

Declining school enrollment since the pandemic

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Declining school enrollment since the pandemic

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Abstract

In this paper, we investigate how student enrollment in public schools is different after the COVID-19 pandemic. Over the pandemic—between the 2018-19 and 2021-22 school years—about 12 percent of public elementary schools and 9 percent of middle schools experienced more than a 20 percent decline. This is a significant change from before the pandemic, when about 5 percent of elementary and middle schools saw a 20 percent enrollment decline between 2015-16 and 2018-19. Enrollment declines are widespread but differ substantially across types of schools, locales, and socioeconomic status. The analysis finds that urban districts and high-poverty districts saw larger declines in school enrollment.

Introduction

The COVID-19 pandemic has had dramatic effects on the learning experiences and academic performance of children as well as on parents, teachers, and schools. During the COVID-19 pandemic, families and schools scrambled to find ways to deliver remote learning to students. A number of studies have provided insights into the short- and the longer-term consequences of these changes on a range of outcomes such as student achievement and income (Kuhfeld et al. 2020, Raymond et al. 2020, Goulas and Raymond 2023, Hanushek 2023), well-being of students and families (Prime, Wade, and Brown 2020, Samji et al. 2022), and teacher morale (Marshall, Pressley, and Love 2022, Marshall et al. 2023).

Recent investigations have also documented large declines in K-12 student enrollment in public schools at the state and district levels (Dee and Murphy 2021, Musaddiq et al. 2022, Dee 2023). However, state- or district-level evidence on enrollment declines may obscure how these losses vary for different types of public schools, such as by grade level and by the characteristics of the community. As more post-pandemic data are reported, a clearer picture of the nationwide declines and their implications for students and public school systems emerges.

Not all enrollment declines are unexpected. Declining enrollment in traditional public schools may reflect demographic shifts, migration, and school choice to some extent. For example, families may have tried out various schooling alternatives during the COVID-19 pandemic, such as homeschooling, and may have found that these options worked well for their children or wanted to avoid a transition to a more typical learning setting after COVID-19. Nonetheless, declining enrollment in public schools may make it difficult to collect information regarding for some students. In particular, it is harder to know the quality of education students receive away from the public school system. When students attend schools with less of an accountability system (i.e., private schools or homeschooling), it is difficult to include those students in policy design and monitor and support their learning journey.

Declining student enrollments may also pose major challenges for schools. First, large declines in student enrollment may translate to teacher layoffs. Because layoffs are not typically based on teaching effectiveness, layoffs have the potential to result in a less effective teacher workforce. Second, declining school enrollment would create organizational pressure for districts to reallocate resources to better serve students and families given the budget constraints. Depending on the extent and distribution of declining enrollment, such pressures could lead to school closures (Gordon et al. 2018). Third, key components of school operational expenses like teacher

salaries and infrastructure investments do not fluctuate as much with student enrollment as fiscal transfers do (Lueken 2017). State and federal aid to schools is closely related to student enrollment (Lee, Gutierrez, and Blagg 2020). In contrast, changes in teaching staff or building infrastructure are only done in response to big increases or decreases in student enrollment (Lueken 2017). As a result, even with stable teaching personnel and infrastructure, declining enrollment limits schools' fiscal room to provide resources and support to remaining students.

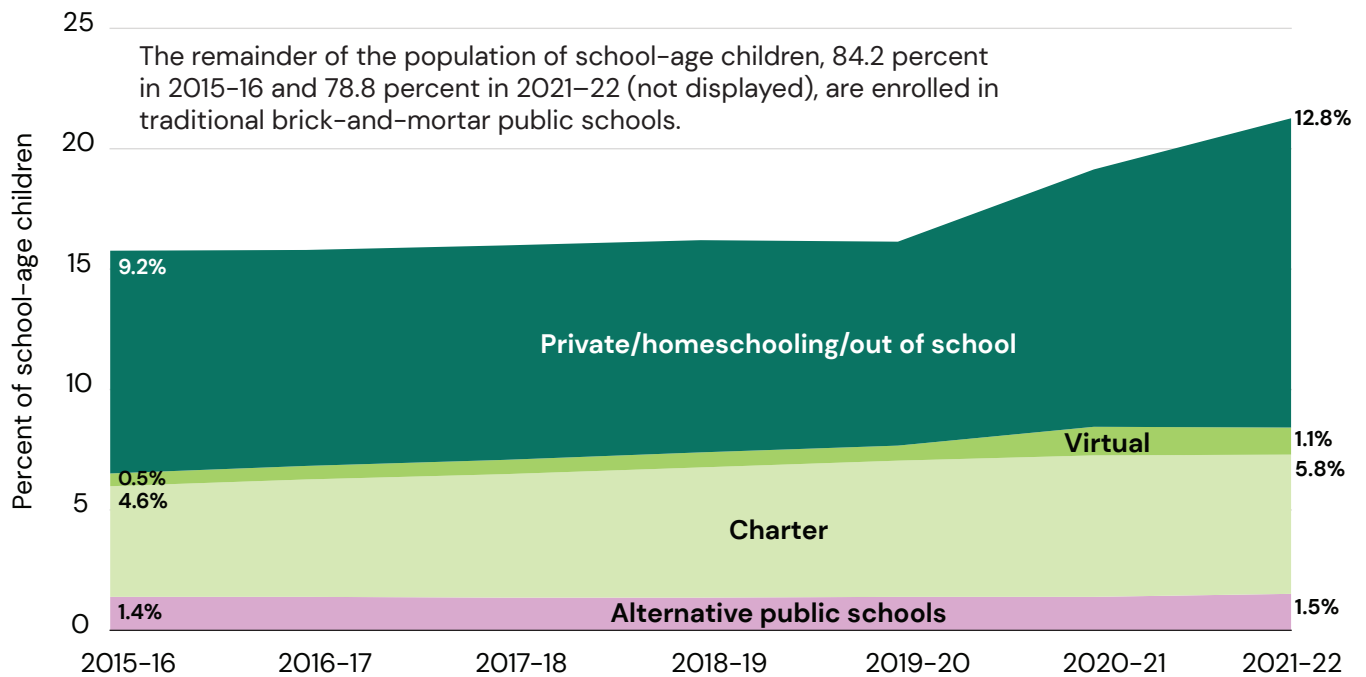
In this paper, we investigate how student enrollment in public schools is different after the COVID-19 pandemic. Our study goes beyond some of the previous explorations in four important ways. First, we use U.S. Census Bureau data to estimate the number of school-age children in each district and infer the number of students not attending public school prior to and after COVID-19. Second, we document the enrollment trajectories in typical (i.e., median) schools in each grade level, locale, and socioeconomic status. Third, we show variation in enrollment changes across schools by showing the distribution of enrollment changes during the pandemic. Finally, we compare the distribution of enrollment changes during COVID-19 to those from the pre-pandemic years to infer typical and extraordinary enrollment declines.

We find that there were substantial declines in public school enrollment during the COVID-19 pandemic (2020-21 and 2021-22 school years). In particular, the median elementary and middle schools lost more than 6 and 5 percent of their students during the pandemic, respectively (between 2019-20 and 2021-22). Recovery from pandemic-related enrollment losses has been slow and uneven. While enrollment in elementary grades stabilized between 2020-21 and 2021-22, it continues to decline in middle school grades. The enrollment losses in middle schools may reflect earlier enrollment losses in elementary grades. We show that the enrollment declines, although widespread, differ substantially across types of schools. Enrollment losses were most severe among urban elementary and middle schools.

Enrollment declines by locale and child poverty level in the district reveal the equity implications of these losses and show which types of schools are most likely to experience logistical and fiscal challenges after COVID-19. Our results also provide insights into how wide a range of policies and supports is needed to help different families and communities find schooling options that work for them. This study quantifies first-order questions in the post-pandemic era, such as how many children are in public schools and whether families have fled traditional public schools (TPS). More comprehensive assessments of those diverse challenges and their longer-term implications will emerge as additional data become available.

FIGURE 1

Evolution of the share of students in and out of public schools



Source: Common Core of Data, National Center for Education Statistics, Current Population Survey, U.S. Census Bureau, authors' calculations.



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Note: The remainder of the population of school-age children not displayed in this figure are enrolled in traditional brick-and-mortar public schools (84.2 percent in 2015–16 and 78.8 percent in 2021–22). For 2021–22, our dataset captures 81,409 brick-and-mortar traditional public schools (TPS), 6,988 brick-and-mortar charter schools, 1,011 virtual public schools, and 5,890 alternative brick-and-mortar public schools. Schools classified in the Common Core of Data as full, primarily, or exclusively virtual were identified as virtual.

Measuring the decline in student enrollment in public schools

School enrollment is driven by a multitude of factors such as schooling decisions of families, school quality, and demographic trajectories. Understanding the extent to which overall declines in public school enrollment are driven by a decline in the number of school-age children over time is crucial in attributing those declines to families' schooling decisions. We use information on annual estimates of school-age children in each school district from the Census Bureau. We combine these estimates with the Department of Education's census of school enrollment, the Common Core of Data (CCD), to show shifts in enrollment in each school year. We note that population estimates from Census may not align exactly with CCD enrollment data because the latter typically reflect head counts in early October.

Figure 1 shows the share of K-12 students enrolled in different types of schools between 2015–16 and 2021–22. The most dramatic shifts are an enrollment decline in traditional public schools (no color) and an increase in unaccounted students, who are potentially

attending private schools, being homeschooled, or out of school entirely (dark teal).

We find that the share of students attending TPS declined, while the share of students outside the public education sector increased. At the start of the pandemic, in 2019–20, roughly 84 percent of school-age children were enrolled in traditional public schools. This number dropped by 2 percentage points to roughly 81 percent in the 2020–2021 school year, and another 2 percentage points to 79 percent in the 2021–2022 school year. This decline is not only striking due to its uncharacteristic size relative to the previous three-year period, but also because of where it appears students are going after they leave TPS's. The data show that the share of K-12 students no longer in the public school system grew by almost 4 percentage points between the 2015–2016 school year and the 2021–2022 school year.

This suggests that a substantial number of students left the public school system in the 2020–22 school years. Most notable is that the decline in TPS enrollment and increase in out-of-system students seem to have persisted after the pandemic despite

easing COVID-19 restrictions and improvement in overall public health conditions.

At the same time, the changes in the share of K-12 students enrolled in virtual schools and charter schools are also notable. As expected, student enrollment in virtual schools spiked in 2020–21. In the 2015–16 school year only 0.5 percent of all K-12 students were enrolled in virtual public schools. However, the share of students in virtual schools more than doubled between 2015 and 2022, reaching 1.1 percent in 2021–22. This doubling is consistent with the pandemic-related transition towards online schooling. Recent studies suggest that customized curricula, increased parental involvement, and the ability to meet individual student needs may have contributed to the switch towards virtual schools even after the pandemic (Bearinger 2021, Norman et al. 2021). Charter schools also increased their enrollment counts during the period under study. In the 2015–16 school year, 4.6 percent of all K-12 students were enrolled in charter schools; and that number steadily increased to 5.8 percent in 2021–22. We find little change in the share of K-12 students enrolled in alternative public schools.

By grade level

We investigate whether enrollment declines differ in public schools of different grade levels. Understanding school enrollment trajectories by grade level provides insights into families' schooling decisions at different ages of children. Exploring the differential enrollment trends by grade level can also facilitate policy targeting at the school and community level as stakeholders navigate ways to support school systems.

Figures 2a and 2b investigate the declining enrollment of K-12 students in public schools by grade level. Figure 2a shows estimates of the number of students attending public schools in different grade levels or being out of the public school system, potentially attending private schools, homeschools or no school at all.

Figure 2b shows the evolution of student enrollment in the median public school in each grade span level. Elementary schools saw the greatest decrease in school enrollment for both 2020–21 and 2021–22 relative to 2019–20. The share of K-12 students attending elementary schools plummeted in 2020–21 relative to prior years, while it remained roughly at the same low level in 2021–22. This is reflected in median elementary school enrollment (see figure 2c), which declined from 441 students in 2019–20 to 411 students in 2020–21 (–6.8 percent) and 413 students in 2021–22 (–6.3 percent relative to 2019–20). Middle schools also exhibit a concerning change in enrollment patterns. Enrollment in the median public middle school decreased from 511 students in 2019–20 to 494 students in 2020–21 (–3.3 percent) and 484 students in 2021–22

(–5.3 percent). Whereas the decline in elementary school enrollment plateaus between the 2020–21 and 2021–22 school years, it persists for middle schools. High schools see limited change in median enrollment during the 2019–2022 period.

When looking at the number of schools over time, we find that the number of elementary and high schools dropped by less than 1 percent between 2019–20 and 2021–22. The number of middle schools even increased by roughly 1 percent over the same period. This suggests that the decrease in median school enrollment may not be driven by school consolidation but rather a decrease in the number of students in the public school system.

By locale and percent of children in poverty

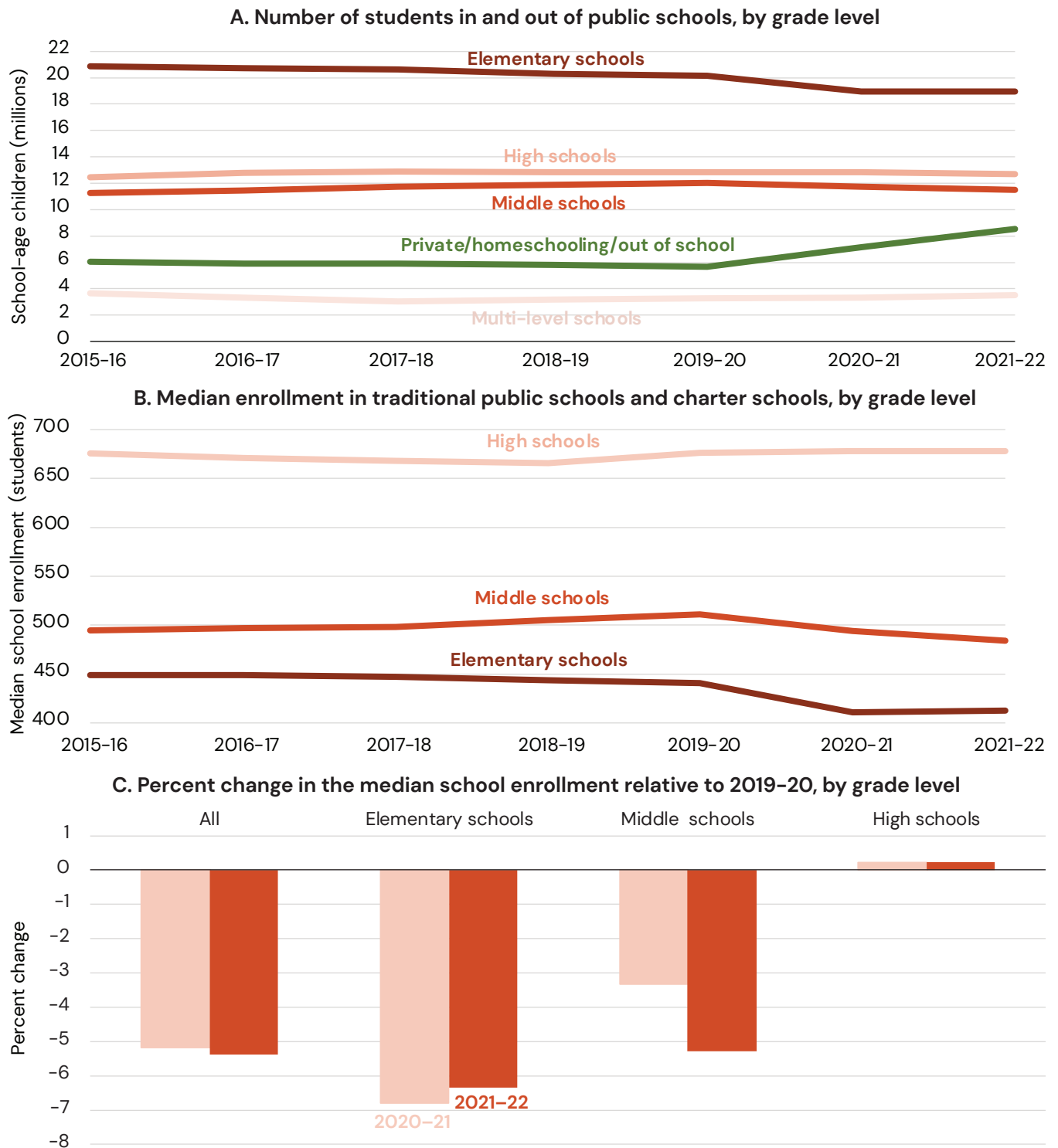
School quality and alternative education options may differ across different locales and by income level. We explore school enrollment losses by school locale and the share of children in poverty at the district level to get closer to the drivers of enrollment declines.

Figure 3 shows the percent change in enrollment in 2020–2021 and 2022–2022 relative to 2019–20, the first year of the COVID-19 pandemic, for the median brick-and-mortar traditional public or charter elementary school. We explore differential enrollment trajectories of public elementary schools by locale (Panel A) and the percentage of local children in poverty (Panel B). In 2020–21, the median elementary school experienced approximately a 7 percent decline in enrollment relative to 2019–2020. The median elementary school was able to recoup only a small fraction of those losses in the 2021–2022 school year, reporting a 6.4 percent decline in enrollment relative to the 2019–2020 level. When we break down these changes by locale, we find that only the median elementary school in urban locales enrollment continues to decline in 2021–22 relative to 2019–20. Specifically, in the 2020–2021 school year, the median urban elementary school experienced a 7.5 percent decline in enrollment relative to 2019–20. That decline in enrollment grew to 9 percent in 2021–2022 relative to 2019–20. The median elementary school in rural locales demonstrates the fastest path towards recovery, recovering three percentage points of loss in the 2021–2022 school year. The median elementary school in suburban and town locales exhibited modest recovery—less than 1.5 percentage points—in enrollment losses. These patterns may reflect different levels of school choice as well as different operational challenges for schools in different locales.

The median elementary school in a high-poverty district (i.e., with a child poverty rate of greater than 20 percent) experienced the largest decline in enrollment

FIGURE 2

Students in and out of public schools, by grade level



Source: Common Core of Data, National Center for Education Statistics, Current Population Survey, U.S. Census Bureau U.S. Census Bureau, authors' calculations.

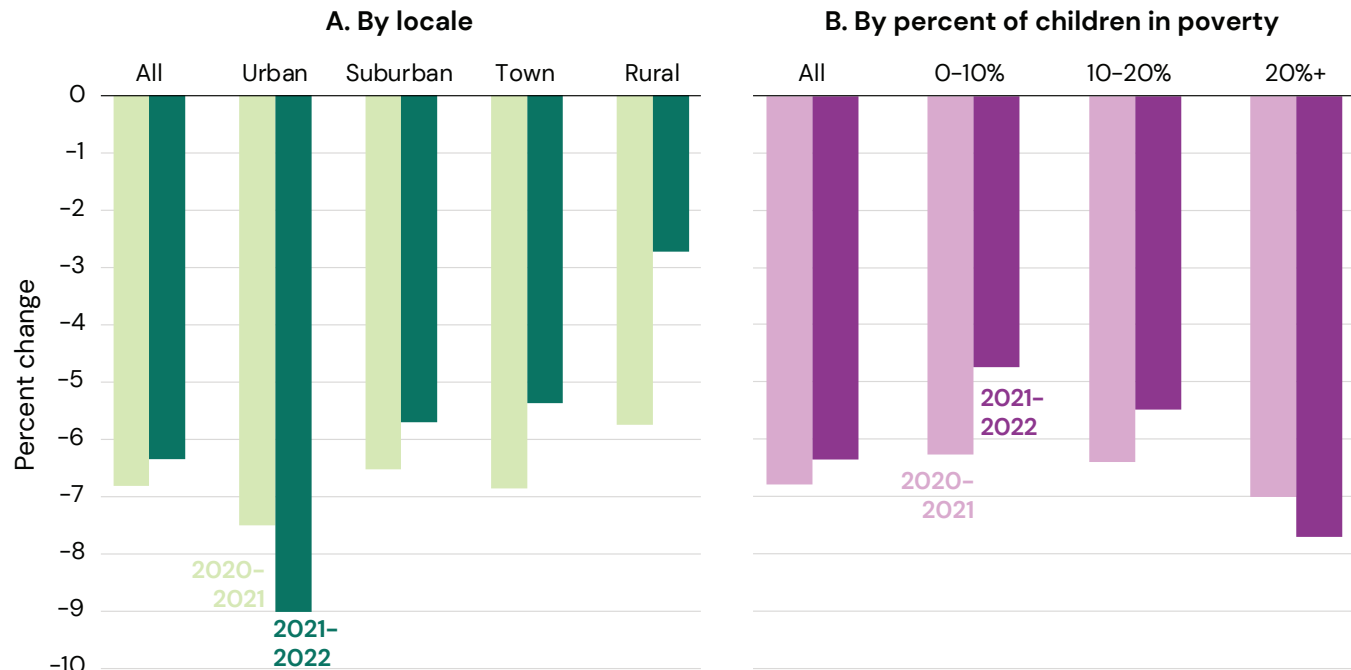
Note: For 2021-22, our dataset captures 47,045 elementary schools, 22,054 middle schools, and 13,612 high schools. Schools serving any grade span between K and 6 were identified as elementary. Schools serving any grade span between 7 and 8 were identified as middle schools. Schools serving any grade span between 9 and 12 were identified as high schools. Schools serving any grade span that covers elementary and high school grades or middle and school grades were identified as multi-grade schools. Multi-grade, alternative, and exclusively virtual schools were excluded.



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FIGURE 3

Percent change in enrollment for median traditional public or charter elementary school relative to 2019–2020



Source: Common Core of Data, National Center for Education Statistics, U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE), authors’ calculations.



Note: The zero line represents enrollment level in 2019–20. Each bar reflects the percent change in enrollment level from 2019–20. For 2021–22, our dataset captures 45,885 brick-and-mortar traditional public or charter elementary schools, of which 12,643 were classified as “Urban,” 16,652 as “Suburban,” 5,601 as “Town,” and 10,989 as “Rural.” Among the same 45,885 traditional public or charter elementary schools; 10,779 were in school districts where fewer than 10 percent of children were in poverty (5-year average between 2015–16 and 2019–20), 18,091 were in districts where 10 to 20 percent of children were in poverty, and 17,015 were in districts where more than 20 percent of children were in poverty.

between 2019–2020 and 2020–2021 compared with median elementary schools in districts with lower child poverty rates. In particular, the median elementary school in a high-poverty district saw a decline of 7 percent. In contrast, the median elementary school in a low-poverty district (less than 10 percent child poverty rate) or in a district with child poverty rate in the middle region (i.e., 10–20 percent child poverty rate) saw a decline in enrollment of approximately 6 percent. While enrollment recovered somewhat in 2021–22 in the median school in districts in the low and middle region of child poverty rate, enrollment continued to decline in the median school in high-poverty districts in 2021–22. In particular, the median elementary school in a high-poverty district posted losses in enrollment of approximately $\frac{3}{4}$ percentage point in 2021–2022 in addition to the losses of 2020–21. The median elementary school in a low-poverty district or in a district with child poverty in the middle region recovered part of their enrollment losses in 2021–22.

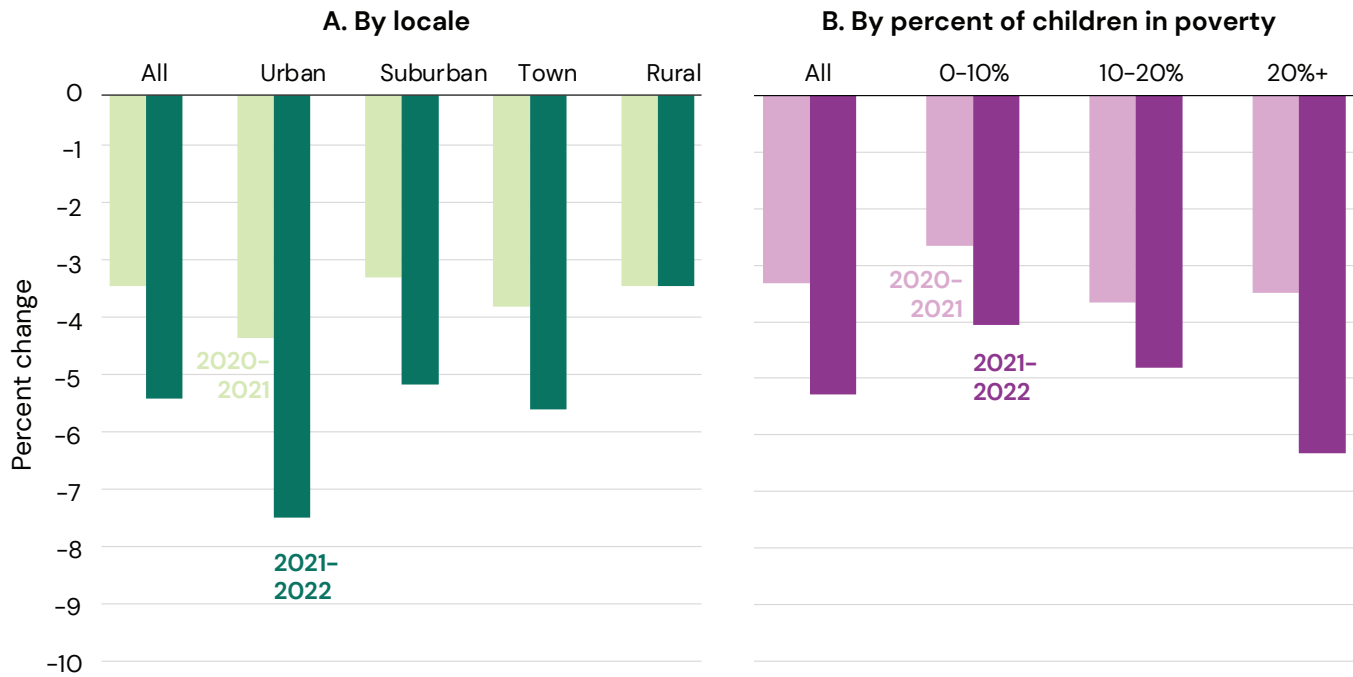
Figure 4 shows the percent change in enrollment in 2020–2021 and 2022–2022 relative to 2019–20, the

first year of the COVID-19 pandemic, for the median traditional public or charter middle school. We explore differential enrollment trajectories of public middle schools by locale (Panel A) and the percentage of local children in poverty (Panel B). In 2020–21, the median middle school posted a 3.3 percent decline in enrollment relative to 2019–2020. Enrollment in the median middle school continued declining in the 2021–2022 school year, reaching a 5.3 percent decline in enrollment relative to the 2019–2020 level.

When we break down these changes by locale, we find middle school enrollment declining in urban, suburban, and town locales with middle schools in urban locales experiencing the most severe losses. To some extent, this might reflect family migration away from urban areas (Whitaker 2021). The enrollment declines continue in 2021–22 with middle schools in urban locales experiencing the largest enrollment declines. Specifically, in the 2020–2021 school year, the median urban elementary school experienced a 4 percent decline in enrollment relative to 2019–20. That decline in enrollment grew to 7.4 percent in 2021–2022 relative to 2019–20.

FIGURE 4

Percent change in enrollment for median traditional public or charter middle school relative to 2019–2020



Source: Common Core of Data, National Center for Education Statistics, U.S. Census Bureau Small Area Income and Poverty Estimates (SAIPE), authors’ calculations.



Note: The zero line represents enrollment level in 2019–20. Each bar reflects the percent change in enrollment level from 2019–20. For 2021–22, our dataset captures 22,042 brick-and-mortar traditional public or charter middle schools, of which 6,405 were classified as “Urban,” 6,463 as “Suburban,” 2,532 as “Town,” and 6,642 as “Rural.” Among the same 22,042 traditional public or charter middle schools; 3,998 were in school districts where fewer than 10 percent of children were in poverty (5-year average between 2015–16 and 2019–20), 8,065 were in districts where 10 to 20 percent of children were in poverty, and 9,979 were in districts where more than 20 percent of children were in poverty.

The median middle school in suburban and town locales exhibited continued enrollment losses in 2021–22 relative to 2020–21. Only in middle schools in rural locales do enrollment losses seem to have stabilized in 2021–22 at around 3 percent below the enrollment levels of 2019–20. These patterns may reflect different levels of schooling options as well as different operational challenges for schools in different locales. Specifically, families in urban locales may have access to more schooling or learning options outside of the traditional public school system.

The median middle school in a high-poverty district (i.e., 20 percent or higher child poverty rate) experienced the largest decline in enrollment between 2019–2020 and 2021–2022 compared with median middle schools in districts with lower child poverty rates. In contrast, the median middle school in a low-poverty district (i.e., with a child poverty rate of less than 10 percent) or in a district with child poverty in the middle region (10–20 percent child poverty rate)

saw a decline in enrollment of approximately 4 and 5 percent, respectively, between 2019–20 and 2021–22.

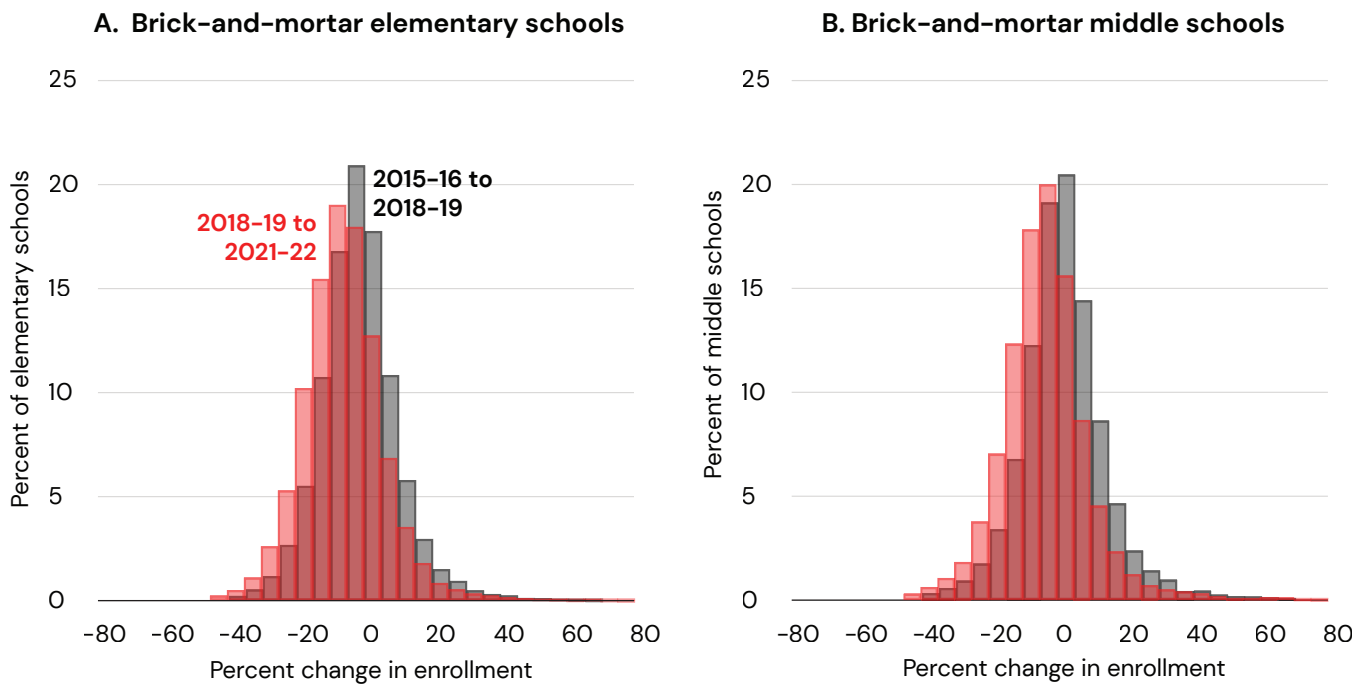
Across district child poverty levels, enrollment in median middle schools continued declining in 2021–22. The median middle school in a low-poverty district or in a district with child poverty in the middle region lost a little over 1 percentage point in 2021–22 in addition to the 2020–21 losses. In 2021–22, the median middle school in a high-poverty district lost almost 3 additional percentage points, reaching an enrollment level that was 6 percent lower relative to 2019–20.

Variation in enrollment declines across schools

Figure 5 plots the distribution of the percent change in enrollment of brick-and-mortar public schools (i.e., traditional public and charter schools) over two three-year windows. The first window is between 2015–16 and 2018–19, and the second between 2018–19 and

FIGURE 5

Distribution of percent change in enrollment over three years, 2015–16 to 2018–19 and 2018–19 to 2021–22, brick-and-mortar schools



Source: Common Core of Data, National Center for Education Statistics, authors' calculations.

Note: For 2021–22, our dataset captures 45,885 traditional public or charter brick-and-mortar elementary schools and 22,042 traditional public or charter brick-and-mortar middle schools. The median brick-and-mortar elementary school had 449 and 444 students in 2015–16 and 2018–19, respectively. The median brick-and-mortar middle school had 495 and 505 students in 2015–16 and 2018–19, respectively. One percent of the overall school population on either side of the distribution was excluded as outliers.



2021–22. Panels A and B correspond to elementary and middle schools, respectively. Even absent shocks to enrollment, some schools experience large fluctuations in enrollment potentially due to year-to-year variation in cohort size or shifts in where people live. The distribution of school-level percent changes in enrollment between 2015–16 and 2018–19 serves as a benchmark showing what the distribution of enrollment changes typically looks like. We find that the entire distribution of percent changes in enrollment between 2018–19 and 2021–22 is shifted to the left relative to the distribution of percent changes in enrollment between 2015–16 and 2018–19.

Our results suggest that the enrollment declines we observe in the post-COVID-19 era are dissimilar to the three-year period prior to the pandemic. What is more, these declines are not found only in limited pockets of schools and communities but are rather widespread, reflecting a substantial distributional shift.

Between 2015–16 and 2018–19, approximately 5 percent of elementary schools and 5 percent of middle schools experienced more than a 20 percent decline in student enrollment. Between 2018–19 and 2021–22, the number of elementary schools that experienced

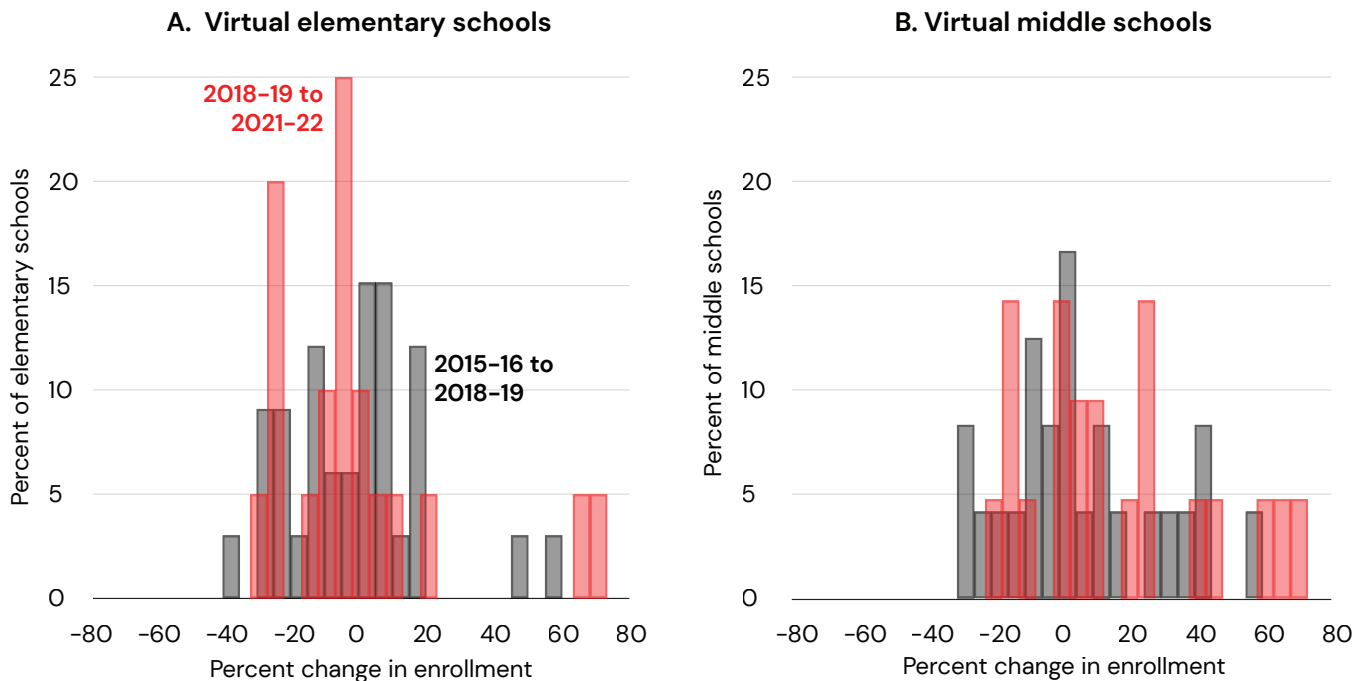
a similar decline increased to roughly 12 percent. The number of middle schools experiencing this decline in enrollment increased to approximately 9 percent.

Schools in urban locales or in districts with high child poverty rates (i.e., 20 percent or higher child poverty rate) are more likely to experience enrollment declines greater than 20 percent between 2018–19 and 2021–22. The enrollment losses are likely to exacerbate logistical, operational, and fiscal challenges for these schools.

Figure 6 plots the distribution of school-level percent changes in enrollment for virtual schools over the course of two three-year periods: from 2015–16 to 2018–19 and from 2018–19 to 2021–22. Panels A and B correspond to elementary and middle virtual public schools, respectively. Both elementary and middle virtual schools are more likely to experience larger percent increases in the enrollment between 2018–19 and 2021–22 than between 2015–16 and 2018–19. It has been established that virtual schools drastically expanded their enrollment during the COVID-19 pandemic (McElrath 2020). We find that this increase is largely sustained through 2021–22.

FIGURE 6

Distribution of percent change in enrollment over three years, 2015–16 to 2018–19 and 2018–19 to 2021–22, virtual schools



Source: Common Core of Data, National Center for Education Statistics, authors' calculations.

Note: For 2021–22, our dataset captures 120 traditional public or charter virtual elementary schools and 149 traditional public or charter virtual middle schools. The median virtual elementary school had 277 and 297 students in 2015–16 and 2018–19, respectively. The median virtual middle school had 231 and 186 students in 2015–16 and 2018–19, respectively. Schools classified in the Common Core of Data as full, primarily, or exclusively virtual were identified as virtual. The Common Core of Data classified schools that were normally brick-and-mortar schools but operated remotely during the pandemic as supplemental virtual. One percent of the overall school population on either side of the distribution was excluded as outliers.



Conclusion

The pandemic has had a powerful impact on schools across the nation. Traditional public schools posted substantial enrollment declines. We find that these enrollment losses were most severe among urban elementary and middle schools. In contrast, enrollment in non-traditional public school options, such as charter or virtual schools, increased.

At the same time, overall patterns mask substantial heterogeneity. Our results reveal the widely varying levels of enrollment declines across schools. We estimate that the percentage of elementary and middle schools experiencing a more than 20 percent decline in student enrollment increased from 5 percent between 2015–16 and 2018–19 to 11 and 9 percent between 2018–19 and 2021–22 for elementary and middle schools, respectively. Schools experiencing unusually severe enrollment declines relative to historical benchmarks may require attention if these declines persist.

These dramatic shifts are important for at least two reasons. First, they indicate that there are a lot of

students missing from the public school system. Recent data show more than a third of the public school enrollment losses cannot be explained by corresponding gains in private school and homeschool enrollment or by demographic change (Dee 2023). Dropping out of school and chronic truancy as potential contributors to this phenomenon are bound to have developmental, academic, and economic consequences for the affected children.

Second, because state and federal financial support to public schools is typically proportional to student counts while costs are more fixed, enrollment declines may threaten some schools' financial and operational viability. Schools with diminishing enrollment may have to lay off teachers or shut down completely. Han et al. (2017) find that enrollment dwindled during the last few years of operation of schools that closed between 2006–7 and 2012–13. School closures may disrupt students' learning experiences and cause psychological stress to families (Han et al. 2017, Tieken and Auldridge-Reveles 2019). Even before school closure though, weak student enrollment may require

instructional and operational adjustments as schools might have personnel redundancies and limited fiscal room after teachers are paid.

The collective impact of these trajectories on students, schools, and communities is of deep concern. The dwindling student counts in some schools signal opportunities to strengthen community engagement and school supports. This study documents the wide variation in enrollment declines across schools and their distributional shift relative to a prior benchmark. To the extent that the composition of factors driving enrollment declines differ across communities, these declines cannot be addressed by one-size-fits-all policies. Our results can be used as evidence in discussing and designing effective policy initiatives and avenues for further research. Important questions, including where the missing students are and whether their learning experiences match the learning experiences of students in the public school sector, remain open.

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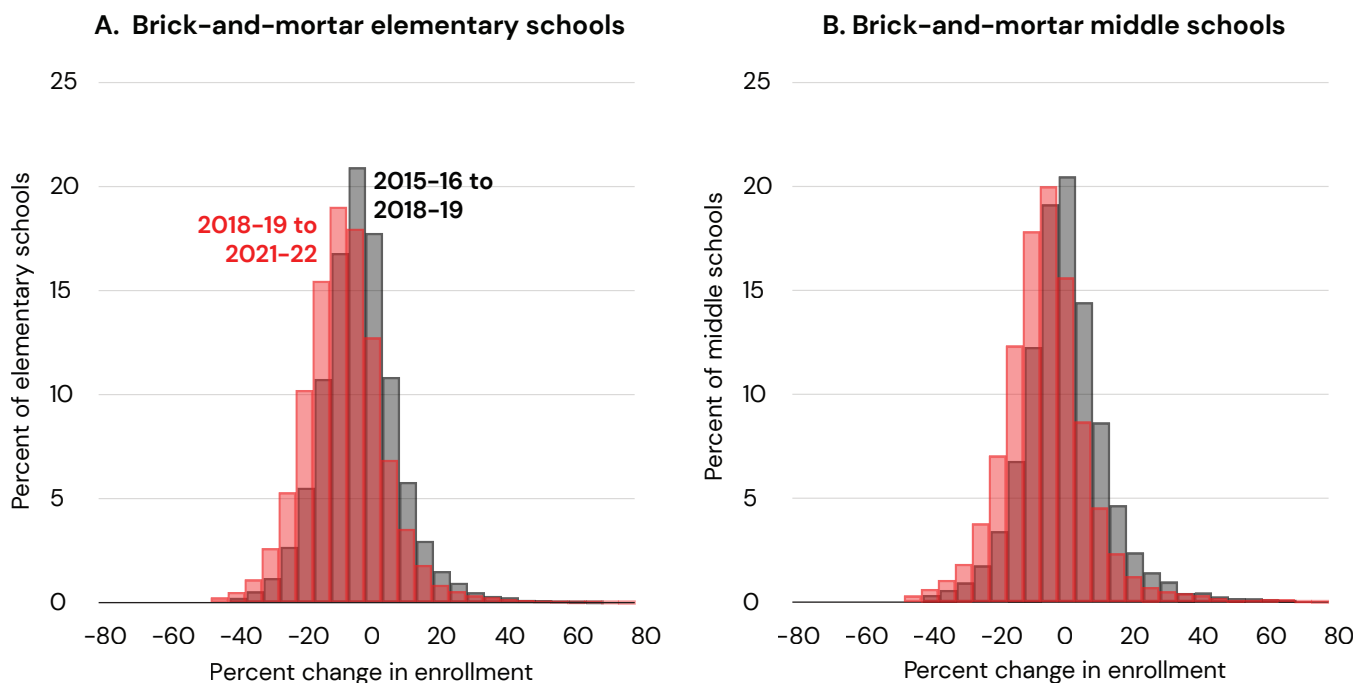
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Director

In this paper, we investigate how student enrollment in public schools is different after the COVID-19 pandemic. Over the pandemic—between the 2018-19 and 2021-22 school years—about 12 percent of public elementary schools and 9 percent of middle schools experienced more than a 20 percent decline. This is a significant change from before the pandemic, when about 5 percent of elementary and middle schools saw a 20 percent enrollment decline between 2015-16 and 2018-19. Enrollment declines are widespread but differ substantially across types of schools, locales, and socioeconomic status. The analysis finds that urban districts and high-poverty districts saw larger declines in school enrollment.

Distribution of Percent Change in Enrollment Over Three Years, 2015-16 to 2018-19 and 2018-19 to 2021-22, Brick-and-mortar Schools



Source: Common Core of Data, National Center for Education Statistics, Authors' Calculations.

Note: For 2021-22, our dataset captures 45,885 traditional public or charter brick-and-mortar elementary schools and 22,042 traditional public or charter brick-and-mortar middle schools. The median brick-and-mortar elementary school had 449 and 444 students in 2015-16 and 2018-19, respectively. The median brick-and-mortar middle school had 495 and 505 students in 2015-16 and 2018-19, respectively. One percent of the overall school population on either side of the distribution was excluded as outliers.



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