Economic Inequality, the Digital Divide, and Remote Learning During COVID-19

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Abstract

Wealth and education establish a cycle of intergenerational inequality. Wealthier house-holds can provide more educational opportunities for their children, who then will have more chances to build wealth for themselves. The digital divide may have emerged as a key reinforcing mechanism of education through wealth and of future wealth through education during the pandemic. The intergenerational transmission of racial wealth inequality likely played out at rapid speed during the pandemic. We analyze the link between wealth, reliable internet and electronic device availability, remote learning time, race, and ethnicity, using the U.S. Census Bureau's Household Pulse Survey. We conclude that Black and Hispanic/Latinx households have less reliable internet and devices available. This goes along with fewer hours children spend on remote learning. The lack of internet and devices correlates with less wealth, as reflected in lower home-ownership rates and greater housing instability. Black and Hispanic/Latinx households, in particular, are more likely to be renters and face housing instability.

Keywords

achievement gap, education and inequality, education policy, equality of opportunity, stratification, wealth gap

Introduction

Three things characterize wealth inequality in the United States. First, economically vulnerable families that could benefit the most from the security and access to

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economic opportunities that wealth provides often have little or no wealth. Second, wealth inequality is passed on intergenerationally. This happens both through direct bequests to children and grandchildren as well as through the ability of high-wealth individuals to provide their heirs with increased access to educational enrichment, beneficial social networks, and protection against adverse life events. In this way, wealth inequality perpetuates generation after generation. Third, wealth inequality has a highly racialized component where the median Black, Latinx, and Native American families have only a fraction of the wealth of the median Asian and White families.

The education system has the ability to disrupt part of this chain of wealth inequality by providing enriched educational opportunities equitably so that individuals from low-wealth backgrounds have access to opportunities that a good education can provide. However, the education system also has the ability to uphold the intergenerational cycle of wealth inequality if wealth continues to be a prerequisite for access to the highest quality education.

In this paper, we argue that the COVID-19 pandemic will exacerbate existing racial wealth inequality, and specifically, that the switch to remote learning for K-12 students during the pandemic will reinforce educational disparities by race and ethnicity. Given the link between educational achievement and future income, pandemic-induced educational disparities have the potential to feed into future wealth gaps, perpetuating thy cycle of intergenerational wealth inequality.

The coronavirus pandemic forced most school systems to move part or all of students' learning time online. Yet, many students of color had fewer opportunities at participating in remote learning during COVID-19 than their White peers. Black, Latinx, Native American, and Asian American families often had less reliable access to the internet and electronic devices for educational purposes than White families. Widespread wealth inequality before the pandemic contributed to this digital divide. The families that needed more wealth to get the resources necessary for successful remote learning were less likely to have wealth to begin with.

Students of color likely spent less time on remote learning activities either by themselves or with their parents or teachers due to the widespread digital divide. The pandemic thus likely widened educational achievement gaps. Such achievement gaps can appear over just a few months and they can persist for decades. The lack of families' wealth can thus translate into fewer economic opportunities for their children as families have fewer resources to handle the unique demands of remote learning during the pandemic.

The rest of this paper is organized as follows. The "Background and Conceptual Framework" section summarizes the relevant literature and our conceptual framework. The "Data, Variables, and Empirical Strategy" section discusses the data and methodology. The "Results" section presents our results. We discuss our findings and summarize our conclusions in the "Discussion and Conclusion" section.

Background and Conceptual Framework

On average, Black, Latinx, and Native American students consistently score below White and Asian students on standardized test scores (Hemphill et al., 2011;

Vanneman, et al., 2009), are underrepresented in advanced placement courses (Francis & Darity, 2020; Francis et al., 2019), have lower high school graduation and college enrollment rates (Black & Sufi, 2002; Sharpe & Darity, 2009), and are more likely to be disciplined with suspensions and expulsions from school (Okonofua & Eberhardt, 2015; Shedd, 2015). These differences are typically large and persist across decades. Underrepresented minority students have fewer positive outcomes and more negative educational outcomes than their White and Asian peers.

Much of this academic disadvantage is explained by racial and ethnic disparities in socioeconomic status. For example, Black–White test score gaps are 49%–84% lower in math and 22% –132% in reading after accounting for a range of socioeconomic factors such as parental income and education, number of books in the home, or the presence of a computer in the home (Clotfelter et al., 2009). Students from more privileged socioeconomic backgrounds are more likely to have access to educationally enriching resources and stable learning environments—both in school and at home (Diamond, 2006; Shedd, 2015).

Household wealth is a key aspect of families' socioeconomic status. Household wealth can provide educational access and opportunity through the ability to afford a home in more stable neighborhoods with better schools; through access to beneficial social and informational networks; through the ability to invest in educational tools such as computers or a library of books; and by acting as a buffer to any potential negative shocks to income that would otherwise create household instability.

Much like academic achievement gaps, racial and ethnic gaps in income and wealth in the United States are large and have persisted over decades (Conley, 2009; Conley & Glauber, 2008; De La Cruz-Viesca et al., 2016; Hanks et al., 2018; Kijakazi et al., 2016; Muñoz et al., 2015; Oliver & Shapiro, 2009; Solomon & Weller, 2018; Weller & Hanks, 2018). According to the U.S. Census Bureau (2019), the average Black man working full-time year-round had 68.4% of the income of the average White man and Black women had 59.4% of the income of White men in 2018. Moreover, Latino men had 63.5% of the income of White men working full-time year-round, whereas Latina women received 59.1 cents for every dollar of White men's income (U.S. Census Bureau, 2019). Regarding wealth, the median Black household had a net worth of $17,150 and the median Latinx household had $20,700 compared to $171,000 of net worth for the median White household in 2016 (Dettling et al., 2017; McIntosh et al., 2020). Average wealth gaps, for which quarterly data exist through 2020, have gradually increased over time, especially since the Great Recession from 2007 to 2009 (see Figure 1). Given the importance of wealth and income for academic achievement, all three gaps by race and ethnicity move in tandem.

How might the COVID-19 pandemic affect the prevailing relationships between race, ethnicity, income, wealth, and educational opportunities? Figure 2 provides a conceptual mapping of hypothesized effects. The top panel presents the pre-COVID-19 landscape previously described—racial and ethnic gaps in income and wealth contribute to racial and ethnic gaps in academic achievement, with one possible mechanism being access to computers and other digital resources that supplement learning in positive ways.
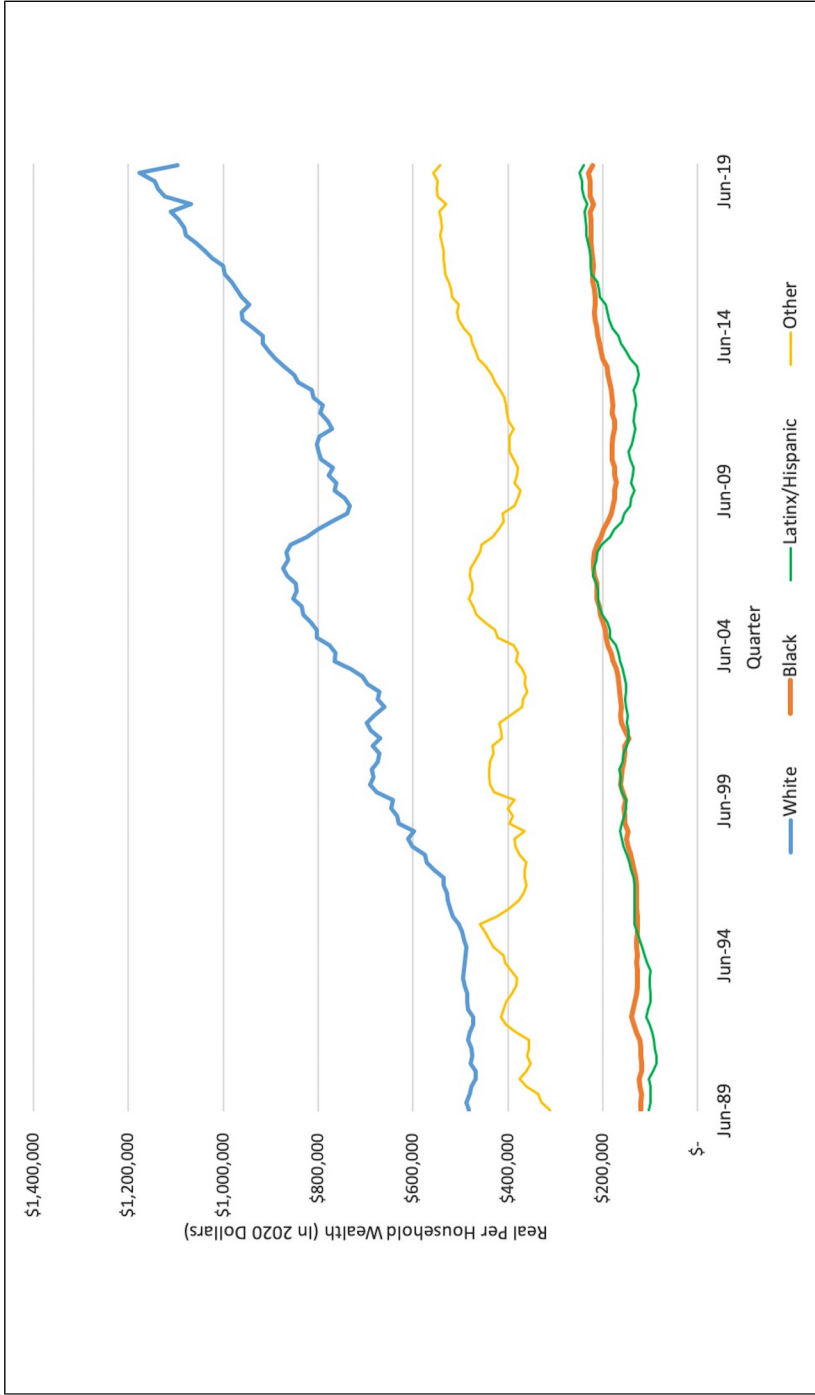
Figure 1. Average real wealth per household by race/ethnicity from 1989 to 2020.
Note. Figure shows values in March 2020 dollars. Authors' calculations based on Board of Governors of the Federal Reserve System (2020a, 2020b) and Bureau of Economic Analysis (2020).
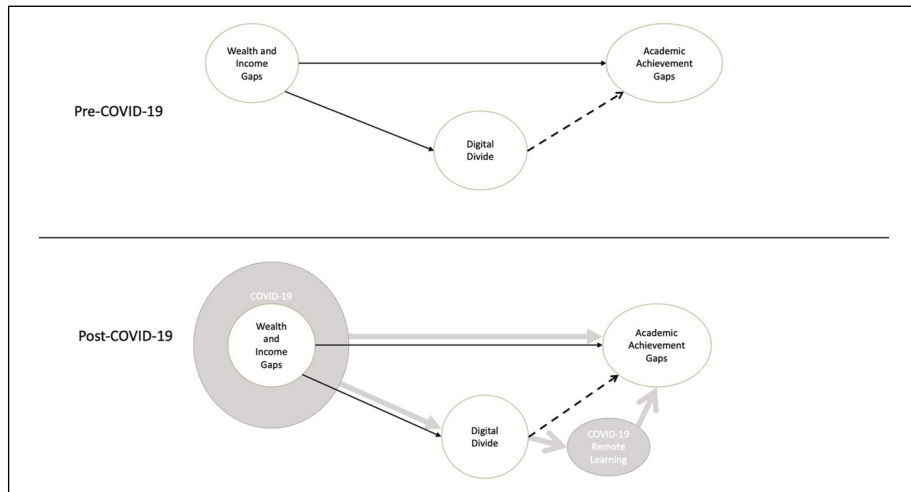
Figure 2. Conceptual mapping of hypothesized effects.

The bottom panel presents three mechanisms through which the COVID-19 pandemic may exacerbate already existing racial and ethnic academic achievement gaps.

First, the pandemic may have widened racial and ethnic gaps in income and wealth. Black and Latinx workers tend to work in less stable jobs, where they experience earlier and longer layoffs than White workers during a recession (Gould & Wilson, 2020; Solomon & Weller, 2018; Weller, 2019). The COVID-19 pandemic was no exception as unemployment rates by race and ethnicity widened over the course of the recession. African-Americans and Latinx workers also get paid less and have fewer benefits from their employers (Gould & Wilson, 2020; Solomon & Weller, 2018; Weller, 2019). All these factors—job instability, low pay, and lack of benefits—make it more difficult to buy a house and save money (Solomon & Weller, 2018; Weller, 2018). Yet, job instability also increases the need for emergency savings, putting especially Black and Latinx people in a financial bind amid the recession.

First, household wealth covers families' expenses in an emergency and it provides the resources for economic opportunity such as supporting their children's education. During an economic crisis, wealth helps families to better protect themselves from the fallout of adverse personal outcomes such as temporary layoffs or more permanent job losses. Wealth provides emergency savings to help pay bills—especially rent or mortgage payments, which are key to maintaining housing stability. For instance, 36.4% of African-American homeowners and 56.4% of African-American renters could not access $400 in an emergency in April 2020. In comparison, 24.4% of White homeowners and 50.9% of White renters had difficulties coming up with that amount in an emergency.[1] Without emergency savings, many more Black homeowners and renters quickly faced trouble making their monthly payments than White homeowners and

renters when they lost their jobs. Thus, racial and ethnic gaps in both income and wealth grew during the pandemic, potentially leading to larger racial and ethnic achievement gaps through increased home instability for minoritized students.

Second, the widening wealth and income gaps during the pandemic may have contributed to a growing racial and ethnic digital divide. Housing tenure—renting or owning—and housing stability—the ability to pay rent or mortgage—closely reflect households' wealth. Less wealth, reflected, among other things, in lower homeownership rates, likely goes along with a lower chance of having reliable internet service and electronic devices, both of which contribute to the digital divide. Black and Latinx households are more likely to live in less stable housing situations than White households, which could widen racial and ethnic gaps in reliable internet and device access.

Third, the COVID-19 pandemic likely strengthened the link between the digital divide and racial and ethnic academic achievement gaps by forcing many school districts to move from in-person to remote schooling. In the pre-COVID era, the digital divide mainly contributed to achievement gaps through access to resources outside of school, but the switch to remote learning during the pandemic possibly brought the effects of the digital divide to learning within school as well since schools moving to remote learning rely on access to the internet and electronic devices.

Additionally, families of color likely needed to spend more of their own money on these critical resources for remote learning than White families since they often live in neighborhoods with lower property values and thus fewer resources for local schools. Black and Latinx households often experience housing discrimination (U.S. Department of Housing and Urban Development, 2012). As a result, communities become racially segregated and housing values in predominantly Black or Latinx communities are lower than in comparable White neighborhoods (Flippen, 2004; Perry et al., 2018; Raymond et al., 2011; Zonta, 2019). In turn, schools in these same neighborhoods have fewer financial resources. Moreover, financial demands on under-resourced schools have only increased during the pandemic (Partelow et al., 2020). The lack of public resources necessarily increases the demand on families' own finances.

Finally, the achievement gap will depend to some degree on the time spent on remote learning. Children can spend time with their teachers, with family members helping them, and by themselves. The digital divide will likely affect all of these school times—with teachers, family, and by themselves—but to varying degrees. The largest effect likely exists for time with teachers since it directly depends on the availability of reliable internet and device access in a remote learning environment. Time learning with family will also depend on internet and device availability, since those are necessary to access school resources. However, the correlation of hours studying with family members with the digital divide is likely smaller than is the case for time with teachers since family members can in part offset the lack of access to internet and devices with other resources such as their own knowledge. Finally, the digital divide could also correlate with time children spend studying by themselves. Yet, that correlation again could be smaller than for the time spend with teachers since children may have other resources at home, mainly books. The correlation of time spent studying by themselves with the

digital divide, though, could be greater than for time spent studying with family members since children are on their own.

These differences in hours spent on learning by the digital divide may differ by race and ethnicity. Black and Latinx workers—who were disproportionately concentrated in industries that were hard-hit by pandemic-related restrictions—were more likely to experience pandemic-related unemployment (Gould & Wilson, 2020; Williams, 2020). This forced unemployment may have given Black and Latinx parents more available time to spend on learning compared to White and Asian parents who were more likely to maintain their employment and work remotely. To the extent that Black workers experienced the highest levels of unemployment early in the pandemic (the time frame of this study), we may also observe differences in hours spent on learning between Black and Latinx students. The potential for a positive effect on time spent on learning may offset some of the previously mentioned negative effects from wealth, housing stability, and access.

These four mechanisms—increasing racial and ethnic wealth and income gaps, an increased racial and ethnic digital divide, the increased importance of digital access in a remote learning environment, and differential time spent on remote learning—likely contributed to increasing racial and ethnic academic achievement gaps. In what follows, we explore these mechanisms by presenting descriptive empirical evidence of the relationship between race/ethnicity, pandemic-related income and housing shocks, and time spent on remote learning.

Data, Variables, and Empirical Strategy

We use the U.S. Census' weekly Household Pulse Survey (HPS)—Phase 1 for our analyses. The Census collected data for its phase 1 of this experimental data set for 12 weeks from April 23 through July 21 (U.S. Census Bureau, 2020a). The survey method sampled families as repeated cross-sections. The U.S. Census Bureau adjusts the weights to the original survey responses to capture the distribution of households by race and ethnicity in the population. This procedure corrects the differences in response rates by race and ethnicity (U.S. Census Bureau, 2020b).[2]

The relevant information on remote learning is consistently available for the first 7 weeks of the 12-week survey since the school year ended for most students at some point in June. For this reason, we restrict our analysis sample to the first 7 weeks of the survey. The HPS included a low of 10,284 households with children in public or private school engaged in remote learning in week 2 and a high of 23,940 households in week 5. The dataset includes information on households' employment, housing, health care, and education, as well as information on gender, age, race, and ethnicity of each respondent. For our analysis, we define race and ethnicity as mutually exclusive categories. In categorizing respondents as Asian, Black, or White, we exclude those, who self-identify as multiple races or ethnicities. Finally, we restrict our analysis to families with children, who also indicated that their children were required to switch to remote learning due to the COVID-19 pandemic.

Table 1. Sample Characteristics.

Race/ethnicity	Sample (%)
Asian, alone	5.8
Black, alone	14.5
Hispanic/Latinx	21.8
White, alone	53.7
Other/multiple races	4.3
Income categories	
<$25,000	15.4
$25,000–$34,999	11.9
$35,000–$49,999	11.9
$50,000–$74,999	16.8
$75,000–$99,999	12.7
$100,000–$149,999	15.4
$150,000–$199,999	7.5
$200,000 +	8.5
Marital status	
Married	63.1
Never married	21.4
Widowed/separated/divorced	15.5
Other key variables	
Has reliable internet and devices available	83.9
Owns own home	66.0
Lost earnings	55.3
Did not pay or deferred mortgage	14.9
Did not pay or deferred rent	25.7
Sample size	

Note: Race and ethnicity categories are mutually exclusive.

Table 1 presents sample descriptive statistics. The majority of household heads identify as White (54%), followed by Hispanic/Latinx (22%),[3] Black (14%), Asian (6%), and other/multiracial (4%). About 63% of the respondents are married, 21% have never been married, and 15% are widowed, separated, or divorced (Table 1).

Our first key variable of interest pertains to internet and electronic device access for children's education. The HPS asked households, who had children enrolled in public or private schools and whose schools moved to some form of remote learning,[4] whether they had reliable internet and regular access to electronic devices for educational purposes. In each case, respondents could rank the availability as "always available," "usually available," "sometimes available," "rarely available," and "never available." To ensure robust sample sizes and to simplify the discussion we combine answers to internet and device availability, so that we identify households as having reliable internet and device access if either one is always or usually available. About 84% of households report having reliable internet and device access (Table 1).

The second education variable of interest is the time children spent on remote learning. The HPS asked families for the total hours that children spent with their parents, with their teachers, or by themselves on remote learning over the previous 7 days in three separate questions. We present summary statistics for these three variables in Table 2. On average, children spent about 4 h per week of remote learning working with family members, 11 h a week working with teachers, and 8 h a week studying by themselves with wide variation for all three modes of learning. The questions do not ask households to report how many hours are spent per child in a household; so, to account for total hours being inflated by multiple children in a household, we control for the number of children in the household in our analyses. The average respondent reported two children in their household (Table 2).

Our relevant intermediating financial variables pertain to families' employment and housing situation. The HPS asked whether people have experienced an earnings loss during the pandemic, allowing for a "yes" or "no" answer. More than half of our respondents in our sample, 55%, indicated that they had lost some earnings (Table 1). The survey also asked people about their current rent or mortgage payments. Respondents could indicate that they paid their rent or mortgage, did not pay it, or deferred it. We combine nonpayments and deferrals of rents or mortgages into indicators of housing instability. About 15% of respondents said they did not pay or deferred a mortgage payment while 26% reported nonpayment or deferral of a rent payment (Table 1).

For our empirical analysis, we first present a series of summary tables showing relationships between employment, earnings, homeownership, and a household's ability to maintain rent and mortgage payments during the pandemic. If households that experienced an employment layoff or earnings losses were also less likely to maintain their rent or mortgage payments, that might be an indication that those households were less likely to have forms of liquid wealth available to draw upon.

Next, we show the link between housing tenure (home ownership or rental), rent and mortgage payments, and reliable internet and device availability to highlight the connection between wealth and the digital divide. To do this, we compare cross-tabulations of housing tenure, stability, and device availability by race and ethnicity.

Table 2. Summary Statistics of Key Educational Variables.

	Mean	Standard Deviation	Minimum	Maximum
Number of children	2.0	1.1	0	5
Hours per week spent with family members on remote learning	3.9	5.9	0	25
Hours per week spent with teachers on remote learning	10.9	11.8	0	48
Hours per week students spent studying by themselves	7.7	9.8	0	40

Note. Number of children refers to the number of children in the household. Parents can have children in public and private schools not living with them.

These estimates highlight the correlation between current wealth, proxied by house-holds' ability to pay their rent or mortgage, and reliable internet and device availability.

Finally, we summarize the hours that children spent on remote learning with family members, their teachers, or by themselves, broken down by internet and device avail-ability as well as housing tenure. The time students studied by themselves is only avail-able from week 6 forward, allowing for only limited comparability with the other measures. Our statistics show the connection between current wealth, proxied by housing tenure, and support for online learning.

We provide a number of tobit regression estimates to ensure that our conclusions are robust, when we simultaneously account for a number of factors. Weekly hours spent on remote learning are our dependent variables. Our right-hand side variables include reli-able internet and device availability, income categories, race and ethnicity, gender, marital status, age, number of children in the household, employment status, and housing tenure in addition to indicator variables for survey weeks and state of residence to account for local conditions related to the pandemic. We also include interactive terms between reliable internet and device availability, on the one hand, and race and ethnicity, on the other hand. Our estimates then provide a sense of how important the reliable avail-ability of internet and devices, which differs by race and ethnicity, is for remote learning.

Results

Table 3 shows our summary data for the link between employment status and housing stability. The share of households that did not pay or defer their mortgage or rent was always higher among households that experienced earnings losses than among those without earnings losses (Table 3). Moreover, earnings losses correlate with more mort-gage and rent troubles for Black and Latinx households than for White households. For instance, 36.3% of Black households and 23.9% of Latinx households with earnings losses said that they either did not pay their mortgage or deferred their mortgage, com-pared with 19.4% for White households (Table 3). Among renters, 42.1% of Black households and 29.4% of Latinx households with earnings losses did not pay or deferred their rent, compared with 29.3% of White households in a similar situation. Alternatively, comparing household heads who are not working because of business closures or furloughs with those who are working, the data again show that those with job losses are much more likely to not pay or defer their mortgage or rent pay-ments. And, this likelihood is much higher for Black households than White house-holds—for both renters and homeowners—and somewhat higher for Latinx renters than for White renters (Table 3). Latinx and White homeowners with pandemic-related job losses were similarly likely to defer or not pay their mortgages. Job losses correlate with greater housing instability for Black households than among White ones. Latinx renters also appear to experience greater housing instability than White renters, when they experience an earnings or job loss, which is crucial given that a disproportionate number of Latinx households are renters compared to White households. These results suggest a general lack of wealth to fall back on in case of a layoff or cut in regular hours that is exacerbated among Black homeowners and renters and among Latinx renters.

Table 3. Earnings Losses and Housing Stability During the Pandemic by Race and Ethnicity.

	Mortgage not paid or deferred		Rent not paid or deferred	
	Without earnings loss (%)	With earnings loss (%)	Without earnings loss (%)	With earnings loss (%)
Asian	5.9	25.2	2.8	19.7
Black	17.1	36.3	19.6	42.1
Hispanic or Latinx	7.9	23.9	14.7	29.4
Multiracial	12.1	25.8	12.7	36.3
White	5.5	19.4	10.9	29.3
	Mortgage not paid or deferred		Rent not paid or deferred	
	Working (%)	Pandemic-related job loss (%)	Working (%)	Pandemic-related job loss (%)
Asian	12.0	27.6	7.5	29.6
Black	21.1	52.2	27.4	46.3
Hispanic or Latinx	13.3	24.6	19.9	32.7
Multiracial	14.8	36.5	22.3	31.9
White	9.4	25.0	19.7	26.3

Note. Racial and ethnic categories are mutually exclusive. Sample includes only respondents with children enrolled in public or private school through week 7 of the U.S. Census Household Pulse Survey (U.S. Census Bureau, 2020a, 2020b).

Table 4. Share of Households Without Reliable Internet and Device Availability by Race, Ethnicity, Housing Tenure, and Housing Stability.

	All (%)	No trouble paying mortgage (%)	Trouble paying mortgage (%)	No trouble paying rent (%)	Trouble paying rent (%)
Asian	8.8	7.3	18.9	10.5	16.8
Black	24.7	11.4	21.3	24.5	43.7
Hispanic/Latinx	19.1	13.8	23.9	20.1	35.5
White	13.0	8.9	18.5	16.1	35.4
Multiple races	19.8	9.2	28.8	21.0	35.4

Note: Racial and ethnic categories are mutually exclusive. Trouble paying mortgage includes households that did not pay or deferred mortgage. Trouble paying rent comprises households that did not pay or deferred rent. Sample includes only respondents with children enrolled in public or private school through week 7 of the U.S. Census Household Pulse Survey (U.S. Census Bureau, 2020a, 2020b).

In Table 4, we summarize the links between housing tenure, housing stability, and internet and device availability by race and ethnicity. Almost one-fourth of Black households, 24.7%, and 19.1% of Latinx households did not have reliable internet and devices available for remote learning (Table 4). In comparison, only 13.0% of White households with children in public or private schools lacked reliable internet

and devices (Table 4). This digital divide by race and ethnicity to some degree correlates with the homeownership gap since Black and Latinx households are more likely to be renters and renters are more likely to lack reliable internet and devices. For example, 24.5% of Black renters who paid their rent lacked reliable internet and devices, compared to 11.4% of Black homeowners who paid their mortgage. Moreover, the lack of internet and device availability correlates with households' rent and mortgage payments. Households that did not pay or deferred their rent or mortgage payments were much more likely to lack reliable internet and devices (Table 4). For instance, 43.7% of Black households that did not pay or deferred their rent lacked these tools for remote learning, compared to 24.5% of Black renters who paid their rent (Table 4). The summary data show a substantial digital divide by race and ethnicity that correlates with housing status and housing stability. This suggests that household wealth or the lack thereof goes along with fewer resources necessary for successful remote learning.

Black and Latinx families are more likely to receive internet services and devices for remote learning from their children's schools or school districts. However, this is no panacea for eliminating the racial digital divide. In Table 5, we show that 13.4% of Black households and 13.0% of Latinx households do not always or usually have access to devices for remote learning, even when they get a device from their school. In comparison, only 7.4% of White households indicate that they do not have always or usually access to a device, when they receive one from their children's school (Table 5). Black and Latinx households both have greater needs for public resources for remote learning and schools and school districts serving Black and Latinx families may have fewer resources to meet those needs. As a result, African-American and Latinx households may be more likely than White households to receive unreliable devices, fewer devices than children needing them or devices that are not suitable for all of the remote learning tasks. Without public resources, the digital divide would be greater. However, with public resources, a substantial digital divide remains.

Table 5. School Provided Devices and Internet and Reliable Device Availability by Race and Ethnicity.

	School provided device (%)	School provided internet (%)	Lacks reliable availability of devices	
			Without school-provided device (%)	With school-provided device (%)
Asian	31.7	2.0	7.7	4.5
Black	41.7	4.0	20.9	13.4
Hispanic/Latinx	43.9	3.1	15.3	13.0
White	36.0	1.2	9.7	7.4
Multiple races	38.0	2.9	15.1	11.7

Note: Racial and ethnic categories are mutually exclusive. Sample includes only respondents with children enrolled in public or private school through week 7 of the U.S. Census Household Pulse Survey (U.S. Census Bureau, 2020a, 2020b).

Table 6 shows our regression estimates for the correlates of weekly hours students spent with family members, teachers, or by themselves in remote learning. Our key variables of interest related to the reliable internet and device availability as well as to race and ethnicity. Our results show that having reliable internet and devices available increases hours between 1 and 2 h per week for remote learning time spent with family and studying alone, but has no significant effect on time spent studying with teachers (Table 6).

Furthermore, the estimates indicate that Black students on average spent about 2–2.5 more hours per week than White students on remote learning in all three forms—with family members, with teachers, and by themselves. However, the increase in hours in time studying with teachers is dependent on Black students having reliable access to remote devices whereas the time studying alone and with family members is not. This can be seen by examining both the estimates associated with the indicator of whether a respondent identified as Black as well as the interaction between that indicator and the indicator of whether a respondent had reliable access to remote devices as depicted in Table 6.

Table 6. Parameter Estimates for Correlates With Hours per Week Spent on Remote Learning.

	Hours per week spent with family members on remote learning	Hours per week students spent studying by themselves	Hours per week spent with teachers on remote learning
Had reliable internet and	2.2033***	1.4011**	0.3057
devices available	(0.2865)	(0.6648)	(0.4546)
Asian, alone	2.5533***	0.9840	−1.1664
	(0.8026)	(1.5810)	(1.1795)
Black, alone	2.1559***	2.4467**	−0.9467
	(0.5373)	(1.1383)	(0.7772)
Hispanic/Latinx	2.7144***	4.9038***	−0.8685
	(0.5610)	(1.2454)	(0.8736)
Other/multiple races	−0.1418	4.8252*	1.0557
	(0.6400)	(2.8189)	(1.1312)
Interaction between reliable internet and device availability and race and ethnicity			
Reliable internet/device, Asian	−0.9542	1.9439	0.0466
	(0.8354)	(1.8356)	(1.2684)
Reliable internet/device, Black	−0.1125	0.1290	2.9718***
	(0.5728)	(1.2661)	(0.8449)
Reliable internet/device,	−1.2409**	−3.6820***	0.7281
Hispanic	(0.5969)	(1.3693)	(0.9340)
Reliable internet/device, other/	1.5228*	−3.4593	−0.2608
multiple race	(0.8247)	(2.9477)	(1.2403)
Renter	0.0276	0.3751	0.8459***
	(0.1834)	(0.5102)	(0.2885)

Table 6. (continued)

	Hours per week spent with family members on remote learning	Hours per week students spent studying by themselves	Hours per week spent with teachers on remote learning
Worked for pay	0.1199	0.5544	−0.3561
	(0.1596)	(0.4440)	(0.2544)
Number of minor children	0.3818***	0.6654***	1.8856***
	(0.0762)	(0.1767)	(0.1150)
Income categories			
$25,000–$34,999	0.0875	−0.9783	−1.1794**
	(0.3433)	(0.8685)	(0.5163)
$35,000–$49,999	−0.5746*	−1.4990	−1.0295**
	(0.3408)	(0.9381)	(0.5128)
$50,000–$74,999	−0.4051	−0.9565	−0.9459*
	(0.3374)	(0.9991)	(0.5025)
$75,000–$99,999	−0.4931	−1.0789	−0.7392
	(0.3348)	(0.9637)	(0.4921)
$100,000–$149,999	−0.2467	−0.9346	−0.6542
	(0.3360)	(0.9934)	(0.5021)
$150,000–$199,999	−0.0636	−0.9154	−1.0620*
	(0.3641)	(1.0549)	(0.5610)
$200,000+	1.0512***	1.0411	−0.4037
	(0.3624)	(1.0449)	(0.5395)
Women	−0.8278***	−1.5760***	−0.7448***
	(0.1452)	(0.4117)	(0.2363)
Age	0.0661***	0.0569***	−0.0334***
	(0.0069)	(0.0195)	(0.0117)
Never married	0.0113	−0.3054	−2.6637***
	(0.2312)	(0.6166)	(0.3721)
Widowed/separated/divorced	−0.3389	−0.4114	−1.1584***
	(0.2154)	(0.5946)	(0.3309)
Constant	−4.9324***	−1.4154	9.0540***
	(0.8582)	(2.4091)	(1.3222)
State indicator variables	Yes	Yes	Yes
Week indicator variables	Yes	Yes	Yes
Observations	136,725	32,180	136,518
F-statistic	29.62	11.68	24.97
p-value	.000	.000	.000

Note. Data on hours per week students studied by themselves only available from week 6 forward. Otherwise, sample sizes vary because of sample restrictions and because of varying number of nonresponsed. Results show parameter estimates based on tobit regressions. Numbers in parentheses are standard errors. *** indicates significance at the 1% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level.

This result that Black students spend more time studying than White students on average is in line with prior research on study time (in a nonremote environment) that has demonstrated that Black students spend as much time or more time than White students on home studying, though often with worse test score outcomes (Ferguson et al., 2001; Harris, 2006). It will remain to be seen whether the switch to remote study will have negative effects on Black students' medium-run and long-run outcomes such as test scores, grades, graduation rates, college attendance, and college selectivity. Our results suggest that Black students continue to study more, but that they are also disproportionately affected by less reliable internet and device availability. The ability to study these outcomes will come with time.

On average, Hispanic/Latinx students spent nearly 3 h more than White students on remote learning with family members and almost 5 h more per week on remote learning alone; however, among families with reliable internet and device availability, those differences decrease to about 1.5 h more spent learning with family members and 1.2 h more spent studying alone (Table 6). This shift could be because Hispanic families with reliable internet access are more likely to have had parents who had continued employment during the pandemic. Working parents have less time to spend helping their children with learning activities. There were no significant differences between Hispanic/Latinx students and White students in hours spent studying with teachers.

Finally, even though Black students spent more time studying remotely with teachers, family, and by themselves, they were also less likely to have reliable access to remote devices, which decreases remote study time, offsetting the positive correlation between Black students and remote study time. That is, having the internet and devices available matters for remote learning and Black and Hispanic/Latinx households often lack those, especially when they are renters and have trouble paying their rent or mortgage (Table 4).

Discussion and Conclusion

Wealth and education already create a cycle of intergenerational inequality. Families that have more wealth can offer more educational opportunities for their children, who can then take advantage of those opportunities in ways that create more wealth. The digital divide has emerged as a key reinforcing mechanism of education through wealth and of future wealth through education.

The intergenerational transmission of racial wealth inequality likely played out at rapid speed during the pandemic. Our results show that Black and Hispanic/Latinx households have less reliable internet and devices available, which reduces the hours children spent on remote learning. And, renters and households with unstable housing situations—those who did not pay or deferred mortgage and rent payments—are more likely to lack reliable internet and devices for remote learning. Black and Hispanic/Latinx households are more likely to be renters and face housing instability. This lack of wealth then correlates with fewer remote learning opportunities, reducing children's future life outcomes.

Our analyses likely understate the effects of limited wealth on children's education by race and ethnicity during the pandemic. Black and Hispanic/Latinx households have suffered more from the deadly virus and the recession than White households with higher infection rates, larger death tolls, and more widespread unemployment. Worse health and economic outcomes impose extra financial and mental health tolls on families. Black and Hispanic/Latinx children likely experienced worse trauma during the pandemic, which can impede their ability to learn, especially since their families may have fewer resources to adequately address that trauma.

Our results illustrate complex correlations between socioeconomic status, remote learning, race, and ethnicity. As remote learning continues in many parts of the country, policymakers will need to consider the lack of wealth among many Black and Hispanic/Latinx families in their efforts to ensure equitable remote learning opportunities. Housing stability, for example, in addition to reliable internet and device availability for all children are all key factors in ensuring that educational achievement gaps by race and ethnicity do not widen much further.

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Notes

1. Calculations based on Board of Governors of the Federal Reserve System (2020c).
2. We estimate our regressions with and without weights to ensure that they do not depend on the design of person weights. The results are generally not sensitive to using the weights.
3. We refer to "Hispanic/Latinx" families since the Household Pulse Survey (HPS) asks whether respondents are "of Hispanic, Latino, or Spanish Origin."
4. Very few households had children in public or private schools that did not move to remote learning.

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Appendix

See Table A1 for specification with added covariate—trouble paying rent/mortgage.

Table A1. Specification With Added Covariate—Trouble Paying Rent/Mortgage.

	(1) Hours per week spent with family members on remote learning	(2) Hours per week students spent studying by themselves	(3) Hours per week spent with teachers on remote learning
Renter	0.0265	0.3519	0.8150***
	(0.1823)	(0.5093)	(0.2890)
Trouble paying rent/mortgage	0.0274	0.6444	0.6948**
	(0.2175)	(0.5132)	(0.3265)
Worked for pay	0.1213	0.5785	−0.3198
	(0.1608)	(0.4455)	(0.2550)
Had reliable internet and devices	2.2060***	1.4844**	0.3721
available	(0.2850)	(0.6641)	(0.4574)
Interaction between reliable internet and device availability and race and ethnicity			
DIGDIVIDEBLACK	−0.1107	0.1772	3.0045***
	(0.5731)	(1.2581)	(0.8458)
DIGDIVIDEASIAN	−0.9536	1.8515	0.0645
	(0.8357)	(1.8365)	(1.2678)
DIGDIVIDEOTHER	1.5233*	−3.4259	−0.2386
	(0.8254)	(2.9211)	(1.2396)
DIGDIVIDEHISPANIC	−1.2406**	−3.7418***	0.7387
	(0.5972)	(1.3648)	(0.9401)
Number of minor children	0.3816***	0.6603***	1.8809***
	(0.0763)	(0.1764)	(0.1155)
Black	2.1524***	2.3529**	−1.0282
	(0.5383)	(1.1310)	(0.7788)
Asian	2.5529***	1.0728	−1.1775
	(0.8029)	(1.5837)	(1.1786)
Other races	−0.1434	4.7731*	1.0077
	(0.6407)	(2.7895)	(1.1287)
Hispanic	2.7141***	4.9462***	−0.8789
	(0.5614)	(1.2404)	(0.8801)
Income categories			
$25	0.0873	−1.0048	−1.1813**
	(0.3430)	(0.8661)	(0.5163)
$35	−0.5736*	−1.4915	−1.0039*
	(0.3414)	(0.9384)	(0.5142)
$50	−0.4038	−0.9363	−0.9110*
	(0.3377)	(0.9992)	(0.5028)

Table AI. (continued)

	(1) Hours per week spent with family members on remote learning	(2) Hours per week students spent studying by themselves	(3) Hours per week spent with teachers on remote learning
$75	−0.4913	−1.0574	−0.6927
	(0.3359)	(0.9646)	(0.4936)
$100	−0.2442	−0.8818	−0.5874
	(0.3376)	(0.9965)	(0.5038)
$150	−0.0601	−0.8495	−0.9727*
	(0.3662)	(1.0581)	(0.5630)
$200	1.0551***	1.1202	−0.3030
	(0.3652)	(1.0491)	(0.5426)
Women	−0.8279***	−1.5715***	−0.7473***
	(0.1452)	(0.4116)	(0.2366)
Age	0.0661***	0.0574***	−0.0329***
	(0.0070)	(0.0195)	(0.0116)
Widowed	−0.3388	−0.4157	−1.1558***
	(0.2155)	(0.5930)	(0.3312)
Never married	0.0121	−0.2866	−2.6428***
	(0.2310)	(0.6149)	(0.3715)
Constant	−4.9394***	−1.6528	8.8755***
	(0.8638)	(2.4374)	(1.3263)
Observations	136,725	32,180	136,518
F-statistic	29.26	11.61	24.62
p-statistic	.000	.000	.000