The Unequal Responses to Pandemic-Induced Schooling Shocks

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Abstract

This paper investigates the existence of socio-demographic gradients in the schooling shocks experienced by school-aged children and their ability to adjust to the disruptions induced by the containment measures imposed in response to the COVID-19 pandemic. It focuses on documenting racial, educational, and income disparities in these two essential components of children's human capital accumulation that could have significant implications in the medium and long run. The paper finds that children in households from disadvantaged socio-demographic groups (1) were significantly more likely to face severe education disruptions in the form of school cancellations at the onset of the pandemic, (2) had more limited access to active learning resources such as computers, and (3) relied more heavily on schools to obtain access to these resources. Notably, these adverse effects severely disrupted children's 2019-20 academic year but were mitigated at the start of the 2020-21 academic year. (**JEL:** I24, I26, I28)

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1   Introduction

The literature has often emphasized the role of schools as social equalizers in providing students from disadvantaged families with improved access to educational resources and the ability to socialize with peers of different socio-economic backgrounds. Disparities in these aspects of children's human capital accumulation tend to have an unequal effect on children's educational outcomes in the medium and long run – primarily through differences in parents' ability to make the necessary investments to help their children adapt to alternative learning formats. In this paper, we focus on investigating the existence of socio-demographic gradients in children's learning format and access to learning resources during the pandemic, which jeopardized such equalizing role of schools. We build upon the data and analysis presented in a companion paper (Flores and Gayle (2022)) to show that the disparate impact of COVID-19 on employment documented by the authors aligns with the socio-demographic gradients we find in children's education disruptions and access to education resources during the pandemic.

Our analysis builds upon the strand of the literature focusing on the impact of education disruptions on children's human capital, which investigates how test scores and college entrance outcomes are affected by the academic disruptions caused by natural disasters like hurricanes. The pandemic shock mimics the impact of a natural disaster mainly in the form of the educational disruptions generated by both shocks. For instance, Sacerdote (2012) finds an immediate one-year decline in math test scores among evacuees from New Orleans affected by Hurricane Katrina, who were from disproportionately poor and low-scoring school districts. Such adverse short-term effect was expected since students lost around five school weeks. Furthermore, his results suggest that students reassigned to wealthier and higher-scoring schools were able to compensate for these short-term adverse effects, highlighting the equalizing role of schools.

Nonetheless, the main point of departure of the pandemic shock from the one generated by natural disasters is the absence of schools as an equalizer amid school closures implemented to contain the spread of the virus. In this way, as Kuhfeld et al. (2020) argues, the disparities induced by the pandemic shock on children's education are instead expected to mimic the differences documented in seasonal learning studies due to the underlying inequities in the access to academic resources and learning environment in the absence of in-person teaching. Thus, it is highly likely that there will exist substantial educational lags among socio-demographic groups that cannot fully compensate for the lack of in-person instruction and who might be more likely to face financial hardships

during the pandemic.

Documenting the disparities observed in children's ability to adjust to the different educational disruptions presented by the pandemic is relevant since these disparities could translate into socio-demographic gaps in medium- and long-term educational outcomes. Evidence obtained from Belgium of the impact of school closures on students' scores in standardized tests suggests an overall decline in math and language scores. There is also evidence of a fall in overall grade point average associated with school closures, with higher losses concentrated among students from disadvantaged socioeconomic groups (Maldonado and De Witte (2020)). There are similar results documented in the Netherlands (Engzell, Frey and Verhagen (2021)). The literature has listed two plausible drivers of these negative effects on children's education outcomes. The first one pertains to the deterioration of children's peer networks due to school

closures (Grewenig et al. (2020), Agostinelli et al. (2020)).[1] The second one pertains to limitations on children's access to educational resources – related to both parental time and monetary investments in children's education – for adapting to alternative learning formats (Andrew et al. (2020), Boca et al. (2020), Sevilla and Smith (2020)).

Our analysis exploits the availability of detailed information on the types of education disruptions faced by school-aged children in US households collected in the Census Bureau's Household Pulse Survey. These disruptions include changes to remote learning and the cancellation of classes during the academic year of reference affected by the pandemic. Additionally, the survey also collects information on the availability of active learning resources, such as computers, and information on these resources' provider(s). The information in the survey allows us to investigate how well-equipped children are in adjusting to alternative learning formats adopted in response to the schooling shocks generated by the pandemic. The information in the survey also allows us to study to what extent schools can help overcome limitations that parents from disadvantaged socio-demographic groups have in securing access to such resources.

We find that children in households of non-white respondents were more likely to have their classes canceled at the onset of the pandemic. Non-white households' chil-

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[1]Grewenig et al. (2020) show that low-achieving students tend to be disproportionately more adversely affected than their high-achieving peers in the absence of an educator's support. The results in Agostinelli et al. (2020) show a similar pattern for the US. When quantifying the impact of the loss of one friend in terms of GPA growth, Agostinelli et al. (2020) find that the loss of a friend is 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 high-achievers tend to be more resilient when losing contact with a friend, based on evidence from the US, and to losing contact with an educator, based on evidence from Germany.

dren are also considerably less likely to have their classes switched to a remote format significantly disrupting the end of their 2019-20 academic year. In fact, for children in these households, we find that the switch to remote learning occurred until the start of the 2020-21 academic year. We document a similar pattern for household income (when comparing households in the two extremes of the income distribution) and the respondents' education (when comparing families of respondents without a college degree and college graduates).

Our results also indicate that children in families of non-white respondents and those without a college degree were significantly less likely to have access to a computer for educational purposes during the pandemic, especially at its onset. Furthermore, we also find that a household's probability of having a computer for educational purposes significantly increases with household income. Such observed income and education gradients resemble the strong relationship between income and active home learning resources documented by Andrew et al. (2020) in the UK. More importantly, among households in which children have access to a computer, those in the aforementioned socio-demographic groups were more likely to rely on schools as the primary providers of this resource.

Overall, the socio-demographic gradients we find in education disruptions and children's access to learning resources strongly align with the disparities documented in Flores and Gayle (2022). Specifically, the documented disparities reflect the pandemic's unequal impact relating significant losses in earned income, the likelihood of having at least one adult household member switch to remote work in response to stay-at-home ordinances, and the incidence of food insecurity exacerbated during the pandemic. The groups of households whose children faced relatively more severe education disruptions and who were more constrained in accessing learning resources conducive to alternative learning formats were precisely the families more severely affected in terms of employment.

The remainder of the paper proceeds as follows. Section 2 describes the data sources used to conduct the analysis presented in this paper and describes the empirical strategy implemented to quantify the disparities documented in our results. Section 3 presents trends in education disruptions experienced by school-aged children in surveyed households and shows how these trends differ across socio-demographic groups during the pandemic. Section 4 documents trends in children's access to learning resources as well as trends in the providers of these learning resources. Lastly, Section 5 concludes.

2 Data and Empirical Strategy

2.1 Data Sources

Throughout the analysis implemented in this paper, we rely on the dataset constructed in the companion paper by Flores and Gayle (2022) using the public use files of the Census Bureau's Household Pulse Survey, referred to as the Pulse hereafter.[2] While there have been at least four additional rounds added to the initial three phases of the survey, we focus on using the data files released for the first three phases of the survey collected between April 23, 2020, and March 29, 2021, spanning the first 27 weeks of the survey. Specifically, we primarily use the combination of household-level and individual-level information on respondents' socio-demographic characteristics and on the types of education disruptions and access to education resources faced by children in respondents' households to investigate whether there exist gradients in household responses to the schooling shocks generated by the pandemic. Importantly, we use the same variables capturing socio-demographic characteristics as defined by the authors in our companion paper.

Since lockdowns imposed in response to the pandemic thwarted efforts to conduct face-to-face interviews, alternative data collection methods deployed during the pandemic have involved online surveys. Specifically, in the strand of the literature focusing on changes in children's schooling and parental investments in children's education during the pandemic, Andrew et al. (2020) use online time diaries, surveying 5,582 parents in England living with at least one school-aged child during the period spanned by April 29, 2020, and June 20, 2020, to collect information on family demographic and socio-economic characteristics as well as on children's home-learning activities and resources. The authors construct weights using data from the nationally-representative Labour Force Survey to correct for potential sampling bias. Such potential sampling bias is a concern since a potential shortcoming of mobile/online data collection relates to the extent to which there exist disparate response patterns across different socio-demographic groups. To address concerns related to this type of bias, the Census Bureau has provided sampling weights in each release of the public use files as detailed in (Peterson et al. (2021)).[3] We apply these sampling weights throughout the empirical

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

[3]Further technical information can be found at https://www.census.gov/programs-surveys/household-pulse-survey/technical-documentation.html .

analysis implemented in this paper.

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. Since we use data from the Pulse spanning April 2020-March 2021, there was a change in the academic year of reference captured in the survey. Thus, during the first 12 survey weeks of the Pulse, the academic year of reference captured 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 weeks 13-27 switched to the 2020-2021 academic year. We account for this shift in the regression analyses implemented throughout this paper. Thus, the data we use in our study 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.

We supplement the Pulse data with state-level information on the number of COVID-19 cases and mobility obtained from the COVID Tracking Project, the CDC Case Surveillance public-use data, and Google's Mobility Reports. The mobility data used has been used in the literature to analyze cross-country differences that capture changes in mobility in response to the different types of measures imposed to contain the community spread of the virus and compliance with such measures as described in (Bargain and Aminjonov (2020)).

2.2 Empirical Strategy

For the analysis implemented in this article, we consider a variation of the specification implemented in Angelucci et al. (2020). Specifically, we implement the following linear regression model

$$Y_{it} = \alpha + \gamma \mathbb{1}\{\text{AY 2020-21}\} + \boldsymbol{\beta}_G \mathbf{G}_i + \boldsymbol{\beta}_{Gt}\mathbb{1}\{\text{AY 2020-21}\} \times \mathbf{G}_i + \boldsymbol{\beta}\mathbf{X}_{it} + \eta_t + \eta_s + \nu_{st} + \epsilon_{it}$$

where $\mathbf{G}_i$ includes indicators of individual i's socio-demographic characteristics including education, race, and income quintile, and $\mathbf{X}_{it}$ denotes other sociodemographic characteristics individual and household. Furthermore, η_t denotes survey week fixed effects, 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

period t and the different indices of geographic mobility documented for state s during period t. Thus, for sociodemographic group G, the coefficient of interest throughout the analysis is captured by β_G. $\mathbb{1}\{$AY 2020-21$\}$ is an indicator of whether reference academic year captured in the survey week corresponds to the 2020-21 AY (capturing a later stage of the pandemic). Thus, for sociodemographic group G, there are two coefficients of interest given that these capture the impact of the pandemic on children's education at two different stages. While β_G captures the impact on group G's education-related outcomes at the onset of the pandemic (i.e. 2019-20 academic year), β_{Gt} captures the impact on group G's outcomes at a later stage of the pandemic (i.e. 2020-21 academic year), which is when schools and families would have had relatively more time to adjust to the limitations generated by the pandemic.

3 Changes in Learning Format

We use the 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.

Switch to Remote Learning Figure 1 presents the socio-demographic gradients in the incidence with which school-aged children's classes switched to remote during the pandemic. Table 1 presents the results obtained upon implementing a linear probability model (LPM) on this type of education disruption to assess the robustness of such disparities to the inclusion of other household and individual characteristics.

Concerning 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 change. The LPM results presented in Column 7 Table 1 show that such shift in the education disparities documented for the two academic years of interest persists when controlling for other household characteristics. In particular, we find that the likelihood of classes switching

to remote learning during the 2019-2020 academic year monotonically increased 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 two extremes 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. This persists even after controlling for other household characteristics, as shown in Column 7 of Table 1.

The gap observed between white and non-white respondents' households is narrower than the one observed for income and education, being wider between black and white respondents than between Hispanic and white respondents. Moreover, this gap reversed at the start of the 2020-2021 school year as the percentage of black respondents' households and Hispanic households in which children keep receiving classes in a distance-learning format remains steady above 71% and 72%, respectively. On the other hand, the fraction 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 the percentage of households responding that schools were open for in-person instruction at the start of the 2020-2021 academic year. Such change was driven by an increase in the share of white households reporting that schools were open that was more prominent than the increase observed among non-white households.

Figure 1: How did the Pandemic Affect the Way in Which Children Learn? Switch to Remote Learning

| Education | Income Quintile | Race |
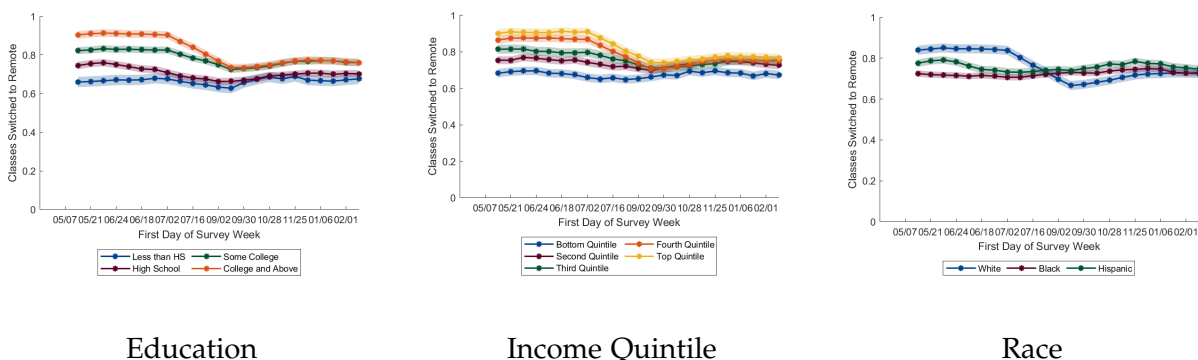
Notes: [1] Equally-weighted five-survey week moving averages are presented.

Class Suspension Figure 2 presents the socio-demographic gradients in the incidence

Table 1: Switch to Remote Learning, with 2020-21 Academic Year Interactions

	(1) Remote	(2) Remote	(3) Remote	(4) Remote	(5) Remote	(6) Remote	(7) Remote
$\mathbb{1}$(Black)	-0.123*** (0.008)			-0.073*** (0.008)	-0.100*** (0.008)	-0.074*** (0.008)	-0.080*** (0.008)
$\mathbb{1}$(Hispanic)	-0.113*** (0.008)			-0.072*** (0.008)	-0.068*** (0.008)	-0.053*** (0.008)	-0.048*** (0.008)
$\mathbb{1}$(Other Race)	-0.040*** (0.010)			-0.040*** (0.010)	-0.050*** (0.010)	-0.046*** (0.010)	-0.035*** (0.010)
$\mathbb{1}$(AY 2020-21)	-0.110*** (0.011)	-0.119*** (0.012)	-0.119*** (0.011)	-0.150*** (0.012)	-0.161*** (0.011)	-0.163*** (0.012)	-0.005 (0.023)
$\mathbb{1}$(Black)×$\mathbb{1}$(AY 2020-21)	0.170*** (0.011)			0.136*** (0.011)	0.154*** (0.010)	0.135*** (0.011)	0.141*** (0.011)
$\mathbb{1}$(Hispanic)×$\mathbb{1}$(AY 2020-21)	0.140*** (0.010)			0.115*** (0.010)	0.118*** (0.010)	0.108*** (0.010)	0.096*** (0.010)
$\mathbb{1}$(Other Race)×$\mathbb{1}$(AY 2020-21)	0.127*** (0.012)			0.128*** (0.012)	0.134*** (0.012)	0.132*** (0.012)	0.112*** (0.012)
$\mathbb{1}$(Bottom quintile)		-0.216*** (0.009)		-0.185*** (0.009)		-0.109*** (0.010)	-0.131*** (0.010)
$\mathbb{1}$(Second quintile)		-0.143*** (0.007)		-0.117*** (0.007)		-0.056*** (0.008)	-0.071*** (0.008)
$\mathbb{1}$(Third quintile)		-0.086*** (0.007)		-0.071*** (0.007)		-0.025*** (0.007)	-0.035*** (0.007)
$\mathbb{1}$(Fourth quintile)		-0.028*** (0.005)		-0.022*** (0.005)		0.003 (0.005)	-0.002 (0.005)
$\mathbb{1}$(Bottom quintile)×$\mathbb{1}$(AY 2020-21)		0.153*** (0.012)		0.105*** (0.012)		0.064*** (0.013)	0.074*** (0.013)
$\mathbb{1}$(Second quintile)×$\mathbb{1}$(AY 2020-21)		0.122*** (0.010)		0.084*** (0.010)		0.046*** (0.010)	0.054*** (0.011)
$\mathbb{1}$(Third quintile)×$\mathbb{1}$(AY 2020-21)		0.069*** (0.009)		0.050*** (0.009)		0.017* (0.010)	0.024** (0.010)
$\mathbb{1}$(Fourth quintile)×$\mathbb{1}$(AY 2020-21)		0.017** (0.007)		0.011* (0.007)		-0.008 (0.007)	-0.003 (0.007)
$\mathbb{1}$(Less than HS)			-0.241*** (0.012)		-0.213*** (0.012)	-0.168*** (0.012)	-0.168*** (0.012)
$\mathbb{1}$(HS)			-0.164*** (0.006)		-0.150*** (0.006)	-0.116*** (0.007)	-0.115*** (0.006)
$\mathbb{1}$(Some College)			-0.077*** (0.004)		-0.067*** (0.004)	-0.045*** (0.004)	-0.046*** (0.004)
$\mathbb{1}$(Less than HS)×$\mathbb{1}$(AY 2020-21)			0.148*** (0.017)		0.102*** (0.017)	0.072*** (0.018)	0.070*** (0.018)
$\mathbb{1}$(HS)×$\mathbb{1}$(AY 2020-21)			0.112*** (0.008)		0.093*** (0.008)	0.068*** (0.009)	0.069*** (0.009)
$\mathbb{1}$(Some College)×$\mathbb{1}$(AY 2020-21)			0.077*** (0.005)		0.065*** (0.005)	0.049*** (0.006)	0.048*** (0.006)
Household Size							0.003* (0.002)
Num. of Children							0.004 (0.002)
$\mathbb{1}$(Female, Respondent)							0.022*** (0.003)
$\mathbb{1}$(Married, Respondent)							-0.018*** (0.004)
State Avg. Mobility, Retail							0.835*** (0.116)
State Avg. Mobility, Transit							-0.600*** (0.105)
State Avg. Mobility, Grocery							0.436*** (0.093)
State Avg. Mobility, Workplaces							-0.352*** (0.089)
State Avg. Mobility, Residential							0.893*** (0.112)
Avg. Num. of New Cases, State							-0.044** (0.020)
Constant	0.755*** (0.013)	0.807*** (0.013)	0.804*** (0.013)	0.821*** (0.013)	0.832*** (0.013)	0.840*** (0.013)	0.791*** (0.018)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	451951	451951	451951	451951	451951	451951	451951

with which school-aged children's classes were cancelled during the pandemic. Table 2 presents the LPM results obtained for this type of education disruption to assess the robustness of such disparities to the inclusion of other household and individual characteristics.

Figure 2: How did the Pandemic Affect the Way in Which Children Learn? Classes were Cancelled

| Education | Income Quintile | Race |
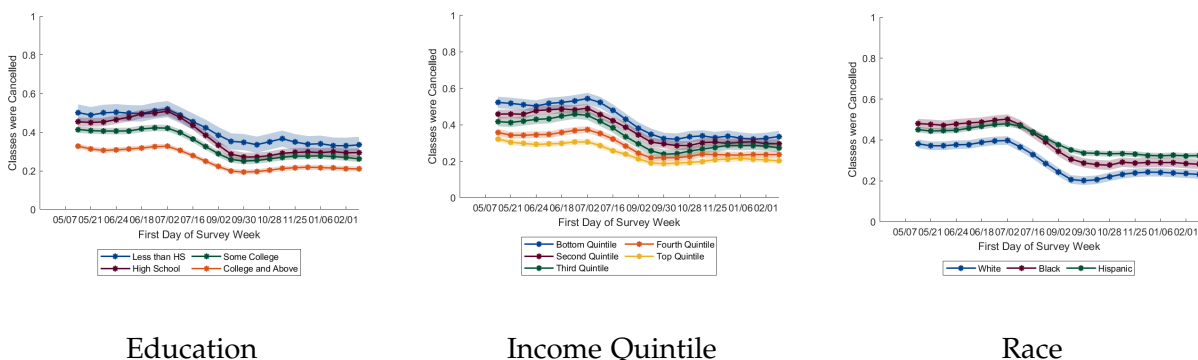
Notes: [1] Equally-weighted five-survey week moving averages are presented.

As can be observed in Figure 2, 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 beginning of the pandemic involved the suspension of classes.[4] 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 cancelled due to the virus. Similarly, the fraction of households in which children's classes were cancelled in response to the pandemic decreases with household income. Importantly, we find suggestive evidence that schools of children from the socio-demographic groups who were more likely to have their classes cancelled towards the end of the 2019-20 academic year were able to adjust to the limitations imposed by the pandemic. Specifically, we observe that the incidence of this type of disruption was significantly lower among these groups at the start of the 2020-21 academic year.

Schools Remaining Open Figure 3 presents the socio-demographic gradients in the incidence with which school-aged children's schools remained open and in-person instruc-

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[4]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 2: Classes were Cancelled, with 2020-21 Academic Year Interactions

	(1) Cancelled	(2) Cancelled	(3) Cancelled	(4) Cancelled	(5) Cancelled	(6) Cancelled	(7) Cancelled
$\mathbb{1}$(Black)	0.102***			0.048***	0.080***	0.049***	0.046***
	(0.009)			(0.009)	(0.009)	(0.009)	(0.009)
$\mathbb{1}$(Hispanic)	0.072***			0.025***	0.034***	0.014	0.015
	(0.009)			(0.009)	(0.009)	(0.009)	(0.009)
$\mathbb{1}$(Other Race)	-0.029**			-0.028**	-0.016	-0.020*	-0.017
	(0.012)			(0.012)	(0.012)	(0.012)	(0.012)
$\mathbb{1}$(AY 2020-21)	-0.179***	-0.125***	-0.134***	-0.136***	-0.141***	-0.128***	-0.083***
	(0.012)	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)	(0.027)
$\mathbb{1}$(Black)×$\mathbb{1}$(AY 2020-21)	-0.035***			-0.007	-0.022**	-0.006	-0.002
	(0.011)			(0.011)	(0.011)	(0.011)	(0.011)
$\mathbb{1}$(Hispanic)×$\mathbb{1}$(AY 2020-21)	0.039***			0.059***	0.054***	0.062***	0.054***
	(0.011)			(0.011)	(0.011)	(0.011)	(0.011)
$\mathbb{1}$(Other Race)×$\mathbb{1}$(AY 2020-21)	0.042***			0.041***	0.037***	0.038***	0.026*
	(0.014)			(0.014)	(0.014)	(0.014)	(0.014)
$\mathbb{1}$(Bottom quintile)		0.221***		0.202***		0.142***	0.152***
		(0.010)		(0.010)		(0.011)	(0.012)
$\mathbb{1}$(Second quintile)		0.165***		0.150***		0.100***	0.105***
		(0.009)		(0.009)		(0.009)	(0.010)
$\mathbb{1}$(Third quintile)		0.127***		0.117***		0.077***	0.080***
		(0.009)		(0.009)		(0.009)	(0.009)
$\mathbb{1}$(Fourth quintile)		0.053***		0.048***		0.025***	0.026***
		(0.007)		(0.007)		(0.007)	(0.007)
$\mathbb{1}$(Bottom quintile)×$\mathbb{1}$(AY 2020-21)		-0.083***		-0.092***		-0.063***	-0.058***
		(0.013)		(0.013)		(0.015)	(0.015)
$\mathbb{1}$(Second quintile)×$\mathbb{1}$(AY 2020-21)		-0.062***		-0.071***		-0.045***	-0.041***
		(0.011)		(0.011)		(0.012)	(0.012)
$\mathbb{1}$(Third quintile)×$\mathbb{1}$(AY 2020-21)		-0.058***		-0.063***		-0.041***	-0.037***
		(0.011)		(0.011)		(0.011)	(0.011)
$\mathbb{1}$(Fourth quintile)×$\mathbb{1}$(AY 2020-21)		-0.020**		-0.021**		-0.008	-0.004
		(0.008)		(0.008)		(0.008)	(0.008)
$\mathbb{1}$(Less than HS)			0.183***		0.169***	0.110***	0.099***
			(0.013)		(0.013)	(0.014)	(0.014)
$\mathbb{1}$(HS)			0.160***		0.147***	0.100***	0.091***
			(0.007)		(0.007)	(0.008)	(0.008)
$\mathbb{1}$(Some College)			0.093***		0.084***	0.050***	0.047***
			(0.005)		(0.005)	(0.006)	(0.006)
$\mathbb{1}$(Less than HS)×$\mathbb{1}$(AY 2020-21)			-0.044**		-0.064***	-0.038**	-0.039**
			(0.018)		(0.018)	(0.019)	(0.019)
$\mathbb{1}$(HS)×$\mathbb{1}$(AY 2020-21)			-0.078***		-0.080***	-0.056***	-0.054***
			(0.009)		(0.009)	(0.010)	(0.010)
$\mathbb{1}$(Some College)×$\mathbb{1}$(AY 2020-21)			-0.039***		-0.040***	-0.022***	-0.022***
			(0.007)		(0.007)	(0.007)	(0.007)
Household Size							0.005***
							(0.002)
Num. of Children							0.006**
							(0.003)
$\mathbb{1}$(Female, Respondent)							-0.037***
							(0.004)
$\mathbb{1}$(Married, Respondent)							-0.002
							(0.005)
State Avg. Mobility, Retail							0.592***
							(0.131)
State Avg. Mobility, Transit							-0.203*
							(0.118)
State Avg. Mobility, Grocery							0.096
							(0.104)
State Avg. Mobility, Workplaces							-0.144
							(0.099)
State Avg. Mobility, Residential							0.506***
							(0.122)
Avg. Num. of New Cases, State							0.008
							(0.023)
Constant	0.430***	0.335***	0.360***	0.337***	0.350***	0.318***	0.293***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.021)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	451951	451951	451951	451951	451951	451951	451951

tion was implemented during the pandemic. Table 3 presents the LPM results obtained for this type of education disruption to assess the robustness of such disparities to the inclusion of other household and individual characteristics.

Figure 3: How did the Pandemic Affect the Way in Which Children Learn? Schools Remained Open

| Education | Income Quintile | Race |
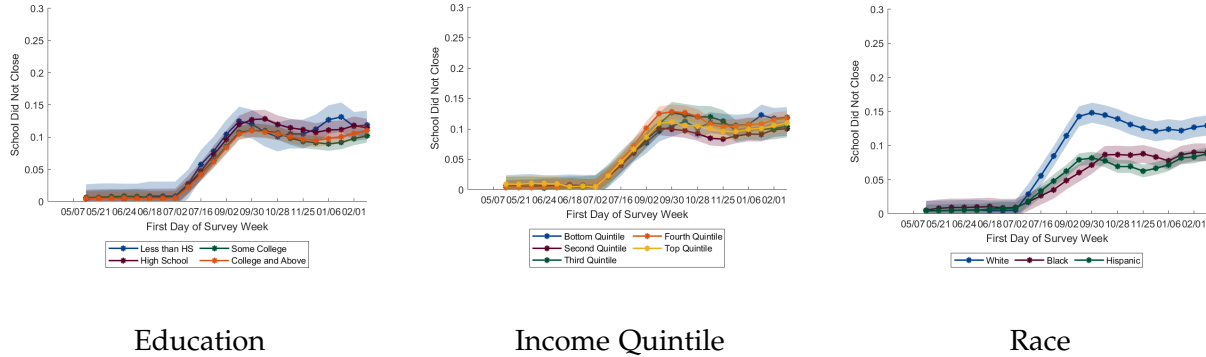
Notes: [1] Equally-weighted five-survey week moving averages are presented.

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 states issued state-ordered in-person instruction and most left the choice to the discretion of each school district.[5] This lead to a fall in the overall percentage of households in which children's classes were cancelled. 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 open being larger than their non-white counterparts' increase.

4   Access to Computers for Education Purposes

We now focus on investigating differences in children's ability to adjust to the changes in learning formats described above as containment measures forced a shift towards home

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

Table 3: 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
$\mathbb{1}$(Black)	-0.001			0.001	-0.000	0.001	-0.006***
	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)
$\mathbb{1}$(Hispanic)	0.011***			0.013***	0.012***	0.013***	0.009***
	(0.001)			(0.002)	(0.001)	(0.001)	(0.001)
$\mathbb{1}$(Other Race)	0.020***			0.020***	0.020***	0.020***	0.013***
	(0.003)			(0.003)	(0.003)	(0.003)	(0.003)
$\mathbb{1}$(AY 2020-21)	0.131***	0.102***	0.104***	0.120***	0.124***	0.117***	0.054***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.011)
$\mathbb{1}$(Black)×$\mathbb{1}$(AY 2020-21)	-0.059***			-0.062***	-0.061***	-0.061***	-0.068***
	(0.006)			(0.006)	(0.006)	(0.006)	(0.006)
$\mathbb{1}$(Hispanic)×$\mathbb{1}$(AY 2020-21)	-0.058***			-0.060***	-0.064***	-0.064***	-0.056***
	(0.004)			(0.004)	(0.004)	(0.004)	(0.004)
$\mathbb{1}$(Other Race)×$\mathbb{1}$(AY 2020-21)	-0.078***			-0.077***	-0.077***	-0.076***	-0.061***
	(0.005)			(0.005)	(0.005)	(0.005)	(0.005)
$\mathbb{1}$(Bottom quintile)		-0.008***		-0.010***		-0.010***	-0.002
		(0.002)		(0.002)		(0.003)	(0.003)
$\mathbb{1}$(Second quintile)		-0.010***		-0.012***		-0.012***	-0.007**
		(0.002)		(0.002)		(0.003)	(0.003)
$\mathbb{1}$(Third quintile)		-0.011***		-0.012***		-0.012***	-0.008***
		(0.002)		(0.002)		(0.003)	(0.003)
$\mathbb{1}$(Fourth quintile)		-0.008***		-0.008***		-0.009***	-0.006***
		(0.002)		(0.002)		(0.002)	(0.002)
$\mathbb{1}$(Bottom quintile)×$\mathbb{1}$(AY 2020-21)		0.001		0.022***		0.010	0.002
		(0.006)		(0.006)		(0.007)	(0.007)
$\mathbb{1}$(Second quintile)×$\mathbb{1}$(AY 2020-21)		-0.007		0.009**		0.002	-0.005
		(0.005)		(0.005)		(0.006)	(0.006)
$\mathbb{1}$(Third quintile)×$\mathbb{1}$(AY 2020-21)		0.008		0.016***		0.011**	0.005
		(0.005)		(0.005)		(0.006)	(0.006)
$\mathbb{1}$(Fourth quintile)×$\mathbb{1}$(AY 2020-21)		0.012***		0.014***		0.012***	0.008*
		(0.004)		(0.004)		(0.004)	(0.004)
$\mathbb{1}$(Less than HS)			0.001		-0.003*	0.001	0.002
			(0.002)		(0.002)	(0.002)	(0.002)
$\mathbb{1}$(HS)			-0.004***		-0.004***	-0.000	0.001
			(0.001)		(0.001)	(0.001)	(0.001)
$\mathbb{1}$(Some College)			-0.001		-0.001	0.002	0.003*
			(0.001)		(0.001)	(0.002)	(0.002)
$\mathbb{1}$(Less than HS)×$\mathbb{1}$(AY 2020-21)			0.007		0.031***	0.030***	0.030***
			(0.008)		(0.008)	(0.009)	(0.009)
$\mathbb{1}$(HS)×$\mathbb{1}$(AY 2020-21)			0.010**		0.017***	0.016***	0.015***
			(0.004)		(0.004)	(0.005)	(0.005)
$\mathbb{1}$(Some College)×$\mathbb{1}$(AY 2020-21)			-0.002		0.002	0.000	0.001
			(0.003)		(0.003)	(0.003)	(0.003)
Household Size							-0.001
							(0.001)
Num. of Children							0.000
							(0.001)
$\mathbb{1}$(Female, Respondent)							-0.001
							(0.002)
$\mathbb{1}$(Married, Respondent)							0.007***
							(0.002)
State Avg. Mobility, Retail							-0.831***
							(0.045)
State Avg. Mobility, Transit							0.348***
							(0.047)
State Avg. Mobility, Grocery							-0.316***
							(0.046)
State Avg. Mobility, Workplaces							-0.007
							(0.047)
State Avg. Mobility, Residential							-0.949***
							(0.061)
Avg. Num. of New Cases, State							-0.003
							(0.010)
Constant	0.028***	0.040***	0.033***	0.036***	0.029***	0.036***	0.051***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	451951	451951	451951	451951	451951	451951	451951

learning. Figure 4 presents the differences in the availability of a computer for education purposes with respect to household income and respondents' education and race. Similarly, 4 presents the LPM results obtained upon controlling for other individual and household characteristics. 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 of reference at the time of the 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 4: Computer Available for Educational Purposes

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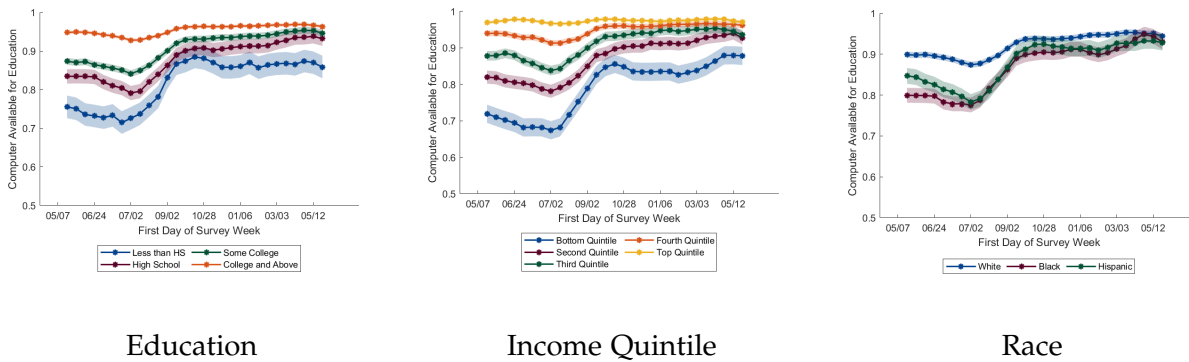
Notes: [1] Equally-weighted five-survey week moving averages are presented.

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 5 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 schools in this regard. Reliance on schools for having access to a computer in the household for children's education decreases with the respondents' education as Figure 6 suggests that better-educated respondents' households are more likely to indicate that someone in the family provides the computer used by children for education.

Furthermore, investigating income, educational and racial gaps in terms of the providers

Table 4: 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.
$\mathbb{1}$(Black)	-0.097***			-0.031***	-0.078***	-0.032***	-0.029***
	(0.007)			(0.007)	(0.007)	(0.007)	(0.007)
$\mathbb{1}$(Hispanic)	-0.079***			-0.025***	-0.043***	-0.015**	-0.013*
	(0.007)			(0.007)	(0.007)	(0.007)	(0.007)
$\mathbb{1}$(Other Race)	0.026***			0.026***	0.019***	0.025***	0.021***
	(0.007)			(0.007)	(0.007)	(0.007)	(0.007)
$\mathbb{1}$(AY 2020-21)	0.022**	-0.025***	-0.006	-0.027***	-0.014	-0.032***	-0.013
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.016)
$\mathbb{1}$(Black)×$\mathbb{1}$(AY 2020-21)	0.068***			0.029***	0.055***	0.028***	0.030***
	(0.008)			(0.008)	(0.008)	(0.008)	(0.008)
$\mathbb{1}$(Hispanic)×$\mathbb{1}$(AY 2020-21)	0.050***			0.023***	0.032***	0.018**	0.021***
	(0.008)			(0.008)	(0.007)	(0.008)	(0.008)
$\mathbb{1}$(Other Race)×$\mathbb{1}$(AY 2020-21)	-0.016**			-0.014*	-0.013*	-0.014*	-0.012
	(0.008)			(0.008)	(0.008)	(0.008)	(0.008)
$\mathbb{1}$(Bottom quintile)		-0.265***		-0.250***		-0.217***	-0.204***
		(0.008)		(0.008)		(0.008)	(0.009)
$\mathbb{1}$(Second quintile)		-0.164***		-0.152***		-0.127***	-0.118***
		(0.006)		(0.006)		(0.006)	(0.007)
$\mathbb{1}$(Third quintile)		-0.103***		-0.095***		-0.077***	-0.071***
		(0.006)		(0.006)		(0.006)	(0.006)
$\mathbb{1}$(Fourth quintile)		-0.041***		-0.037***		-0.027***	-0.025***
		(0.003)		(0.003)		(0.003)	(0.003)
$\mathbb{1}$(Bottom quintile)×$\mathbb{1}$(AY 2020-21)		0.138***		0.125***		0.107***	0.106***
		(0.010)		(0.010)		(0.010)	(0.010)
$\mathbb{1}$(Second quintile)×$\mathbb{1}$(AY 2020-21)		0.101***		0.090***		0.075***	0.074***
		(0.007)		(0.007)		(0.007)	(0.007)
$\mathbb{1}$(Third quintile)×$\mathbb{1}$(AY 2020-21)		0.067***		0.061***		0.049***	0.047***
		(0.007)		(0.007)		(0.007)	(0.007)
$\mathbb{1}$(Fourth quintile)×$\mathbb{1}$(AY 2020-21)		0.028***		0.025***		0.018***	0.017***
		(0.004)		(0.004)		(0.004)	(0.004)
$\mathbb{1}$(Less than HS)			-0.201***		-0.181***	-0.095***	-0.091***
			(0.011)		(0.011)	(0.011)	(0.011)
$\mathbb{1}$(HS)			-0.118***		-0.104***	-0.038***	-0.037***
			(0.005)		(0.005)	(0.005)	(0.005)
$\mathbb{1}$(Some College)			-0.077***		-0.067***	-0.021***	-0.021***
			(0.004)		(0.004)	(0.004)	(0.004)
$\mathbb{1}$(Less than HS)×$\mathbb{1}$(AY 2020-21)			0.108***		0.092***	0.048***	0.049***
			(0.014)		(0.014)	(0.014)	(0.014)
$\mathbb{1}$(HS)×$\mathbb{1}$(AY 2020-21)			0.069***		0.058***	0.020***	0.020***
			(0.006)		(0.006)	(0.006)	(0.006)
$\mathbb{1}$(Some College)×$\mathbb{1}$(AY 2020-21)			0.055***		0.047***	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)
$\mathbb{1}$(Female, Respondent)							-0.009***
							(0.002)
$\mathbb{1}$(Married, Respondent)							0.012***
							(0.003)
State Avg. Mobility, Retail							0.013
							(0.088)
State Avg. Mobility, Transit							-0.048
							(0.070)
State Avg. Mobility, Grocery							0.037
							(0.061)
State Avg. Mobility, Workplaces							0.076
							(0.058)
State Avg. Mobility, Residential							0.114
							(0.073)
Avg. Num. of New Cases, State							-0.008
							(0.011)
Constant	0.892***	0.981***	0.939***	0.983***	0.954***	0.990***	1.028***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.013)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	515781	515781	515781	515781	515781	515781	515781

of education resources, Figure 5 presents differences in the share of households with access to a computer provided by the child's school, and Figure 6 presents differences in the percentage of households with a computer supplied by someone in the child's household/family for education purposes.

Figure 5: Computer Available for Educational Purposes is Provided by the Child's School

| Education | Income Quintile | Race |
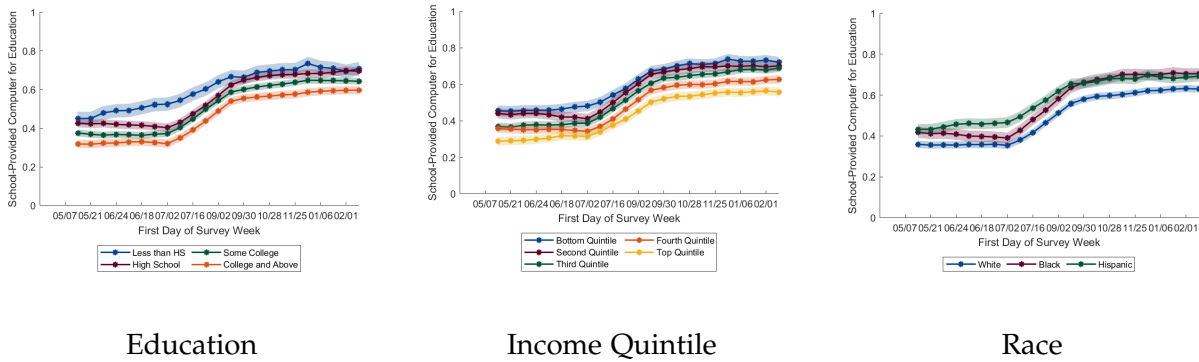
Notes: [1] Equally-weighted five-survey week moving averages are presented.

Figure 6: Computer Available for Educational Purposes is Provided by Someone in the Household/Family or Owned by the Child

| Education | Income Quintile | Race |
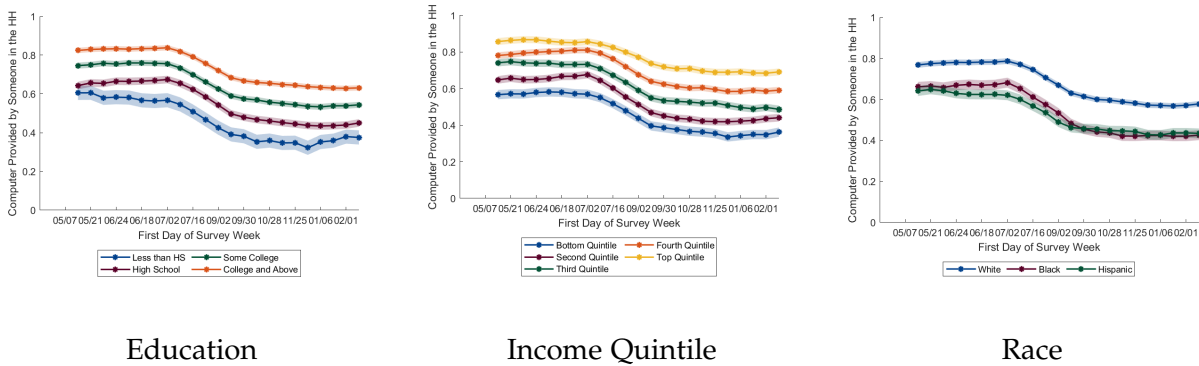
Notes: [1] Equally-weighted five-survey week moving averages are presented.

There is a noticeable income gradient in the availability of a computer for children's education, with the share of households having such resources available increasing with household income. Similar to the observed differences with respect to respondents' education, the second panel of Figure 5 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

Table 5: Computer Availability in the Household for Education Purposes, Provided by School

	(1) Comp. Avail.	(2) Comp. Avail.	(3) Comp. Avail.	(4) Comp. Avail.	(5) Comp. Avail.	(6) Comp. Avail.	(7) Comp. Avail.
$\mathbb{1}$(Black)	0.085***			0.047***	0.070***	0.048***	0.043***
	(0.009)			(0.009)	(0.009)	(0.009)	(0.009)
$\mathbb{1}$(Hispanic)	0.119***			0.085***	0.089***	0.073***	0.067***
	(0.009)			(0.009)	(0.009)	(0.009)	(0.009)
$\mathbb{1}$(Other Race)	-0.027**			-0.029**	-0.023**	-0.028**	-0.023**
	(0.012)			(0.012)	(0.012)	(0.011)	(0.012)
$\mathbb{1}$(AY 2020-21)	0.265***	0.256***	0.264***	0.258***	0.265***	0.257***	0.320***
	(0.013)	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)	(0.027)
$\mathbb{1}$(Black)$\times\mathbb{1}$(AY 2020-21)	0.033***			0.037***	0.038***	0.038***	0.043***
	(0.011)			(0.011)	(0.011)	(0.011)	(0.011)
$\mathbb{1}$(Hispanic)$\times\mathbb{1}$(AY 2020-21)	-0.016			-0.019*	-0.010	-0.012	-0.004
	(0.011)			(0.011)	(0.011)	(0.011)	(0.011)
$\mathbb{1}$(Other Race)$\times\mathbb{1}$(AY 2020-21)	-0.028*			-0.023	-0.020	-0.019	-0.015
	(0.015)			(0.014)	(0.014)	(0.014)	(0.015)
$\mathbb{1}$(Bottom quintile)		0.180***		0.148***		0.112***	0.093***
		(0.010)		(0.010)		(0.011)	(0.012)
$\mathbb{1}$(Second quintile)		0.140***		0.112***		0.084***	0.071***
		(0.009)		(0.009)		(0.009)	(0.010)
$\mathbb{1}$(Third quintile)		0.092***		0.074***		0.054***	0.044***
		(0.009)		(0.009)		(0.009)	(0.009)
$\mathbb{1}$(Fourth quintile)		0.055***		0.046***		0.036***	0.031***
		(0.007)		(0.007)		(0.007)	(0.007)
$\mathbb{1}$(Bottom quintile)$\times\mathbb{1}$(AY 2020-21)		0.009		0.005		0.015	0.017
		(0.013)		(0.014)		(0.015)	(0.015)
$\mathbb{1}$(Second quintile)$\times\mathbb{1}$(AY 2020-21)		0.018*		0.018		0.025**	0.025**
		(0.011)		(0.011)		(0.012)	(0.012)
$\mathbb{1}$(Third quintile)$\times\mathbb{1}$(AY 2020-21)		0.030***		0.029**		0.034***	0.037***
		(0.011)		(0.011)		(0.012)	(0.012)
$\mathbb{1}$(Fourth quintile)$\times\mathbb{1}$(AY 2020-21)		0.011		0.011		0.014	0.014
		(0.009)		(0.009)		(0.009)	(0.009)
$\mathbb{1}$(Less than HS)			0.182***		0.148***	0.105***	0.109***
			(0.013)		(0.014)	(0.014)	(0.014)
$\mathbb{1}$(HS)			0.103***		0.083***	0.047***	0.059***
			(0.007)		(0.007)	(0.008)	(0.008)
$\mathbb{1}$(Some College)			0.056***		0.042***	0.016***	0.023***
			(0.005)		(0.005)	(0.006)	(0.006)
$\mathbb{1}$(Less than HS)$\times\mathbb{1}$(AY 2020-21)			-0.038**		-0.039**	-0.049**	-0.050***
			(0.018)		(0.018)	(0.019)	(0.019)
$\mathbb{1}$(HS)$\times\mathbb{1}$(AY 2020-21)			0.004		0.004	-0.003	-0.005
			(0.009)		(0.010)	(0.010)	(0.010)
$\mathbb{1}$(Some College)$\times\mathbb{1}$(AY 2020-21)			0.004		0.003	-0.003	-0.003
			(0.007)		(0.007)	(0.007)	(0.007)
Household Size							-0.002
							(0.002)
Num. of Children							0.044***
							(0.003)
$\mathbb{1}$(Female, Respondent)							0.053***
							(0.004)
$\mathbb{1}$(Married, Respondent)							0.014***
							(0.005)
State Avg. Mobility, Retail							-0.053
							(0.129)
State Avg. Mobility, Transit							-0.372***
							(0.117)
State Avg. Mobility, Grocery							0.163
							(0.105)
State Avg. Mobility, Workplaces							0.177*
							(0.099)
State Avg. Mobility, Residential							0.272**
							(0.122)
Avg. Num. of New Cases, State							-0.033
							(0.021)
Constant	0.220***	0.150***	0.188***	0.148***	0.174***	0.141***	0.019
	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)	(0.020)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	447000	447000	447000	447000	447000	447000	447000

Table 6: Computer Availability in the Household for Education Purposes, Provided by Someone in the Household/Family

	(1) Comp. Avail.	(2) Comp. Avail.	(3) Comp. Avail.	(4) Comp. Avail.	(5) Comp. Avail.	(6) Comp. Avail.	(7) Comp. Avail.
1(Black)	-0.133***			-0.068***	-0.109***	-0.069***	-0.067***
	(0.008)			(0.009)	(0.008)	(0.009)	(0.009)
1(Hispanic)	-0.164***			-0.107***	-0.118***	-0.090***	-0.085***
	(0.008)			(0.008)	(0.008)	(0.008)	(0.008)
1(Other Race)	0.016*			0.020**	0.008	0.016	0.015
	(0.010)			(0.010)	(0.010)	(0.010)	(0.010)
1(AY 2020-21)	-0.164***	-0.139***	-0.155***	-0.138***	-0.154***	-0.134***	-0.202***
	(0.013)	(0.013)	(0.012)	(0.013)	(0.013)	(0.013)	(0.025)
1(Black)×1(AY 2020-21)	-0.042***			-0.040***	-0.045***	-0.042***	-0.048***
	(0.011)			(0.011)	(0.011)	(0.011)	(0.011)
1(Hispanic)×1(AY 2020-21)	-0.006			0.007	0.002	0.008	-0.003
	(0.011)			(0.011)	(0.011)	(0.011)	(0.011)
1(Other Race)×1(AY 2020-21)	0.019			0.010	0.007	0.006	-0.001
	(0.013)			(0.013)	(0.013)	(0.013)	(0.013)
1(Bottom quintile)		-0.289***		-0.247***		-0.189***	-0.176***
		(0.009)		(0.010)		(0.010)	(0.011)
1(Second quintile)		-0.209***		-0.173***		-0.127***	-0.119***
		(0.008)		(0.008)		(0.008)	(0.009)
1(Third quintile)		-0.137***		-0.114***		-0.079***	-0.072***
		(0.008)		(0.008)		(0.008)	(0.008)
1(Fourth quintile)		-0.066***		-0.054***		-0.036***	-0.033***
		(0.006)		(0.006)		(0.006)	(0.006)
1(Bottom quintile)×1(AY 2020-21)		-0.061***		-0.055***		-0.049***	-0.049***
		(0.013)		(0.013)		(0.014)	(0.014)
1(Second quintile)×1(AY 2020-21)		-0.063***		-0.061***		-0.059***	-0.058***
		(0.010)		(0.010)		(0.011)	(0.011)
1(Third quintile)×1(AY 2020-21)		-0.055***		-0.053***		-0.055***	-0.056***
		(0.011)		(0.011)		(0.011)	(0.011)
1(Fourth quintile)×1(AY 2020-21)		-0.036***		-0.036***		-0.037***	-0.036***
		(0.008)		(0.008)		(0.008)	(0.008)
1(Less than HS)			-0.258***		-0.213***	-0.139***	-0.148***
			(0.013)		(0.013)	(0.013)	(0.013)
1(HS)			-0.177***		-0.150***	-0.091***	-0.104***
			(0.007)		(0.007)	(0.007)	(0.007)
1(Some College)			-0.084***		-0.065***	-0.024***	-0.031***
			(0.005)		(0.005)	(0.005)	(0.005)
1(Less than HS)×1(AY 2020-21)			-0.045**		-0.042**	-0.017	-0.016
			(0.018)		(0.018)	(0.019)	(0.019)
1(HS)×1(AY 2020-21)			-0.021**		-0.022**	-0.004	-0.001
			(0.009)		(0.009)	(0.010)	(0.010)
1(Some College)×1(AY 2020-21)			-0.016**		-0.016**	-0.003	-0.002
			(0.006)		(0.006)	(0.007)	(0.007)
Household Size							0.002
							(0.002)
Num. of Children							-0.020***
							(0.003)
1(Female, Respondent)							-0.056***
							(0.004)
1(Married, Respondent)							-0.023***
							(0.005)
State Avg. Mobility, Retail							0.106
							(0.125)
State Avg. Mobility, Transit							0.399***
							(0.114)
State Avg. Mobility, Grocery							-0.191*
							(0.103)
State Avg. Mobility, Workplaces							-0.284***
							(0.097)
State Avg. Mobility, Residential							-0.366***
							(0.119)
Avg. Num. of New Cases, State							0.022
							(0.022)
Constant	0.831***	0.938***	0.887***	0.940***	0.909***	0.952***	1.044***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.019)
Survey Week FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	447000	447000	447000	447000	447000	447000	447000

suggests that reliance on schools for having access to a computer in the household for children's education decreases with household income as Figure 6 indicates that families in higher quintiles of the income distribution are more likely to report that someone in the household provides the computer used by children for education.

Regarding race, a higher share of white respondents' households has access to a computer for children's education than the percentage of black and Hispanic respondents' homes 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 6 suggests that white respondents' households are more likely to indicate that someone in the family provides the computer used by children for education.

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   Conclusion

Throughout the analysis implemented in this paper, we assess how the unequal impact of COVID-19 on employment presented in Flores and Gayle (2022) relates to similar disparities in its effect on children's education. Using data from the Pulse survey on school-aged children's education, we present evidence of a comparable unequal impact of the pandemic on the education disruptions faced by school-aged children. Furthermore, we find that the estimated gradients align very closely with the disparities documented pertaining to 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.

When focusing on the impact of COVID-19 on children's education, we consider two essential aspects of children's human capital formation that were affected during the pandemic. The first relates to schools' responses to limitations imposed on in-person instruction, which significantly impacted how children learned during the pandemic. The second one pertains to active learning resources for school-aged children at home. Related to the latter, it is also essential to distinguish the provider of such resources among

children of different socio-demographic groups. This distinction suggests avenues for implementing policies to close observed gaps in active learning resources.

We document that children in households in the bottom quintile of the income distribution and non-white and non-college-educated respondents were significantly more likely to have had their classes canceled at the earlier stage of the pandemic. Children from these groups were also considerably less likely to have their classes switched to a remote format. Similar disparities are observed in children's access to computers for learning purposes. These findings are of particular concern since there is evidence related to the impact of natural disasters indicating that significant education disruptions can negatively affect children's long-term educational outcomes, especially if students cannot adapt to or compensate for these disruptions. Thus, children's education becomes constrained to the education-related investments made at home. Nonetheless, despite a weakening of the equalizing role of schools, these still play an essential role in providing access to necessary learning resources to help students from disadvantaged groups – particularly those more hardly hit by employment income losses – adapt to the education disruptions experienced during the pandemic.

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