

DISCUSSION PAPER SERIES

IZA DP No. 13802

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## ABSTRACT

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# Employment Opportunities and High School Completion during the COVID-19 Recession\*

COVID-19 created major disruptions for young people including health concerns, school closures, reduced social opportunities, and a wilting economy. We examine the effect of COVID-19 on high school completion in the United States. We find that high school completion rates increased considerably in 2020 compared to previous years. We investigate various mechanisms and find that worse employment conditions were the driving force. The lower opportunity costs of schooling because of the pandemic recession encouraged more young people to complete high school. The pandemic created extensive problems in education, but fortunately it did not reduce overall high school completion rates.

**JEL Classification:** I2, J2

**Keywords:** COVID-19, recession, employment, education, human capital

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## 1. Introduction

The COVID-19 pandemic created devastating losses of health, life, and economic opportunities. The pandemic triggered a severe recession in 2020 with the highest unemployment rate in the United States since at least 1948 (BLS 2020). Employment decreases were especially severe for young people (Cho and Winters 2020). The country experienced widespread closures of businesses, schools, and public spaces to reduce the spread of the virus. School closures disrupted human capital development, and the consequences may last for decades (Aucejo et al. 2020; Bacher-Hicks et al. 2020; Baron et al. 2020; Psacharopoulos et al. 2020). Many schools moved to online learning and other forms of distance education starting in March 2020, but the effectiveness was hindered by limited experience with these modes of delivery, lack of internet access for many students, and the inherent difficulty of virtual learning for young people.<sup>1</sup> COVID-19 caused many schools to end the school year early. The COVID-19 disruption and school closures occurred at an especially critical time for students in their senior year of high school. The senior year is the final year of secondary schooling and provides formative experiences and stepping stones to next stages in life, including entry to college, the workforce, or the military.

In this paper we use individual level-data from the U.S. Current Population Survey (CPS) to examine the effect of COVID-19 on high school completion rates. The difficulties during the pandemic might have hindered high school completion. However, the overall effect is theoretically ambiguous because COVID-19 affected both the marginal costs and marginal benefits of additional schooling in competing ways. Specifically, the arduous transition to

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<sup>1</sup> Earlier studies have examined differences in performance between online and face-to-face courses and found that students taking a course online have significantly worse learning outcomes than those in face-to-face instruction (Xu and Jaggars 2014; Alpert et al. 2016; Bettinger et al. 2017; Bacolod et al. 2018).

distance education may have increased the marginal costs of schooling, but the worsened employment opportunities during the recession likely lowered the opportunity cost of time in schooling. The shift to online learning also likely lowered the benefits of additional schooling for many young people.

We find that high school completion rates increased in 2020 relative to previous years, despite the more challenging learning environment. We then exploit local variation in high school completion rates and examine mechanisms contributing to the increase in 2020. We find that increased high school completion rates during COVID-19 are fully attributable to worse local labor market conditions. The increase in high school completion was especially pronounced in areas with large employment losses. We do not find high school completion to be significantly affected by local COVID-19 infection rates nor state policy responses.

Our paper contributes to two strands of literature. The first is the rapidly growing literature examining the various economic impacts of COVID-19. This literature has documented widespread losses in employment and well-being across a variety of regions, countries, and groups (Adams-Prassl et al. 2020; Beland et al. 2020; Brodeur et al. 2020a; Chetty et al. 2020; Cho et al. 2020; Coates et al. 2020; Crowley et al. 2020; Pouliakas and Branka 2020).<sup>2</sup> Second, we also contribute to a longer literature examining educational decisions via the human capital framework and specifically contribute to the literature connecting human capital investment decisions to macroeconomic conditions (Betts and McFarland 1995; Clark 2011; Atkin 2016; Adamopoulou and Tanzi 2017; Charles et al. 2018).<sup>3</sup> Schooling decisions are

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<sup>2</sup> A segment of the COVID-19 literature has also identified silver linings from the pandemic including reduced air pollution due to reduced transportation and burning of fossil fuels (Brodeur et al. 2020b; Dang and Trinh 2020; He et al. 2020).

<sup>3</sup> An additional education literature examines effects of single school closings (before COVID-19) with students being displaced to other schools (Engberg et al. 2012; Brummet 2014; Beuchert et al. 2018; Larsson Taghizadeh 2020). The effects appear to depend on the quality of the closing and receiving schools, but there is also evidence of disruption effects.

typically found to be countercyclical, consistent with a worse economy lowering the opportunity cost of schooling.<sup>4</sup> The COVID-19 pandemic affected multiple factors in individual schooling decisions, but our analysis suggests that worsened employment opportunities are the dominant factor affecting changes in high school completion rates during the pandemic.

Given the substantial difficulties students faced, there may be some relief that high school completion rates did not go down and actually increased. However, our results do not imply that no students were harmed. It is also important to recognize that the quality of education was likely reduced. Furthermore, we can say very little about longer run effects on overall human capital. Preliminary estimates indicate that college enrollment for Fall 2020 will be down somewhat, due to students taking gap years and reluctance to pay big money for a less desirable college experience during COVID-19 (National Student Clearinghouse 2020). Thus, our study provides important results about high school completion during the COVID-19 pandemic that should be viewed as part of a larger story that is still unfolding.

## **2. Theoretical Framework**

Our setting considers young people who have begun their senior year of high school and must decide whether to complete this final year of secondary schooling ( $S$ ). Completing an additional amount of schooling is a human capital investment that involves both marginal costs and marginal benefits. The marginal costs include financial costs ( $C_f$ ), effort costs ( $C_e$ ) and the opportunity cost of time ( $C_t$ ). The majority of high school students in the U.S. are in public schools with minimal pecuniary costs, but students and their families still incur financial expenditures for materials, supplies, and technological resources. Schooling requires effort that

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<sup>4</sup> A segment of the literature has focused on energy shocks that specifically improved employment opportunities for young and less-educated men (Black et al. 2005; Rickman et al. 2017; Cascio and Narayan 2020; Kovalenko 2020).

is unpleasant to many students and discourages marginal investments in schooling. Perhaps most importantly, schooling is time-consuming and reduces the amount of time that young people could spend on other activities including recreation, social activities, and paid work. The marginal benefits of additional schooling include the intrinsic pleasure from learning and socializing with peers in a structured setting ( $B_p$ ) and the net present value of expected higher future wage earnings ( $B_w$ ). The human capital model predicts that a young person will complete additional schooling if the marginal benefits exceed the marginal costs, i.e.,

$$S = \begin{cases} 1 & \text{if } B_p + B_w > C_f + C_e + C_t \\ 0 & \text{if } B_p + B_w \leq C_f + C_e + C_t \end{cases}$$

The COVID-19 pandemic altered the marginal costs and marginal benefits of completing the senior year of high school in important ways. The recession reduced contemporaneous employment opportunities and therefore lowered the opportunity cost of individual time investments in schooling. For students without previous internet access or a home computer, movement to online instruction increased the financial costs of schooling. Effort costs were affected in heterogeneous ways. School closures reduced access to complementary schooling inputs and increased the effort costs of finishing high school for many young people, especially those with limited skills and resources for managing their own academic progress remotely. Furthermore, the stress, anxiety, and disruption created by the pandemic more generally may have reduced student ability to focus on schooling and further increased the costs of effort. However, many states, districts, and schools implemented policy changes that eased graduation requirements and lowered the effort costs of finishing for some students. The net effect of the pandemic on effort costs varied across schools and students.

COVID-19 and the resulting school closures also reduced the benefits of additional schooling for many young people. Students unfamiliar and uncomfortable with distance learning

likely learned less in the remote environment, which hindered their human capital development and ability to increase their future earning potential. The disruptions also made schooling less pleasant for many and further lowered the benefits of finishing high school. COVID-19 took away important milestone events for many high school seniors such as prom, college campus visits, and walking across a high school graduation stage. The reduced social experiences and formative events may have demoralized some students and discouraged them from completing high school in 2020.

Thus, the marginal costs and marginal benefits of finishing high school both changed during the pandemic, and the net effect on high school completion rates is theoretically ambiguous. The net effect depends on how the marginal benefits and marginal costs were affected. If the marginal costs of additional schooling decreased by much more than the marginal benefits decreased, then we would expect high school completion rates to increase. If the marginal costs increased overall or decreased by less than the marginal benefits decreased, then high school completion rates would decrease. Finally, if the benefits and costs changed in roughly equal magnitude, high school completion rates would be largely unchanged.

### **3. Empirical Framework**

We use individual-level data from the U.S. Current Population Survey (CPS) to examine changes in high school completion rates. The CPS collects labor, demographic, and other information including the highest level of schooling individuals have completed. We use the July CPS for years 2016-2020 and examine persons ages 18-19 at the time of the survey. We focus on July because school years for U.S. students typically end in May or June and typically begin in August or September. 2020 is the COVID-19 treatment year, and 2016-2019 are pre-



treatment years used for comparison. Age 18 is the typical age at high school graduation in the U.S., but some graduate later because they started school late or repeated a grade.<sup>5</sup> We also limit the sample to persons born in the U.S. to avoid potential influences of COVID-19 and other recent factors on immigrant composition. Our analysis uses CPS survey weights.

We first examine how high school completion rates changed in 2020 relative to previous years. We then examine the extent to which changes in 2020 are attributable to individual characteristics, local employment conditions, and state public policy responses to COVID-19. Specifically, we estimate linear probability models of the following form:

$$Y_{iat} = \alpha Y2020Dum_t + \pi Year_t + \theta AreaDum_a + \beta X_{iat} + \gamma Z_{at} + \varepsilon_{iat} \quad (1)$$

$$Y_{iat} = \delta YearDum_t + \theta AreaDum_a + \beta X_{iat} + \gamma Z_{at} + \varepsilon_{iat} \quad (2)$$

$Y_{iat}$  is an indicator variable for individual  $i$  in local area  $a$  and year  $t$  that equals one if the individual has completed a high school diploma or equivalent (e.g. GED).  $Y2020Dum_t$  is an indicator variable equal to one for year 2020 and zero otherwise.  $Year_t$  is a linear time trend variable that accounts for pre-2020 trends.  $AreaDum_a$  is a full set of indicator variables capturing local area fixed effects. Local areas consist of individually identifiable metropolitan areas and state-specific residual areas for non-metropolitan areas and unidentifiable metro areas. 82.3 percent of the sample lives in one of 260 individually identifiable metropolitan areas.  $X_{iat}$  is a set of individual characteristic control variables including dummies for gender, race, and ethnicity.  $Z_{at}$  is a set of time-varying state and local area characteristics discussed below. In equation (2),  $YearDum_t$  is a set of year indicator variables for each year excluding 2019.<sup>6</sup>

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<sup>5</sup> Some also graduate at age 17 or earlier, but the percentage is relatively small. For our sample, 71.9 percent of persons age 18 and 90.1 percent of those age 19 have completed high school. For age 17, only 15.7 percent had completed high school.

<sup>6</sup> This includes  $Y2020Dum_t$ . The  $Year_t$  variable is not included in equation (2) because it would be collinear with the full set of year dummies and the regression constant term.

Equation (2) examines differences for each year relative to 2019. We estimate separate regressions for ages 18 and 19. We cluster standard errors by state.

We measure local area employment changes from the previous year using data from the BLS Local Area Unemployment Statistics. Specifically, we compute total employment in each local area in May for 2015-2020.<sup>7</sup> We then compute the percentage change from the previous year for each year and local area, and include this as our time-varying measure of local employment conditions. This variable is preferable to the local unemployment rate because the pandemic reduced labor force participation causing the unemployment rate to understate employment losses (BLS 2020; Cho and Winters 2020). A stronger economy is expected to raise opportunity costs of time and reduce individual investments in schooling, so we expect the variable to have a negative coefficient for high school completion.

We collected data from various sources on state education policy responses to COVID-19 and construct two indicator variables.<sup>8</sup> The first is for whether the state had and eliminated exit exams that students must pass for graduation.<sup>9</sup> The second is an indicator equal to one if the state implemented a policy allowing seniors to satisfy graduation requirements if they were

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<sup>7</sup> This includes paid employment for persons of all ages. Unfortunately, there is no reliable employment measure for local areas that just includes young people. CPS sample sizes are too small to construct such a measure with sufficient precision to use as an explanatory variable; the small samples and consequent measurement error would induce attenuation bias in regression analysis. In results not shown, we did look at national variation in CPS employment rates for ages 18-19 and found significant decreases in 2020 consistent with expectations and findings in previous literature for broader age ranges.

<sup>8</sup> Education Week (<https://www.edweek.org/ew/section/multimedia/data-how-is-coronavirus-changing-states-graduation-requirements.html>) provides compiled data of changes in graduation requirements for each state through late April. We confirmed most of the states by finding official announcements from each state department of education as much as possible. We also searched the "Education commission of the states" website (<https://www.ecs.org/state-education-policy-watch-list/>) to look at the education policy responses of each state through bill enactment status. Further, we looked at local news as well as some of the local school district web sites.

<sup>9</sup> 16 states with exit exams scheduled for 2020 completely eliminated the requirements, but two (Idaho and New Mexico) did not. Most states had no exit exam requirement. The indicator equals one only for those that had and cancelled exit exams. The 16 states that eliminated exit exams are Arizona, Arkansas, Florida, Kentucky, Louisiana, Maryland, Massachusetts, Mississippi, Missouri, Nevada, New York, North Dakota, Ohio, Texas, Utah, and Virginia.

passing before school closure without having to complete additional schooling remotely.<sup>10</sup> Both of these indicators equal zero for all states before 2020; they equal one in 2020 if the state implemented the policy change in response to COVID-19 and zero if not. These education policy indicators measure relaxing of requirements and lower effort costs of schooling, so we expect them to have positive effects on high school completion. There was also variation in COVID-19 related policies and practices among local schools and teachers. Unfortunately, the idiosyncratic nature prevents us from measuring sub-state variation in education policy changes.

We use data from USAFacts (2020) to measure the percentage of the local area population that had tested positive for COVID-19 through May 31, 2020. A higher local COVID-19 infection rate is likely to reduce local recreational opportunities and opportunity costs of time spent on schooling but increase anxiety and effort costs of schooling, so the net expected effect on schooling is ambiguous. We also include a variable for the number of days (divided by 100) a state shelter in place policy was in effect through May 31, 2020; the measure comes from the Institute for Health Metrics and Evaluation (IHME 2020). The shelter in place variable has ambiguous expected effects on schooling similar to the infection rate variable. Finally, we include an indicator equal to one in 2020 if the state had a Republican governor in 2020; it equals zero for previous years and for states without a Republican governor. State policy responses differed between Democratic and Republican governors, with the latter allowing more economic activity to remain open. Young people in states with Republican governors may also have expected a shorter duration of the pandemic. The expected effect of having a Republican governor in 2020 on high school graduation is also ambiguous. Given the uncertain expectations

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<sup>10</sup> The 13 states with these statewide policy changes are Alabama, Arkansas, Florida, Illinois, Indiana, Massachusetts, New York, North Carolina, Oregon, Tennessee, Virginia, Washington, and West Virginia.

and potential collinearity between some of these variables, we also estimate robustness checks that include subsets of these variables with results in the appendix.

Table 1 presents sub-sample means and time differences for selected variables. The first three columns are for age 18 and the last three columns are for age 19. Columns (1) and (4) report means for years 2016-2019, and Columns (2) and (5) report means for year 2020. Columns (3) and (6) present differences in means between the two periods. The share of high school graduates for age 18 increased from 0.705 in 2016-2019 to 0.774 in 2020, i.e., the high school graduation rate increased by 6.9 percentage points during 2020 relative to previous years. This is a large increase and indicates that the COVID-19 pandemic and resulting disruptions increased high school completion rates overall. For age 19, the share of high school graduates increased from 0.892 in 2016-2019 to 0.937 in 2020. Some young people graduate high school at age 19 instead of 18, so the overall percentages are higher for the older group. The 4.5 percentage point increase for age 19 is somewhat smaller than for age 18, but it is still quite large. Figure 1 shows the annual variation in high school completion rates and reiterates the large increase in 2020 relative to previous years.

Table 1 also shows that individual characteristics are similar across the sub-samples, but there are some differences over time warranting regression analysis with individual control variables. The local employment change decreased significantly in 2020. It is measured in percentage points, and the mean went from 0.012 in 2016-2019 to -0.12 in 2020 indicating that the year-over-year employment change in May 2020 was more than 13 percentage points lower in 2020 than in previous years. However, there was also considerable variation in 2020 employment conditions across local areas as documented in previous literature (Chetty et al. 2020; Cho et al. 2020; Forsythe et al. 2020). The standard deviation for the local employment

change variable was 0.051 in year 2020 for both ages (not reported in the table). Cho et al. (2020) document that early employment losses were especially severe in large metropolitan areas because of greater population density and virus exposure. Local industrial structure also mattered as local areas with employment concentrated in the leisure and hospitality sector were especially hard hit. The other explanatory variables in Table 1 equal zero in 2016-2019 by construction but have non-zero means in 2020.

#### **4. Regression Results**

Table 2 reports regression results for variants of equation (1). The first three columns are for age 18 and the last three are for age 19. Columns (1) and (4) include no time-varying state and local area characteristic variables. Columns (2) and (5) add the local employment change variable. Columns (3) and (6) present the full specification.

Column (1) reports that the high school completion rate for age 18 increased by 5.7 percentage points in 2020 relative to previous years controlling for individual characteristics and a linear time trend. The year trend variable is not statistically significant, but its inclusion does moderately reduce the Column (1) Year 2020 Dummy coefficient estimate; see Appendix Table A1 for equation (1) results without the year trend variable. In Column (2) the local employment change variable is significantly negative as expected, and the Year 2020 Dummy coefficient decreases and is not statistically significant. In Column (3), the local employment change variable is again negative and statistically significant, but the other time-varying state and local variables are not statistically significant individually nor jointly. Columns (4) through (6) follow a similar pattern as (1) through (3). Column (4) indicates a significant increase in high school

completion in 2020, but this goes away in Column (5) when controlling for local employment change and none of the other time-varying state and local variables are significant in Column (6).

The results in Table 2 indicate that high school completion rates significantly increased overall in 2020, and the driving factor was the worsened labor market conditions. Multiplying the local employment change coefficients in Table 2 by the corresponding changes in sub-sample means over time in Table 1 implies that the worse labor market increased high school completion by 6.8 to 6.9 percentage points for age 18 and by 4.2 to 4.3 percentage points for age 19; these magnitudes are nearly identical to the overall changes in high school completion reported in Table 1. That is, the worse employment conditions appear to fully explain the 2020 increase in high school completion rates.<sup>11</sup>

A few caveats are worth noting. First, we are measuring overall effects on high school completion rates, but there may have been unobservable heterogeneous effects with some students pushed into high school completion and others pushed out of high school completion. We are capturing the overall effect, and an overall positive effect does not preclude negative effects for some individuals. For example, the worse economy reduced employment opportunities and encouraged high school completion for many young people, but it also reduced household income for many young people whose parents lost jobs and could have disrupted their schooling. Some young people may have even quit school and entered the labor force due to parental job loss during the pandemic. We are unable to provide evidence on such heterogeneous effects, but they are a possible consideration for future research. Second, high school completion is an important outcome but only one component of educational attainment.

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<sup>11</sup> In results not shown, we also conducted an Oaxaca-Blinder decomposition of the changes between 2016-2019 and 2020 and again found that the local employment change variable was the driving factor. Specifically, the decomposition suggests that the local employment change variable explains a 6.6 percentage point decline for age 18 and a 4.5 percentage point decline for age 19.

If students have been disrupted in their education due to school closures and distance learning, it may harm their overall human capital development and future labor market outcomes.

Table 3 presents results for variants of equation (2) which includes dummies for each year excluding 2019 as the base year. The six columns are structured similarly to Table 2. The results in Table 3 are very similar to Table 2. The local employment change coefficient modestly decreases in magnitude in Columns (2) and (3) and modestly increases magnitude in Columns (5) and (6). Multiplying the local employment changes coefficients by the change in sample mean implies that the worse labor market due to COVID-19 increased high school completion by 6.6 to 6.7 percentage points for age 18 and by 4.3 percentage points for age 19. The other state and local characteristics are neither individually nor jointly significant. Appendix Tables A2 and A3 examine the robustness to alternative specifications of time-varying state and local characteristics. Results for the local employment change variable are very similar to Table 2.

## **5. Conclusion**

COVID-19 disrupted lives and livelihoods around the world. The U.S. experienced record unemployment in April 2020. COVID-19 severely impacted education via school closures, online learning, and major uncertainties for how to proceed. Many young people struggled educationally, economically, socially, and emotionally. There was some concern that COVID-19 may have reduced student performance and lowered graduation rates for high school seniors. We present a human capital framework relating schooling decisions to marginal costs and marginal benefits. We examine changes in high school completion rates in 2020 relative to previous years. High school completion rates increased by 6.9 percentage points for persons age 18 and by 4.5 percentage points for persons age 19. We investigate the importance of

contributing factors and find that worse local employment conditions are the driving force. As the economy worsened, the opportunity cost of schooling decreased. The lower marginal cost of schooling encouraged more young people to complete high school.

Our analysis is valuable for researchers, policymakers, and educators. For researchers, our findings provide reaffirming empirical support for the human capital framework as a model for understanding individual education decisions, especially high school completion. A weak economy reduces employment opportunities for young people and they respond by increasing their investment in schooling. For policymakers and educators, it is noteworthy that the overall effects of COVID-19 and efforts to combat it did not reduce high school completion rates. Students certainly struggled in many ways, but it is important to understand that high school completion rates were not overall adversely impacted in 2020 despite school closures, online learning, and other challenges. By increasing overall high school completion rates, many high school seniors achieved something positive in an otherwise negative environment. Of course, the pandemic-related disruptions were deleterious for many young people and their human capital development. Some impacts of the pandemic will last well into the future, so it is important that the education community keeps working to support students and provide the best education possible given the circumstances.



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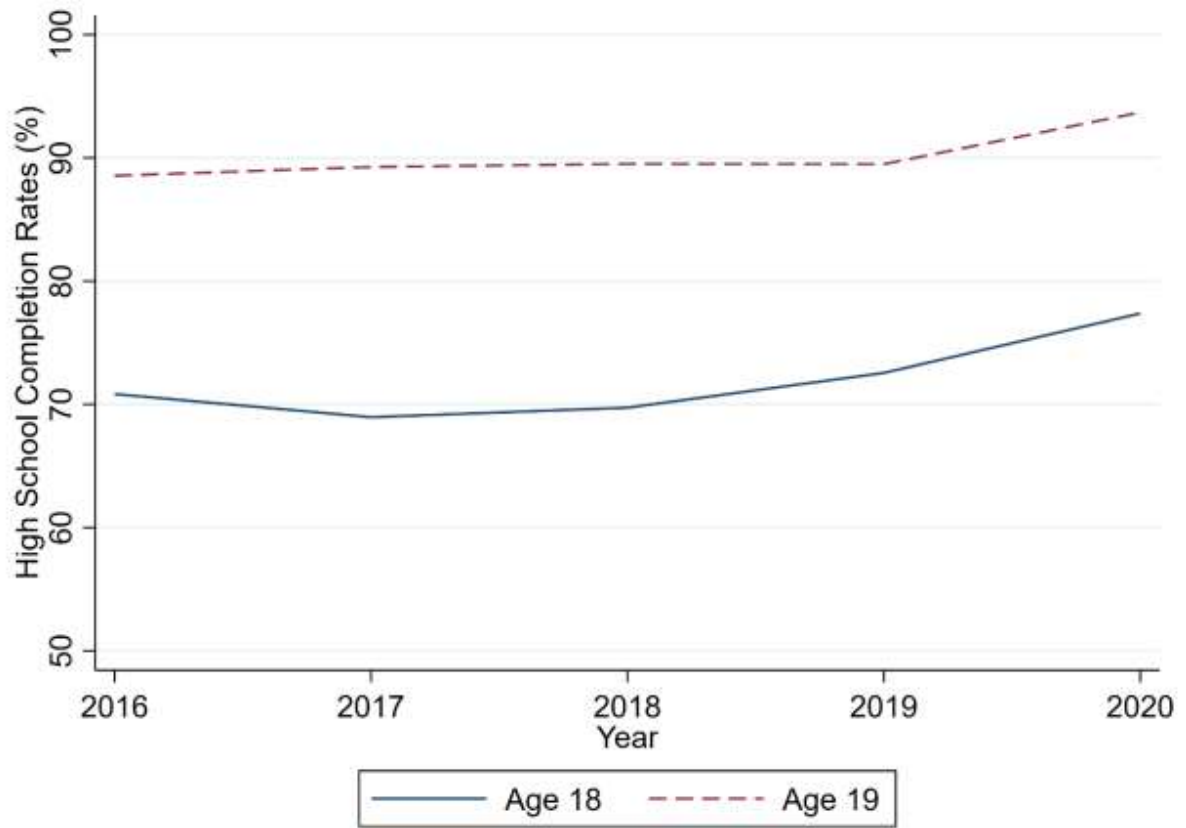
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Figure 1: High School Completion Rates, 2016-2020



Source: authors' estimates using the U.S. Current Population Survey for July.

Table 1: Sub-Sample Means and Time Differences for Selected Variables

	(1)	(2)	(3)	(4)	(5)	(6)
	Age 18	Age 18	Age 18	Age 19	Age 19	Age 19
	2016-19	2020	Difference	2016-19	2020	Difference
High School Graduate	0.705	0.774	0.069***	0.892	0.937	0.045***
Female	0.492	0.484	-0.007	0.498	0.500	0.002
Black	0.133	0.145	0.011	0.151	0.123	-0.028**
Native American	0.009	0.012	0.002	0.010	0.010	0.000
Asian	0.035	0.039	0.003	0.035	0.041	0.006
Pacific Islander	0.005	0.003	-0.002	0.003	0.004	0.001
Multi-racial	0.037	0.024	-0.013**	0.030	0.037	0.008
Hispanic	0.211	0.221	0.010	0.199	0.211	0.011
Local Employment Change	0.012	-0.120	-0.132***	0.012	-0.122	-0.134***
Dropped Exit Exams * Y2020	0	0.416	0.416***	0	0.438	0.438***
Passing Graduates * Y2020	0	0.357	0.357***	0	0.319	0.319***
Local COVID Infection Rate	0	0.521	0.521***	0	0.539	0.539***
Shelter in Place Days (/100)	0	0.475	0.475***	0	0.463	0.463***
Republican Governor * Y2020	0	0.453	0.453***	0	0.481	0.481***

Notes: The full sample includes persons in the 2016-2020 July CPS ages 18-19 and born in the U.S.

\*Significant at the ten percent level; \*\*Significant at five percent level; \*\*\*Significant at one percent level.

Table 2: High School Completion Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
	Age 18	Age 18	Age 18	Age 19	Age 19	Age 19
Year 2020 Dummy	0.057**	-0.010	0.002	0.033**	-0.009	-0.047*
	(0.023)	(0.042)	(0.063)	(0.014)	(0.024)	(0.027)
Year Trend	0.005	0.004	0.004	0.003	0.002	0.003
	(0.008)	(0.007)	(0.007)	(0.004)	(0.004)	(0.004)
Local Employment Change		-0.518**	-0.521**		-0.318**	-0.315**
		(0.196)	(0.230)		(0.143)	(0.148)
Dropped Exit Exams * Y2020			-0.026			0.021
			(0.042)			(0.020)
Passing Graduates * Y2020			-0.030			-0.019
			(0.030)			(0.019)
Local COVID Infection Rate			0.015			0.003
			(0.025)			(0.012)
Shelter in Place Days (/100)			-0.011			0.048
			(0.069)			(0.039)
Republican Governor * Y2020			0.012			0.024
			(0.045)			(0.019)
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Local Area Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,790	6,790	6,790	6,074	6,074	6,074

Notes: Standard errors in parentheses are clustered by state. Individual controls include dummy variables for sex, race, and ethnicity. Local areas include identifiable metropolitan areas and state-specific residuals for non-metropolitan areas and unidentifiable metropolitan areas. \*Significantly different from zero at the ten percent level; \*\*Significant at five percent level; \*\*\*Significant at one percent level.



Table 3: High School Completion Regression Results with Individual Year Dummies

	(1)	(2)	(3)	(4)	(5)	(6)
	Age 18	Age 18	Age 18	Age 19	Age 19	Age 19
Year 2020 Dummy	0.053*** (0.019)	-0.012 (0.038)	0.001 (0.060)	0.037*** (0.012)	-0.005 (0.023)	-0.044 (0.027)
Year 2018 Dummy	-0.023 (0.021)	-0.020 (0.021)	-0.020 (0.021)	-0.001 (0.013)	0.001 (0.014)	0.001 (0.014)
Year 2017 Dummy	-0.027 (0.016)	-0.024 (0.016)	-0.024 (0.016)	-0.005 (0.013)	-0.002 (0.013)	-0.003 (0.013)
Year 2016 Dummy	-0.015 (0.022)	-0.012 (0.021)	-0.012 (0.021)	-0.009 (0.014)	-0.007 (0.014)	-0.008 (0.014)
Local Employment Change		-0.502** (0.198)	-0.505** (0.229)		-0.322** (0.149)	-0.320** (0.153)
Dropped Exit Exams * Y2020			-0.026 (0.042)			0.021 (0.020)
Passing Graduates * Y2020			-0.030 (0.030)			-0.019 (0.019)
Local COVID Infection Rate			0.015 (0.025)			0.003 (0.012)
Shelter in Place Days (/100)			-0.011 (0.069)			0.048 (0.039)
Republican Governor * Y2020			0.011 (0.044)			0.024 (0.019)
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Local Area Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,790	6,790	6,790	6,074	6,074	6,074

Notes: Standard errors in parentheses are clustered by state. 2019 is the omitted year. Individual controls include dummy variables for sex, race, and ethnicity. Local areas include identifiable metropolitan areas and state-specific residuals for non-metropolitan areas and unidentifiable metropolitan areas.

\*Significantly different from zero at the ten percent level; \*\*Significant at five percent level;

\*\*\*Significant at one percent level.

## Appendix Tables

Table A1: High School Completion Regression Results without Year Trend Variable

	(1)	(2)	(3)	(4)	(5)	(6)
	Age 18	Age 18	Age 18	Age 19	Age 19	Age 19
Year 2020 Dummy	0.069*** (0.016)	-0.002 (0.038)	0.011 (0.059)	0.040*** (0.009)	-0.004 (0.024)	-0.042 (0.026)
Local Employment Change		-0.532*** (0.197)	-0.537** (0.233)		-0.327** (0.140)	-0.325** (0.145)
Dropped Exit Exams * Y2020			-0.026 (0.042)			0.021 (0.020)
Passing Graduates * Y2020			-0.030 (0.030)			-0.019 (0.019)
Local COVID Infection Rate			0.014 (0.025)			0.003 (0.012)
Shelter in Place Days (/100)			-0.012 (0.069)			0.047 (0.039)
Republican Governor * Y2020			0.011 (0.044)			0.024 (0.019)
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Local Area Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,790	6,790	6,790	6,074	6,074	6,074

Notes: Standard errors in parentheses are clustered by state. Individual controls include dummy variables for sex, race, and ethnicity. Local areas include identifiable metropolitan areas and state-specific residuals for non-metropolitan areas and unidentifiable metropolitan areas. \*Significantly different from zero at the ten percent level; \*\*Significant at five percent level; \*\*\*Significant at one percent level.

Table A2: Alternative Specifications of State and Local Characteristics Results for Age 18

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Age 18	Age 18	Age 18	Age 18	Age 18	Age 18	Age 18
Year 2020 Dummy	-0.002 (0.039)	0.000 (0.039)	0.007 (0.039)	0.004 (0.038)	0.013 (0.047)	-0.003 (0.047)	0.004 (0.063)
Year Trend	0.004 (0.007)	0.004 (0.007)	0.004 (0.007)	0.004 (0.007)	0.004 (0.007)	0.004 (0.007)	0.004 (0.007)
Local Employment Change	-0.518** (0.199)	-0.520*** (0.189)	-0.520*** (0.194)	-0.500** (0.206)	-0.516** (0.222)	-0.517** (0.228)	-0.492** (0.225)
Dropped Exit Exams * Y2020	-0.021 (0.031)		-0.018 (0.030)	-0.019 (0.029)	-0.022 (0.035)	-0.026 (0.041)	-0.029 (0.042)
Passing Graduates * Y2020		-0.030 (0.033)	-0.028 (0.031)	-0.031 (0.032)	-0.030 (0.030)	-0.031 (0.031)	-0.031 (0.029)
Local COVID Infection Rate				0.012 (0.024)	0.013 (0.025)	0.015 (0.025)	
Shelter in Place Days (/100)					-0.023 (0.067)		-0.012 (0.068)
Republican Governor * Y2020						0.014 (0.042)	0.017 (0.045)
Local COVID Death Rate							0.328 (0.298)
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local Area Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,790	6,790	6,790	6,790	6,790	6,790	6,790

Notes: Standard errors in parentheses are clustered by state. Individual controls include dummy variables for sex, race, and ethnicity. Local areas include identifiable metropolitan areas and state-specific residuals for non-metropolitan areas and unidentifiable metropolitan areas. \*Significantly different from zero at the ten percent level; \*\*Significant at five percent level; \*\*\*Significant at one percent level.

Table A3: Alternative Specifications of State and Local Characteristics Results for Age 19

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Age 19	Age 19	Age 19	Age 19	Age 19	Age 19	Age 19
Year 2020 Dummy	-0.021 (0.024)	-0.004 (0.026)	-0.016 (0.025)	-0.016 (0.025)	-0.026 (0.027)	-0.023 (0.025)	-0.048* (0.028)
Year Trend	0.002 (0.004)	0.003 (0.004)	0.003 (0.004)	0.003 (0.004)	0.003 (0.004)	0.003 (0.004)	0.003 (0.004)
Local Employment Change	-0.328** (0.146)	-0.316** (0.140)	-0.327** (0.140)	-0.327** (0.147)	-0.307** (0.152)	-0.339** (0.149)	-0.299** (0.149)
Dropped Exit Exams * Y2020	0.025 (0.018)		0.026 (0.019)	0.026 (0.019)	0.029 (0.020)	0.020 (0.020)	0.020 (0.020)
Passing Graduates * Y2020		-0.015 (0.019)	-0.017 (0.018)	-0.017 (0.019)	-0.019 (0.019)	-0.016 (0.019)	-0.020 (0.019)
Local COVID Infection Rate				0.000 (0.013)	-0.001 (0.013)	0.003 (0.012)	
Shelter in Place Days (/100)					0.026 (0.038)		0.047 (0.038)
Republican Governor * Y2020						0.013 (0.017)	0.027 (0.019)
Local COVID Death Rate							0.122 (0.124)
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local Area Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,074	6,074	6,074	6,074	6,074	6,074	6,074

Notes: Standard errors in parentheses are clustered by state. Individual controls include dummy variables for sex, race, and ethnicity. Local areas include identifiable metropolitan areas and state-specific residuals for non-metropolitan areas and unidentifiable metropolitan areas. \*Significantly different from zero at the ten percent level; \*\*Significant at five percent level; \*\*\*Significant at one percent level.