

ECONOMIC COMMENTARY

COVID-19 and Education: An Updated Survey of the Research

Peter Hinrichs

This *Economic Commentary* surveys research on COVID-19 in relation to education in the United States. It is a companion to an earlier survey (Hinrichs, 2021) and focuses on the consequences of the COVID-19 pandemic that might persist even after life has returned to a relative normal. The evidence suggests that the pandemic led to lower enrollment at public schools and negatively impacted student learning. In addition, teacher turnover did not rise at the beginning of the pandemic, but it has risen in the years since.

The COVID-19 pandemic upended life across the globe. In addition to the immediate health and economic consequences experienced in the United States, there was sustained disruption to education across the country as schools canceled in-person classes and shifted to online instruction. Although life in the United States has since returned to a relative normal and schools have returned to in-person instruction, some of the changes that occurred during the pandemic may leave a lasting impact on students and the educational system even after this period of crisis has subsided.

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In addition, while teacher turnover did not rise at the beginning of the pandemic, it has risen in the years since.

This *Economic Commentary* reviews research conducted in the time since publication of an earlier *Economic Commentary* (Hinrichs, 2021) that surveyed early research on COVID-19 and education. Hinrichs (2021) reviewed evidence on transmission of COVID-19 at schools and colleges, the impact of K–12 school closures on labor force participation, and the effects of virtual schooling on student outcomes. Research conducted since provides strength to the argument that COVID-19 may have lasting impacts on students even though life has returned to a relative normal. These educational impacts may, in turn, affect students' earnings potential and labor productivity as adults, potentially resulting in important consequences for the entire economy.

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Effects of the Pandemic on School Enrollment

Shifts in enrollment across school sectors during the pandemic were large. In looking specifically at Massachusetts, Dee and Murphy (2021) find that enrollment in traditional public school districts in the state fell by 4.5 percent, enrollment in charter school districts rose by 2.7 percent, enrollment in vocational school districts rose by 1.8 percent, and enrollment in virtual schools districts rose by 21.5 percent between the 2019–2020 and 2020–2021 school years. Musaddiq et al. (2022) find a similar enrollment shift using student-level longitudinal administrative data from Michigan that allow them to follow variation in enrollment choices over time for an individual family as a student moves from one sector to another. From 2014 to 2018, 4.1 percent of students enrolled in a Michigan public elementary school in October were not enrolled in a Michigan public school the following October. However, 6.4 percent of students enrolled in a Michigan public elementary school in October 2019 were not enrolled in a Michigan public school in October 2020. Musaddiq et al. (2022) also study schooling choices on a national level using data from the US Census Bureau's Household Pulse Survey. Although the data do not distinguish between public schools and private schools, Musaddiq et al. (2022) find that the percentage of US households with at least one homeschooled child rose from 4.5 percent in February 2020 to 7.3 percent in September and October 2020.

Movement of students out of public schools did not occur evenly across school districts. Rather, a school's operating mode played a role. Using data from 875 school districts that belong to 34 states and enroll 35 percent of public school students in the United States, Dee et al. (2021) find that remote schooling is associated with 1.1 percent lower enrollment in the 2020–2021 school year compared to fully in-person schooling. Hybrid schooling, which involves meeting in person part of the time and remotely the rest of the time, is not associated with an enrollment change relative to fully in-person schooling. The effects of fully in-person schooling on enrollment numbers are especially pronounced at the kindergarten level and essentially nonexistent at the high school level. Based on their estimate of the remote schooling impact, the number of students enrolled in public schools (49 million), and the percentage of students with remote instruction (57 percent), Dee et al. (2021) estimate that public school enrollment fell by 300,000 nationally as a result of remote schooling. Dee et al. (2021) write, "Disenrollment from public schools implies that students have switched schools (e.g., to private schools or homeschooling), intend to skip or delay kindergarten, and dropped out or become truant." They also point out that any of these possibilities could have negative impacts on students.

Not only did a school's operating mode affect whether students left that school, but it affected the sector to which departing students switched, as well. Musaddiq et al. (2022) find that exiting public schools for homeschooling was more common when schools met in person compared to when they were remote, while switching from public schools to private schools displayed the opposite pattern. This finding suggests that some families preferred in-person instruction, while others did not, and families chose the kind of schooling they felt suited them best given the constraints they faced. In districts in which public schools met fully in person, some families may have switched to homeschooling out of fear of COVID-19 transmission. In districts in which public schools met remotely, other families may have enrolled their children in private schools in order to provide them with an in-person schooling experience. On a national level, Musaddiq et al. (2022) find that the increase in the homeschooling rate in 2020 was especially large in states with a high share of students attending school remotely.

It remains to be seen what long-run impact the enrollment trends found in Dee and Murphy (2021), Dee et al. (2021), and Musaddiq et al. (2022) will have. Some families may reenroll their children in public schools now that schools have resumed in-person instruction. Others may keep their children enrolled in private schools or continue to homeschool them. The longer-run public school disenrollment effects could conceivably be even larger than the short-run effects if the shift to private schooling and homeschooling builds support for those sectors. To the extent that fewer students are enrolled in public schools, the level of funding for public schools may fall, and public schools may, in turn, experience additional budget pressure.

Effects of the Pandemic on Student Learning

Achievement levels on a variety of standardized tests fell during the pandemic. Jack et al. (2022) analyze data on statewide standardized tests in grades 3–8 in 11 states in 2016–2019 and 2021, and among their findings is that from 2019 to 2021, the average pass rate in mathematics fell by 12.8 percentage points and the average pass rate in English language arts (ELA) fell by 6.8 percentage points. Kane et al. (2022) find similar results using eighth grade mathematics test scores from 1990 to 2022 from the National Assessment of Education Progress.¹ Scores rose from 1990 to 2019 but then fell substantially in 2022. The nationwide trends are actually true of each state, as each state scored higher in 2019 than in 1990 but lower in 2022 than in 2019. However, scores fell more in some states than in others; in five states (Iowa, Maine, Montana, North Dakota, and Oregon), the decline was large enough that 2022 scores were below 1990 scores. Goldhaber et al. (2022) find test-score declines using data on NWEA's Measures of Academic Progress (MAP) Growth assessments from over 2.1 million students in nearly 10,000 schools spread across almost every state. The authors study individual student achievement growth from 2019 to 2021 based on what would have been expected if extrapolating from achievement growth from 2017 to 2019, with a focus on math test scores. They find that students lost ground during the pandemic and that achievement gaps by race and school poverty level widened.

Evidence suggests that test scores during the pandemic were related to the choice of instructional mode. Depending on the exact statistical specification, Jack et al. (2022) find that in-person schooling is associated with about a 13 percentage point or 14 percentage point higher pass rate in mathematics and an 8 percentage point or 9 percentage point higher pass rate in ELA than with virtual schooling, while hybrid schooling is associated with about a 7 percentage point or 8 percentage point higher pass rate in mathematics and a 5 percentage point or 6 percentage point higher pass rate in ELA than with virtual schooling. The effects are largest in the lower grades. Goldhaber et al. (2022) find that remote instruction is associated with widening achievement gaps, primarily because the negative effects of remote instruction are larger in magnitude at high-poverty schools and to a lesser extent because high-poverty schools are more likely to use remote instruction.

The drop in test scores during the pandemic may have long-lasting consequences. Although it is difficult to predict the exact magnitudes in advance, some potential evidence comes from an analysis of state-level math scores and individual-level earnings from the decennial census and the American Community Survey discussed in Kane et al. (2022). The authors find that an increase of one standard deviation in test scores is associated with about an 8 percent increase in income as an adult. The 0.2 standard deviation decline in test scores between 2019 and 2022 would thus suggest an earnings decline of about 1.6 percent at the individual level. Based on estimates of lifetime income from prior research, this amounts to \$19,400 per student. Multiplying this amount by the 48 million students enrolled in public schools suggests \$900 billion in total losses to national income as a result of the drop in test scores.

Some commentators have called for additional instruction in order to make up for lost instruction during the pandemic. For example, former New York City mayor Michael Bloomberg discusses a philanthropist-funded summer school program in New York and calls for additional summer instruction throughout the United States (Bloomberg, 2023). Based on a finding that widening achievement gaps are primarily an across-school phenomenon rather than a within-school phenomenon, Goldhaber et al. (2022) suggest focusing on particular schools rather than on particular groups within those schools in order to try to undo the negative effects of the pandemic on learning.

Effects of the Pandemic on Teacher Turnover

Another way the COVID-19 pandemic might have a lasting impact on education is through the departure of teachers from the teaching profession. Teachers may have left the profession because of fear of COVID-19 transmission at school, because they had an aversion to teaching remotely, or because of other reasons related to the new education landscape.

At least four teams of researchers have studied teacher turnover during the pandemic using administrative data from four different states: Massachusetts, Washington, Arkansas, and North Carolina. The results are similar across the four states. In particular, while there was not much change in teacher turnover after the 2019–2020 school year, there was an increase in teacher turnover as the pandemic wore on.

Bacher-Hicks, Chi, and Orellana (2022) study teacher turnover in Massachusetts with data on public school teachers from the 2015–2016 school year through the 2021–2022 school year. The percentage of teachers who left the Massachusetts teacher workforce was 8.0 percent after the 2019–2020 school year.² However, the figure rose to 9.4 percent after the 2020–2021 school year.

Partly with the help of a new emergency teacher license program, Massachusetts was able to hire new teachers to fill the slots of teachers who had left, and the total number of teachers employed rose slightly between the 2020–2021 and 2021–2022 school years. Bacher-Hicks, Chi, and Orellana (2022) describe several factors that may have helped keep turnover in check. For example, although teaching may have become less appealing during the pandemic, other careers may have become less appealing, as well. Additionally, it may take time to acquire training for an alternative career path, thus potentially keeping people in jobs they already have.

This does not imply that the transition was costless. Hiring new teachers requires schools to expend resources, new hires may not be as effective as teachers who have voluntarily departed, and, even if they are as effective, it may require time for them to reach their potential. But still, there were few enough teachers leaving that Massachusetts was able to replace those who did depart, at least in the aggregate.

Goldhaber and Theobald (forthcoming) study teacher turnover in Washington state using longitudinal data on public school teachers from 1984–1985 through 2021–2022. They find that 6.4 percent of teachers left Washington’s public school workforce after the 2019–2020 school year, a rate that is slightly lower than the 6.7 percent of teachers who left the public school workforce after the 2018–2019 school year and the 6.6 percent who left in the average prepandemic year. Goldhaber and Theobald (forthcoming) find that 7.3 percent of teachers left the public school workforce in Washington after the 2020–2021 school year. But, even so, at the time, this was

not even the year with the highest turnover, as 7.7 percent of teachers left after the 2006–2007 school year. Goldhaber and Theobald (forthcoming) mention that journalistic accounts had used terms such as “mass exodus” and “in crisis” when referring to the teacher labor market, but Goldhaber and Theobald (forthcoming) conclude that the situation was not quite so dire. However, Goldhaber and Theobald (2023) update the results of Goldhaber and Theobald (forthcoming) using an additional year’s worth of data. They find that 8.9 percent of Washington’s teachers left the public school workforce after the 2021–2022 school year, the highest rate in the nearly 40 years’ worth of data.

Camp, Zamarro, and McGee (2023) study teacher turnover in Arkansas using data from the 2013–2014 school year through the 2022–2023 school year. The percentage of teachers who left the teaching workforce did not change noticeably at the beginning of the pandemic, holding relatively steady at levels between 8.5 percent and 8.8 percent from 2017–2018 through 2020–2021.³ However, the rate rose to 10.4 percent after the 2021–2022 school year. This is not the highest rate in the data, however, as 13.3 percent of teachers left after the 2014–2015 school year. But still, as with Massachusetts and Washington, the jump suggests that teacher turnover in Arkansas increased eventually.

Bastian and Fuller (2023) obtain similar results when studying turnover in North Carolina with data on public school teachers from the 2016–2017 school year through the 2022–2023 school year. The percentage of teachers in September who were not working as a teacher the following September was 11.5 percent in 2016, 11.5 percent in 2017, and 11.2 percent in 2018. The rate then dropped to 9.8 percent in 2019 before rising to 12.1 percent in 2020 and 15.6 percent in 2021. In most years schools were able to hire a comparable number of teachers to replace those that had departed, but this was not the case in the most recent year of data. If this trend continues, it could result in difficulties for public schools in the state.

Conclusion

Research on COVID-19 and education will likely continue for many years. Future research on COVID-19 might include reevaluations of the short-run effects and new estimates of longer-run or intergenerational effects.

The evidence thus far suggests that the pandemic led to lower enrollment at public schools and negatively impacted student learning. In addition, teacher turnover did not rise at the beginning of the pandemic, but it has risen in the years since. The extent to which these effects will persist remains to be seen, although they may have important consequences for the economy.

Endnotes

¹ The test, sometimes referred to as “the Nation’s Report Card,” was administered in 1990, 1992, and 1996 and then once every three years beginning in 2000. However, the 2021 test was postponed to 2022.

² This figure was 8.8 percent after the 2015–2016 school year, 8.5 percent after the 2016–2017 school year, 8.1 percent after the 2017–2018 school year, and 8.2 percent after the 2018–2019 school year.

³ In particular, the figure was 8.8 percent after the 2017–2018 school year, 8.5 percent after the 2018–2019 school year, 8.6 percent after the 2019–2020 school year, and 8.7 percent after the 2020–2021 school year.

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