing the Pulse data with the CPS data, exploiting the fact that information on food sufficiency is available in both surveys, to document the extent to which the pandemic has increased the incidence of food insufficiency. The second one relates to the use made by households of the Economic Impact Payment received during the pandemic. Lastly, we focus on gaps in the application for and receipt of unemployment insurance (UI) benefits.

2.2 Empirical Strategy

In general, for outcomes observed only during the pandemic as in the case of the data obtained from the Pulse, we implement the following linear regression model to quantify the differential impact of the pandemic across sociodemographic groups

$$Y_{it} = \alpha + \boldsymbol{\beta}_G \mathbf{G}_i + \boldsymbol{\beta} \mathbf{X}_{it} + \eta_t + \eta_s + \nu_{st} + \epsilon_{it}$$

where $\mathbf{G}_i$ includes indicators of i's socio-demographic characteristics including education, race, and income quintile, and $\mathbf{X}_{it}$ other individual sociodemographic individual

and household characteristics. Furthermore, η_t denotes time-specific fixed effects (survey week fixed effects for data obtained from the Pulse and month fixed effects when using data from the CPS), η_s denotes state fixed effects, and ν_{st} denotes time-varying state characteristics. Among the latter, we consider the total number of new COVID-19 cases reported in state s during time period t and the different indices of geographic mobility documented for state s during time period t. Thus, for sociodemographic group G, the coefficient of interest throughout the analysis is captured by β_G.

When supplementing the Pulse data with the CPS to include information on months prior to the onset of the pandemic, we consider a variation of the specification implemented in Angelucci et al. (2020). Specifically, we implement the following linear regression model

$$Y_{it} = \alpha + \gamma Post_t + \boldsymbol{\beta}_G G_i + \boldsymbol{\beta}_{Gt} Post_t \times \mathbf{G}_i + \boldsymbol{\beta} \mathbf{X}_{it} + \eta_t + \eta_s + \nu_{st} + \epsilon_{it}$$

where $Post_t$ is an indicator of whether t corresponds to a pandemic month (after March 2020). Thus, for sociodemographic group G, the coefficient of interest throughout the analysis is captured by β_{Gt} as it captures the differential impact of the pandemic on group G when accounting for pre-existing gaps in the relevant outcome.

3 Employment

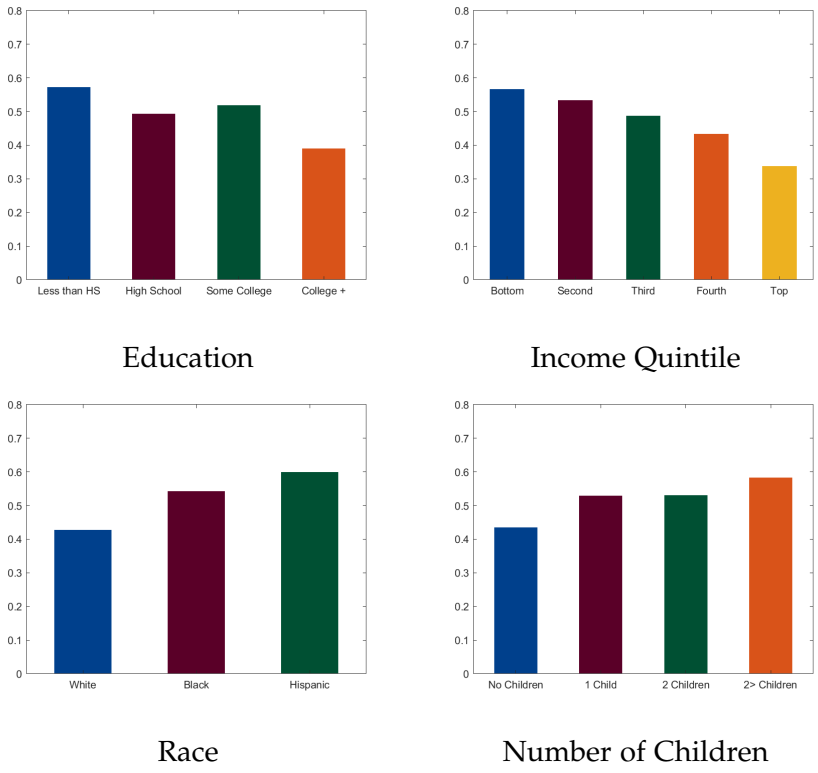
This section focuses on the effect of COVID-19 on (1) the incidence of employment income losses and changes in work arrangements in the respondents' households, and (2) individuals' employment status during the week prior to the survey.

3.1 Employment Income Losses

Overall, approximately 48% of households had experienced a loss in employment income since March 13, 2020. However, there exist noticeable differences across households in terms of education, income, race and the number of children in the household. Figure 1 presents the fraction of households within each socio-demographic group that have reported an employment income loss since the onset of the COVID-19 crisis.

In term of education, there is evidence of differential household employment income losses in terms of the respondents' education. While almost 58% of households in which the respondent has less than a high school diploma report experiencing a drop in em-

Figure 1: Loss of Employment Income Experienced in the Household since March 13th, 2020



Notes: Averages across all available weeks are reported.

ployment income since the start of the pandemic, only 39% of households in which the respondent has a college degree or higher report experiencing an earnings loss. Upon controlling for additional sociodemographic characteristics including household income and the respondent's age as well as for state-level mobility changes and average number of new COVID-19 cases and deaths in Table 1, we find that the education gradient in the incidence of employment income losses is non-monotonic among households in which the respondent did not have a college degree. While we find that these households were more likely to experience an employment income loss during the pandemic relative to those of college graduates, this was slightly higher among households of respondents with some college (7.4 percentage points compared to 4.7 percentage points among households of high school dropouts and 3.5 percentage points among households of high school graduates).

In terms of income, the incidence of employment income losses during the COVID-19 pandemic monotonically decreases with household income. While approximately 57%

Table 1: Households' Probability of Experiencing a Loss in Employment Income

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Earn. Loss	Earn. Loss	Earn. Loss	Earn. Loss	Earn. Loss	Earn. Loss	Earn. Loss	Earn. Loss	Earn. Loss
𝟙(Black)	0.118***			0.082***	0.105***	0.079***	0.056***	0.053***	0.028***
	(0.003)			(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.008)
𝟙(Hispanic)	0.165***			0.135***	0.143***	0.128***	0.093***	0.075***	0.043***
	(0.003)			(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.007)
𝟙(Other Race)	0.032***			0.031***	0.048***	0.040***	0.018***	-0.011**	-0.039***
	(0.004)			(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
𝟙(Bottom quintile)		0.238***		0.203***		0.167***	0.172***	0.196***	0.245***
		(0.003)		(0.004)		(0.004)	(0.004)	(0.005)	(0.011)
𝟙(Second quintile)		0.206***		0.178***		0.146***	0.153***	0.174***	0.209***
		(0.003)		(0.003)		(0.003)	(0.003)	(0.004)	(0.008)
𝟙(Third quintile)		0.160***		0.143***		0.117***	0.127***	0.138***	0.175***
		(0.003)		(0.003)		(0.003)	(0.003)	(0.004)	(0.008)
𝟙(Fourth quintile)		0.104***		0.095***		0.079***	0.086***	0.089***	0.111***
		(0.002)		(0.002)		(0.002)	(0.002)	(0.003)	(0.005)
𝟙(Less than HS)			0.172***		0.127***	0.083***	0.049***	0.047***	0.057***
			(0.004)		(0.005)	(0.006)	(0.006)	(0.008)	(0.013)
𝟙(HS)			0.109***		0.092***	0.050***	0.034***	0.035***	0.052***
			(0.002)		(0.002)	(0.003)	(0.003)	(0.003)	(0.007)
𝟙(Some College)			0.131***		0.118***	0.088***	0.074***	0.074***	0.066***
			(0.002)		(0.002)	(0.002)	(0.002)	(0.002)	(0.005)
Household Size							0.041***	0.065***	0.046***
							(0.001)	(0.002)	(0.003)
Num. of Children							-0.001	-0.031***	-0.039***
							(0.001)	(0.002)	(0.004)
𝟙(Female, Respondent)							-0.018***	-0.012***	-0.010**
							(0.002)	(0.002)	(0.005)
𝟙(Married, Respondent)							-0.032***	-0.033***	-0.016***
							(0.002)	(0.003)	(0.006)
Average Mobility, Retail Areas							0.000	0.000	0.000
							(0.001)	(0.001)	(0.002)
Average Mobility, Transit Stations							-0.000	-0.001	-0.002**
							(0.000)	(0.000)	(0.001)
Average Mobility, Grocery Stores							-0.000	-0.000	0.001
							(0.001)	(0.001)	(0.002)
Average Mobility, Workplaces							-0.001	0.001	-0.001
							(0.001)	(0.001)	(0.002)
Average Mobility, Residential Areas							-0.001	0.000	-0.006
							(0.002)	(0.003)	(0.005)
Avg. Num. of New Cases, State							-0.000	-0.000	-0.000
							(0.000)	(0.000)	(0.000)
𝟙(At Least 1 Adult in Tele-Work)								0.024***	-0.063***
								(0.003)	(0.005)
𝟙(Distance Learning Switch)									0.043***
									(0.005)
𝟙(Clases were Cancelled)									0.057***
									(0.005)
Constant	0.377***	0.251***	0.321***	0.245***	0.300***	0.219***	0.342	-0.007	0.840
	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.251)	(0.377)	(0.731)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2226429	1899190	2310090	1831341	2226429	1831341	1760133	834165	210067

of households in the bottom quintile of the income distribution report experiencing a loss in employment income since March 13, 2020, 33% of households in the top quintile of the income distribution have reported a drop in earnings during the pandemic. Table 1 shows that this income gradient observed persists once we control for other sociodemographic characteristics and average state-level mobility and cases. In particular, we find that households in the bottom quintile were 22.6 percentage points more likely to experience a loss in employment income during the pandemic relative to households in top quintile of the income distribution.

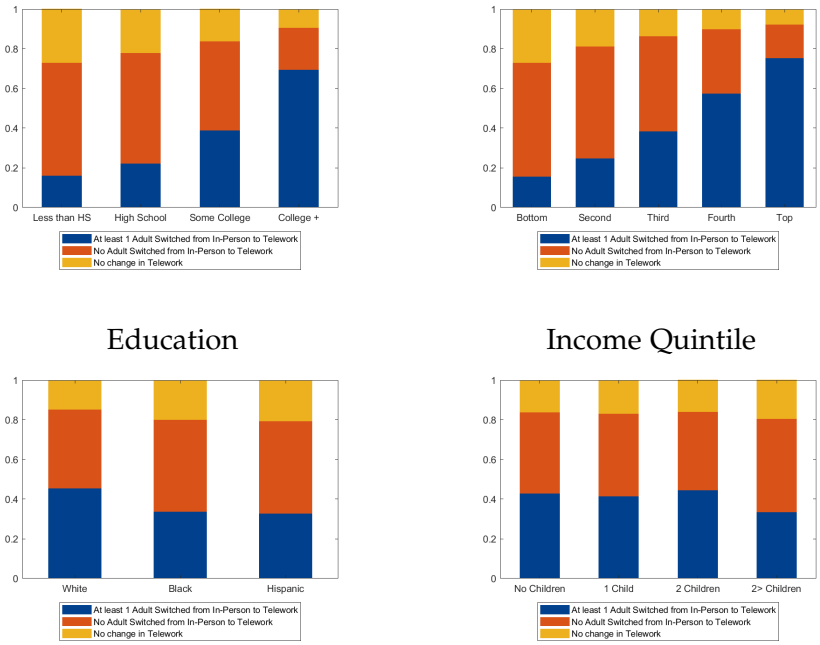
We also find that income losses display substantial racial differences. While 43% of white respondents' households report experiencing a decline in employment income during the pandemic, 55% and 60% of black and Hispanic respondents' households, respectively, report experiencing a similar drop in earnings since March. The results presented in Table 1 suggest that these persist even after controlling for household income and composition, respondent's education and changes in work arrangements. In particular, we observe that the probability of experiencing an employment income loss among households of black and Hispanic respondents was 5.3 percentage points and 7.5 percentage points higher than among households of white respondents, respectively.

3.2 Changes in Work Arrangements

Adams-Prassl et al. (2020) find that the share of tasks that can be done from home is a strong predictor of the share of workers who have experienced a job loss throughout the pandemic, explaining up to 69% of the variation in job losses related to COVID-19 in the US. Given the socio-demographic patterns presented above in terms of the incidence of employment income losses experienced by households since the start of the pandemic, it is then pertinent to investigate whether there exist comparable patterns in households' work arrangement changes. Figure 2 presents the differences observed in the ability of adults living in the respondents' households to switch from in-person work to work from home with respect to education, income, race and number of children in the household. Table 2 presents the results from implementing a linear probability model on the incidence that at least one adult in the respondent's household switched their typical in-person work to tele-work during the pandemic.

In terms of education, while only 15% of households in which the respondent has less than a high school diploma report at least one adult household member substituting his/her typical in-person work for tele-work, more than 60% of households in which the

Figure 2: Changes in Household Adults' Work Arrangements



Education | Income Quintile

Race | Number of Children

Notes: [1] Averages across weeks are reported. [2] Information on changes in household members' work arrarangements is available only in Phase 2 and Phase 3 of the survey: question explicitly defines telework as working from home and asks whether any adult in the household has substituted some or all of their typical in-person work for telework because of the pandemic (including the respondent) with the options being (a) yes, at least one adult, (b) no, no adults have substituted their typical in-person work for telework, and (c) no, there has been no change in telework.

respondent has a college degree or higher report at least one adult household member starting to work from home during the pandemic. The LPM results suggest that the probability of at least one adult in the household switching to tele-work during the pandemic is 33.4 percentage points lower for households in which the respondent does not have a high school diploma compared to households in which the respondent has a college degree or higher.

We also find a sharp income gradient in the incidence of at least one adult household member starts working from home due to the pandemic. While 13% of households at the bottom of the income distribution report at least one adult working from home due to the pandemic, 70% of households at the top of the distribution report a switch between in-person work and tele-work. The LPM results suggest that the probability of experiencing at least one adult switching to tele-work during the pandemic is lower by

41.9 percentage points for households in the bottom quintile of the distribution relative to households in the top quintile of the distribution.

Similar to the differences observed in employment income losses, Figure 2 shows that there are also noticeable racial differences in the incidence of changes in households' work arrangements. Around 33% of black respondents' households and of Hispanic respodents' households had at least one adult working from home due to COVID-19 while 45% of white respondents' households had at least one adult tele-working in response to the pandemic. Focusing on Column 1 of Table 2, the LPM results suggest an initial racial disparity on the probability of at least one adult switching to tele-work during the pandemic by indicating that this probability is lower by 7.1 and 9.5 percentage points for black and Hispanic respondents, respectively, compared to their white counterparts. Nonetheless, we find that these racial differences are reversed once we control for household income and respondents' education.

We supplement the Pulse's household-level information on adults' work arrangement changes with individual-level data on respondents' changes to tele-work during the pandemic obtained from the CPS. Table 3 presents the results from implementing a linear probability model on respondents' changes in work arrangements. Using the CPS data allows us to control for occupation fixed effects which is of particular importance given the observed relationship between workers' occupation and ability to work from home documented in Adams-Prassl et al. (2020). We corroborate that differences in occupation matter as we find that the disparities documented with respect to race, income and education reduce in magnitude and statistical significance (in the case of race) once we control for occupation-specific fixed effects.

Table 2: At Least 1 Adult in the Household Switched to Tele-Work during the Pandemic

	(1) Tele-Work	(2) Tele-Work	(3) Tele-Work	(4) Tele-Work	(5) Tele-Work	(6) Tele-Work	(7) Tele-Work
𝟙(Black)	-0.071***			0.026***	-0.029***	0.031***	0.019***
	(0.003)			(0.004)	(0.003)	(0.004)	(0.004)
𝟙(Hispanic)	-0.095***			0.010***	-0.010***	0.045***	0.029***
	(0.003)			(0.004)	(0.003)	(0.003)	(0.004)
𝟙(Other Race)	0.088***			0.079***	0.031***	0.040***	0.028***
	(0.005)			(0.005)	(0.004)	(0.005)	(0.005)
𝟙(Bottom quintile)		-0.552***		-0.553***		-0.403***	-0.419***
		(0.003)		(0.003)		(0.004)	(0.004)
𝟙(Second quintile)		-0.481***		-0.482***		-0.355***	-0.362***
		(0.003)		(0.003)		(0.003)	(0.004)
𝟙(Third quintile)		-0.362***		-0.363***		-0.269***	-0.272***
		(0.003)		(0.003)		(0.003)	(0.004)
𝟙(Fourth quintile)		-0.179***		-0.179***		-0.129***	-0.129***
		(0.003)		(0.003)		(0.003)	(0.003)
𝟙(Less than HS)			-0.454***		-0.448***	-0.321***	-0.334***
			(0.005)		(0.005)	(0.006)	(0.006)
𝟙(HS)			-0.412***		-0.409***	-0.293***	-0.298***
			(0.002)		(0.002)	(0.003)	(0.003)
𝟙(Some College)			-0.258***		-0.254***	-0.178***	-0.186***
			(0.002)		(0.002)	(0.002)	(0.002)
Household Size							0.021***
							(0.001)
Num. of Children							-0.007***
							(0.002)
𝟙(Female, Respondent)							0.005**
							(0.002)
𝟙(Married, Respondent)							-0.039***
							(0.002)
Average Mobility, Retail Areas							-0.000
							(0.001)
Average Mobility, Transit Stations							-0.000
							(0.000)
Average Mobility, Grocery Stores							0.001
							(0.001)
Average Mobility, Workplaces							-0.001
							(0.001)
Average Mobility, Residential Areas							-0.003
							(0.002)
Avg. Num. of New Cases, State							0.000
							(0.000)
Constant	0.276***	0.604***	0.519***	0.599***	0.525***	0.681***	1.093***
	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)	(0.007)	(0.325)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1137666	927452	1181074	893983	1137666	893983	834972

Table 3: Individual Switched to Tele-Work during the Pandemic, Aggregating Occupation Code to a 2-Digit Code [CPS]

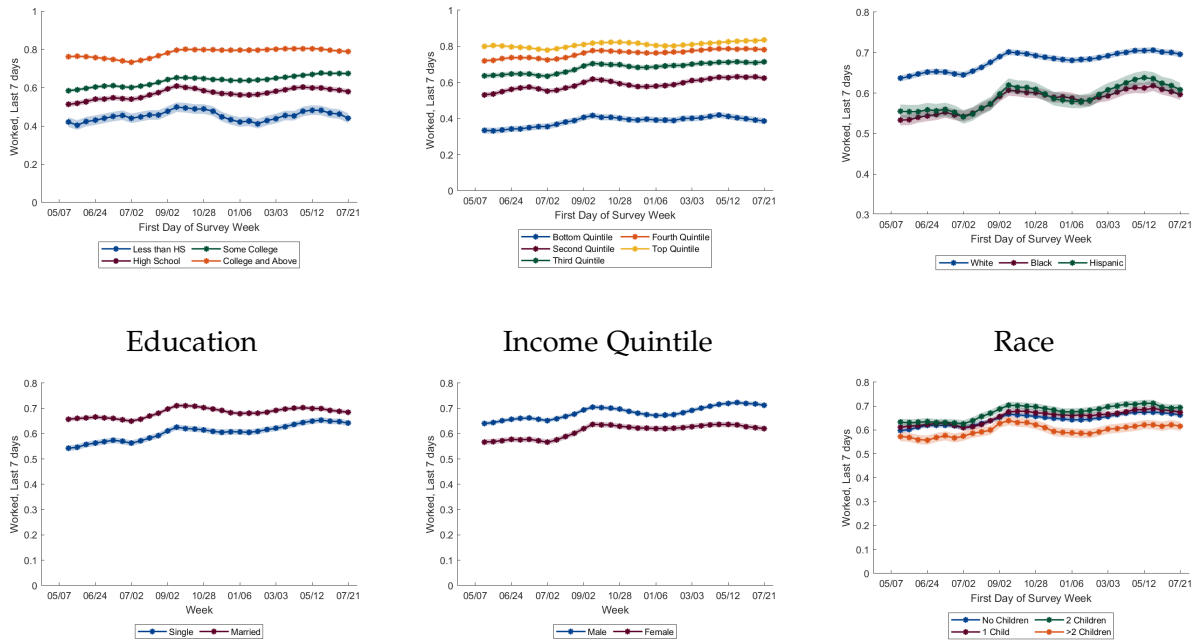
	(1) Tele-Work	(2) Tele-Work	(3) Tele-Work	(4) Tele-Work	(5) Tele-Work	(6) Tele-Work	(7) Tele-Work	(8) Tele-Work	(9) Tele-Work	(10) Tele-Work	(11) Tele-Work	(12) Tele-Work
1(Black)	-0.052***	-0.007***					-0.013***	0.009***	-0.013***	0.006***	0.002	0.013***
	(0.002)	(0.002)					(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
1(Hispanic)	-0.124***	-0.036***					-0.077***	-0.020***	-0.036***	-0.012***	-0.011***	0.004*
	(0.002)	(0.001)					(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
1(Other Race)	0.075***	0.051***					0.075***	0.052***	0.049***	0.039***	0.053***	0.039***
	(0.002)	(0.002)					(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
1(Bottom quintile)			-0.264***	-0.123***			-0.244***	-0.120***			-0.148***	-0.102***
			(0.002)	(0.002)			(0.002)	(0.002)			(0.003)	(0.003)
1(Second quintile)			-0.250***	-0.125***			-0.232***	-0.121***			-0.145***	-0.104***
			(0.002)	(0.002)			(0.002)	(0.002)			(0.003)	(0.002)
1(Third quintile)			-0.206***	-0.113***			-0.192***	-0.110***			-0.124***	-0.094***
			(0.002)	(0.002)			(0.002)	(0.002)			(0.002)	(0.002)
1(Fourth quintile)			-0.127***	-0.077***			-0.119***	-0.075***			-0.073***	-0.061***
			(0.002)	(0.002)			(0.002)	(0.002)			(0.002)	(0.002)
1(Less than HS)					-0.363***	-0.198***			-0.344***	-0.191***	-0.324***	-0.184***
					(0.001)	(0.002)			(0.002)	(0.002)	(0.002)	(0.002)
1(HS)					-0.313***	-0.185***			-0.304***	-0.182***	-0.296***	-0.181***
					(0.001)	(0.001)			(0.001)	(0.001)	(0.002)	(0.002)
1(Some College)					-0.248***	-0.153***			-0.242***	-0.151***	-0.238***	-0.150***
					(0.001)	(0.001)			(0.001)	(0.001)	(0.002)	(0.002)
1(Female, Respondent)											0.038***	0.033***
											(0.001)	(0.002)
1(Married, Respondent)											0.007***	-0.001
											(0.001)	(0.001)
Household Size											-0.028***	-0.019***
											(0.001)	(0.001)
Num. of Children											0.022***	0.017***
											(0.001)	(0.001)
Average Mobility, Retail Areas											-0.001	-0.000
											(0.000)	(0.000)
Average Mobility, Transit Stations											-0.002***	-0.002***
											(0.000)	(0.000)
Average Mobility, Grocery Stores											0.003***	0.002***
											(0.000)	(0.000)
Average Mobility, Workplaces											0.001	0.001**
											(0.001)	(0.001)
Average Mobility, Residential Areas											0.005***	0.006***
											(0.001)	(0.001)
Average Num. of New Cases, State											0.000***	0.000***
											(0.000)	(0.000)
Constant	0.254***	0.387***	0.398***	0.455***	0.428***	0.466***	0.391***	0.449***	0.425***	0.461***	-0.193	-0.215
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.206)	(0.194)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	707066	707066	707066	707066	707066	707066	707066	707066	707066	707066	431669	431669

3.3 Employment Status

While the discussion so far has centered on the impact of the pandemic on employment at the household level, the focus of the analysis is now shifted towards the impact of COVID-19 on individual respondents' work status during the week prior to the time of the survey. Figure 3 presents how the employment rate differs across socio-demographic groups over the weeks spanned by the Pulse.

Overall and averaging across all survey weeks available, 63% of respondents aged 18-65 have worked during the 7 days prior to the time of the survey. However, there are noticeable differences in employment rates that have persisted throughout the COVID-19 pandemic with respect to respondents' education, household income quintile, race, marital status, gender and number of children in the household. Table 4 presents the results from estimating a linear probability model on respondents' employment status during the pandemic.

Figure 3: Respondent Worked in the Last 7 Days



Education | Income Quintile | Race

Marital Status | Gender | Number of Children

Notes: [1] Equally-weighted five-survey week moving averages are presented.

With respect to education, we find that the employment rate was higher among workers with a college degree (steadily above 70% throughout all survey weeks) than among

workers without a college degree (oscillating between 40% and 50% during the pandemic). In general, we find that respondents without a college degree were less likely than college graduates to report being employed during the week prior to the interview. More specifically, as shown in column 7 of Table 4, we find that respondents without a high school degree were 15.7 percentage points less likely to report having worked during the pandemic than college graduates when we control for other sociodemographic characteristics and household income and composition. Using data from the CPS covering December 2019 up to December 2020, we find that respondents with a high school degree and those with some college were the education groups more adversely impacted than college graduates during the pandemic relative to pre-COVID months in terms of employment as shown in Column 8 of Table 5.

The income gradients documented so far persist when looking at individual respondents' employment status. Focusing on the two extremes of the income distribution, the employment rate was substantially higher among workers living in households in the top quintile (above 77% during all survey weeks) than for workers living in households in the bottom quintile (around 33-42% during the pandemic). The LPM results presented in Table 4 suggest that these persist after controlling for other sociodemographic characteristics, survey week and state fixed effects. In particular, we find that respondents living in households in the bottom quintile of the income distribution were almost 37.1 percentage points less likely to be employed during the pandemic than respondents in households at the top quintile of the income distribution. Through a pre- and post-pandemic comparison using CPS data from 2019 and 2020, we corroborate that individuals living in households at the bottom two quintiles of the income distribution were more adversely affected by the pandemic than respondents in households at the top of the income distribution.

Racial differences are also persistent when focusing on respondents' work status. While the employment rates of black and Hispanic respondents are very close to each other (oscillating between 55% and 62% throughout all survey weeks), the employment rate of their white counterparts is above 64% across all survey weeks. Nevertheless, the LPM results presented in Table 4 suggest that these racial gaps observed during the pandemic become insignificant once we control for household income, respondents' education and other household characteristics. A pre- and post-pandemic comparison using CPS data from 2019 and 2020 suggests that even after controlling for respondents' education and household characteristics, the employment rate of non-white individuals

Table 4: Employment, 2020

	(1) Employed	(2) Employed	(3) Employed	(4) Employed	(5) Employed	(6) Employed	(7) Employed
𝟙(Black)	-0.092***			-0.012***	-0.062***	-0.008***	-0.002
	(0.003)			(0.003)	(0.003)	(0.003)	(0.003)
𝟙(Hispanic)	-0.078***			-0.003	-0.019***	0.016***	0.005*
	(0.003)			(0.003)	(0.003)	(0.003)	(0.003)
𝟙(Other Race)	-0.001			0.011***	-0.028***	-0.005	-0.013***
	(0.003)			(0.004)	(0.003)	(0.004)	(0.004)
𝟙(Bottom quintile)		-0.432***		-0.428***		-0.355***	-0.371***
		(0.003)		(0.003)		(0.003)	(0.004)
𝟙(Second quintile)		-0.227***		-0.225***		-0.165***	-0.176***
		(0.003)		(0.003)		(0.003)	(0.003)
𝟙(Third quintile)		-0.136***		-0.135***		-0.090***	-0.097***
		(0.003)		(0.003)		(0.003)	(0.003)
𝟙(Fourth quintile)		-0.057***		-0.056***		-0.031***	-0.035***
		(0.002)		(0.002)		(0.002)	(0.002)
𝟙(Less than HS)			-0.324***		-0.313***	-0.180***	-0.157***
			(0.004)		(0.004)	(0.005)	(0.006)
𝟙(HS)			-0.216***		-0.212***	-0.124***	-0.113***
			(0.002)		(0.002)	(0.002)	(0.002)
𝟙(Some College)			-0.147***		-0.142***	-0.088***	-0.087***
			(0.001)		(0.001)	(0.002)	(0.002)
age							-0.004***
							(0.000)
Household Size							-0.010***
							(0.001)
Num. of Children							0.004***
							(0.001)
𝟙(Female, Respondent)							-0.059***
							(0.002)
𝟙(Married, Respondent)							0.007***
							(0.002)
Average Mobility, Retail Areas							0.000
							(0.000)
Average Mobility, Transit Stations							-0.000
							(0.000)
Average Mobility, Grocery Stores							-0.001
							(0.000)
Average Mobility, Workplaces							0.004***
							(0.001)
Average Mobility, Residential Areas							-0.001
							(0.001)
Avg. Num. of New Cases, State							-0.000
							(0.000)
Constant	0.610***	0.777***	0.730***	0.779***	0.746***	0.816***	0.921***
	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)	(0.198)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2155516	1811613	2245691	1739544	2155516	1739544	1687394

have been more adversely impacted by the pandemic than the employment rate of white individuals.

Table 5: Employment, 2019-2020

	(1) Employed	(2) Employed	(3) Employed	(4) Employed	(5) Employed	(6) Employed	(7) Employed	(8) Employed
𝟙(Black)	-0.063***			-0.002	-0.037***	0.005***	0.008***	0.010***
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Hispanic)	-0.020***			0.033***	0.047***	0.068***	0.069***	0.075***
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Other Race)	-0.031***			-0.020***	-0.038***	-0.025***	-0.024***	-0.020***
	(0.002)			(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
𝟙(Pandemic Month)	-0.019***	-0.011***	-0.018***	-0.005	-0.011***	0.000	-0.009***	-0.009**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
𝟙(Pandemic Month)×𝟙(Black)	-0.025***			-0.021***	-0.022***	-0.020***	-0.016***	-0.015***
	(0.003)			(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
𝟙(Pandemic Month)×𝟙(Hispanic)	-0.025***			-0.023***	-0.028***	-0.026***	-0.025***	-0.025***
	(0.002)			(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Pandemic Month)×𝟙(Other Race)	-0.019***			-0.021***	-0.022***	-0.023***	-0.022***	-0.023***
	(0.003)			(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
𝟙(Bottom quintile)		-0.365***		-0.371***		-0.308***	-0.297***	-0.317***
		(0.002)		(0.002)		(0.002)	(0.002)	(0.002)
𝟙(Second quintile)		-0.157***		-0.163***		-0.115***	-0.107***	-0.121***
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Third quintile)		-0.074***		-0.079***		-0.045***	-0.040***	-0.050***
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Fourth quintile)		-0.020***		-0.023***		-0.004***	-0.001	-0.007***
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Bottom Quintile)		-0.028***		-0.023***		-0.019***	-0.013***	-0.013***
		(0.003)		(0.003)		(0.003)	(0.003)	(0.003)
𝟙(Pandemic Month)×𝟙(Second quintile)		-0.041***		-0.036***		-0.032***	-0.027***	-0.027***
		(0.003)		(0.003)		(0.003)	(0.003)	(0.003)
𝟙(Pandemic Month)×𝟙(Third quintile)		-0.031***		-0.029***		-0.024***	-0.021***	-0.021***
		(0.003)		(0.003)		(0.003)	(0.003)	(0.003)
𝟙(Pandemic Month)×𝟙(Fourth quintile)		-0.014***		-0.013***		-0.010***	-0.009***	-0.010***
		(0.002)		(0.002)		(0.002)	(0.002)	(0.002)
𝟙(Less than HS)			-0.291***		-0.309***	-0.213***	-0.227***	-0.204***
			(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
𝟙(HS)			-0.146***		-0.152***	-0.095***	-0.107***	-0.092***
			(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Some College)			-0.112***		-0.115***	-0.080***	-0.083***	-0.075***
			(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Less than HS)			-0.006*		0.004	0.008**	0.007**	0.009**
			(0.003)		(0.003)	(0.004)	(0.003)	(0.003)
𝟙(Pandemic Month)×𝟙(HS)			-0.026***		-0.022***	-0.017***	-0.017***	-0.017***
			(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Pandemic Month)×𝟙(Some College)			-0.023***		-0.021***	-0.018***	-0.017***	-0.016***
			(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Female, Respondent)							-0.112***	-0.110***
							(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Female)							-0.006***	-0.006***
							(0.002)	(0.002)
𝟙(Married, Respondent)							0.001	0.024***
							(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Married)							0.018***	0.018***
							(0.002)	(0.002)
Household Size								-0.029***
								(0.000)
Num. of Children								0.025***
								(0.000)
age								-0.002***
								(0.000)
Constant	0.691***	0.801***	0.787***	0.804***	0.801***	0.844***	0.902***	1.044***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2141873	2141873	2141873	2141873	2141873	2141873	2141873	2141873

3.4 Reasons for Non-Employment

This subsection explores socio-demographic differences in three main reasons reported by individuals aged 18-65 for not working during the week prior to the survey: (1) feeling sick with COVID-19 symptoms, (2) being laid off, furloughed or losing employment as employers closed due to COVID-19, and (3) taking care of children not in school or in daycare.

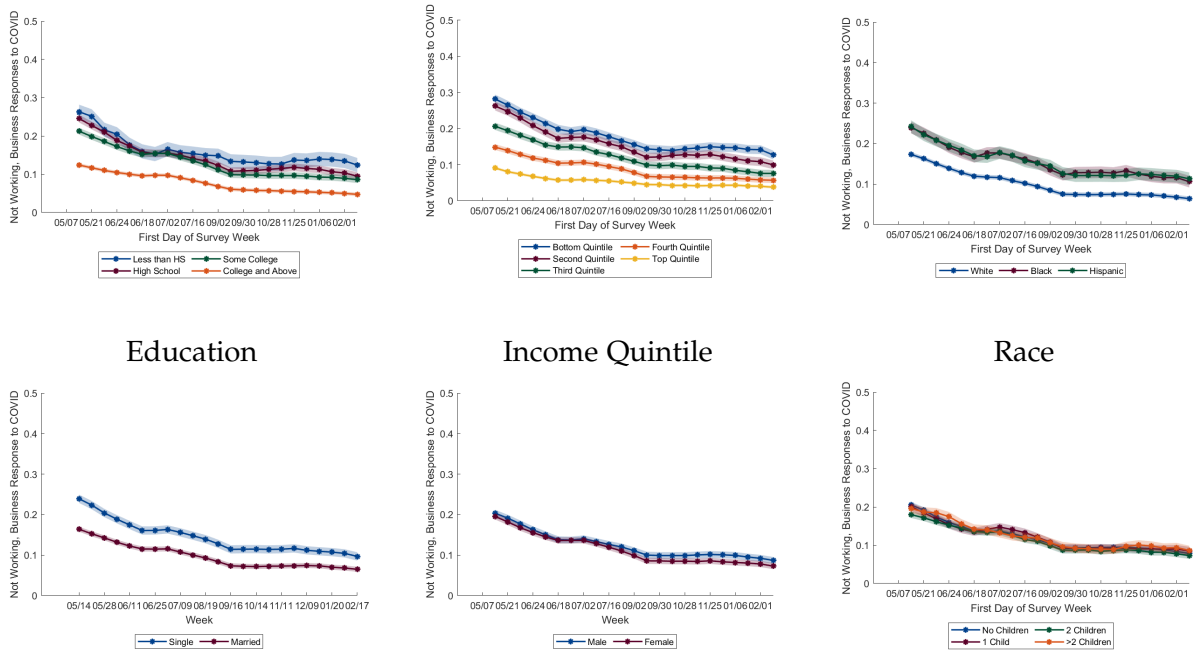
3.4.1 Business Responses to COVID-19

As the spread of COVID-19 started accelerating, both the implementation of increasingly strict lockdown measures and demand reductions in major sectors of the economy that did not fall within the working definition of critical infrastructure provided by the Department of Homeland Security[7], adversely impacted businesses in non-critical (i.e. non-essential) sectors of the economy. While some financially fragile businesses did not survive, resulting in mass layoffs, others either laid off or furloughed a share of their workers in response to the COVID-19 shock (Bartik et al. (2020)). Figure 4 presents the differences across socio-demographic groups in the incidence of respondents not working during the week prior to the survey because respondents were laid off or furloughed as their employers adjusted to the COVID-19 shock. Table 6 presents the results obtained upon the implementation of a linear probability model on the incidence of respondents experiencing non-employment due to employers' responses to COVID-19.

Focusing on differences in education, high school dropouts were almost twice as likely to experience a disruption in employment due to a business-related response to the COVID-19 shock as college graduates. While this education gap fell during the first nine survey weeks, this increased steadily since the end of June 2020. The results presented in column 8 of Table 6 show that upon controlling for respondents' race, household income and other household characteristics, respondents without a college degree were significantly more likely to be unemployed due to employers' response to COVID-19 than college graduates. Furthermore, we also document that high school graduates (both without college education and with some college) were the most adversely affected by the pandemic in this regard. We check that the latter is robust using data from the CPS as shown in Column 11 of Table 7, though it is robust only for respondents with some college once we control for occupation as presented in Column 12.

[7]Based on the analysis of Blau, Koebe and Meyerhofer (2020), 194 out of 287 industry categories in the North American Industry Classification System (NAICS) can be categorized as essential.

Figure 4: Respondent Not Working in the Last 7 Days, Business Response to COVID



Education | Income Quintile | Race

Marital Status | Gender | Number of Children

Notes: [1] Equally-weighted five-survey week moving averages are presented.

Similarly, respondents living in households in the bottom quintile of the income distribution were more than 3 times as likely such employment disruption as respondents living in households in the top quintile. The results presented in column 7 of Table 6 suggest that this persists when controlling for respondents' education and race as well as other household characteristics as we find that the likelihood of non-employment due to employers' response to COVID-19 monotonically decreases with household income. In particular, we find that respondents in households at the bottom quintile of the income distribution were almost 10.6 percentage points more likely to report non-employment due to businesses' responses to the pandemic relative to respondents in households at the top quintile of the income distribution.

With respect to race, both black and Hispanic workers were more than 1.3 times as likely to not be working due to a business reduction in response to the pandemic. The regression results presented in Column 7 of Table 6 suggest that these persist when controlling for respondents' education, household income and other household characteristics.Specifically, we find that blacks and Hispanics were 2.4 and 2 percentage points

Table 6: Non-Employment During the Pandemic: Business Response to COVID-19

	(1) Bus. Resp.	(2) Bus. Resp.	(3) Bus. Resp.	(4) Bus. Resp.	(5) Bus. Resp.	(6) Bus. Resp.	(7) Bus. Resp.
𝟙(Black)	0.050***			0.026***	0.042***	0.025***	0.024***
	(0.002)			(0.003)	(0.002)	(0.003)	(0.003)
𝟙(Hispanic)	0.043***			0.024***	0.029***	0.021***	0.020***
	(0.002)			(0.003)	(0.002)	(0.003)	(0.003)
𝟙(Other Race)	0.009***			0.010***	0.018***	0.016***	0.014***
	(0.003)			(0.004)	(0.003)	(0.004)	(0.004)
𝟙(Bottom quintile)		0.134***		0.125***		0.105***	0.100***
		(0.003)		(0.003)		(0.003)	(0.003)
𝟙(Second quintile)		0.112***		0.105***		0.087***	0.083***
		(0.002)		(0.002)		(0.002)	(0.003)
𝟙(Third quintile)		0.079***		0.075***		0.061***	0.060***
		(0.002)		(0.002)		(0.002)	(0.002)
𝟙(Fourth quintile)		0.041***		0.039***		0.031***	0.031***
		(0.002)		(0.002)		(0.002)	(0.002)
𝟙(Less than HS)			0.081***		0.069***	0.032***	0.029***
			(0.004)		(0.004)	(0.005)	(0.005)
𝟙(HS)			0.071***		0.067***	0.039***	0.035***
			(0.002)		(0.002)	(0.002)	(0.002)
𝟙(Some College)			0.056***		0.052***	0.034***	0.032***
			(0.001)		(0.001)	(0.002)	(0.002)
Household Size							0.005***
							(0.001)
Num. of Children							-0.007***
							(0.001)
𝟙(Female, Respondent)							-0.015***
							(0.002)
𝟙(Married, Respondent)							-0.018***
							(0.002)
Average Mobility, Retail Areas							-0.000
							(0.000)
Average Mobility, Transit Stations							-0.000
							(0.000)
Average Mobility, Grocery Stores							-0.001*
							(0.001)
Average Mobility, Workplaces							-0.002***
							(0.001)
Average Mobility, Residential Areas							-0.001
							(0.001)
Avg. Num. of New Cases, State							-0.000**
							(0.000)
Constant	0.177***	0.107***	0.142***	0.106***	0.134***	0.093***	0.448**
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)	(0.206)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1704504	1458463	1776298	1400119	1704504	1400119	1347969

more likely to experience non-employment due to employers' response to the pandemic than their white counterparts. We corroborate the robustness of these disparities using data from the COVID module of the CPS in Column 11 of Table 7. Furthermore, Column 12 shows that these persist after controlling for occupation.

The socio-demographic disparities here observed in terms of the incidence of employment disruptions stemming from business' responses to the economic crisis induced by

Table 7: Non-Employment During the Pandemic: Business Response to COVID-19, Controlling for Occupation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Bus. Resp.	Bus. Resp.	Bus. Resp.	Bus. Resp.	Bus. Resp.	Bus. Resp.	Bus. Resp.	Bus. Resp.	Bus. Resp.	Bus. Resp.	Bus. Resp.	Bus. Resp.
1(Black)	0.025***	0.025***					0.015***	0.014***	0.022***	0.024***	0.020***	0.020***
	(0.001)	(0.001)					(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
1(Hispanic)	0.032***	0.023***					0.022***	0.014***	0.027***	0.020***	0.029***	0.018***
	(0.001)	(0.001)					(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
1(Other Race)	0.012***	0.018***					0.011***	0.016***	0.013***	0.019***	0.016***	0.022***
	(0.001)	(0.001)					(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
1(Bottom quintile)			0.060***	0.089***			0.055***	0.086***			0.062***	0.104***
			(0.001)	(0.002)			(0.001)	(0.002)			(0.002)	(0.003)
1(Second quintile)			0.050***	0.052***			0.045***	0.050***			0.054***	0.065***
			(0.001)	(0.001)			(0.001)	(0.001)			(0.002)	(0.002)
1(Third quintile)			0.032***	0.030***			0.029***	0.028***			0.035***	0.036***
			(0.001)	(0.001)			(0.001)	(0.001)			(0.002)	(0.002)
1(Fourth quintile)			0.015***	0.012***			0.013***	0.011***			0.016***	0.015***
			(0.001)	(0.001)			(0.001)	(0.001)			(0.001)	(0.001)
1(Less than HS)					0.027***	0.028***			0.018***	0.022***	-0.003	0.003
					(0.001)	(0.002)			(0.001)	(0.002)	(0.002)	(0.003)
1(HS)					0.023***	0.012***			0.018***	0.010***	0.007***	-0.002
					(0.001)	(0.001)			(0.001)	(0.001)	(0.001)	(0.002)
1(Some College)					0.023***	0.018***			0.020***	0.017***	0.015***	0.012***
					(0.001)	(0.001)			(0.001)	(0.001)	(0.001)	(0.002)
1(Female, Respondent)											-0.002**	0.010***
											(0.001)	(0.001)
1(Married, Respondent)											-0.009***	0.002
											(0.001)	(0.001)
Household Size											0.001***	0.001**
											(0.000)	(0.001)
Num. of Children											0.001	-0.001
											(0.001)	(0.001)
Average Mobility, Retail Areas											-0.000	-0.000
											(0.000)	(0.000)
Average Mobility, Transit Stations											-0.001***	-0.001***
											(0.000)	(0.000)
Average Mobility, Grocery Stores											0.001**	0.001***
											(0.000)	(0.000)
Average Mobility, Workplaces											0.000	-0.000
											(0.000)	(0.000)
Average Mobility, Residential Areas											-0.000	-0.000
											(0.001)	(0.001)
Average Num. of New Cases, State											0.000	-0.000
											(0.000)	(0.000)
Constant	0.184***	0.208***	0.161***	0.195***	0.175***	0.207***	0.159***	0.192***	0.171***	0.202***	0.197	0.219
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.134)	(0.159)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	1013912	763537	1013912	763537	1013912	763537	1013912	763537	1013912	763537	625546	470913

the pandemic are consistent with the findings of Adams-Prassl et al. (2020), Angelucci et al. (2020) and Montenovo et al. (2020) that have documented the extent to which workers at the bottom of the income distribution, without a college degree and who are either black or Hispanic have been severely hit by the COVID-19 pandemic in terms of job and earnings losses mostly associated with the relatively low remotability of their jobs as social distancing measures were increasingly adopted to slow the spread of the virus.

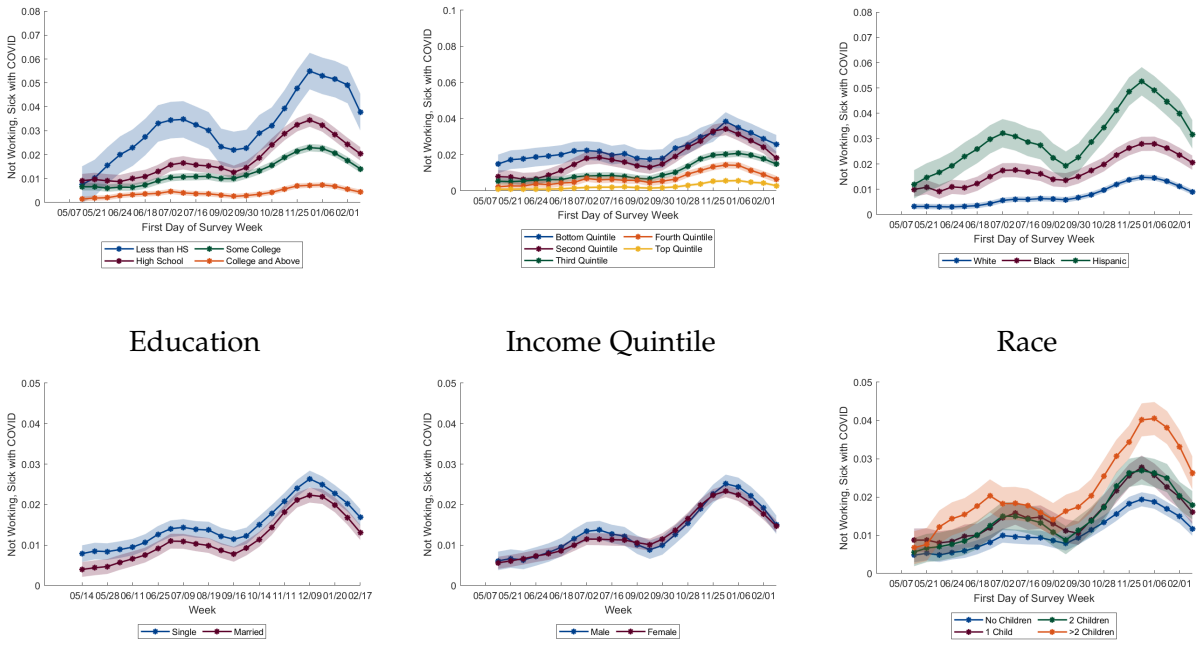
3.4.2 Exhibiting COVID-19 Symptoms

As the virus spreads within and across communities, it is expected for workers to become more likely to contract the virus, especially if they are not able to adopt self-protective behavior that not only limits their exposure to the virus but also reduces the probability of infection when the risk of exposure is inevitably high. Figure 5 presents the differences across socio-demographic groups in the incidence of respondents not working during the week prior to the survey because respondents were exhibiting symptoms related to COVID-19. Table 8 presents the results obtained upon implementing a linear probability model on respondents' incidence of non-employment due to being sick with COVID-19 symptoms.

In terms of education, there are noticeable differences between high school dropouts and college graduates. While less than 0.6% of respondents with a college degree reported not working due to being sick with COVID-19 during the week prior to the survey throughout the pandemic, the percentage of high school dropouts not working because they were feeling sick with COVID-19 oscillated between 0.75% and 3% during the pandemic (peaking around mid-June and reaching its highest towards mid-November). This persists when controlling for respondents' race, household income and other household characteristics as the probability of non-employment due to COVID-19 symptoms is 0.7 higher for respondents without a high school diploma than for college graduates. Furthermore, the results presented in Column 7 of Table 8 shows that this probability decreases monotonically with the respondent's education.

Similar gaps are observed with respect to race as Hispanic respondents were more than 4 times as likely to not be working due to exhibiting COVID-19 symptoms as their white counterparts while black respondents were more than twice as likely as their white counterparts to not be working for this same reason. These persist when controlling for respondents' education, household income and other household characteristics as suggested in the results presented in Column 7 of Table 8 which show that the probability of

Figure 5: Respondent Not Working in the Last 7 Days, Sick with COVID symptoms



Education | Income Quintile | Race

Marital Status | Gender | Number of Children

Notes: [1] Equally-weighted five-survey week moving averages are presented.

non-employment due to COVID-19 symptoms is 0.5 percentage points higher for black respondents and 1.5 percentage points higher for Hispanics relative to their white counterparts.

The peak observed for high school dropouts, Hispanic and black respondents coincides with the spike in cases recorded around June 10th as various states starting easing social distancing measures upon the implementation of their reopening plans. Similarly the rapid pickup in the incidence of an employment disruption due to COVID-19 symptoms observed for these respondents starting in mid-October coincides with the spike in nationwide cases observed in October 15th when around 44 states announced a substantial increase in new caseloads compared to mid-September. Furthermore, the spike observed towards mid-November for these respondents is close to the time when the US reported around 100,000 cases in a single day, around November 4 and ultimately leads to the second peak captured close to January further fueled by the spread of the Delta variant.[8]

[8] https://www.ajmc.com/view/a-timeline-of-covid19-developments-in-2020

Table 8: Non-Employment During the Pandemic: Sick with COVID-19 Symptoms

	(1) Sick	(2) Sick	(3) Sick	(4) Sick	(5) Sick	(6) Sick	(7) Sick
𝟙(Black)	0.010***			0.006***	0.008***	0.005***	0.005***
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Hispanic)	0.022***			0.018***	0.018***	0.016***	0.015***
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Other Race)	0.003***			0.002**	0.004***	0.003***	0.002*
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Bottom quintile)		0.020***		0.016***		0.011***	0.013***
		(0.001)		(0.001)		(0.001)	(0.001)
𝟙(Second quintile)		0.015***		0.011***		0.007***	0.008***
		(0.001)		(0.001)		(0.001)	(0.001)
𝟙(Third quintile)		0.008***		0.006***		0.003***	0.004***
		(0.001)		(0.001)		(0.001)	(0.001)
𝟙(Fourth quintile)		0.004***		0.003***		0.002***	0.002***
		(0.000)		(0.000)		(0.000)	(0.000)
𝟙(Less than HS)			0.025***		0.020***	0.015***	0.013***
			(0.002)		(0.002)	(0.002)	(0.002)
𝟙(HS)			0.014***		0.011***	0.007***	0.007***
			(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Some College)			0.008***		0.007***	0.004***	0.004***
			(0.000)		(0.000)	(0.000)	(0.000)
Household Size							0.001***
							(0.000)
Num. of Children							0.001
							(0.000)
𝟙(Female, Respondent)							-0.001
							(0.001)
𝟙(Married, Respondent)							0.001
							(0.001)
Average Mobility, Retail Areas							0.000
							(0.000)
Average Mobility, Transit Stations							-0.000***
							(0.000)
Average Mobility, Grocery Stores							0.001***
							(0.000)
Average Mobility, Workplaces							-0.001***
							(0.000)
Average Mobility, Residential Areas							0.000
							(0.000)
Avg. Num. of New Cases, State							-0.000
							(0.000)
Constant	0.003*	-0.004**	-0.002	-0.005***	-0.004**	-0.007***	0.043
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.071)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1704504	1458463	1776298	1400119	1704504	1400119	1347969

We also find evidence of an income gradient in the incidence of non-employment associated with sickness due to COVID-19 symptoms with respondents in households in the bottom two quintiles being relatively more likely to report this type of non-employment during the pandemic than respondents in households at the top of the income distribution. The results presented in Column 7 of Table 8 show that respondents in households at the bottom of the income distribution were 1.3 percentage points more likely to report this type of non-employment than respondents in households at the top quintile of the income distribution. Thus, overall, the results show that the likelihood of this type of non-employment decreases with household income.

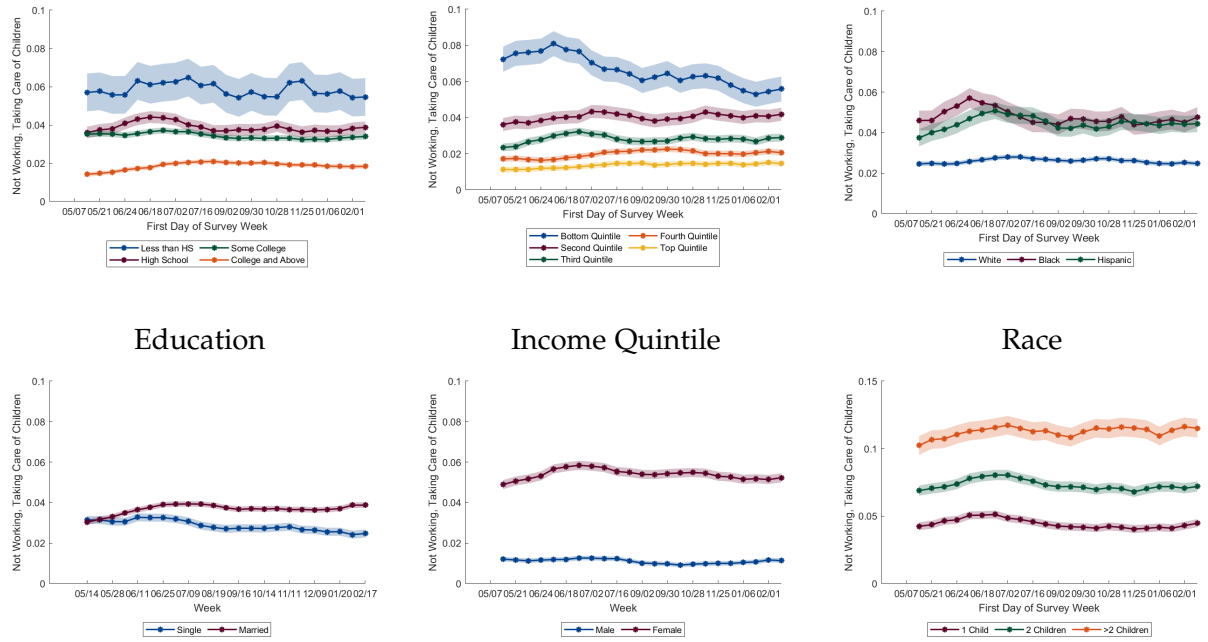
Unsurprisingly, the socio-demographic groups more adversely affected during the pandemic in terms of economic inactivity due to falling sick with the virus coincide with the groups who tend to be less likely to make the necessary adjustments in their work arrangement to safely work from home. This is aligned with the evidence presented by Papageorge et al. (2020) and Angelucci et al. (2020) both centering the relevant discussion on individuals' ability to adopt self-protective measures. While the observed patterns are argued to display underlying differences in the adoption of work-related protective measures, there is also evidence that some socio-demographic groups might also be limited in their ability of adopting necessary non-work protective behavior by facing a higher risk of evictions and utility disconnections in the US (Jowers et al. (2021)). Similarly, focusing on the case of NYC at the start of the pandemic, the findings of Almagro et al. (2020) suggest that housing crowding and exposure at home are both significant drivers of racial gaps in COVID-19 infections. Another impediment to these groups' ability to adhere with non-work related protective behavior relates to the types of public places frequented by these groups. For instance, using mobility data within a SEIR epidemiological model, Chang et al. (2020) find that the points of interest visited by individuals of disadvantaged racial and socioeconomic groups tend to be more crowded, which combined with the smaller reduction in mobility observed among these groups, can help explain their relatively high transmission rates observed in the data.

3.4.3 Meeting Child Care Needs

As schools closed in response to the rising number of cases in the country, the pandemic placed a significant burden on parents' time constraints. Figure 6 presents the differences across socio-demographic groups in the incidence of respondents not working during the week prior to the survey because they were taking care of children in the household

who were not going to school or to daycare. While it is not possible to distinguish respondents who were already not working because they were taking care of children prior to the pandemic from those who were working before the pandemic and who had to stop doing so to take care of children who suddenly were no longer attending school or going to daycare, the observed changes in non-employment due to childcare potentially captures, to some extent, employment disruptions due to the burden placed by the pandemic on parents' time constraint due to the unavailability of daycare and the closure of schools.

Figure 6: Respondent Not Working in the Last 7 Days, Taking Care of Children not in School or in Daycare



Education | Income Quintile | Race

Marital Status | Gender | Number of Children

Notes: [1] Equally-weighted five-survey week moving averages are presented.

With respect to education, we find that respondents without a high school degree were more likely to report not working due to child care needs than respondents of a higher educational attainment as shown in Figure 6. Similarly, we can also observe that this type of non-employment is more likely among respondents living in households at the bottom of the income distribution and among non-white respondents. Column 7 of Table 9 show that the education gradient persists upon controlling for other sociode-

mographic characteristics and household income as we find that individuals without a high school diploma were 1.4 percentage points more likely to report this type of non-employment than college graduates. Furthermore, we find that the income gradient persists upon controlling for the additional covariates with respondents in households at the bottom of the income distribution being approximately 4.4 percentage points more likely to report not working during the pandemic due to meeting child care needs. On the other hand, the results suggest that the racial disparities observed in Figure 6 are not robust once we control for household composition and the respondent's gender and marital status.

So far, the main employment gaps that have been observed related to the pandemic have been predominantly in terms of respondents' education, income and race. However, employment gaps related to the care of children in the household who are not in school or daycare exhibit a substantial gender gap that has been documented in Alon et al. (2020), Adams-Prassl et al. (2020) and Montenovo et al. (2020). While 4%-5% of women report not working to take care of children during the pandemic, only around 1% of men report having not worked due to childcare needs. This implies that women are more than 4 times as likely to not be working to take care of children in the household as their male counterparts. This gender gap persists when controlling for race, education, household income and other household characteristics as presented in column 7 of Table 9. Specifically, we find that female respondents were 3.7 percentage points more likely to report this type of non-employment relative to their male counterparts.

Since the Pulse information on non-employment due to child care needs does not permit disentangling how much of such non-employment is driven by the increased pressure imposed on parents' time constraints by the closure of schools and daycare, the CPS data can be used to compare the incidence of this type of non-employment before and during the pandemic. Table 10 present the LPM results using data from the CPS during 2019-2020, suggesting that this non-employment significantly increased more for women than for men during the pandemic. This is attuned with the gender gaps observed in the US and UK in Adams-Prassl et al. (2020) who find that women were spending more time caring for children in the US, suggesting that mothers assumed a higher burden of the increased child care needs imposed by the pandemic.[9] Similarly, we find that the

[9]Similar evidence is documented in other countries. For instance, in the case of the UK, Sevilla and Smith (2020) find that part of the gender differences in experiencing employment disruptions during the COVID-19 pandemic can be explained by the increased demand for child care. Boca et al. (2020) find that while both mothers and fathers were spending more time in childcare during the start of the pandemic

Table 9: Non-Employment During the Pandemic: Taking Care of Children not in Daycare or School

	(1) Child Care	(2) Child Care	(3) Child Care	(4) Child Care	(5) Child Care	(6) Child Care	(7) Child Care
𝟙(Black)	0.021***			0.011***	0.018***	0.011***	0.003*
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Hispanic)	0.019***			0.011***	0.013***	0.009***	-0.000
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Other Race)	0.004**			0.003	0.006***	0.004**	0.002
	(0.002)			(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Bottom quintile)		0.053***		0.049***		0.042***	0.044***
		(0.002)		(0.002)		(0.002)	(0.002)
𝟙(Second quintile)		0.027***		0.023***		0.018***	0.019***
		(0.001)		(0.001)		(0.001)	(0.001)
𝟙(Third quintile)		0.015***		0.013***		0.009***	0.011***
		(0.001)		(0.001)		(0.001)	(0.001)
𝟙(Fourth quintile)		0.006***		0.005***		0.003***	0.004***
		(0.001)		(0.001)		(0.001)	(0.001)
𝟙(Less than HS)			0.040***		0.035***	0.021***	0.014***
			(0.002)		(0.002)	(0.002)	(0.002)
𝟙(HS)			0.020***		0.018***	0.008***	0.011***
			(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Some College)			0.016***		0.014***	0.009***	0.011***
			(0.001)		(0.001)	(0.001)	(0.001)
Household Size							-0.003***
							(0.000)
Num. of Children							0.034***
							(0.001)
𝟙(Female, Respondent)							0.037***
							(0.001)
𝟙(Married, Respondent)							0.008***
							(0.001)
Average Mobility, Retail Areas							0.001***
							(0.000)
Average Mobility, Transit Stations							-0.000
							(0.000)
Average Mobility, Grocery Stores							-0.000
							(0.000)
Average Mobility, Workplaces							-0.000
							(0.000)
Average Mobility, Residential Areas							0.001
							(0.001)
Avg. Num. of New Cases, State							0.000
							(0.000)
Constant	0.026***	0.011***	0.017***	0.010***	0.013***	0.007*	-0.113
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.097)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1704504	1458463	1776298	1400119	1704504	1400119	1347969

racial and income gradients (though not the education gradient) documented during the pandemic related to non-employment due to child care are robust once we control for pre-pandemic trends in this type of non-employment.

4 Human Capital and Education

This section covers changes in children's learning format and access to learning resources during the pandemic. These two outcomes associated with children's human capital accumulation are of interest since there exist evidence that school closures experienced in response to shocks (like natural disasters and a pandemic) tend to have an unequal effect on children's educational outcomes primarily through disparities in parents' ability to make the necessary investments to help their children adapt to alternative learning formats. Given the information provided in the Pulse, it is possible to investigate patterns related to the digital divide that might thwart children's transition to distance-learning during the pandemic.

The analysis we implement in this section is motivated by the strand of the literature focusing on the impact of education disruptions on children's human capital, documenting how scores and college entrance outcomes are affected by the academic disruptions caused by natural disasters like hurricanes. For instance, Sacerdote (2012) finds an immediate one-year decline in math test scores among New Orleans' evacuees affected by Hurricane Katrina, who were from disproportionately poor and low-scoring school districts. Such an adverse short-term effect was expected because students lost around 5 school weeks. Furthermore, his results suggest that students who moved to richer and higher-scoring school were able to compensate for these short-term adverse effects, highlighting the equalizing role of schools. The pandemic shock mimics the impact of a natural disaster mainly in the form of the educational disruptions generated by both shocks. Nonetheless the main point of departure of the pandemic shock from the one generated by natural disasters is based on the absence of schools as an equalizer amid school closures implemented to contain the spread of the virus. In this way, substantial educational lags can be expected to be highly likely among socio-demographic groups

in Italy, mothers were facing most of the burden of the additional childcare generated by the COVID-19 crisis. Contrary to the case of the US, however, mothers were not significantly more likely to stop working during the pandemic because they were more likely to have kept their jobs by working from home. This differs from Adams-Prassl et al. (2020) who argue that part of the gender differences observed in job losses can be explained by women being less likely to start working from home during the pandemic in the US.

Table 10: Not in the Labor Force, Taking Care of House or Family, 2019-2020

	(1) Not in LF	(2) Not in LF	(3) Not in LF	(4) Not in LF	(5) Not in LF	(6) Not in LF	(7) Not in LF	(8) Not in LF
𝟙(Black)	-0.006***			-0.015***	-0.010***	-0.016***	-0.007***	-0.012***
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Hispanic)	0.046***			0.037***	0.032***	0.029***	0.029***	0.015***
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Other Race)	0.034***			0.032***	0.034***	0.032***	0.031***	0.023***
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)	0.005***	0.002	0.006***	0.001	0.005***	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Pandemic Month)×𝟙(Black)	0.004***			0.003**	0.003**	0.003*	0.003*	0.002
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Hispanic)	0.003*			0.002	0.003**	0.002	0.003*	0.002
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Other Race)	0.003*			0.003*	0.003*	0.003*	0.003*	0.003*
	(0.002)			(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Bottom quintile)		0.050***		0.047***		0.036***	0.051***	0.063***
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Second quintile)		0.035***		0.031***		0.023***	0.033***	0.041***
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Third quintile)		0.015***		0.013***		0.008***	0.015***	0.021***
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Fourth quintile)		0.002***		0.001*		-0.001	0.001	0.004***
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Bottom Quintile)		0.005***		0.005***		0.005***	0.004**	0.005***
		(0.002)		(0.002)		(0.002)	(0.002)	(0.002)
𝟙(Pandemic Month)×𝟙(Second quintile)		0.008***		0.007***		0.008***	0.007***	0.007***
		(0.002)		(0.002)		(0.002)	(0.002)	(0.002)
𝟙(Pandemic Month)×𝟙(Third quintile)		0.006***		0.006***		0.006***	0.005***	0.006***
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Fourth quintile)		0.003**		0.003**		0.003**	0.003**	0.003**
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Less than HS)			0.067***		0.058***	0.045***	0.061***	0.048***
			(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
𝟙(HS)			0.028***		0.026***	0.018***	0.034***	0.030***
			(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Some College)			0.003***		0.003***	-0.002***	0.009***	0.004***
			(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Less than HS)			0.002		0.001	-0.001	0.000	-0.000
			(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Pandemic Month)×𝟙(HS)			0.001		0.001	-0.001	0.001	0.000
			(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Some College)			0.000		-0.000	-0.001	-0.000	-0.000
			(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Female, Respondent)							0.104***	0.103***
							(0.000)	(0.000)
𝟙(Pandemic Month)×𝟙(Female)							0.001	0.002*
							(0.001)	(0.001)
𝟙(Married, Respondent)							0.068***	0.063***
							(0.000)	(0.001)
𝟙(Pandemic Month)×𝟙(Married)							-0.001	0.000
							(0.001)	(0.001)
Household Size								0.007***
								(0.000)
Num. of Children								0.019***
								(0.000)
Age								-0.001***
								(0.000)
Constant	0.070***	0.050***	0.054***	0.054***	0.056***	0.050***	-0.059***	-0.054***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2138904	2138904	2138904	2138904	2138904	2138904	2138904	2138904

that cannot fully compensate for the lack of in-person instruction and who might be more likely to face financial hardships during the crisis.[10]

4.1 Changes in Learning Format

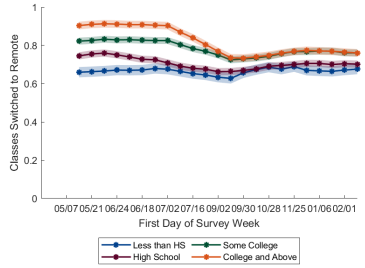
We use information on education disruptions available in the Pulse to document changes in learning format experienced during the pandemic. We find noticeable differences in the disruptions experienced by children in respondents' households in terms of household income and respondents' race and education during the weeks in which the variable used to capture education disruptions caused by the pandemic focused on its impact on the remainder of the 2019-2020 academic year.[11] Figure 7 presents the changes in learning format experienced by children in households distinguished by the different sociodemographic characteristics considered throughout our analysis so far. Tables 11-13 presents the results obtained upon implementing a linear probability model for the different types of education disruption experienced: no school closure, suspension of classes and a shift to distance learning.

With respect to education, while in more than 80% of households in which the respondent has a college degree or higher and in which children were enrolled either in a private or public school in February 2020, at least one child in the household experienced a shift towards a distance learning format, in just over 60% of households in which respondents have less than a high school diploma experience such shift. The LPM results presented in Column 7 Table 11 show that such shift in the education disparities documented for the two academic years of interest persist when controlling for other household characteristics. In particular, we find that the likelihood of classes switching

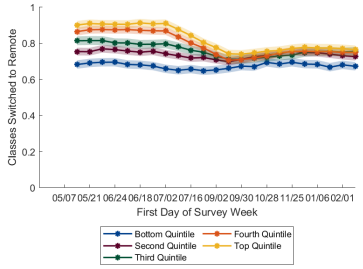
[10]There is already evidence obtained from Belgium of the impact of school closures on students' scores in standardized tests suggesing an overall decline in math and language score losses as well as a fall in overall grade point average associated with school closures, with higher losses being concentrated among students from disadvantaged socioeconomic groups (Maldonado and De Witte (2020)). Evidence from Germany, documented in Grewenig et al. (2020) suggest that low-achieving students tend to be disproportionately more adversely impacted than their high-achieving peers in the absence of an educator's support. Similar results are documented in Agostinelli et al. (2020) for the US when assessing the impact of the loss of one friend in terms of GPA growth, finding that the loss of a friend can be associated with a loss of more than 10% in GPA growth, with the negative effects being larger for low-achieving students. The authors argue that this suggests that high-achievers tend to be more resilient when losing contact with a friend, based on evidence from US, and to losing contact with an educator, based on evidence from Germany.

[11]Since we use data from the Pulse spanning April 2020-February 2021, there was a change in the academic year of reference captured in the survey. Thus, there are some weeks in the Pulse for which the academic year of reference used in the survey corresponded to the 2019-2020 academic year. With the start of Fall 2020, the academic year of reference used in the survey switched to the 2020-2021 academic year. We account for this shift in the regression analyses implemented throughout this section.

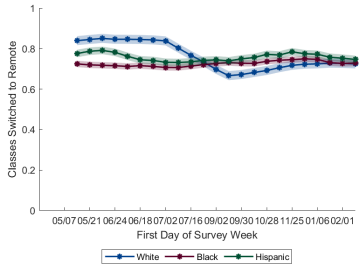
Figure 7: How the Pandemic Affected the Way in Which Children Learn?



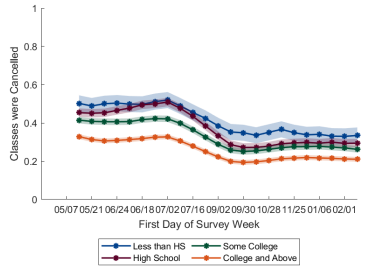
(1) Education



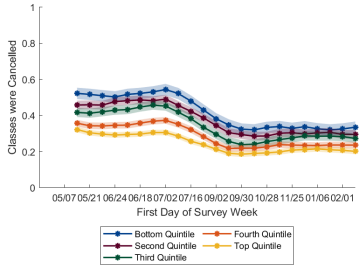
(1) Income Quintile



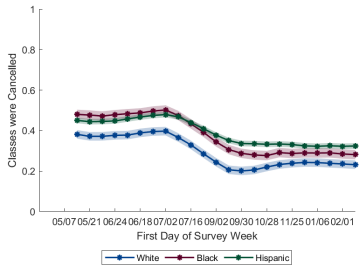
(1) Race



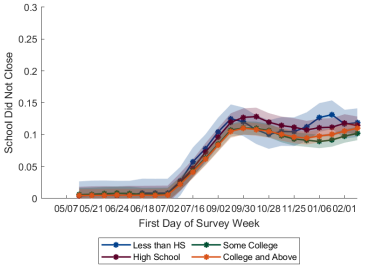
(2) Education



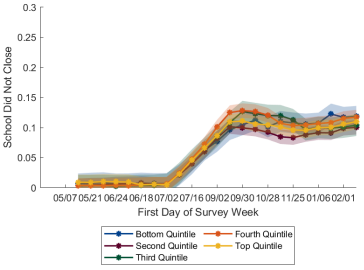
(2) Income Quintile



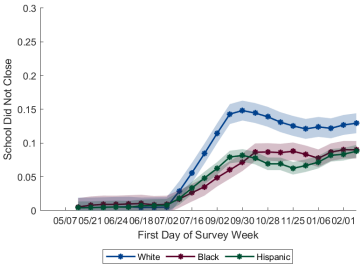
(2) Race



(3) Education



(3) Income Quintile



(3) Race

Notes: [1] Equally-weighted five-survey week moving averages are presented.

to remote learning during the 2019-2020 academic year monotonically decreased with the respondents' education. We then observe that, relative to the 2019-2020 academic year, this educational gradient reversed during the 2020-2021 academic year.

A similar gap can be observed between the top and bottom quintiles of the income distribution with the percentage of households in which children's classes were switched to a distance learning format monotonically increasing with household income during the 2019-2020 academic year, but decreasing with household income for the 2020-2021 academic year (relative to the 2019-2020 academic year). This persists even after controlling for other household characteristics as shown in Column 7 of 11.

The gap observed between the households of white and non-white respondents in this regard is narrower than the one observed with respect to income and education, being wider between black and white respondents than between Hispanic and white respondents. Moreover, this gap reversed and widened at the start of the 2020-2021 school year as the percentage of black respondents' households and Hispanic households in which children keep receive classes in a distance-learning format remains steady above 71% and 72%, respectively while the percentage of white respondents' households in which children receive classes at a distance experienced a slight fall remaining just below 70% during the fall. This can be explained by the racial gap observed in terms of the percentage of households responding that schools were not closed at the start of the 2020-2021 as the increase in the share of white households reporting that schools were open was larger than their non-white counterparts' increase.

As can be observed in Figure 7, with the shelter-in-place ordinances enacted at the start of the pandemic, a significant education disruption faced by children in around 50% of households at the start of the pandemic involved the canceling of classes.[12] The income and education gradients observed in the transition to distance learning are then reversed as a higher percentage of households in which the respondent has less than a high school diploma report that children's classes were canceled due to the virus. Similarly, the percentage of households in which children's classes were canceled in response to the pandemic decreases with household income.

As some schools reopened for the 2020-2021 academic year, the percentage of households in which children were attending school normally by resuming in-person learning increased at the start of the school year in August/September, especially since some

[12]This might reflect differences in states' education funding that could have constrained public schools' capacity to make an adequate transition to remote learning and it might be something we might want to check whether there are geographical differences behind the disparities we are observing.

Table 11: Switch to Remote Learning, with 2020-21 Academic Year Interactions

	(1) Remote	(2) Remote	(3) Remote	(4) Remote	(5) Remote	(6) Remote	(7) Remote
𝟙(Black)	-0.119***			-0.069***	-0.096***	-0.070***	-0.080***
	(0.007)			(0.008)	(0.007)	(0.008)	(0.008)
𝟙(Hispanic)	-0.112***			-0.069***	-0.067***	-0.051***	-0.048***
	(0.007)			(0.008)	(0.007)	(0.008)	(0.008)
𝟙(Other Race)	-0.039***			-0.041***	-0.050***	-0.047***	-0.035***
	(0.009)			(0.010)	(0.009)	(0.010)	(0.010)
𝟙(AY 2020-21)	-0.113***	-0.120***	-0.120***	-0.154***	-0.164***	-0.167***	-0.005
	(0.011)	(0.011)	(0.010)	(0.012)	(0.011)	(0.011)	(0.023)
𝟙(Black)×𝟙(AY 2020-21)	0.156***			0.129***	0.140***	0.128***	0.141***
	(0.010)			(0.011)	(0.010)	(0.011)	(0.011)
𝟙(Hispanic)×𝟙(AY 2020-21)	0.140***			0.112***	0.119***	0.105***	0.096***
	(0.009)			(0.010)	(0.009)	(0.009)	(0.010)
𝟙(Other)×𝟙(AY 2020-21)	0.120***			0.128***	0.128***	0.132***	0.112***
	(0.011)			(0.011)	(0.011)	(0.011)	(0.012)
𝟙(Bottom quintile)		-0.215***		-0.186***		-0.109***	-0.131***
		(0.008)		(0.009)		(0.010)	(0.010)
𝟙(Second quintile)		-0.142***		-0.119***		-0.058***	-0.071***
		(0.007)		(0.007)		(0.008)	(0.008)
𝟙(Third quintile)		-0.085***		-0.072***		-0.025***	-0.035***
		(0.007)		(0.007)		(0.007)	(0.007)
𝟙(Fourth quintile)		-0.028***		-0.022***		0.003	-0.002
		(0.005)		(0.005)		(0.005)	(0.005)
𝟙(Bottom quintile)×𝟙(AY 2020-21)		0.148***		0.105***		0.063***	0.074***
		(0.012)		(0.012)		(0.013)	(0.013)
𝟙(Second quintile)×𝟙(AY 2020-21)		0.123***		0.088***		0.050***	0.054***
		(0.009)		(0.010)		(0.010)	(0.011)
𝟙(Third quintile)×𝟙(AY 2020-21)		0.074***		0.053***		0.020**	0.024**
		(0.009)		(0.009)		(0.010)	(0.010)
𝟙(Fourth quintile)×𝟙(AY 2020-21)		0.017**		0.012*		-0.007	-0.003
		(0.007)		(0.007)		(0.007)	(0.007)
𝟙(Less than HS)			-0.237***		-0.211***	-0.170***	-0.168***
			(0.011)		(0.012)	(0.012)	(0.012)
𝟙(HS)			-0.164***		-0.151***	-0.117***	-0.115***
			(0.006)		(0.006)	(0.006)	(0.006)
𝟙(Some College)			-0.075***		-0.065***	-0.045***	-0.046***
			(0.004)		(0.004)	(0.004)	(0.004)
𝟙(Less than HS)×𝟙(AY 2020-21)			0.140***		0.100***	0.073***	0.070***
			(0.016)		(0.016)	(0.017)	(0.018)
𝟙(HS)×𝟙(AY 2020-21)			0.106***		0.091***	0.070***	0.069***
			(0.008)		(0.008)	(0.009)	(0.009)
𝟙(Some College)×𝟙(AY 2020-21)			0.077***		0.065***	0.049***	0.048***
			(0.005)		(0.005)	(0.006)	(0.006)
Household Size							0.003*
							(0.002)
Num. of Children							0.004
							(0.002)
𝟙(Female, Respondent)							0.022***
							(0.003)
𝟙(Married, Respondent)							-0.018***
							(0.004)
Average Mobility, Retail Areas							0.007***
							(0.001)
Average Mobility, Transit Stations							-0.003***
							(0.000)
Average Mobility, Grocery Stores							0.005***
							(0.001)
Average Mobility, Workplaces							-0.005***
							(0.001)
Average Mobility, Residential Areas							0.024***
							(0.003)
Avg. Num. of New Cases, State							-0.000**
							(0.000)
Constant	0.757***	0.809***	0.805***	0.825***	0.835***	0.844***	-2.228***
	(0.012)	(0.013)	(0.012)	(0.013)	(0.012)	(0.013)	(0.436)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	495383	489849	517716	468723	495383	468723	451951

Table 12: Classes were Cancelled, with 2020-21 Academic Year Interactions

	(1) Cancelled	(2) Cancelled	(3) Cancelled	(4) Cancelled	(5) Cancelled	(6) Cancelled	(7) Cancelled
𝟙(Black)	0.100***			0.047***	0.079***	0.048***	0.046***
	(0.008)			(0.009)	(0.008)	(0.009)	(0.009)
𝟙(Hispanic)	0.074***			0.025***	0.037***	0.014	0.015
	(0.008)			(0.009)	(0.008)	(0.009)	(0.009)
𝟙(Other Race)	-0.029**			-0.028**	-0.015	-0.020*	-0.017
	(0.011)			(0.012)	(0.011)	(0.012)	(0.012)
𝟙(AY 2020-21)	-0.183***	-0.126***	-0.138***	-0.136***	-0.146***	-0.129***	-0.083***
	(0.012)	(0.012)	(0.011)	(0.013)	(0.012)	(0.013)	(0.027)
𝟙(Black)×𝟙(AY 2020-21)	-0.031***			-0.007	-0.018*	-0.007	-0.002
	(0.010)			(0.011)	(0.010)	(0.011)	(0.011)
𝟙(Hispanic)×𝟙(AY 2020-21)	0.036***			0.059***	0.053***	0.063***	0.054***
	(0.011)			(0.011)	(0.010)	(0.011)	(0.011)
𝟙(Other)×𝟙(AY 2020-21)	0.045***			0.039***	0.041***	0.036***	0.026*
	(0.014)			(0.014)	(0.014)	(0.014)	(0.014)
𝟙(Bottom quintile)		0.218***		0.202***		0.143***	0.152***
		(0.009)		(0.010)		(0.011)	(0.012)
𝟙(Second quintile)		0.163***		0.152***		0.101***	0.105***
		(0.008)		(0.009)		(0.009)	(0.010)
𝟙(Third quintile)		0.124***		0.117***		0.077***	0.080***
		(0.009)		(0.009)		(0.009)	(0.009)
𝟙(Fourth quintile)		0.053***		0.048***		0.025***	0.026***
		(0.007)		(0.007)		(0.007)	(0.007)
𝟙(Bottom quintile)×𝟙(AY 2020-21)		-0.083***		-0.098***		-0.070***	-0.058***
		(0.013)		(0.013)		(0.014)	(0.015)
𝟙(Second quintile)×𝟙(AY 2020-21)		-0.061***		-0.072***		-0.047***	-0.041***
		(0.010)		(0.011)		(0.011)	(0.012)
𝟙(Third quintile)×𝟙(AY 2020-21)		-0.055***		-0.064***		-0.042***	-0.037***
		(0.010)		(0.011)		(0.011)	(0.011)
𝟙(Fourth quintile)×𝟙(AY 2020-21)		-0.022***		-0.023***		-0.010	-0.004
		(0.008)		(0.008)		(0.008)	(0.008)
𝟙(Less than HS)			0.178***		0.168***	0.111***	0.099***
			(0.012)		(0.013)	(0.014)	(0.014)
𝟙(HS)			0.155***		0.145***	0.098***	0.091***
			(0.007)		(0.007)	(0.008)	(0.008)
𝟙(Some College)			0.091***		0.082***	0.051***	0.047***
			(0.005)		(0.005)	(0.006)	(0.006)
𝟙(Less than HS)×𝟙(AY 2020-21)			-0.049***		-0.074***	-0.039**	-0.039**
			(0.017)		(0.017)	(0.019)	(0.019)
𝟙(HS)×𝟙(AY 2020-21)			-0.073***		-0.076***	-0.054***	-0.054***
			(0.009)		(0.009)	(0.010)	(0.010)
𝟙(Some College)×𝟙(AY 2020-21)			-0.037***		-0.037***	-0.021***	-0.022***
			(0.006)		(0.006)	(0.007)	(0.007)
Household Size							0.005***
							(0.002)
Num. of Children							0.006**
							(0.003)
𝟙(Female, Respondent)							-0.037***
							(0.004)
𝟙(Married, Respondent)							-0.002
							(0.005)
Average Mobility, Retail Areas							0.005***
							(0.001)
Average Mobility, Transit Stations							-0.001*
							(0.001)
Average Mobility, Grocery Stores							0.001
							(0.001)
Average Mobility, Workplaces							-0.002
							(0.001)
Average Mobility, Residential Areas							0.014***
							(0.003)
Avg. Num. of New Cases, State							0.000
							(0.000)
Constant	0.428***	0.338***	0.363***	0.337***	0.348***	0.318***	-1.447***
	(0.014)	(0.015)	(0.013)	(0.015)	(0.014)	(0.015)	(0.471)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	495383	489849	517716	468723	495383	468723	451951

Table 13: No School Closure, with 2020-21 Academic Year Interactions

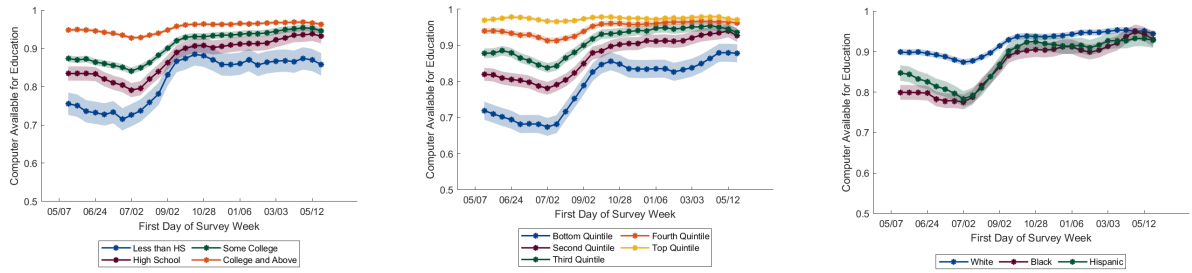
	(1) No Closure	(2) No Closure	(3) No Closure	(4) No Closure	(5) No Closure	(6) No Closure	(7) No Closure
𝟙(Black)	-0.000			0.001	0.000	0.001	0.006***
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)
𝟙(Hispanic)	0.011***			0.013***	0.012***	0.013***	0.009***
	(0.001)			(0.002)	(0.001)	(0.001)	(0.001)
𝟙(Other Race)	0.021***			0.019***	0.021***	0.020***	0.013***
	(0.003)			(0.003)	(0.003)	(0.003)	(0.003)
𝟙(AY 2020-21)	0.131***	0.101***	0.101***	0.120***	0.124***	0.118***	0.054***
	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.011)
𝟙(Black)×𝟙(AY 2020-21)	-0.057***			-0.061***	-0.059***	-0.060***	-0.068***
	(0.005)			(0.006)	(0.005)	(0.006)	(0.006)
𝟙(Hispanic)×𝟙(AY 2020-21)	-0.059***			-0.061***	-0.066***	-0.065***	-0.056***
	(0.004)			(0.004)	(0.004)	(0.004)	(0.004)
𝟙(Other)×𝟙(AY 2020-21)	-0.078***			-0.077***	-0.077***	-0.076***	-0.061***
	(0.005)			(0.005)	(0.005)	(0.005)	(0.005)
𝟙(Bottom quintile)		-0.009***		-0.010***		-0.010***	-0.002
		(0.002)		(0.002)		(0.003)	(0.003)
𝟙(Second quintile)		-0.010***		-0.012***		-0.012***	-0.007**
		(0.002)		(0.002)		(0.003)	(0.003)
𝟙(Third quintile)		-0.012***		-0.012***		-0.012***	-0.008***
		(0.002)		(0.002)		(0.002)	(0.003)
𝟙(Fourth quintile)		-0.009***		-0.008***		-0.008***	-0.006***
		(0.002)		(0.002)		(0.002)	(0.002)
𝟙(Bottom quintile)×𝟙(AY 2020-21)		0.003		0.023***		0.011	0.002
		(0.006)		(0.007)		(0.007)	(0.007)
𝟙(Second quintile)×𝟙(AY 2020-21)		-0.008*		0.009*		0.001	-0.005
		(0.004)		(0.005)		(0.005)	(0.006)
𝟙(Third quintile)×𝟙(AY 2020-21)		0.007		0.016***		0.011*	0.005
		(0.005)		(0.005)		(0.005)	(0.006)
𝟙(Fourth quintile)×𝟙(AY 2020-21)		0.012***		0.014***		0.012***	0.008*
		(0.004)		(0.004)		(0.004)	(0.004)
𝟙(Less than HS)			0.001		-0.004**	0.000	0.002
			(0.002)		(0.002)	(0.002)	(0.002)
𝟙(HS)			-0.004***		-0.004***	-0.000	0.001
			(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Some College)			-0.002		-0.001	0.002	0.003*
			(0.001)		(0.001)	(0.002)	(0.002)
𝟙(Less than HS)×𝟙(AY 2020-21)			0.015*		0.038***	0.035***	0.030***
			(0.008)		(0.009)	(0.009)	(0.009)
𝟙(HS)×𝟙(AY 2020-21)			0.012***		0.019***	0.016***	0.015***
			(0.004)		(0.004)	(0.005)	(0.005)
𝟙(Some College)×𝟙(AY 2020-21)			-0.004*		0.000	-0.001	0.001
			(0.002)		(0.003)	(0.003)	(0.003)
Household Size							-0.001
							(0.001)
Num. of Children							0.000
							(0.001)
𝟙(Female, Respondent)							-0.001
							(0.002)
𝟙(Married, Respondent)							0.007***
							(0.002)
Average Mobility, Retail Areas							-0.007***
							(0.000)
Average Mobility, Transit Stations							0.002***
							(0.000)
Average Mobility, Grocery Stores							-0.003***
							(0.000)
Average Mobility, Workplaces							-0.000
							(0.001)
Average Mobility, Residential Areas							-0.025***
							(0.002)
Avg. Num. of New Cases, State							-0.000
							(0.000)
Constant	0.028***	0.044***	0.036***	0.037***	0.030***	0.037***	3.569***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.240)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	495383	489849	517716	468723	495383	468723	451951

states issued state-ordered in-person instruction and most left the choice to the discretion of each school district.[13] This lead to a fall in the overall percentage of households in which children's classes were canceled. In terms of the incidence of children attending school normally since their schools were open, there are no noticeable gaps with respect to household income and respondents' education, but there is a noticeable racial gap between households of non-white and white respondents as the increase in the share of white households reporting that schools were not closed being larger than their non-white counterparts' increase.

4.2 Access to Education Resources

Figure 8 presents the differences in the availability of a computer for educational purposes with respect to household income, and respondents' education and race. Furthermore, investigating income, educational and racial gaps in terms of the providers of education resources, Figure 9 presents differences in the share of households with access to a school-provided computer and Figure 10 presents differences in the the share of households with a self-provided computer for education purposes. Overall, there is a computer available for education purposes in 88% of households with children enrolled in a private or public school during the academic year at the time of survey. However, there exist noticeable gaps in the access to a computer for education purposes in terms of respondents' education and race, and household income.

Figure 8: Computer Available for Educational Purposes

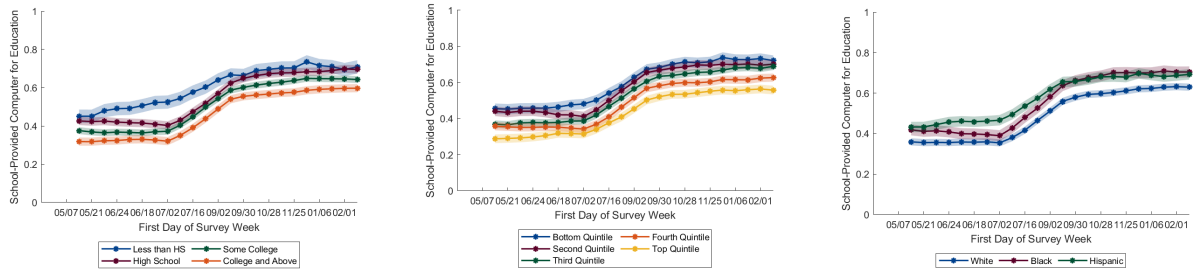


Education Income Quintile Race

Notes: [1] Equally-weighted five-survey week moving averages are presented.

[13] https://ballotpedia.org/School_responses_to_the_coronavirus_(COVID-19)_pandemic_during_the_2020-2021_academic_year

Figure 9: Computer Available for Educational Purposes is Provided by the Child's School



Education Income Quintile Race

Notes: [1] Equally-weighted five-survey week moving averages are presented.

In terms of respondents' education, while more than 90% of households with children enrolled in school and in which the respondent has a college degree or higher report having a computer available for education throughout the pandemic, less than 76% of households with children enrolled in school and in which the respondent has less than a high school diploma report having a computer available for education between May and July with this percentage increasing towards the start of fall. The first panel of Figure 9 shows that the reduction of such gap is primarily driven by the increase in the share of households with access to a computer for education purposes indicating support from children's school in this regard. In fact, reliance on schools for having access to a computer in the household for children's education decreases with the respondents' education as Figure 10 suggests that better educated respondents' households are more likely to indicate that the computer used by children for education is provided by someone in the household.

Similarly, there exists an income gradient in the availability of a computer for children's education, with the share of households having such resource available increasing with household income. Similar to the observed differences with respect to respondents' education, the second panel of Figure 9 shows that the reduction of such gap is also driven by the increase in the share of households with access to a computer for education purposes indicating support from children's school in this regard. The income gradient observed suggests that reliance on schools for having access to a computer in the household for children's education decreases with household income as Figure 10 suggests that households in higher quintiles of the income distribution are more likely to indicate that the computer used by children for education is provided by someone in

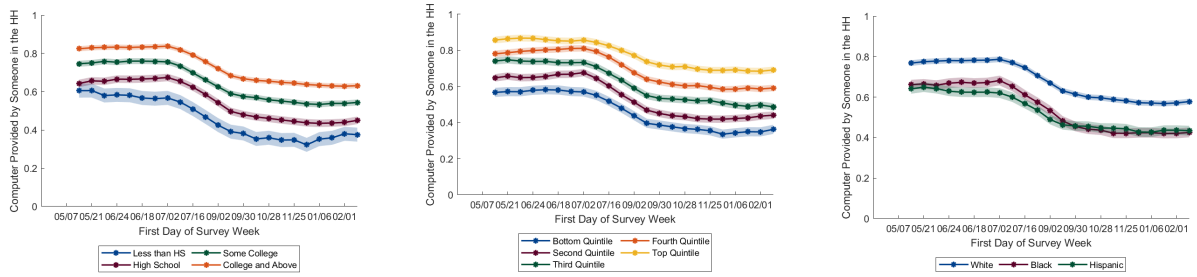
Table 14: Computer Availability in the Household for Education Purposes, with 2020-21 Academic Year Interactions

	(1) Comp. Avail.	(2) Comp. Avail.	(3) Comp. Avail.	(4) Comp. Avail.	(5) Comp. Avail.	(6) Comp. Avail.	(7) Comp. Avail.
𝟙(Black)	-0.098***			-0.032***	-0.080***	-0.032***	-0.029***
	(0.007)			(0.007)	(0.007)	(0.007)	(0.007)
𝟙(Hispanic)	-0.077***			-0.024***	-0.041***	-0.013*	-0.013*
	(0.007)			(0.007)	(0.006)	(0.007)	(0.007)
𝟙(Other Race)	0.027***			0.025***	0.019***	0.024***	0.021***
	(0.007)			(0.007)	(0.006)	(0.007)	(0.007)
𝟙(AY 2020-21)	0.024***	-0.024***	-0.005	-0.025***	-0.012	-0.030***	-0.013
	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)	(0.016)
𝟙(Black)×𝟙(AY 2020-21)	0.068***			0.029***	0.056***	0.028***	0.030***
	(0.008)			(0.008)	(0.008)	(0.008)	(0.008)
𝟙(Hispanic)×𝟙(AY 2020-21)	0.048***			0.023***	0.030***	0.017**	0.021***
	(0.007)			(0.008)	(0.007)	(0.007)	(0.008)
𝟙(Other)×𝟙(AY 2020-21)	-0.016**			-0.013*	-0.012*	-0.013*	-0.012
	(0.007)			(0.008)	(0.007)	(0.008)	(0.008)
𝟙(Bottom quintile)		-0.266***		-0.248***		-0.214***	-0.204***
		(0.008)		(0.008)		(0.008)	(0.009)
𝟙(Second quintile)		-0.164***		-0.150***		-0.124***	-0.118***
		(0.006)		(0.006)		(0.006)	(0.007)
𝟙(Third quintile)		-0.102***		-0.093***		-0.074***	-0.071***
		(0.006)		(0.006)		(0.006)	(0.006)
𝟙(Fourth quintile)		-0.039***		-0.035***		-0.025***	-0.025***
		(0.003)		(0.003)		(0.003)	(0.003)
𝟙(Bottom quintile)×𝟙(AY 2020-21)		0.139***		0.125***		0.106***	0.106***
		(0.010)		(0.010)		(0.010)	(0.010)
𝟙(Second quintile)×𝟙(AY 2020-21)		0.101***		0.089***		0.074***	0.074***
		(0.007)		(0.007)		(0.007)	(0.007)
𝟙(Third quintile)×𝟙(AY 2020-21)		0.069***		0.060***		0.048***	0.047***
		(0.006)		(0.007)		(0.007)	(0.007)
𝟙(Fourth quintile)×𝟙(AY 2020-21)		0.027***		0.024***		0.017***	0.017***
		(0.004)		(0.004)		(0.004)	(0.004)
𝟙(Less than HS)			-0.200***		-0.178***	-0.097***	-0.091***
			(0.010)		(0.011)	(0.011)	(0.011)
𝟙(HS)			-0.120***		-0.104***	-0.038***	-0.037***
			(0.005)		(0.005)	(0.005)	(0.005)
𝟙(Some College)			-0.077***		-0.065***	-0.022***	-0.021***
			(0.003)		(0.004)	(0.004)	(0.004)
𝟙(Less than HS)×𝟙(AY 2020-21)			0.101***		0.089***	0.051***	0.049***
			(0.013)		(0.013)	(0.014)	(0.014)
𝟙(HS)×𝟙(AY 2020-21)			0.072***		0.059***	0.021***	0.020***
			(0.006)		(0.006)	(0.006)	(0.006)
𝟙(Some College)×𝟙(AY 2020-21)			0.054***		0.044***	0.019***	0.019***
			(0.004)		(0.004)	(0.004)	(0.004)
Household Size							-0.002
							(0.001)
Num. of Children							-0.021***
							(0.002)
𝟙(Female, Respondent)							-0.009***
							(0.002)
𝟙(Married, Respondent)							0.012***
							(0.003)
Average Mobility, Retail Areas							0.000
							(0.001)
Average Mobility, Transit Stations							-0.000
							(0.000)
Average Mobility, Grocery Stores							0.000
							(0.001)
Average Mobility, Workplaces							0.001
							(0.001)
Average Mobility, Residential Areas							0.003
							(0.002)
Avg. Num. of New Cases, State							-0.000
							(0.000)
Constant	0.892***	0.978***	0.939***	0.980***	0.954***	0.988***	0.590**
	(0.008)	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)	(0.271)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	562003	556389	587178	532528	562003	532528	515781

Table 15: Computer Availability in the Household for Education Purposes, Provided by School, with 2020-21 Academic Year Interactions

	(1) Comp. Avail.	(2) Comp. Avail.	(3) Comp. Avail.	(4) Comp. Avail.	(5) Comp. Avail.	(6) Comp. Avail.	(7) Comp. Avail.
𝟙(Black)	0.082***			0.046***	0.068***	0.047***	0.043***
	(0.008)			(0.009)	(0.008)	(0.009)	(0.009)
𝟙(Hispanic)	0.119***			0.085***	0.089***	0.073***	0.067***
	(0.008)			(0.009)	(0.009)	(0.009)	(0.009)
𝟙(Other Race)	-0.028**			-0.029**	-0.023**	-0.028**	-0.023**
	(0.011)			(0.011)	(0.011)	(0.011)	(0.012)
𝟙(AY 2020-21)	0.252***	0.248***	0.255***	0.254***	0.257***	0.254***	0.320***
	(0.012)	(0.013)	(0.012)	(0.013)	(0.012)	(0.013)	(0.027)
𝟙(Black)×𝟙(AY 2020-21)	0.035***			0.038***	0.040***	0.039***	0.043***
	(0.011)			(0.011)	(0.011)	(0.011)	(0.011)
𝟙(Hispanic)×𝟙(AY 2020-21)	-0.016			-0.019*	-0.008	-0.012	-0.004
	(0.010)			(0.011)	(0.010)	(0.011)	(0.011)
𝟙(Other)×𝟙(AY 2020-21)	-0.027*			-0.022	-0.022	-0.019	-0.015
	(0.014)			(0.014)	(0.014)	(0.014)	(0.015)
𝟙(Bottom quintile)		0.184***		0.151***		0.114***	0.093***
		(0.009)		(0.010)		(0.011)	(0.012)
𝟙(Second quintile)		0.146***		0.117***		0.087***	0.071***
		(0.008)		(0.009)		(0.009)	(0.010)
𝟙(Third quintile)		0.092***		0.075***		0.054***	0.044***
		(0.009)		(0.009)		(0.009)	(0.009)
𝟙(Fourth quintile)		0.057***		0.049***		0.038***	0.031***
		(0.007)		(0.007)		(0.007)	(0.007)
𝟙(Bottom quintile)×𝟙(AY 2020-21)		0.006		0.003		0.015	0.017
		(0.013)		(0.014)		(0.015)	(0.015)
𝟙(Second quintile)×𝟙(AY 2020-21)		0.017*		0.015		0.024**	0.025**
		(0.010)		(0.011)		(0.012)	(0.012)
𝟙(Third quintile)×𝟙(AY 2020-21)		0.036***		0.031***		0.037***	0.037***
		(0.011)		(0.011)		(0.011)	(0.012)
𝟙(Fourth quintile)×𝟙(AY 2020-21)		0.013		0.009		0.013	0.014
		(0.008)		(0.008)		(0.008)	(0.009)
𝟙(Less than HS)			0.182***		0.147***	0.104***	0.109***
			(0.012)		(0.013)	(0.014)	(0.014)
𝟙(HS)			0.105***		0.086***	0.050***	0.059***
			(0.007)		(0.007)	(0.008)	(0.008)
𝟙(Some College)			0.056***		0.041***	0.017***	0.023***
			(0.005)		(0.005)	(0.006)	(0.006)
𝟙(Less than HS)×𝟙(AY 2020-21)			-0.051***		-0.046***	-0.055***	-0.050***
			(0.017)		(0.017)	(0.019)	(0.019)
𝟙(HS)×𝟙(AY 2020-21)			-0.003		-0.005	-0.006	-0.005
			(0.009)		(0.009)	(0.010)	(0.010)
𝟙(Some College)×𝟙(AY 2020-21)			0.001		-0.001	-0.005	-0.003
			(0.006)		(0.006)	(0.007)	(0.007)
Household Size							-0.002
							(0.002)
Num. of Children							0.044***
							(0.003)
𝟙(Female, Respondent)							0.053***
							(0.004)
𝟙(Married, Respondent)							0.014***
							(0.005)
Average Mobility, Retail Areas							-0.000
							(0.001)
Average Mobility, Transit Stations							-0.002***
							(0.001)
Average Mobility, Grocery Stores							0.002
							(0.001)
Average Mobility, Workplaces							0.003*
							(0.001)
Average Mobility, Residential Areas							0.007**
							(0.003)
Avg. Num. of New Cases, State							-0.000
							(0.000)
Constant	0.227***	0.160***	0.196***	0.155***	0.179***	0.148***	-0.948**
	(0.013)	(0.014)	(0.013)	(0.014)	(0.014)	(0.014)	(0.473)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	486371	484355	508090	463649	486371	463649	447000

Figure 10: Computer Available for Educational Purposes is Provided by Someone in the Household/Family or Owned by the Child



Education Income Quintile Race

Notes: [1] Equally-weighted five-survey week moving averages are presented.

the household.

In terms of race, a higher share of white respondents' households have access to a computer for children's education than the share of black and Hispanic respondents' households having access to this education resource. The racial gaps observed suggest that reliance on schools for having access to a computer in the household for children's education is lower in white respondents' households than in non-white respondents' households as Figure 10 suggests that white respondents' households are more likely to indicate that the computer used by children for education is provided by someone in the household.

These patterns are consistent with the ones documented by Andrew et al. (2020) in the UK who find significant income gradients, particularly among primary school children's households, in children's access to active home-learning resources as they observe that better-off households are more likely to provide children with the resources needed for learning such as a computer/tablet and a desk of their own.

5 Consumption

Besides having an impact on employment, the mandated halt of non-essential activities to contain the virus can also be expected to alter the consumption patterns of households. Blundell et al. (2020) argue that for households that spend a higher share of their total expenditures on goods and services in sectors that have been affected by lockdowns such as leisure and hospitality (which consists of spending on holidays, hotels, restaurants

and personal care) while not facing severe reductions in their income are expected to automatically save some amount of money during the pandemic. In this regard, Baker et al. (2020) find a significant reduction in spending on air travel, restaurants, and public transportation as well as a substantial increase in grocery and food delivery spending as stay-at-home orders were implemented across the US. Thus, it is expected that these households are also more likely to spend additional income differently than households more adversely affected by the pandemic in terms of income losses while devoting a higher share of expenditures to necessities. The information available in the Pulse is conducive to investigating differences in households' experience of food insufficiency during the pandemic and the use of the stimulus payment granted under the CARES Act.

5.1 Food Insufficiency

Across the 21 weeks of the pandemic covered in the Pulse, an overall 10% of households reported sometimes or often not having had enough to eat during the week prior to the survey.[14] Nevertheless, this masks substantial gaps presented in Figure 11 with respect to respondents' education, race, marital status and household income and number of children. Table 16 presents the results from implementing a linear probability model on households' experience of food insufficiency during the pandemic.

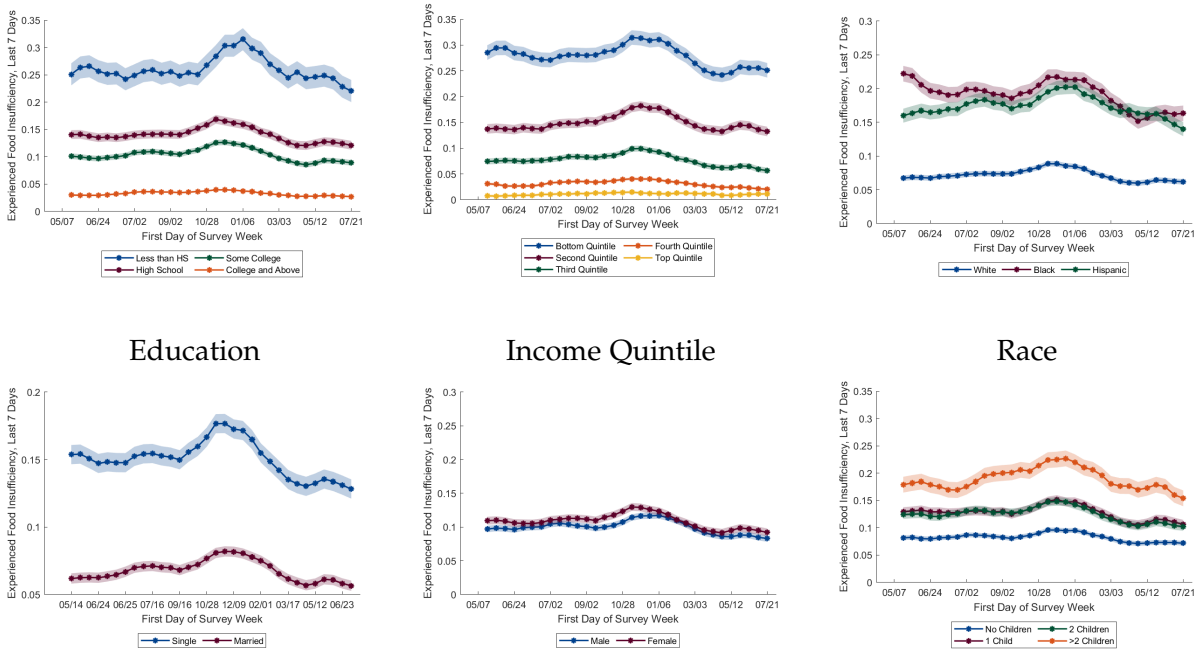
With respect to respondents' education, while around 25% of high school dropouts' households have not had enough to eat during the COVID-19 crisis, less than 4% of college graduates' households have experienced food insufficiency throughout the pandemic. Thus, households of high school dropouts are more than 6 times as likely to have faced food insufficiency during the pandemic than the households of respondents with a college degree or higher. A considerably wider gap is observed in terms of household income as households in the bottom quintile of the income distribution are more than 20 times as likely to not have enough to eat as households in the top quintile of the distribution. There is also a racial gap between white respondents' and non-white respondents' households, slightly wider compared to black respondents' households than to Hispanics' households during the first months of the pandemic with both Hispanics' and black respondents' households being more than twice as likely of experiencing food insufficiency during the pandemic than white respondents' households.

[14]Note that this definition of food insufficiency is the more restrictive version of the one used in Ziliak (2020) who also uses the Pulse data to examine food hardship during the pandemic.

Table 16: Households' Probability of Experiencing Food Insufficiency During the Pandemic [Pulse]

	(1) Food Ins.	(2) Food. Ins.	(3) Food Ins.	(4) Food Ins.	(5) Food Ins.	(6) Food Ins.	(7) Food Ins.	(8) Food Ins.
𝟙(Black)	0.127***			0.076***	0.112***	0.075***	0.063***	0.056***
	(0.003)			(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
𝟙(Hispanic)	0.105***			0.062***	0.071***	0.048***	0.035***	0.033***
	(0.003)			(0.003)	(0.002)	(0.003)	(0.003)	(0.004)
𝟙(Other Race)	-0.004			-0.003	0.006**	0.001	-0.005*	-0.011***
	(0.003)			(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
𝟙(Bottom quintile)		0.277***		0.252***		0.217***	0.198***	0.202***
		(0.003)		(0.003)		(0.003)	(0.003)	(0.005)
𝟙(Second quintile)		0.141***		0.123***		0.097***	0.086***	0.097***
		(0.002)		(0.002)		(0.002)	(0.002)	(0.003)
𝟙(Third quintile)		0.073***		0.061***		0.043***	0.039***	0.044***
		(0.002)		(0.002)		(0.002)	(0.002)	(0.003)
𝟙(Fourth quintile)		0.024***		0.019***		0.009***	0.009***	0.009***
		(0.001)		(0.001)		(0.001)	(0.001)	(0.002)
𝟙(Less than HS)			0.226***		0.198***	0.119***	0.104***	0.098***
			(0.005)		(0.005)	(0.005)	(0.005)	(0.008)
𝟙(HS)			0.110***		0.098***	0.046***	0.040***	0.040***
			(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Some College)			0.074***		0.062***	0.030***	0.025***	0.027***
			(0.001)		(0.001)	(0.001)	(0.001)	(0.002)
Household Size							0.006***	0.013***
							(0.001)	(0.001)
Num. of Children							0.018***	0.015***
							(0.001)	(0.002)
𝟙(Employed)							-0.026***	-0.028***
							(0.002)	(0.002)
𝟙(Female, Respondent)							-0.009***	-0.006***
							(0.001)	(0.002)
𝟙(Married, Respondent)							-0.033***	-0.034***
							(0.002)	(0.002)
Average Mobility, Retail Areas							0.000	-0.001
							(0.000)	(0.001)
Average Mobility, Transit Stations							0.000	0.000
							(0.000)	(0.000)
Average Mobility, Grocery Stores							-0.001	-0.001
							(0.000)	(0.001)
Average Mobility, Workplaces							0.001	0.003**
							(0.001)	(0.001)
Average Mobility, Residential Areas							0.001	0.000
							(0.001)	(0.002)
Avg. Num. of New Cases, State							0.000	0.000
							(0.000)	(0.000)
Avg. Num. of New Deaths during Svy. Week, State							0.000	0.000
							(0.000)	(0.000)
𝟙(At Least 1 Adult in HH Switching to Tele-Work)								-0.015***
								(0.002)
Constant	0.085***	-0.002	0.041***	-0.009*	0.019***	-0.022***	-0.116	-0.134
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.196)	(0.358)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1837807	1660133	1907053	1600302	1837807	1600302	1508769	609529

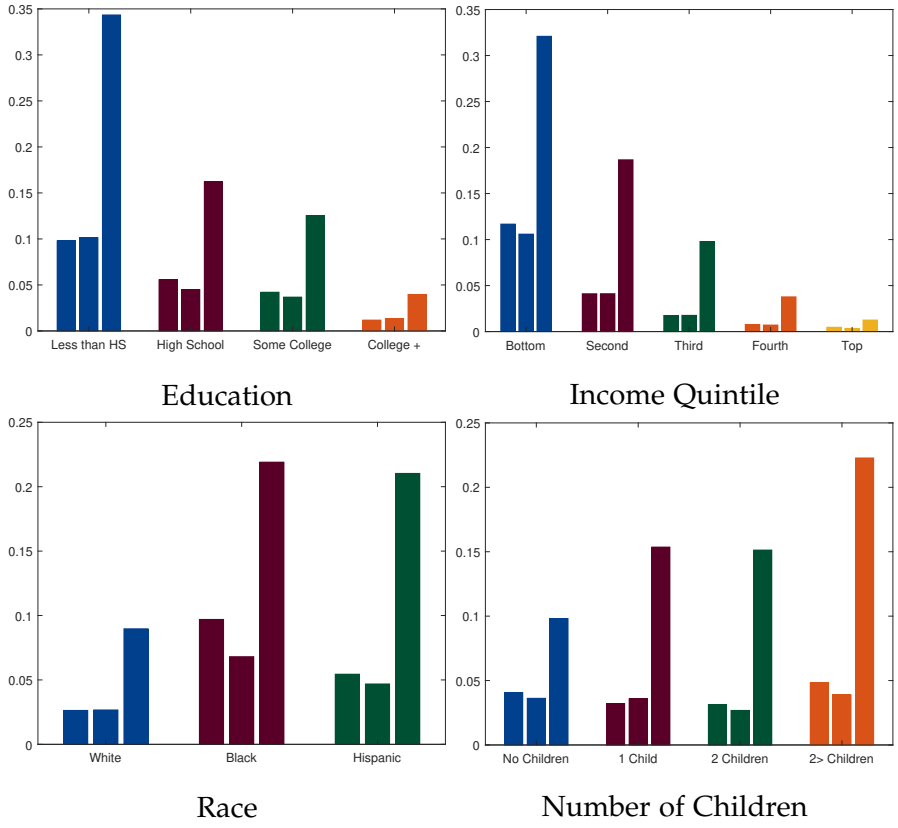
Figure 11: Sometimes or Often Did Not Have Enough to Eat in the Last 7 Days (Household-Level)



Notes: [1] Equally-weighted five-survey week moving averages are presented.

Figure 12 shows how the incidence of food insufficiency has changed between 2018 and 2020. As in Ziliak (2020), we use pre-pandemic data from the December Food Security Supplement of the Current Population Survey corresponding to 2018 and 2019 which asks respondents a set of questions related to food security that can be used in a similar way as the questions asked in the Pulse questionnaire to identify the incidence with which households face hardships in this regard. Ziliak (2020) provides a detailed comparison between the CPS and Pulse data, showing that this supplement from the CPS and the Pulse data align relatively well in terms of most relevant socioeconomic characteristics. Table 12 presents the results from running a linear regression on the incidence of food insufficiency in the household over pooled data obtained from the CPS and the December week of the Pulse survey. We find that households of non-white respondents, of respondents without a college degree and living at households in the lower quintiles of the income distribution were more adversely impacted by the pandemic in terms of food insufficiency when compared to their observed incidence of food insufficiency prior to the onset of the pandemic.

Figure 12: Sometimes or Often Did Not Have Enough to Eat (Dec. 2018, Dec. 2019, Dec. 2020)



Notes: [1] First bar corresponds to the fraction of households reporting food insufficiency in December 2018 and the second bar corresponds to the fraction of households reporting food insufficiency in December 2019 from the Current Population Survey. The third bar corresponds to the average across the 2 weeks of the Household Pulse Survey collected during December 2020. [2] For income quintiles, (ii) Bottom Quintile includes the income bracket with household income lower than $25,000, (ii) Second Quintile includes the income brackets with household income between $25,000 and $50,000, (iii) Third Quintile includes the income bracket with household income between $50,000 and $75,000, (iv) Fourth Quintile includes the income brackets with household income between $75,000 and $150,000, and (v) Top Quintile includes the income brackets with household income higher than $150,000.

Table 17: Households' Probability of Experiencing Food Insufficiency, Before and After the Pandemic

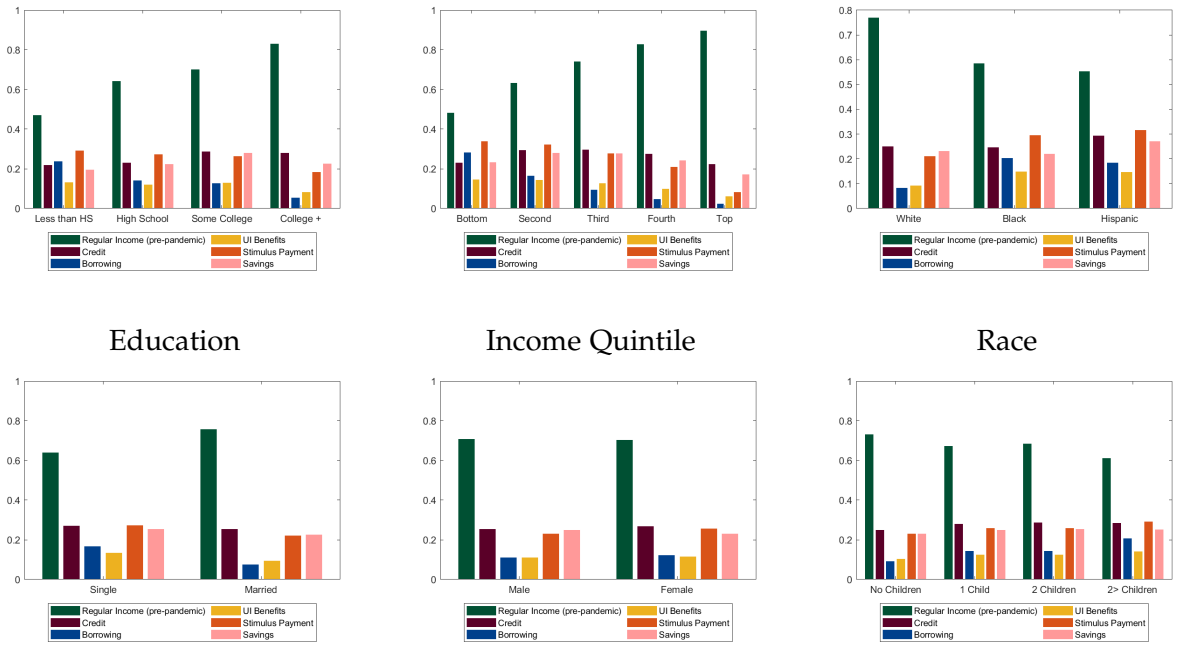
	(1) Food Ins.	(2) Food. Ins.	(3) Food Ins.	(4) Food Ins.	(5) Food Ins.	(6) Food Ins.	(7) Food Ins.	(8) Food Ins.
𝟙(Black)	0.056***			0.039***	0.049***	0.037***	0.033***	0.049***
	(0.004)			(0.004)	(0.004)	(0.004)	(0.004)	(0.007)
𝟙(Hispanic)	0.024***			0.013***	0.007**	0.007**	-0.001	0.005
	(0.003)			(0.003)	(0.003)	(0.003)	(0.004)	(0.006)
𝟙(Other Race)	0.010***			0.009***	0.013***	0.011***	0.007*	0.011
	(0.003)			(0.003)	(0.003)	(0.004)	(0.004)	(0.007)
𝟙(Pandemic Month)	0.075***	0.011***	0.031***	0.005	0.019***	0.013	-0.001	-0.007
	(0.004)	(0.004)	(0.002)	(0.004)	(0.003)	(0.008)	(0.008)	(0.011)
𝟙(Pandemic Month)×𝟙(Black)	0.087***			0.041***	0.075***	0.040***	0.037**	0.025
	(0.014)			(0.014)	(0.014)	(0.014)	(0.014)	(0.021)
𝟙(Pandemic Month)×𝟙(Hispanic)	0.087***			0.060***	0.064***	0.046***	0.043***	0.092***
	(0.012)			(0.013)	(0.012)	(0.013)	(0.013)	(0.023)
𝟙(Pandemic Month)×𝟙(Other Race)	-0.039***			-0.030***	-0.020*	-0.022**	-0.025**	-0.015
	(0.011)			(0.010)	(0.012)	(0.010)	(0.010)	(0.023)
𝟙(Bottom quintile)		0.108***		0.101***		0.079***	0.082***	0.083***
		(0.003)		(0.003)		(0.003)	(0.004)	(0.004)
𝟙(Second quintile)		0.037***		0.033***		0.019***	0.022***	0.023***
		(0.002)		(0.002)		(0.002)	(0.003)	(0.003)
𝟙(Third quintile)		0.013***		0.011***		0.002	0.005**	0.006***
		(0.002)		(0.002)		(0.002)	(0.002)	(0.002)
𝟙(Fourth quintile)		0.003***		0.002**		-0.002	0.001	0.001
		(0.001)		(0.001)		(0.001)	(0.001)	(0.001)
𝟙(Pandemic Month)×𝟙(Bottom Quintile)		0.230***		0.206***		0.166***	0.164***	0.162***
		(0.016)		(0.015)		(0.015)	(0.015)	(0.015)
𝟙(Pandemic Month)×𝟙(Second quintile)		0.148***		0.134***		0.107***	0.107***	0.108***
		(0.009)		(0.009)		(0.010)	(0.010)	(0.010)
𝟙(Pandemic Month)×𝟙(Third quintile)		0.083***		0.076***		0.058***	0.058***	0.059***
		(0.008)		(0.008)		(0.008)	(0.008)	(0.008)
𝟙(Pandemic Month)×𝟙(Fourth quintile)		0.024***		0.021***		0.014***	0.016***	0.017***
		(0.005)		(0.005)		(0.005)	(0.005)	(0.005)
𝟙(Less than HS)			0.087***		0.083***	0.044***	0.034***	0.034***
			(0.004)		(0.005)	(0.005)	(0.005)	(0.005)
𝟙(HS)			0.038***		0.036***	0.014***	0.010***	0.010***
			(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Some College)			0.027***		0.025***	0.012***	0.010***	0.010***
			(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
𝟙(Pandemic Month)×𝟙(Less than HS)			0.206***		0.174***	0.119***	0.111***	0.107***
			(0.025)		(0.026)	(0.028)	(0.028)	(0.028)
𝟙(Pandemic Month)×𝟙(HS)			0.106***		0.097***	0.047***	0.045***	0.044***
			(0.008)		(0.008)	(0.008)	(0.008)	(0.008)
𝟙(Pandemic Month)×𝟙(Some College)			0.066***		0.057***	0.030***	0.027***	0.028***
			(0.005)		(0.005)	(0.005)	(0.005)	(0.005)
𝟙(Female, Respondent)						0.004**	-0.001	-0.000
						(0.002)	(0.002)	(0.002)
𝟙(Pandemic Month)×𝟙(Female)						-0.013*	-0.011	-0.011
						(0.007)	(0.007)	(0.007)
𝟙(Married, Respondent)						-0.013***	-0.031***	-0.030***
						(0.002)	(0.003)	(0.003)
𝟙(Pandemic Month)×𝟙(Married)						-0.020**	-0.008	-0.008
						(0.008)	(0.008)	(0.008)
Household Size							0.011***	0.011***
							(0.003)	(0.003)
Num. of Children							0.008**	0.008**
							(0.003)	(0.003)
𝟙(Employed)							-0.016***	-0.009***
							(0.004)	(0.002)
𝟙(Black)×𝟙(Employed)								-0.028***
								(0.008)
𝟙(Hispanic)×𝟙(Employed)								-0.009
								(0.007)
𝟙(Other Race)×𝟙(Employed)								-0.007
								(0.008)
𝟙(Pandemic Month)×𝟙(Employed)								0.010
								(0.007)
𝟙(Black)×𝟙(Pandemic Month)×𝟙(Employed)								0.021
								(0.028)
𝟙(Hispanic)×𝟙(Pandemic Month)×𝟙(Employed)								-0.087***
								(0.028)
𝟙(Other Race)×𝟙(Pandemic Month)×𝟙(Employed)								-0.017
								(0.026)
Constant	0.026***	0.004***	0.012***	-0.000	0.006***	-0.006	-0.014	-0.019
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.011)	(0.012)	(0.012)
State FE	No	No	No	No	No	Yes	Yes	Yes
N	132638	125946	134935	123963	132638	123963	123935	123935

Notes: [1] OLS estimates reported.

5.2 Sources of Spending Income

As households become vulnerable to declines in employment income during the pandemic, Blundell et al. (2020) have emphasized the role of safety nets to help mitigate the shocks experienced by households, arguing that these have been crucial policy levers used in the UK in response to the pandemic. In the case of the US, Moffitt and Ziliak (2020) and Bitler, Hoynes and Schanzenbach (2020) provide an overview of the types of social assistance programs that constitute the US safety net, highlighting the role of Unemployment Insurance (UI) and the Supplemental Nutrition Assistance Program (SNAP) as primary stabilizers for income losses incurred by households during economic downturns. The Pulse data allows to investigate the different sources of spending income used by households. Figure 13 shows the share of households by socio-demographic groups relying on regular (pre-pandemic) income, credit cards, borrowing from family and friends, UI benefits, stimulus payments and/or savings to meet their expenses during the pandemic.

Figure 13: Income Sources Used for Spending



Education | Income Quintile | Race

Marital Status | Gender | Number of Children

Notes: [1] Averages across weeks are reported. [2] Respondents are allowed to list multiple income sources so that spending source categories are not mutually exclusive.

Those groups that have faced a higher incidence of earnings losses in the household during the pandemic seem to have relied less on regular income and more on borrowing from family and friends, unemployment insurance benefits and the stimulus payment for spending than households that have been relatively less adversely affected in terms of employment income losses. It is noticeable that the use of regular pre-pandemic income decreases with household income, but the way households adjust to the loss of regular income varies as we move from the top of the distribution to the bottom. While the reliance on credit cards and savings seems to be prevalent among households in the bottom four quintiles, households in the bottom quintile seem to rely on borrowing from family and friends and on the stimulus payment to a greater extent than households in the third and fourth quintiles. This seems to suggest that for low-income households, their immediate family and friend networks are serving as a buffer for reductions in pre-pandemic income sources.

5.2.1 Use of Social Insurance Programs

Given the emphasis given to social insurance programs like UI and the groups of households reporting a higher share of employment income losses, it could have been expected that these sociodemographic groups would exhibit a higher reliance on UI benefits than their better-off counterparts. However, especially among education groups without a college degree and among households in the bottom three quintiles of the income distribution, the gaps are quite narrow. This is attuned with the criticism raised by Moffitt and Ziliak (2020) and Bitler, Hoynes and Schanzenbach (2020) that social insurance programs in the US have not been successful in responding to unmet household needs as evidenced by the relatively high incidence of food insufficiency among households in more disadvantaged socio-demographic groups due to delays, coverage gaps and magnitude of the benefits, particularly related to UI. To investigate this, we check for differential patterns in households' decision to apply and, ultimately, the receipt of UI, the Pulse has information on this since the start of Phase 2. The top four panels of Figure 14 present differences with respect to respondents' education and race and their households' income and number of children in their decision to apply for UI. The bottom four panels of Figure 14 presents differences with respect to respondents' education and race and their households' income and number of children in the receipt of UI conditional on having applied for it. Tables 18 and 19 present the LPM to assess the robustness of these differences to additional individual and household characteristics.

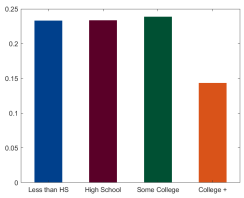
Table 18: Applied for Unemployment Insurance Benefits

	(1) UI Apply	(2) UI Apply	(3) UI Apply	(4) UI Apply	(5) UI Apply	(6) UI Apply	(7) UI Apply	(8) UI Apply
𝟙(Black)	0.099***			0.072***	0.090***	0.070***	0.058***	0.058***
	(0.003)			(0.004)	(0.003)	(0.004)	(0.004)	(0.004)
𝟙(Hispanic)	0.063***			0.047***	0.049***	0.044***	0.029***	0.029***
	(0.003)			(0.004)	(0.003)	(0.004)	(0.004)	(0.004)
𝟙(Other Race)	0.010**			0.014***	0.026***	0.025***	0.018***	0.018***
	(0.004)			(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
𝟙(Bottom quintile)		0.175***		0.157***		0.129***	0.111***	0.101***
		(0.004)		(0.004)		(0.004)	(0.004)	(0.005)
𝟙(Second quintile)		0.157***		0.143***		0.116***	0.107***	0.098***
		(0.003)		(0.003)		(0.003)	(0.003)	(0.004)
𝟙(Third quintile)		0.117***		0.109***		0.087***	0.083***	0.076***
		(0.003)		(0.003)		(0.003)	(0.003)	(0.003)
𝟙(Fourth quintile)		0.071***		0.066***		0.053***	0.053***	0.049***
		(0.002)		(0.002)		(0.002)	(0.002)	(0.002)
𝟙(Less than HS)			0.088***		0.071***	0.038***	0.031***	0.027***
			(0.005)		(0.005)	(0.007)	(0.007)	(0.007)
𝟙(HS)			0.094***		0.088***	0.054***	0.053***	0.046***
			(0.002)		(0.002)	(0.003)	(0.003)	(0.003)
𝟙(Some College)			0.099***		0.093***	0.071***	0.067***	0.061***
			(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
Household Size							0.011***	0.011***
							(0.001)	(0.001)
Num. of Children							0.012***	0.011***
							(0.002)	(0.002)
𝟙(Female, Respondent)							-0.009***	-0.007***
							(0.002)	(0.002)
𝟙(Married, Respondent)							-0.050***	-0.050***
							(0.002)	(0.002)
Average Mobility, Retail Areas							0.000	0.000
							(0.001)	(0.001)
Average Mobility, Transit Stations							-0.001**	-0.001**
							(0.000)	(0.000)
Average Mobility, Grocery Stores							-0.000	-0.000
							(0.001)	(0.001)
Average Mobility, Workplaces							-0.001	-0.001
							(0.001)	(0.001)
Average Mobility, Residential Areas							-0.001	-0.001
							(0.002)	(0.002)
Avg. Num. of New Cases, State							-0.000	-0.000
							(0.000)	(0.000)
𝟙(At Least 1 Adult in HH Switching to Tele-Work)								-0.037***
								(0.002)
Constant	0.136***	0.044***	0.091***	0.035***	0.072***	0.011	0.221	0.254
	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)	(0.007)	(0.327)	(0.335)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1179590	955697	1224270	921421	1179590	921421	860264	833958

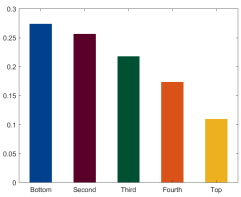
Table 19: Receipt of Unemployment Insurance Benefits, Conditional on Applying for UI

	(1) UI Rec.	(2) UI Rec.	(3) UI Rec.	(4) UI Rec.	(5) UI Rec.	(6) UI Rec.	(7) UI Rec.	(8) UI Rec.
𝟙(Black)	-0.054***			-0.034***	-0.050***	-0.034***	-0.030***	-0.032***
	(0.007)			(0.008)	(0.007)	(0.008)	(0.009)	(0.009)
𝟙(Hispanic)	-0.051***			-0.034***	-0.041***	-0.031***	-0.020***	-0.020**
	(0.006)			(0.007)	(0.007)	(0.007)	(0.008)	(0.008)
𝟙(Other Race)	0.002			0.008	0.004	0.010	0.014	0.013
	(0.008)			(0.010)	(0.008)	(0.010)	(0.010)	(0.010)
𝟙(Bottom quintile)		-0.102***		-0.090***		-0.087***	-0.078***	-0.089***
		(0.009)		(0.010)		(0.010)	(0.011)	(0.012)
𝟙(Second quintile)		-0.032***		-0.021**		-0.020**	-0.016*	-0.023**
		(0.008)		(0.008)		(0.009)	(0.009)	(0.010)
𝟙(Third quintile)		-0.002		0.004		0.004	0.004	-0.002
		(0.008)		(0.009)		(0.009)	(0.009)	(0.010)
𝟙(Fourth quintile)		0.011		0.015*		0.014*	0.012	0.008
		(0.008)		(0.008)		(0.008)	(0.008)	(0.009)
𝟙(Less than HS)			-0.085***		-0.067***	-0.026**	-0.020	-0.022
			(0.011)		(0.011)	(0.013)	(0.014)	(0.014)
𝟙(HS)			-0.024***		-0.017***	0.002	0.006	0.002
			(0.005)		(0.005)	(0.006)	(0.006)	(0.006)
𝟙(Some College)			-0.012***		-0.005	0.007	0.011**	0.009*
			(0.004)		(0.004)	(0.004)	(0.004)	(0.005)
Household Size							-0.012***	-0.013***
							(0.003)	(0.003)
Num. of Children							0.001	0.001
							(0.004)	(0.004)
𝟙(Female, Respondent)							0.008	0.008
							(0.005)	(0.005)
𝟙(Married, Respondent)							0.032***	0.032***
							(0.006)	(0.006)
Average Mobility, Retail Areas							0.003	0.002
							(0.002)	(0.002)
Average Mobility, Transit Stations							0.000	0.000
							(0.001)	(0.001)
Average Mobility, Grocery Stores							0.000	0.001
							(0.002)	(0.002)
Average Mobility, Workplaces							-0.006**	-0.006**
							(0.002)	(0.002)
Average Mobility, Residential Areas							0.001	0.001
							(0.006)	(0.006)
Avg. Num. of New Cases, State							-0.000	-0.000
							(0.000)	(0.000)
𝟙(At Least 1 Adult in HH Switching to Tele-Work)								-0.018***
								(0.005)
Constant	0.655***	0.664***	0.653***	0.676***	0.669***	0.674***	0.717	0.734
	(0.019)	(0.023)	(0.019)	(0.024)	(0.019)	(0.024)	(0.807)	(0.815)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	190548	154806	200236	147336	190548	147336	137944	135917

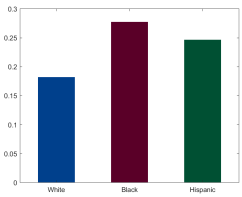
Figure 14: Respondent has (a) Applied for UI and (b) Received UI Benefits Conditional on Applying for UI, since March 13th, 2020



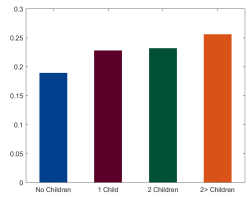
(a) Education



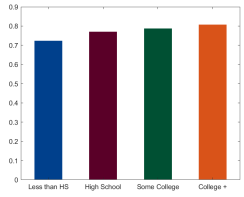
(a) Income Quintile



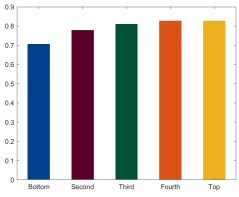
(a) Race



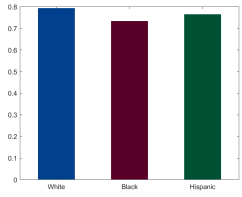
(a) Num. of Children



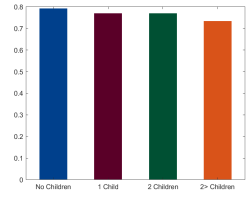
(b) Education



(b) Income Quintile



(b) Race



(b) Num. of Children

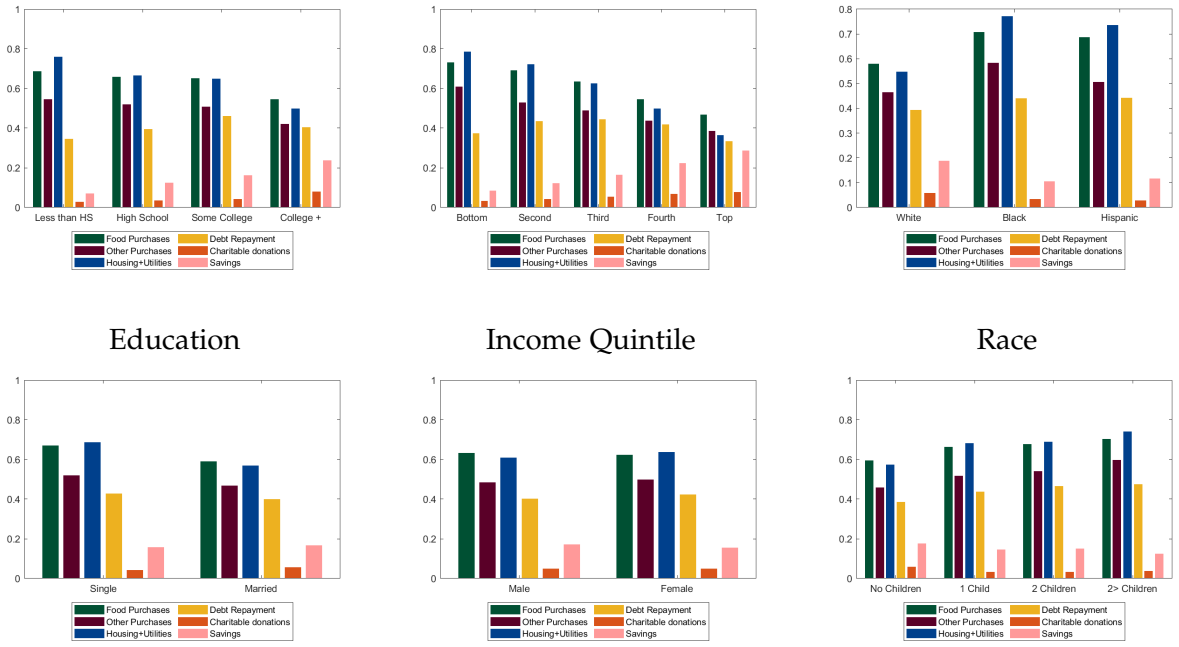
Notes: Averages across all available weeks are reported.

5.2.2 Use of Economic Impact Payment

As aforementioned, Blundell et al. (2020) argue that the pandemic is expected to disparately alter households' consumption patterns. A way to assess this within the context of the US using the data available in the Pulse is to investigate the differences in the spending use made by households of the stimulus payments made to eligible individuals during the earlier months of the pandemic. Among households reporting at least one household member receiving a stimulus check, there are differences in households' use of the check for spending on necessities such as food, housing and utilities and for savings. Figure 15 shows the share of households reporting the receipt of a stimulus check by socio-demographic groups that use this transfer for (1) food purchases, (2) other purchases, (3) housing and utilities, (4) debt repayment, (5) charitable donations, and (6) savings.

Overall, we find that socio-demographic groups with a higher share of households experiencing employment income losses during the pandemic also display a higher share of households using the stimulus payment to cover food expenditures and utilities that socio-demographic reporting a relatively lower incidence of employment income losses. These gaps are also evident in the share of households saving this additional income as this share increases monotonically with household income and respondents' education

Figure 15: How was the Economic Impact Payment Spent?



Education | Income Quintile | Race

Marital Status | Gender | Number of Children

Notes: [1] Averages across weeks are reported. [2] Information on the spending use made of the stimulus payment was collected only during weeks 7-12 of the Pulse. [3] Other purchases include: clothing, recreational goods, household items (for example, appliances), household supplies and personal care items. [4] Debt repayment includes payments towards credit card balances, student loans, other loans and scheduled or monthly vehicle payments.

and is higher for white respondents' households than for their non-white counterparts. This is consistent with the patterns observed in the previous subsection suggesting that the share of households relying on the stimulus payment as a spending income source is higher for those groups more adversely affected by the pandemic in terms of earnings and job security. A similar pattern can be observed with respect to education and between white respondents' households and non-white respondents' households.

6 Conclusion

Throughout the analysis implemented in this paper, we assess how the unequal impact of COVID-19 on employment relates to comparable disparities in its impact on children's education and household consumption. Using data from the Pulse survey, supplemented

with data from the CPS and state-level information on average mobility and COVID-19 cases, we present evidence of a comparable unequal impact of the pandemic on the education disruptions faced by school-aged children, food insecurity and households' reliance on social insurance programs and other forms of government assistance to compensate for the losses in regular income sources generated by the pandemic.

Focusing on employment, we find that employment income losses tend to be concentrated among households in the bottom quintiles of the income distribution and of respondents who are non-white and without a college degree. These gradients are reflective of the disparities we observe in the observed impact on non-employment due to business responses to the pandemic, due to sickness associated with the virus and with the increased demand for child care at home generated by the containment measures set in place at the early stage of the COVID-19 crisis. Furthermore, we find that the gaps we observe in employment are related with individuals' ability to work from home during the pandemic, which display similar differences across sociodemographic groups. Besides differences in workers' ability to switch to tele-work during the crisis, we find that differences in the adverse impact of the pandemic on employment can be partly attributed to the relatively high incidence of non-employment related to sickness associated with COVID-19 among non-white respondents. This is, in turn, reflects the documented unequal spread of the virus across racial groups.

When shifting the focus on the pandemic's impact on children's education, we document that children in households in the bottom quintile of the income distribution, of non-white and non-college educated respondents, were significantly more likely to have had their classes canceled at the earlier stage of the pandemic and significantly less likely to have their classes switched to a remote format. Similar disparities are observed in children's access to computers for learning purposes. This is of particular concern since there exists evidence related to the impact of natural disasters indicating that significant education disruptions, can have a detrimental impact on children's long-term educational outcomes, especially if students' are not able to adapt to or compensate for these disruptions. Thus, as children's education becomes constrained to the education-related investments made at home, the pandemic leads to a comparable weakening in the equalizing role of schools that can be costly in terms of children's human capital accumulation.

In terms of consumption, we find similar disparities in food insufficiency. Specifically, we observe that households of blacks and Hispanics, of respondents without a college

degree and living in households at the lower quintiles of the income distribution were significantly more likely to report not having enough to eat during the pandemic. Similarly, we find that these sociodemographic groups relied significantly more on borrowing from family and friends and the economic impact payment (EIP), which is aligned with the disparities observed in employment income losses. Furthermore, despite there existing similar disparities in the demand for UI benefits, we find that these do not necessarily translate to disparities in the receipt of UI, thereby limiting the extent to which we document comparable disparities in households' reliance on UI as a buffer for the losses incurred in employment income during the pandemic.

Overall, we find that socio-demographic groups with a higher share of households experiencing employment income losses during the pandemic also display a higher share of households in which children faced severe education disruptions combined with a more restricted access to educational resources at the early stage of the pandemic. Similarly, we also find a higher share of households among these sociodemographic groups experiencing food insecurity and relying on alternative income sources to meet spending needs during the pandemic. Thus, adequate financial assistance for those groups more adversely impacted by the pandemic in terms of earnings losses is of particular importance given the pervasiveness of observed employment disparities in the impact of the pandemic on children's education and household.

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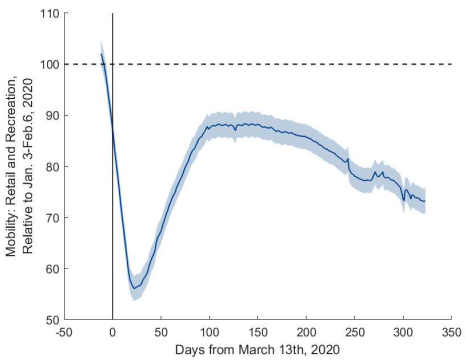
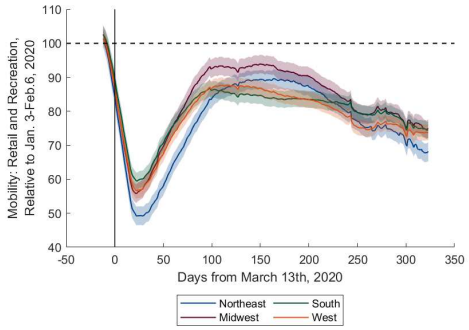
A Appendix: Mobility Graphs

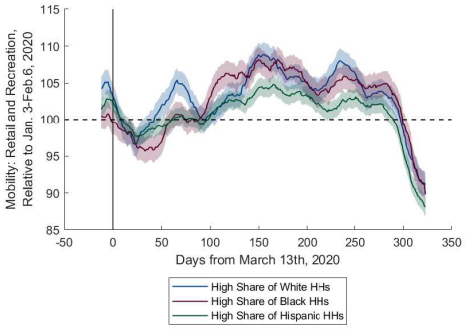
Figure 16: Changes in Retail Mobility Relative to January 3-February 6, 2020, Overall [Data from Google Mobility Reports]



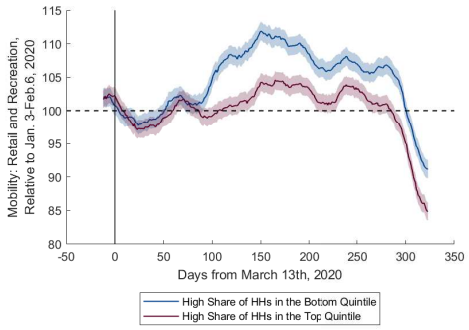
Overall



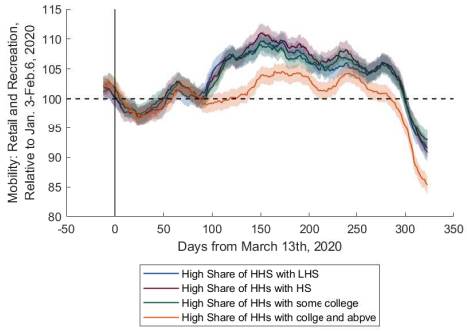
By Census Bureau-Designated Region



By Race



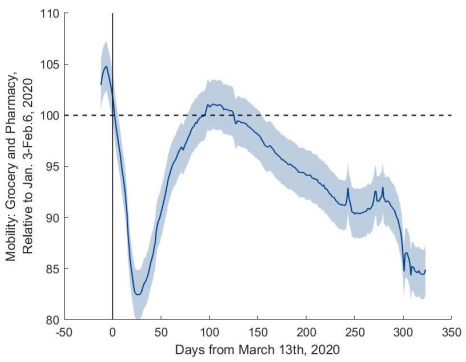
By Income



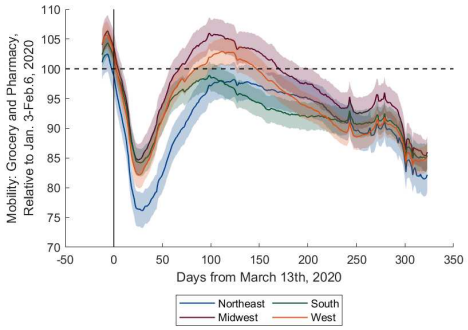
By Education

Notes: [1] Each day's baseline is the median day-value during the 5-week period spanning January 3rd, 2020 - February 6th, 2020. [2] The mobility index has been changed to a 100-based scale, so that the reference period used by Google assumes a value of 100 as in Bargain and Aminjonov (2020). Thus, mobility values lower than 100 imply decreases in a particular type of mobility relative to the reference period. [3] 30-day moving average presented [4] March 13th, 2020 pinpoints the date in which COVID-19 is officially declared a national emergency in the US.

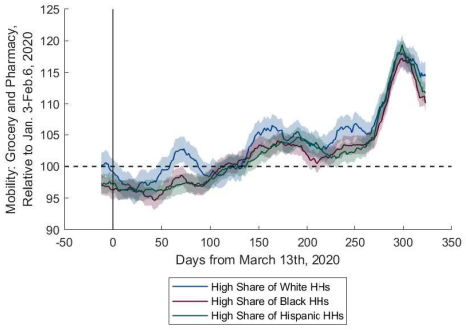
Figure 17: Changes in Grocery Store Mobility Relative to January 3-February 6, 2020, Overall [Data from Google Mobility Reports]



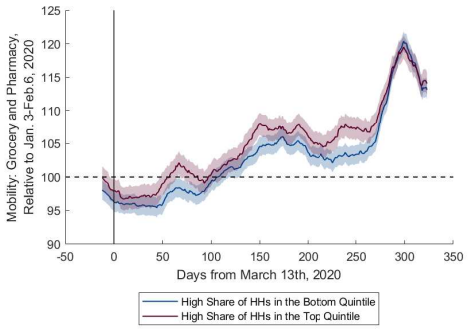
Overall



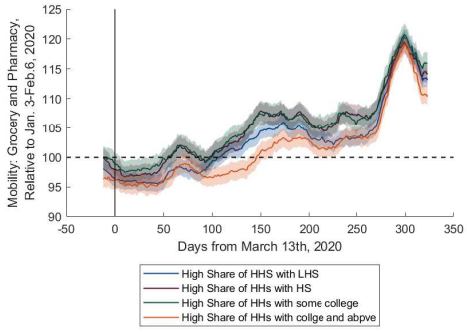
By Census Bureau-Designated Region



By Race



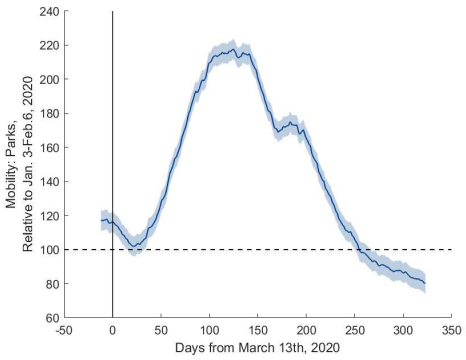
By Income



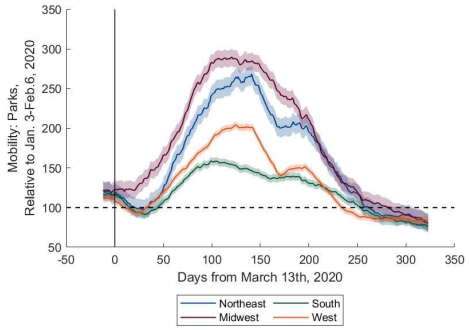
By Education

Notes: [1] Each day's baseline is the median day-value during the 5-week period spanning January 3rd, 2020 - February 6th, 2020. [2] The mobility index has been changed to a 100-based scale, so that the reference period used by Google assumes a value of 100 as in Bargain and Aminjonov (2020). Thus, mobility values lower than 100 imply decreases in a particular type of mobility relative to the reference period. [3] 30-day moving average presented [4] March 13th, 2020 pinpoints the date in which COVID-19 is officially declared a national emergency in the US.

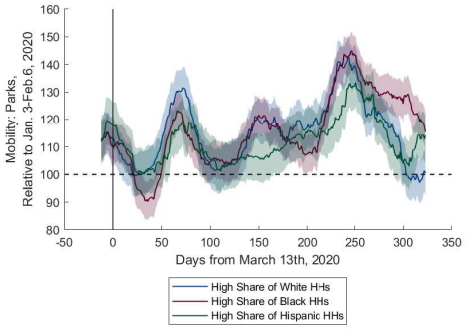
Figure 18: Changes in Parks Store Mobility Relative to January 3-February 6, 2020, Overall [Data from Google Mobility Reports]



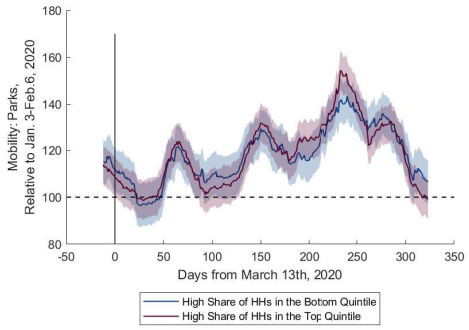
Overall



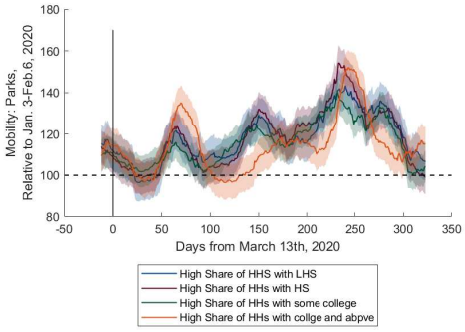
By Census Bureau-Designated Region



By Race



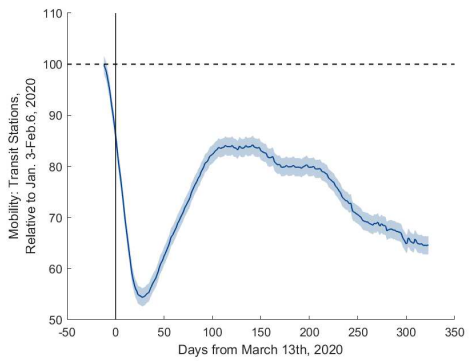
By Income



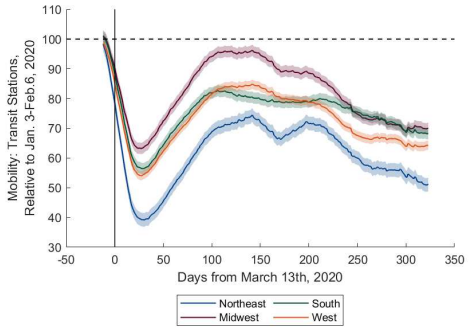
By Education

Notes: [1] Each day's baseline is the median day-value during the 5-week period spanning January 3rd, 2020 - February 6th, 2020. [2] The mobility index has been changed to a 100-based scale, so that the reference period used by Google assumes a value of 100 as in Bargain and Aminjonov (2020). Thus, mobility values lower than 100 imply decreases in a particular type of mobility relative to the reference period. [3] 30-day moving average presented [4] March 13th, 2020 pinpoints the date in which COVID-19 is officially declared a national emergency in the US.

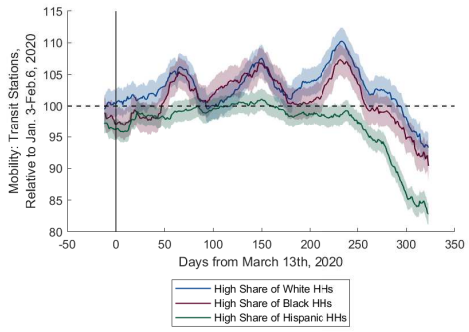
Figure 19: Changes in Transit Station Mobility Relative to January 3-February 6, 2020, Overall [Data from Google Mobility Reports]



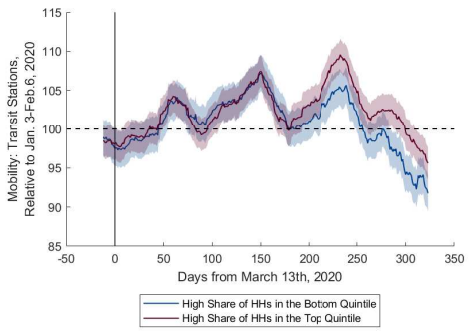
Overall



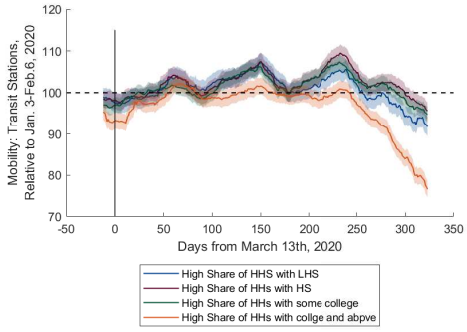
By Census Bureau-Designated Region



By Race



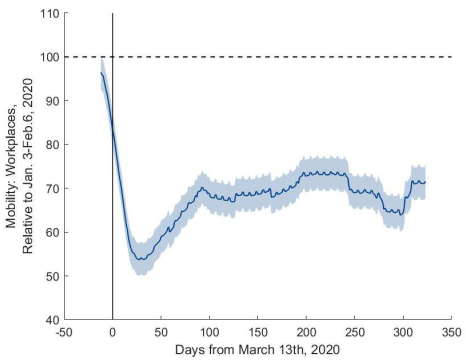
By Income



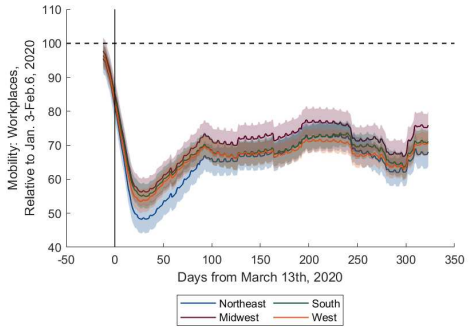
By Education

Notes: [1] Each day's baseline is the median day-value during the 5-week period spanning January 3rd, 2020 - February 6th, 2020. [2] The mobility index has been changed to a 100-based scale, so that the reference period used by Google assumes a value of 100 as in Bargain and Aminjonov (2020). Thus, mobility values lower than 100 imply decreases in a particular type of mobility relative to the reference period. [3] 30-day moving average presented [4] March 13th, 2020 pinpoints the date in which COVID-19 is officially declared a national emergency in the US.

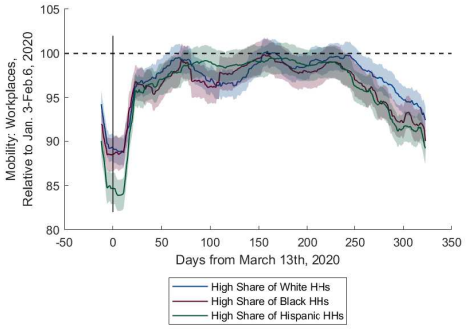
Figure 20: Changes in Workplace Mobility Relative to January 3-February 6, 2020, Overall [Data from Google Mobility Reports]



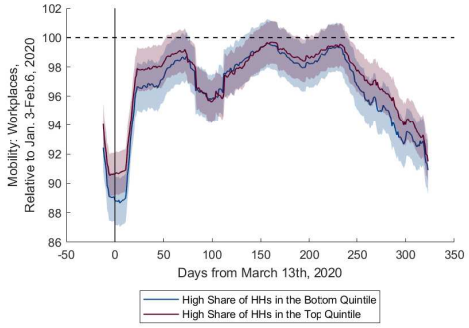
Overall



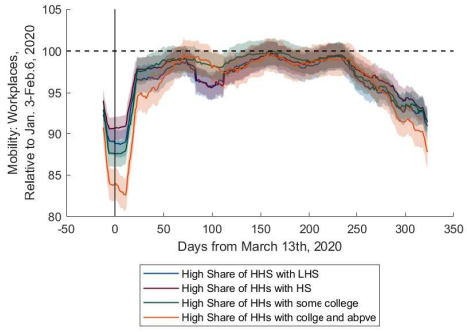
By Census Bureau-Designated Region



By Race



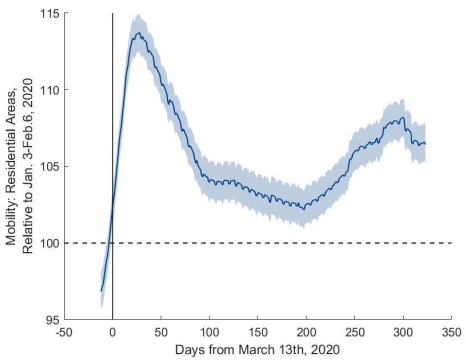
By Income



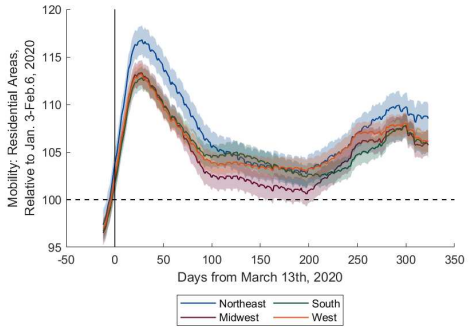
By Education

Notes: [1] Each day's baseline is the median day-value during the 5-week period spanning January 3rd, 2020 - February 6th, 2020. [2] The mobility index has been changed to a 100-based scale, so that the reference period used by Google assumes a value of 100 as in Bargain and Aminjonov (2020). Thus, mobility values lower than 100 imply decreases in a particular type of mobility relative to the reference period. [3] 30-day moving average presented [4] March 13th, 2020 pinpoints the date in which COVID-19 is officially declared a national emergency in the US.

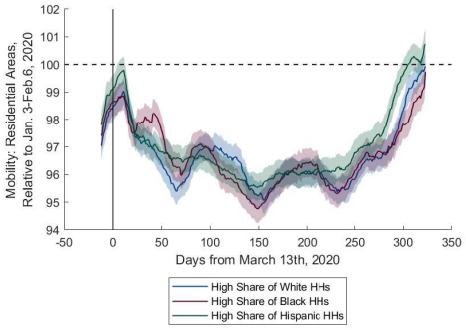
Figure 21: Changes in Residential Area Mobility Relative to January 3-February 6, 2020, Overall [Data from Google Mobility Reports]



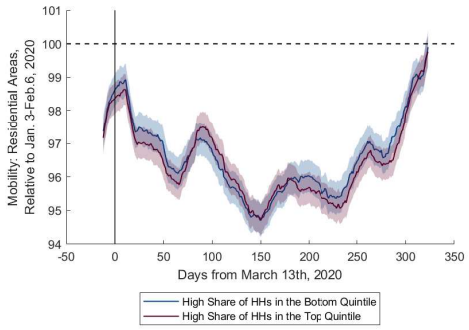
Overall



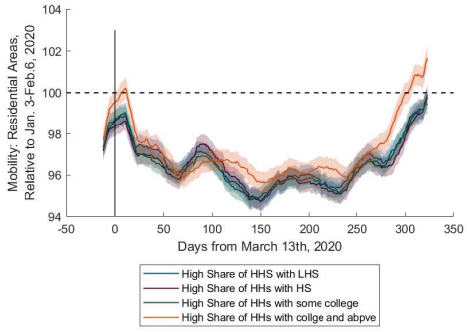
By Census Bureau-Designated Region



By Race



By Income



By Education

Notes: [1] Each day's baseline is the median day-value during the 5-week period spanning January 3rd, 2020 - February 6th, 2020. [2] The mobility index has been changed to a 100-based scale, so that the reference period used by Google assumes a value of 100 as in Bargain and Aminjonov (2020). Thus, mobility values lower than 100 imply decreases in a particular type of mobility relative to the reference period. [3] 30-day moving average presented [4] March 13th, 2020 pinpoints the date in which COVID-19 is officially declared a national emergency in the US.