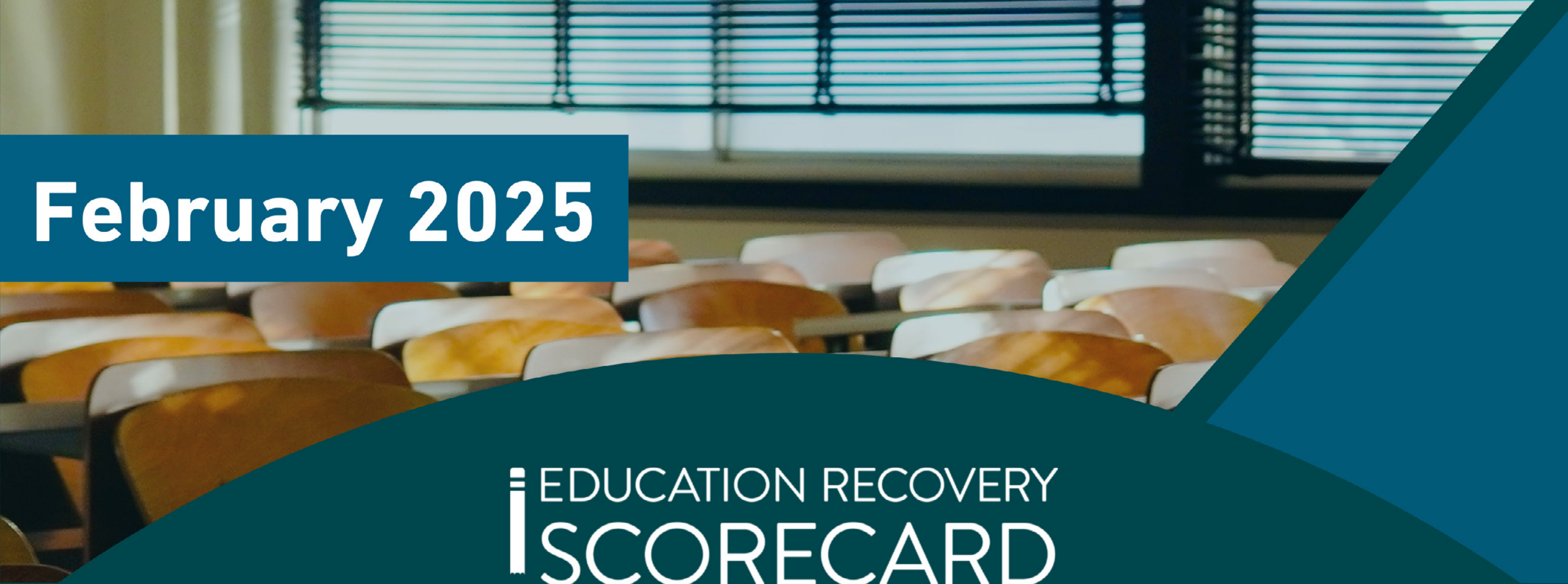

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EDUCATION RECOVERY SCORECARD

# Pivoting from Pandemic Recovery to Long-Term Reform: A District-Level Analysis


Daniel C. Dewey, *Harvard University*
Erin Fahle, *Stanford University*
Thomas J. Kane, *Harvard University*
Sean F. Reardon, *Stanford University*
Douglas O. Staiger, *Dartmouth College*



Center for Education Policy Research
HARVARD UNIVERSITY

The Educational Opportunity Project at Stanford University

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# Introduction

In this third iteration of the Education Recovery Scorecard, we provide a high resolution picture of academic recovery as of Spring 2024 for individual school districts across 43 states. To do so, we combine the recently released NAEP results with state test scores for roughly 35 million students in 2019, 2022, and 2024 to look more closely at district-level changes in achievement for communities across the country. In addition to comparing trends in recovery by district characteristics and by subgroup, we update our initial estimates of the impact of the federal pandemic relief aid (which we released last summer). We also describe the rise in chronic absenteeism and provide initial evidence of the effect of absenteeism in slowing the recovery.

Here's a summary of what we found:

1. **As of Spring 2024, the average U.S. student remained nearly half a grade level behind pre-pandemic achievement in both math and reading.** Students are now further behind in reading than they were in 2022.

2. **Although no state improved in both math and reading on the NAEP relative to 2019, a number of districts are scoring above 2019 levels in both subjects.** 17 percent of students in grades 3 to 8 are in districts with mean math achievement above 2019, 11 percent are in districts that have recovered in reading, and 6 percent are in districts which have recovered in both subjects.

3. **District-level data reveal pockets of success and continued struggle in most states.** For instance, the NAEP reported that only one state, Alabama, had average achievement above 2019 levels in 4th grade math. Yet, even in Alabama, about one third of students (38 percent) are enrolled in districts where math achievement remains below 2019 levels. A number of districts in Alabama, such as Montgomery, remain 40 percent or more of a grade level behind their own achievement in 2019. Meanwhile, some high poverty districts such as Birmingham have nearly recovered in both math and reading.

4. **The highest income decile districts are nearly 4 times more likely to have recovered in both math and reading than the lowest income decile districts:** 14.1 percent vs. 3.9 percent. Still, we see examples of higher poverty districts recovering in reading and math—such as Compton, California; Ector County, Texas (Odessa); Maury County, Tennessee; Union City, New Jersey; Rapides Parish, Louisiana; Bartow County, Georgia; and Johnston County, North Carolina. We provide a list of districts nationally which made exemplary progress.

5. **Socioeconomic and racial/ethnic disparities in math achievement have grown since the start of the pandemic both within districts and across districts.** The disparity in math scores between students in affluent and low-income districts has grown by 11 percent since the start of the pandemic, and the disparity in scores between students in predominantly non-minority and predominantly minority districts has grown by 15 percent. Moreover, the average within-district racial/ethnic disparities in math scores have grown by 7-12 percent since 2019. The disparities in reading scores have grown as well, but by less.

**6. The federal relief dollars aided the recovery in higher poverty districts (where achievement in both math and reading was boosted by 10 percent of a grade equivalent.)** Each dollar of federal relief improved student achievement by about as much as a general revenue increase. But it mattered how districts spent the money. In California, which maintained more detailed spending data, we find that student achievement grew more in districts that spent more on academic interventions, such as tutoring or summer school.

**7. A widespread rise in absenteeism is slowing the recovery, especially in high poverty districts.** Most districts—high- and low-income—have seen a rise in student absenteeism, with larger increases in low-income districts. Our data show that districts with high post-pandemic absenteeism did experience slower recovery, but the full impact of the rise in absenteeism is not yet clear.

# Recommendations

The federal pandemic relief is gone, yet many U.S. children remain behind where they should be. It is time to pivot from short-term recovery to longer-term evidence-based reform. We recommend focusing on four priorities in the next few years:

**1. States and districts should double down on academic catch-up efforts previously funded by federal relief.** In the absence of federal pandemic relief, states will need to redirect their own dollars and the federal Title I dollars they administer for interventions which have been shown effective, such as tutoring and summer learning.

**2. Mayors, employers, and other community leaders should join schools in tackling student absenteeism.** Rather than place the responsibility for academic recovery entirely on school leaders' shoulders, reducing absenteeism is one burden that others can help schools carry. Such help could include public information campaigns, extracurricular activities to draw students to school, and solving transportation problems.

**3. Teachers must inform parents when their child is not at grade level.** Since early in the recovery, the overwhelming majority of parents have been under the false impression that their children were unaffected. Parental perceptions are central to many of the challenges districts face. If they are to help lower absenteeism, sign up for summer learning, and increase reading at home, parents need to know when their child is behind. And teachers are often the most credible source to tell them.

**4. We must learn what's working (and what is not) in the recent reforms.** In the last few years, 40 states have implemented "science of reading" reforms. But each state has taken a different approach, placing different emphasis on curriculum, teacher training, coaching, and retaining students who do not demonstrate reading proficiency. In addition, many have implemented cell phone bans. Such policy innovation can be a strength of our federal system—but only if we learn which of those efforts are working (and which are not) and spread the most effective solutions.

Below, we describe the data we use, the trends in achievement we observe, as well as the degree to which recovery between 2022 and 2024 was related to federal pandemic relief spending and chronic absenteeism.

# Data

### Achievement Data and Measures

We use achievement data from the Stanford Education Data Archive Version 2024 (Reardon et al., 2025). SEDA provides test score estimates for schools and districts from 2009 through 2024 in math and reading language arts (we refer to this as reading, throughout) for grades 3 to 8 for all students and for racial and economic subgroups. We primarily use data from 2019, 2022, 2024 in this report. The test score estimates are constructed from state accountability test data. Because state tests differ (and differ across time and grade within states), SEDA links each state test score scale to the NAEP scale, so that they are comparable across states and time. In order to make the NAEP-linked scores more interpretable, we rescale them in two ways: first, we rescale them to correspond to grade level equivalents, using the 2019 NAEP as a referent; in this "grade-standardized" scale, one unit is approximately one grade level.[1]

This scale is broadly interpretable by non-technical audiences. Second, we standardize the scores using the grade-specific NAEP 2019 national test score distributions, so that scores are expressed in standard deviations relative to the 2019 national average. For additional details on the SEDA Version 2024 construction methodology, see the technical documentation (Fahle et al., 2025).

From 2009-2019, the SEDA data include all districts in all states. In those years, the raw data were obtained from the EDFacts data system, which has collected test score data from all schools, districts, and states in the U.S. annually since 2009. In 2020 and 2021, states were not required to test all students in those years (while some students did take their state assessments in 2021, those who did are not representative of the whole student population, so we do not use data from 2021, even when some is available).

From 2022-2024, we use data collected by Zelma from state departments of education (both from public websites and additional data requests). Not all states provided the data we needed. As described in Appendix C, we did not have district-level results in 2024 for Maine, Montana, or Vermont. New Mexico only reports the share of students proficient or not (while our methodology requires the share of students in at least three proficiency categories.) In several other states, student participation rates were too low for the data to be considered representative in one or more years (Alaska, Colorado, New York and Oregon). Although the District of Columbia as a whole (the district schools and the charters) had sufficient participation to be included in our statewide reports, the District of Columbia Public School District did not have sufficient participation in math in 2019 to be included in this analysis. In Virginia, too many students were taking math tests from outside their current grade level to be included in that subject, although we included them in the reading analysis. West Virginia was missing reading data in 2019 and Arkansas reading data was not comparably reported in EDFacts and Zelma. This leaves us with 43 states

1 Roughly speaking, we define one "grade level" as one-fourth the difference in average 4th and 8th grade NAEP scores in 2019. See Fahle et al., 2025 for details.

for which we have useable data in each year, 2019, 2022, and 2024, in at least one subject. (Arkansas and West Virginia are missing reading data in at least one year; Virginia and the District of Columbia are missing math data in at least one year.) We have 41 states with district-level math data; and 41 states for which we have district-level reading data. These 43 states enrolled 86 percent of grade 3-8 public school students in the U.S. in 2024.

Test score results are suppressed by state departments of education in public reporting in some cases (typically if there are fewer than ten students' scores included in a district-year-grade-subject-subgroup cell, though the suppression rules vary by state). As a result, we do not have test score data for every district in each of the 43 states; small districts are often missing. The total set of districts for which we have useable test score data in 2024 is 11,327 (out of roughly 14,000 school districts in the U.S.). Of these, 9,365 have data in each of 2019, 2022, and 2024; and of these, 8,719 are geographic districts (rather than charter districts or other administrative districts). These 8,719 districts constitute our analytic sample in this paper. Together, they enroll 89 percent of students in the 43 states in our sample, and 79 percent of all grade 3-8 students in the U.S. in 2024. For most of these districts, we have data each year from 2009-2019 and 2022-2024 (see Table 1).

## TABLE 1: NUMBER OF DISTRICTS WITH DISTRICT-LEVEL DATA, BY SUBGROUP

| | All | White | Black | Hispanic | Asian | Female | Male | ECD | Non-ECD | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 2019 | 8,719 | 6,932 | 1,614 | 2,666 | 755 | 5,868 | 5,654 | 5,584 | 5,514 | 43,306 |
| 2022 | 8,719 | 6,932 | 1,614 | 2,666 | 755 | 5,868 | 5,654 | 5,584 | 5,514 | 43,306 |
| 2023 | 8,716 | 6,925 | 1,612 | 2,665 | 755 | 5,418 | 5,220 | 5,572 | 5,498 | 42,381 |
| 2024 | 8,719 | 6,932 | 1,614 | 2,666 | 755 | 5,868 | 5,654 | 5,584 | 5,514 | 43,306 |
| Total | 34,873 | 27,721 | 6,454 | 10,663 | 3,020 | 23,022 | 22,182 | 22,324 | 22,040 | 172,299 |

**Note**: ECD = Economically Disadvantaged

Most, but not all, states report test scores for all students in a district as well as by racial/ethnic, economic, and gender subgroups, as required by federal law.[2] However, data on subgroups is much more often suppressed due to small numbers of tested students per district-grade-year-subject (and in some cases a school does not have any members of a subgroup). As a result of these factors, we have subgroup data for only a subset of the districts in our sample, though these districts contain the majority of members of each subgroup in the population, given that missingness is primarily in districts with small numbers of the subgroup (Table 1).

Table 2 reports descriptive statistics for all districts in the US, for all districts in the 43 states we include, as well as for two analytic samples. The first analytic sample we use for all test score trend analyses; it includes the 8,719 geographic districts for which we have test score data in 2019, 2022, and 2024. The second analytic sample we use for our spending effect analyses; it includes slightly fewer districts (8,339), due to missing data on spending or other covariates. The analytic samples closely match the national population of districts in all measured covariates.

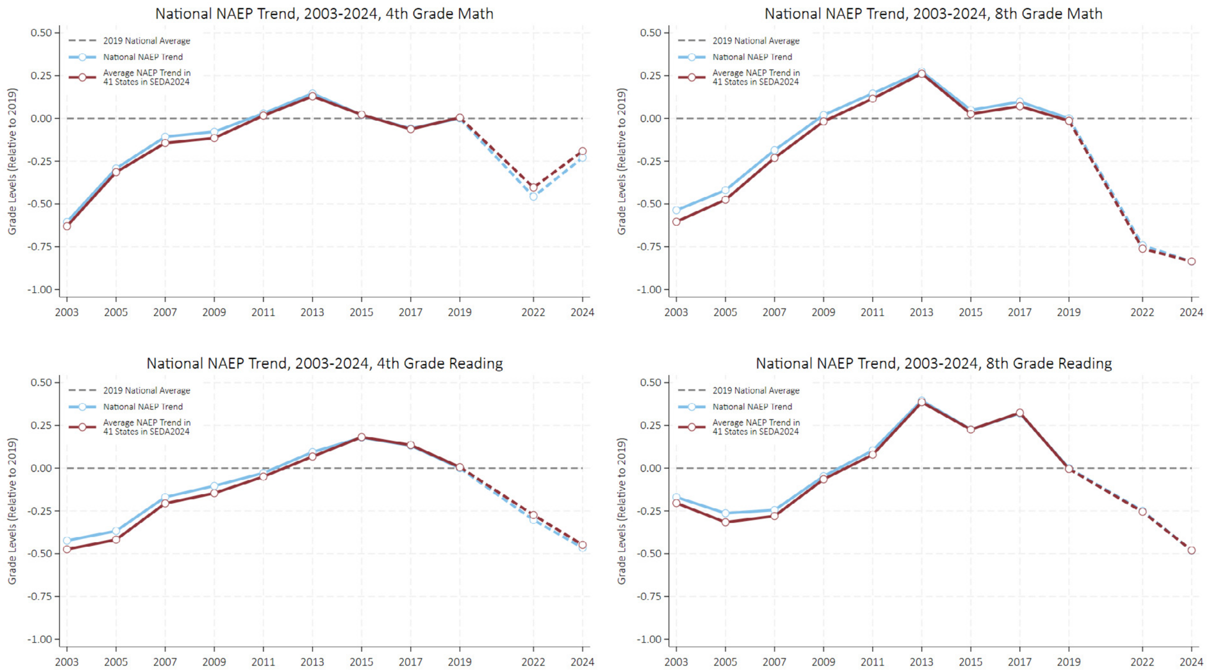
2 Among our 43 states, four do not report data by race/ethnicity (AR, HI, MS, UT); eight do not report data by economic disadvantage status (AR, DC, HI, IL, MS, NH, UT, and WV); and eight do not report data by gender (AR, DC, HI, KS, MO, MS, UT, and WV).

### TABLE 2. NATIONAL AND SAMPLE DESCRIPTIVE STATISTICS

| | Nationally | SEDA 43 States | In Analytic Sample | In Spending Analyses |
|---|---|---|---|---|
| **Achievement Outcomes:** | | | | |
| Change in Math 2019 to 2022 | -0.564 | -0.536 | -0.525 | -0.526 |
| Change in Reading 2019 to 2022 | -0.283 | -0.269 | -0.288 | -0.288 |
| Change in Math 2022 to 2024 | 0.106 | 0.105 | 0.089 | 0.089 |
| Change in Reading 2022 to 2024 | -0.189 | -0.193 | -0.202 | -0.203 |
| **Chronic Absenteeism:** | | | | |
| Chronic Absenteeism Rate (2019) | 15.0% | 14.5% | 14.0% | 14.0% |
| Chronic Absenteeism Rate (2022) | 28.6% | 27.7% | 27.2% | 27.1% |
| Chronic Absenteeism Rate (2023) | 25.7% | 24.7% | 24.4% | 24.3% |
| **Demographics:** | | | | |
| % Black (2024) | 14.9% | 15.4% | 15.0% | 15.1% |
| % Hispanic (2024) | 29.4% | 29.4% | 29.2% | 29.1% |
| % Minority (2024) | 56.3% | 56.6% | 56.0% | 55.9% |
| % Free/Reduced Price Lunch (2024) | 55.2% | 55.3% | 55.0% | 55.0% |
| Average K-12 Enrollment (2024) | 2,746 | 2,864 | 4,538 | 4,657 |
| Average 3-8 Enrollment (2024) | 1,211 | 1,264 | 2,047 | 2,100 |
| **Percent Remote/Hybrid:** | | | | |
| % of 2020-21 SY in Remote Instruction | 24.6% | 24.7% | 24.3% | 24.0% |
| % of 2020-21 SY in Hybrid Instruction | 38.5% | 37.2% | 37.3% | 37.3% |
| **ESSER Allocation:** | | | | |
| ESSER I Dollars Allocated Per Student | $262 | $256 | $226 | $229 |
| ESSER II Dollars Allocated Per Student | $1,078 | $1,057 | $934 | $949 |
| ESSER III Dollars Allocated Per Student | $2,422 | $2,375 | $2,024 | $2,054 |
| Total ESSER Dollars Allocated Per Student | $3,762 | $3,688 | $3,184 | $3,233 |
| Number of Districts | 17,937 | 15,546 | 8,719 | 8,339 |
| Number of Students Grades K-12 | 49,189,940 | 44,440,043 | 39,563,005 | 38,833,382 |
| Number of Students Grades 3-8 | 21,694,697 | 19,606,490 | 17,843,788 | 17,511,822 |

Figure 1 compares national NAEP trends to the average NAEP trend among the states in our sample. Over a 21-year period (2003-2024), the average trend in scores in the states in our sample matches the national trends very closely in each grade and subject, suggesting that our results based on these 43 states will generalize to the full national population.

## FIGURE 1: TREND IN NAEP SCORES: NATIONAL SAMPLE VS. ERS SAMPLE, BY GRADE AND SUBJECT




For the remainder of our analyses, we use data on state assessments, averaged over grades 3-8, from the 8,719 districts in our analytic sample.[3]

### Student Absences

To measure student absences, we rely on two sources: First, Nat Malkus at the American Enterprise Institute (AEI) provided data on state-reported district chronic absence rates between 2017 and 2023. While 40 states reported absence rates at some point during the period, only 18 states reported district chronic absence rates every year between 2017 and 2023. For 22 states, Malkus assembled chronic absenteeism rates through Spring 2024, the latest school year.

In order to ensure a consistent sample of states when reporting the national trend in chronic absenteeism from 2017 to 2023, we imputed chronic absence rates in the years when a state's absenteeism rates were missing, using the count of chronically absent students and total district enrollment reported to the U.S. Department of Education's EdFacts data collection.[4]

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3 In some cases, data are missing for a district-year-subject in one or more grades. This is most common in math in grades 7 and 8 in states that allow students to either take a common end-of-grade math test or a course-specific end-of-course test if they are in an advanced or higher-grade's math class. In these cases, we do not use the math data, since we have no way of making the two types of tests comparable or of dealing with the non-random selection of students into the two different tests. To deal with the fact that data are missing in some grades, we regress grade-specific average scores on a linear grade term for each district-year-subject-subgroup, centering grade at 5.5 (the middle of grades 3-8). We use GLS, weighting by the inverse of the squared standard error of each grade's average scores. We then use the estimated intercept of this model as our estimate of the average grade 3-8 test scores in the district.

4 Under federal law, states and districts are required to participate in EdFacts, so the data are largely complete. Districts are instructed to report the number of students enrolled at least 10 days in a given school, who were absent

For our analyses of the effects of absenteeism on recovery between 2022 and 2024, we calculate average chronic absence rates over the period 2022 to 2024 using the AEI data. We relied on the chronic absence rates from AEI (and not the imputations from EdFacts) because, unlike the EdFacts data, these are used in school accountability systems in many states and thus are subjected to greater scrutiny.

The prior literature on the impact of absences on student achievement relies not on the share of students chronically absent, but the average absence rate or the average number of days students were absent. Using data from two states, Massachusetts and Florida, which report both chronic absence rate and average absence rate by district, we find a strikingly consistent linear relationship between the two measures across those two states. The same relationship holds both before and after the pandemic. (See Appendix A for details.) Thus, we use the chronic absence rates to estimate an average absence rate for each district. Each 10-point increase in chronic absence corresponds to a 1.8-point increase in average percent of days absent, or a 3.2-day increase in average days absent (assuming a 180-day school year).

### ESSER Spending

The first package of federal pandemic relief for schools (ESSER I, $13.2 billion) had to be obligated by districts by the end of September 2022. Because we are investigating achievement gains between Spring 2022 and Spring 2024, we focus on the second two packages, ESSER II ($54 billion) and the American Rescue Plan, or ESSER III ($122 billion). We use the total district allocation under ESSER II/III as a proxy for the increase in spending in the district during the 2022-23 and 2023-24 school years. The proxy is not perfect for several reasons: some of the ESSER II dollars may have been spent before Spring 2022; and some of the ESSER III dollars were spent between Spring 2024 and the spending deadline of September 30, 2024. As discussed below, a third reason is that the federal dollars may have crowded out some spending out of local funding, although state funding was subject to a maintenance of effort requirement under federal law.

In California, districts reported expenditures separately for academic recovery and other uses, broken down quarterly. We use these detailed data in a supplementary analysis of California districts.

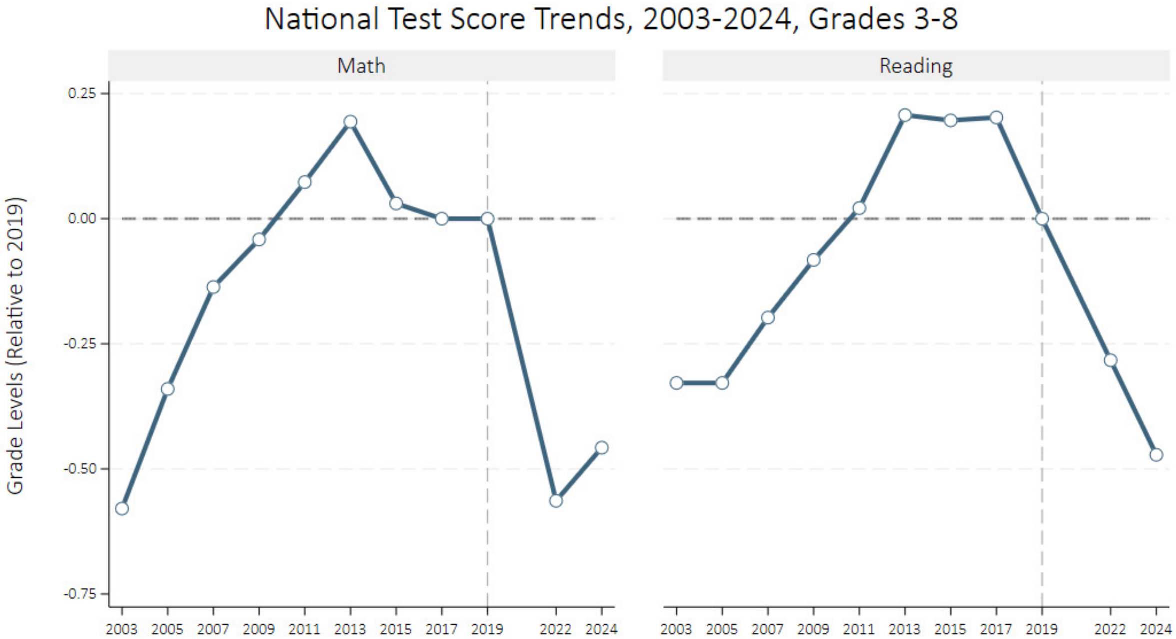
### Trends in Achievement

Figure 2 shows that, on average, test scores in both math and reading are roughly half a grade level lower (0.46 grade levels lower in math; 0.47 lower in reading) in 2024 than in 2019. In reading, the decline since 2019 appears to be the continuation of a trend that began prior to the pandemic: reading scores are down roughly two thirds of a grade level since their pre-pandemic peaks in 2013-2017. And while math scores have rebounded slightly since their low in 2022, the recovery has been modest.[5]

for 10 percent or more of those days. If a student attended more than one school in a district in the same year, and was chronically absent in multiple schools, they would be counted multiple times when summed to the district level. To estimate the percentage of students chronically absent, we divided the total number of students chronically absent (which could include double-counts at the district level) by the total enrollment in grades K-12 reported by the district on October 1. Separately by state and by pre-pandemic and post-pandemic period, we regressed each districts' chronic absenteeism rate reported by Malkus against the ratio inferred from EdFacts. We used those regressions to impute a districts' chronic absence rate when it was missing.

5 In our 2023 report, we estimated—based on state test scores in 29 states, but without a 2023 NAEP assessment

## FIGURE 2: TREND IN MEAN MATH AND READING, GRADES 3-8




### Variation Among Districts in Post-Pandemic Trends

In prior research, we found that scores declined more from 2019-2022 in higher poverty districts, and that from 2022-2023, the recovery was weakest among middle income districts and highest among low- and high-poverty districts. Here we investigate these patterns over the 2019-2024 period.

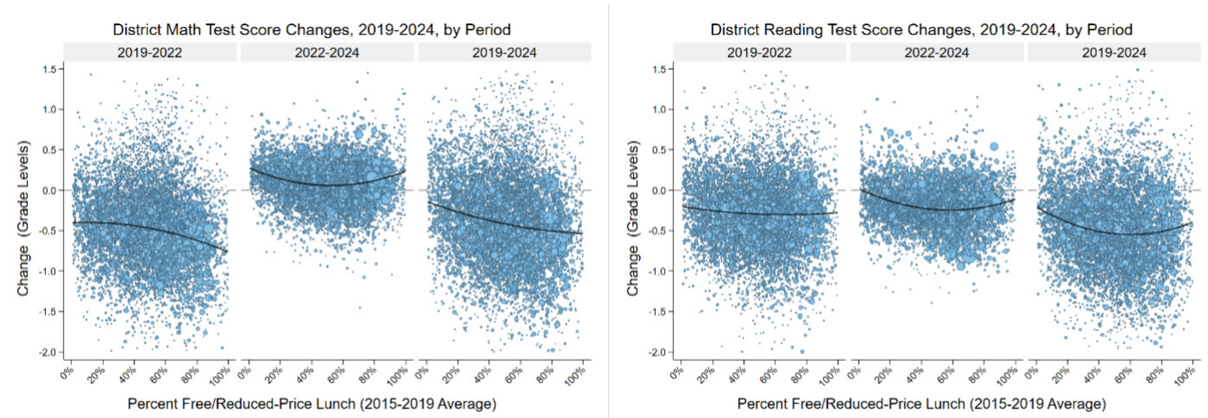
Figure 3 shows patterns of test score changes, by district free- and reduced-price lunch eligibility rates, for three periods: 2019-2022 (pandemic-era changes); 2022-2024 (post-pandemic changes); and 2019-2024 (cumulative changes since the start of the pandemic). In math, the declines from 2019-2022 were, on average, larger in higher-poverty districts, while the post-pandemic changes followed a U-shaped pattern, with slightly higher average increases in scores in the richest and poorest districts than in middle-income districts. The pattern of cumulative changes from 2019-2024 shows much stronger recovery among low-poverty districts than middle- and high-poverty

to link the state assessments—that average math scores had increased by 0.17 grade levels from 2022 to 2023. However, the NAEP 2024 data show that national average scores math increased by 0.10 grade levels, roughly 60 percent of the recovery we estimated in 2023. There are several possible explanations for this difference: 1) the sample of 29 states may not have been representative of the nation in 2023; 2) test scores may have declined by 0.07 grade levels from 2023 to 2024; 3) we may have inadvertently included some states whose state assessments had changed between 2022 and 2023, despite our efforts to use only data from states whose tests were stable; 4) the process by which states equate their test scales from year-to-year may have had some upward bias (the equating is always imperfect, so we expect some noise); or 5) schools/teachers/students may have been more familiar with the state tests in 2023 than in 2022, leading to more teaching/learning to the tests. We cannot fully adjudicate among these explanations, but in supplementary analyses we do find some evidence that the 29 states were slightly non-representative (scores grew faster in those states from 2022-2024 on NAEP than in the nation as a whole). We also find some evidence of inflation of test scores or upwardly biased equating as well. That suggests that some of what appeared to be recovery in 2023 was inflation/poor linkage on state assessments.

districts. Indeed, 30 percent of students in low-poverty districts are in districts with average math scores above their 2019 average; compared to 8 percent of high-poverty districts.

In reading, the patterns were similar, but the differences in changes between low- and high-poverty districts were more modest. The pattern of cumulative changes from 2019-2024 shows stronger recovery among low-poverty districts than middle- and high-poverty districts. Indeed, 23 percent of students in low-poverty districts are in districts with average math scores above their 2019 average; compared to 11 percent of students in high-poverty districts.

## FIGURE 3: TEST SCORES CHANGES BY DISTRICT POVERTY AND TIME PERIOD, 2019-2024




Certainly, the widening of disparities in achievement from 2019-2024 between high- and low-poverty districts is concerning. This pattern of widening between district gaps is evident along other dimensions as well. In Table 3, we report the difference in average scores between students in the districts with the highest and lowest proportions of various demographic groups. For example, the second row of the table shows the difference in average scores between students in districts with the lowest and highest proportions of Black students. In 2019, this gap was 1.68 grade levels. In 2024, it was 1.96 grade levels, a growth of 0.28 grade levels (a 17 percent increase) from 2019 to 2024.

Table 3 shows that gaps between district with low- and high-proportions of free/ reduced-price lunch eligible students, Black students, Hispanic students, and minority students all grew substantially from 2019 to 2024. Reading gaps along the same dimensions have grown as well, but much more modestly, from 2019-2024.

## TABLE 3: BETWEEN-DISTRICT GAPS, BY DEMOGRAPHIC CHARACTERISTICS AND SUBJECT, 2019-2024

| District Demographic Characteristic | Average Score in Top Decile | | | Average Score in Bottom Decile | | | Top-Bottom Decile Gap (Grade Levels) | | Change | Percentage Change |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2019 | 2022 | 2024 | 2019 | 2022 | 2024 | 2019 | 2024 | 2019-24 | 2019-24 |
| Math | | | | | | | | | | |
| % FRPL | 3.98 | 3.27 | 3.39 | 7.69 | 7.29 | 7.48 | 3.71 | 4.10 | 0.39 | 11% |
| % Black | 4.06 | 3.34 | 3.48 | 5.74 | 5.33 | 5.44 | 1.68 | 1.96 | 0.28 | 17% |
| % Hispanic | 4.56 | 3.97 | 4.11 | 5.73 | 5.26 | 5.44 | 1.16 | 1.33 | 0.17 | 14% |
| % Minority | 4.44 | 3.73 | 3.87 | 6.33 | 5.91 | 6.05 | 1.88 | 2.17 | 0.29 | 15% |
| Reading | | | | | | | | | | |
| % FRPL | 3.91 | 3.57 | 3.40 | 7.60 | 7.40 | 7.30 | 3.70 | 3.90 | 0.21 | 6% |
| % Black | 4.26 | 3.85 | 3.78 | 5.66 | 5.41 | 5.26 | 1.41 | 1.48 | 0.07 | 5% |
| % Hispanic | 4.46 | 4.28 | 4.00 | 5.84 | 5.52 | 5.44 | 1.38 | 1.44 | 0.06 | 4% |
| % Minority | 4.28 | 4.01 | 3.77 | 6.39 | 6.07 | 5.95 | 2.12 | 2.18 | 0.07 | 3% |

In 2022, we reported that within-district test score gaps did not change during the pandemic, from 2019-2022, although between district disparities widened, as we see above. We repeat that analysis here, using data through 2024 and with the larger set of states for which we now have within-district demographic data.

Table 4 shows the trends in within-district gaps, by economic status, gender, and race/ethnicity from 2019-2024. First, as we reported in 2022, the economic status gap and the White-Black and White-Hispanic gaps were generally stable (or declined modestly, in the case of economic gaps) during the pandemic. The within-district gaps generally grew, however, from 2022-2024. In math, the within-district White-Black and White-Hispanic gaps are now 7-12 percent larger (about 0.15 grade levels larger) than in 2019. The economic gaps have changed little, however, from 2019-2024, though this masks a modest narrowing of the gaps from 2019-2022 and then a widening from 2022-2024. Within-district reading gaps by race/ethnicity and economic status have changed little.

## TABLE 4: AVERAGE WITHIN-DISTRICT ECONOMIC, RACIAL/ETHNIC, AND GENDER GAPS, 2019-2024

| | Gap (Grade Levels) | | | Change (Grade Levels) | | Percentage Change |
|---|---|---|---|---|---|---|
| Subject and Gap | 2019 | 2022 | 2024 | 2019-2022 | 2019-2024 | 2019-24 |
| Math | | | | | | |
| Non-ECD - ECD | 1.66 | 1.60 | 1.71 | -0.06 | 0.05 | 3% |
| White - Black | 2.08 | 2.12 | 2.22 | 0.04 | 0.14 | 7% |
| White - Hispanic | 1.30 | 1.30 | 1.46 | 0.00 | 0.16 | 12% |
| Female - Male | 0.02 | -0.20 | -0.28 | -0.21 | -0.30 | -1572% |
| Reading | | | | | | |
| Non-ECD - ECD | 1.81 | 1.73 | 1.79 | -0.08 | -0.02 | -1% |
| White - Black | 2.05 | 2.06 | 2.06 | 0.01 | 0.00 | 0% |
| White - Hispanic | 1.40 | 1.35 | 1.45 | -0.05 | 0.06 | 4% |
| Female - Male | 0.92 | 0.81 | 0.82 | -0.10 | -0.10 | -11% |

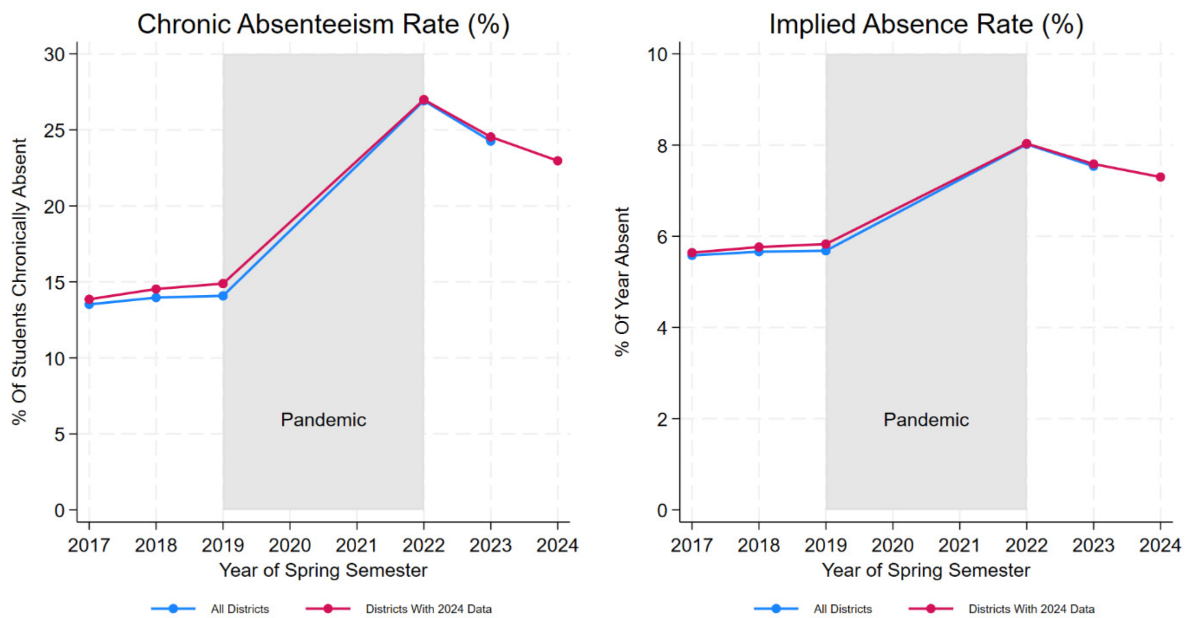
Of particular note in Table 4 is the sharp change in gender gaps since 2019. Prior to 2019, girls' and boys' math skills on NAEP had been roughly equal in grades 3-8 for a decade. But since 2019, girls have fallen a third of a grade level behind boys in math, while the disparity in girls' and boys' reading skills has narrowed by 11 percent since the pandemic began. These patterns are not unique to state standardized assessments: the same trends in gender patterns are evident nationally in NAEP scores and in international assessments like TIMMS.[6]

### The Rise in Student Absenteeism

Figure 4 displays the share of students nationally who were considered chronically absent (missing more than 10 percent of the school year), which nearly doubled between 2019 and 2022, rising from 14 percent to 26 percent. The challenge has receded only slightly since 2022: rates fell by only 3 points between 2022 and 2023. In the 20 states for which we have data through Spring 2024, chronic absenteeism fell by an additional 2 points between 2023 and 2024. While the chronic absenteeism rate has declined from its peak in 2022, it remains 8 percentage points higher than immediately before the pandemic. The right-hand panel of Figure 4 uses our estimated relationship between a district's chronic absenteeism rate and its average absence rate (see Appendix A) to plot the implied trend in absence rates over the same years. The implied absence rate rose from just under 6 percent nationally prior to the pandemic to 8 percent in 2022 before falling slightly in 2023 and 2024. The roughly 2-point increase in the absence rate implies that students are missing an additional 3.6 days out of an 180-day academic year than in 2019.

6 2019 results: Mullis, I. V. S., Martin, M. O., Foy, P., Kelly, D. L., & Fishbein, B. (2020). 2023 results: von Davier, M., Kennedy, A., Reynolds, K., Fishbein, B., Khorramdel, L., Aldrich, C., Bookbinder, A., Bezirhan, U., & Yin, L. (2024).

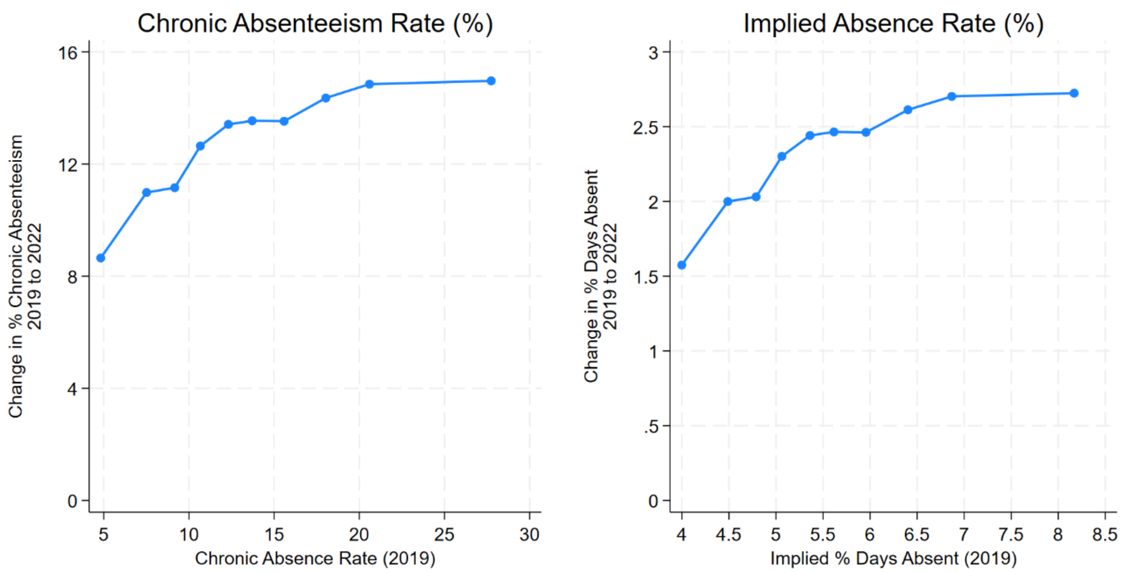
## FIGURE 4. NATIONAL TRENDS IN CHRONIC ABSENTEEISM AND IMPLIED ABSENCES




**Note**: We used state-reported chronic absenteeism as collected by Nat Malkus, American Enterprise Institute, and SchoolDigger, an education data company. When state-reported data were missing in the years between 2017 and 2023, we used chronic absenteeism data from EdFacts to impute missing values. The blue line includes all states but Wyoming, Idaho, and South Dakota, which we exclude due to poor data. The red line was limited to the 20 states reporting 2024 data that we didn't exclude.

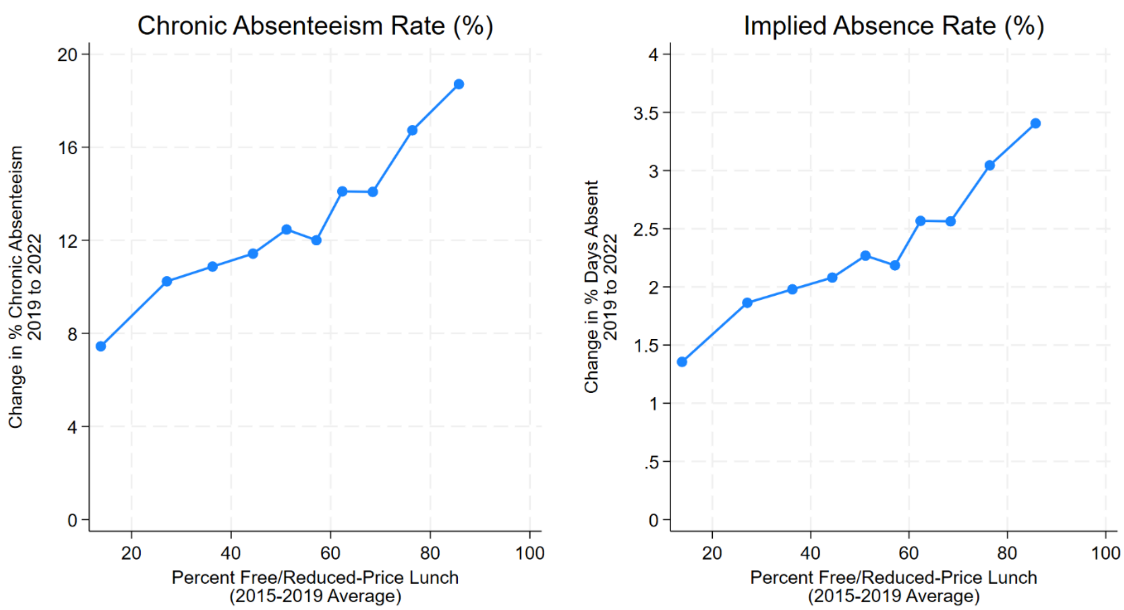
Absenteeism rose more for districts which started out with higher absenteeism. In Figure 5, we report the mean change in chronic absenteeism rates between 2019 and 2022 by districts' prior chronic absenteeism rate (immediately before the pandemic in 2019). We sorted districts into deciles based on their 2019 chronic absenteeism rates and plotted the mean change in chronic absence rates between 2019 and 2022 for each decline. For the lowest absence decile of districts, chronic absence rates more than doubled, rising by 8 percentage points from a base of 5 percent. For districts in the 5$^{th}$ decile (near the median) in 2019, chronic absenteeism doubled, rising by 13 percentage points to 26 percent chronically absent. Although not doubling, the absolute increases were even larger for the districts with high pre-pandemic absences, increasing by 15 percentage points from 28 percent to 43 percent. (Similar results were reported in Malkus, 2024.)

## FIGURE 5. CHANGE IN STUDENT ABSENTEEISM BY PRE-PANDEMIC ABSENCE RATE (2019)




**Source**: For chronic absenteeism, Return to Learn Tracker, American Enterprise Institute. See Appendix A for details on the conversion to the implied average absence rate.

## FIGURE 6. CHANGE IN ABSENTEEISM BY DISTRICT POVERTY




**Source**: For chronic absenteeism, Return to Learn Tracker, American Enterprise Institute. See Appendix A for details on the conversion to the implied average absence rate.

The rise in absenteeism was widespread, occurring in both high- and low-income districts. However, the increases were larger in low-income, high poverty districts. In Figure 6, we report the mean change in chronic absenteeism for high and low poverty districts. We first sorted districts into deciles by the percent of students estimated to be eligible for federal free and reduced-price lunches between 2015 and 2019. For the highest income decile of districts (those on the far left of the horizontal axis with the lowest free lunch eligibility), chronic absenteeism rates rose by roughly 8 points and average absence rates by 1.4 points. But the increases were considerably larger in the highest poverty decile of districts, which experienced nearly a 20-point rise in chronic absenteeism and a 3.5 percentage point increase in average absence rates. In other words, during a 180-day school year, students in the highest income districts were missing 2.5 additional days on average. In the highest poverty districts, students were missing an additional 6.3 days per year.

In the above figures, we showed that the increase in chronic absenteeism was larger in districts with higher starting points (higher absenteeism in 2019) and in districts with higher poverty rates. In addition, Malkus (2024) provided suggestive evidence that the rise in absenteeism was higher in districts which were remote for longer during the 2020-21 school year. Unfortunately, all three factors—prior absenteeism, poverty rates, and length of remote instruction 2020-21—are positively correlated, so an increase in absences associated with one characteristic—e.g., higher absences in districts with greater levels of remote instruction—could be driving all three.

By regressing the change in rates of chronic absenteeism between 2019 and 2022 on various district characteristics, we attempt to sort out the independent relationship of each to the rise in absenteeism, while holding the other factors constant. In column (1) of Table 5, we limit the analysis to racial composition and pre-pandemic average absenteeism between 2017 and 2019. Not accounting for district poverty or the share of the 2020-21 school year that schools were remote, it would appear that districts that had higher rates of chronic absenteeism pre-pandemic and larger shares of black or Hispanic students experienced higher increases in absenteeism. However, in column 2, after we add controls for the average percent of students eligible for free/reduced-price lunch, the independent effect of prior absences is reduced by two-thirds and the apparent role of racial composition is reduced. The percentage of students who are Black has no independent predictive power and a 10 percentage point rise in the percent of students who were Hispanic would predict a .3 percentage point rise in chronic absences. Districts with 10 percent more Asian students experienced a 1.3 percentage point decline in chronic absences.

In column (3), we add the percent of the 2020-21 school year that districts were remote or hybrid. Even among districts with similar levels of poverty, racial composition and prior absences, the rise in absenteeism was slightly higher in districts which were operating on a remote or hybrid basis for longer in 2020-21: .3 percentage points higher per 10 percentage point change percent remote or hybrid. In other words, a school that was 100 percent remote or hybrid during 2020-21 would be predicted to have absence rates 3 percentage points higher than a district that was in-person all year. Given that absence rates rose by 12 points between 2019 and 2022 on average, that is a modest, but not negligible, effect. Goldhaber et al. (2023) reported that each week of remote instruction seemed to have a more negative effect on student achievement in higher poverty districts. In column (4), we find a similar result, implying that each week of remote instruction was associated with larger increases in chronic absenteeism in higher poverty districts. However, the rise in absenteeism was not solely associated with remote/hybrid instruction. Even among districts which were not-in-person for the same share of the 2020-21 school year, the level of pre-pandemic absences and the level of poverty in the district were strong predictors of increases in absenteeism.

Below, we first discuss the evidence on the impact of federal spending and then evaluate the role of higher absenteeism in slowing the recovery.

### TABLE 5. DISTRICT CHARACTERISTICS ASSOCIATED WITH INCREASED ABSENTEEISM BETWEEN 2019 AND 2022

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| % Black | 0.0626*** | 0.0144 | 0.0022 | 0.0018 |
| | (0.0100) | (0.0113) | (0.0115) | (0.0116) |
| % Hispanic | 0.0952*** | 0.0329*** | 0.0224* | 0.0237* |
| | (0.0097) | (0.0127) | (0.0128) | (0.0125) |
| % Asian | -0.1494*** | -0.1319*** | -0.1411*** | -0.1309*** |
| | (0.0211) | (0.0204) | (0.0207) | (0.0205) |
| % Other | 0.1071* | 0.1051* | 0.0972* | 0.1197** |
| | (0.0571) | (0.0577) | (0.0573) | (0.0580) |
| Pre-pandemic Average Chronic Absenteeism | 0.2003*** | 0.0733** | 0.0574* | 0.0575* |
| | (0.0263) | (0.0314) | (0.0308) | (0.0308) |
| % FRPL 2015-2019 | | 0.1030*** | 0.1069*** | 0.0808*** |
| | | (0.0115) | (0.0116) | (0.0153) |
| % Remote in 2020-21 | | | 0.0284*** | -0.0001 |
| | | | (0.0086) | (0.0153) |
| % FRPL * % Remote | | | | 0.0489* |
| | | | | (0.0257) |
| % Hybrid in 2020-21 | | | 0.0234*** | 0.0073 |
| | | | (0.0053) | (0.0096) |
| % Poverty * % Hybrid | | | | 0.0345* |
| | | | | (0.0192) |
| State FE | Yes | Yes | Yes | Yes |
| N | 8917 | 8917 | 8917 | 8917 |

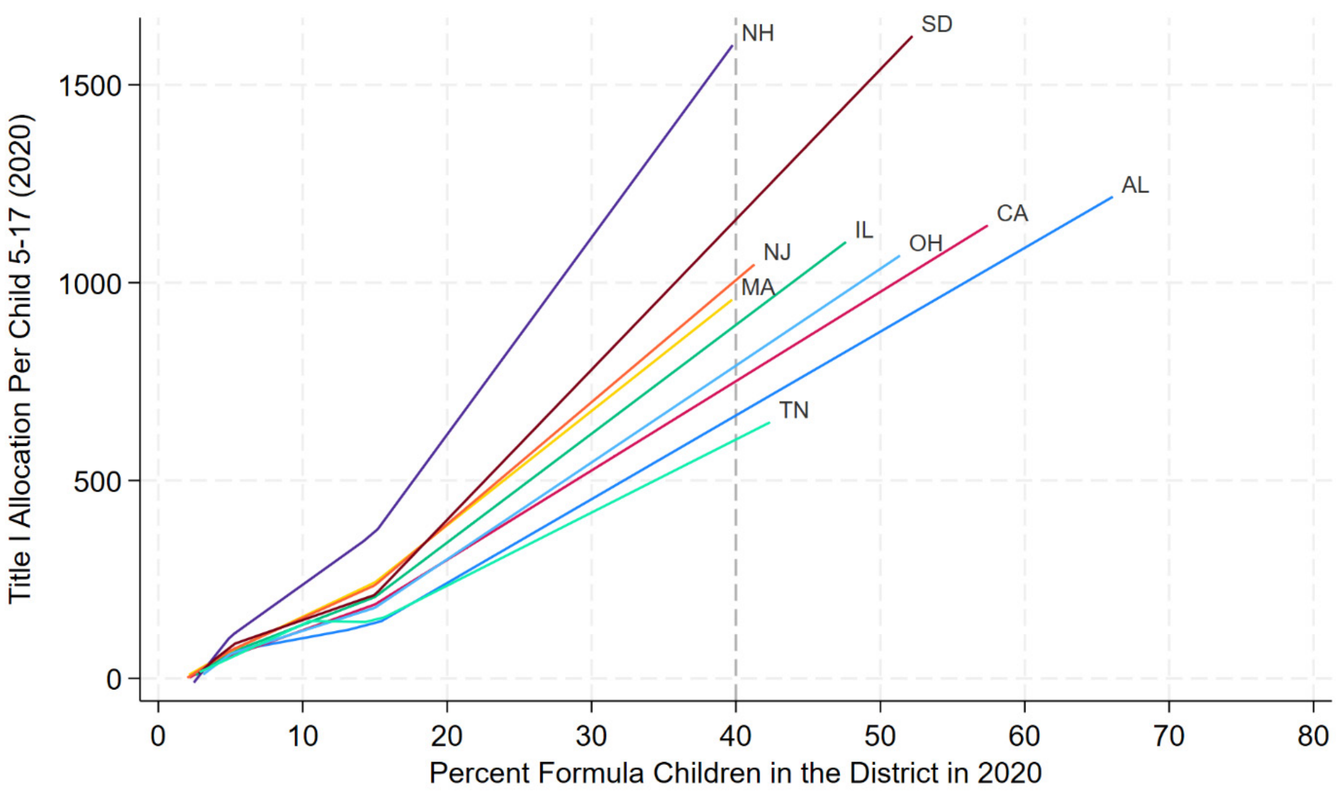
**Note**: The dependent variable is the change in chronic absenteeism between 2019 and 2022, measured in percentage point units (i.e., a value of 10 implies a 10 percentage point change). The above are partial regression coefficients, holding the other factors in each column constant. All specifications include state fixed effects, to account for any differing definitions of absenteeism across states. Observations were weighted by district enrollment size.

### Predicting 2022-24 Recovery: The Role of Federal Relief Dollars

Last summer, we reported on the effect of federal pandemic relief spending on the growth in scores between Spring 2022 and 2023 (Dewey et al., 2024). Unfortunately, there was no NAEP in 2023, so our analysis was limited to the states which used the same tests and proficiency thresholds in 2022 and 2023. We found that the pandemic relief dollars did boost achievement gains, especially in the higher poverty districts. Below, we replicate that analysis using an entirely different set of outcomes, based on the 2024 NAEP and the 2024 state tests, and a larger group of states (43 rather than 29 states). Effectively, we are performing an out-of-sample test using the previously specified models estimated with the 2023 data. For a more thorough data description and literature review, see Dewey et al., 2024.

Our greatest empirical challenge is distinguishing between the effect of the aid and the pre-existing district traits (such as poverty) which were used in calculating districts' allocation of federal pandemic relief dollars. As we did in our prior report, we rely on aspects of the Title I formula which resulted in similar districts in different states receiving very different amounts of federal dollars.

## FIGURE 7. DIFFERENCE IN TITLE I ALLOCATIONS BY PERCENT OF CHILDREN ELIGIBLE BY STATE




**Note**: This figure was based on actual Title I allocations in FY 2020, fitted with a linear spline function, with knots at 2 percent, 5 percent and 15 percent eligible children, separately for each district. Although not a perfect fit (for instance, large districts can qualify for a concentrated grant even if they have fewer than 15 percent poor children, as long as they have more than 6,500 eligible children), the splines are a good summary, explaining 98 percent of the variance in Title I grants per population for districts not subject to hold harmless provisions.

Figure 7 reports the mean Title I allocation per population aged 5-17 by the percentage of school-age children eligible for Title I for each of seven states. Title I allocations per child are typically zero for the lowest poverty districts (those with fewer than two percent eligible children). The relationship between eligibility and allocations steepens at five and fifteen percent eligible children, as districts become eligible for additional types of Title I grants.

At any given percentage of eligible children (equivalent to drawing a vertical line in Figure 7), Title I grants vary depending upon the state where the district is located. Those differences become larger at higher poverty levels. For instance, a district with 40 percent of children meeting the eligibility formula would have received $572 per child in Tennessee, $652 per child in Alabama, $742 in California, $769 in Ohio, $870 in Illinois, $957 in Massachusetts, $1,069 in South Dakota and $1,602 in New Hampshire.[7] In other words, for very poor districts, there is roughly a $1,000 difference in Title I allocations per child for those in New Hampshire vs. those in Alabama or Tennessee.

Such differences are driven by two primary factors: state average per pupil expenditures and the minimum grants for small states.[8] In general, when states increase their average per pupil spending, districts will receive more Title I funding for each poor child. That is the primary reason why districts in some states, like Massachusetts or Illinois, receive more Title I funding than districts in Alabama and Tennessee with the same percentage of eligible children.

However, poor districts in small states benefit tremendously from the minimum state grant provisions. The states with the largest Title I grants in Figure 7 (New Hampshire and South Dakota) are not particularly high spending states, but they do have small populations. Congress has guaranteed that small states receive a minimum share of appropriations for Title I. But, in Figure 7, it is not just the average grant that is higher in South Dakota and New Hampshire; the slope is steeper—meaning that poor districts especially benefit from the small state minimum. The reason for the steeper slope is an indirect result of the fact that Title I is not fully funded. Based on the formula, districts were eligible for 7 times more funding under the Title I basic grant program than Congress appropriated in FY 2021 (Gordon and Reber, 2023). When appropriations fall short of authorized grants, Title I allocations are proportionally reduced within a state. Thus, when a state's allocation is raised by the small state minimum, all the district allocations are increased proportionally, meaning that districts in small states receive allocations closer to the full authorized amount, thus steepening the slope of the relationship between Title I grant per student and poverty. The states that benefited from the small state minimums in FY 2020 were Vermont, Wyoming, North Dakota, New Hampshire, Washington, D.C., Alaska, South Dakota, and Montana (Gordon and Reber, 2023).

Because we control for state fixed effects, we control for differences in average spending and average Title I grants in each state. Therefore, we essentially use the differences in the slope in Title I grants by percent eligibility across states to infer the effect of the ESSER aid.

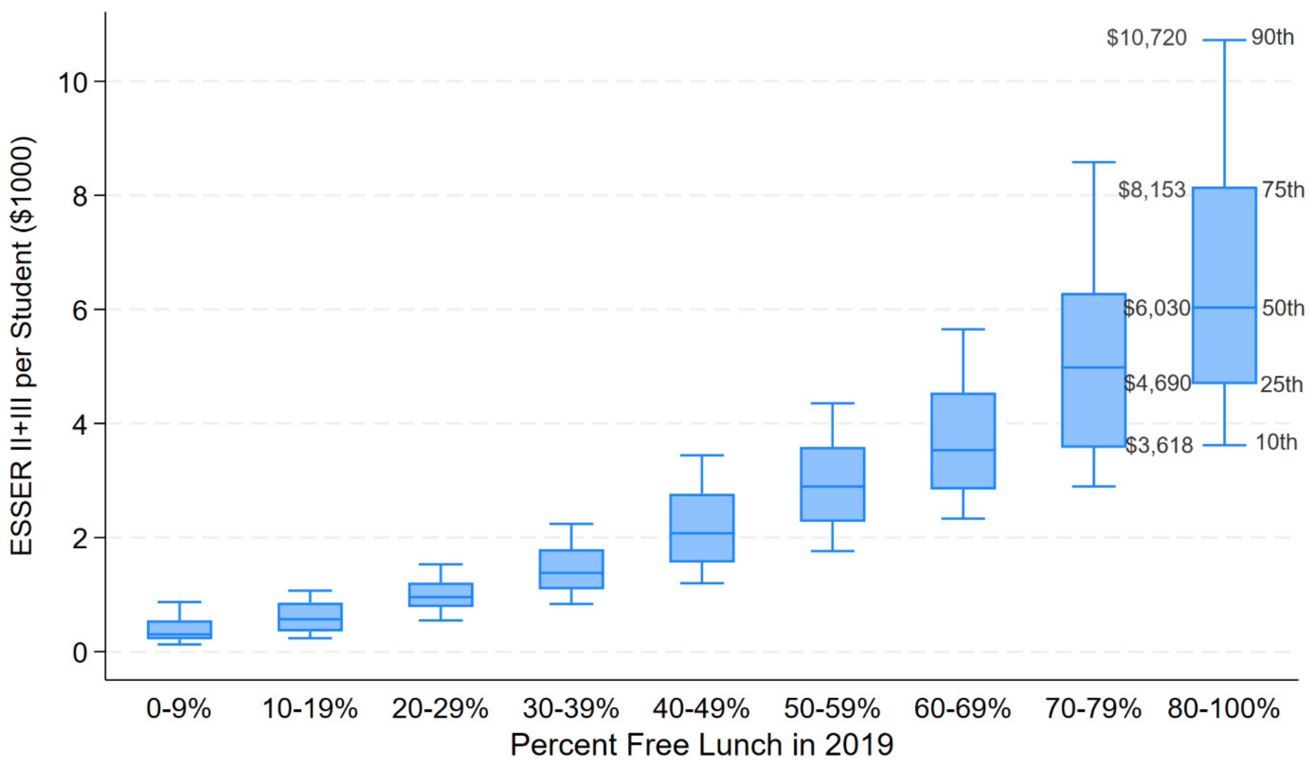
7 For an excellent explanation of the Title I formula, see Gordon and Reber (2023).

8 On paper, there are other factors that matter as well, such as the "state equity factor" (based on the coefficient of variation in expenditures per student across districts in the state) and the "state effort factor" (a function of the ratio of education spending per child and per capita income). However, as Gordon and Reber (2023) show, those adjustments have little effect on the state differences illustrated in Figure 4.

In addition, district funding is based on estimates of the number of poor children in each district from the American Community Survey. Because those estimates are computed using a 1 percent sample of households within each district over 5 years—and not a full census of households—poverty rates fluctuate due to sampling variation. (In Dewey et al., 2024, we detected signs of sampling variation in wider fluctuations in poverty rates in smaller districts.) A positive fluctuation in estimated poverty in FY 2020 (such as we show occurred in Gary, Indiana) led to a windfall of Title I funding in that year and in ESSER funding. Moreover, similar positive fluctuations in the years leading up to FY 2020 would have led to a boost in Title I funding due to the program's hold harmless provisions.

Because ESSER funding was more than 10 times larger than Title I funding in FY 2020, the pandemic relief simply amplified the idiosyncrasies in the Title I formula. Total funding for the Title I program was $16 billion in FY 2020, while the total funding for ESSER II and ARP was $175 billion—more than 10 times larger. In effect, with ESSER II and ARP, Congress pushed $175 billion through pipes that were designed to carry one tenth of the volume of funds. The relief packages essentially multiplied the differences in Figure 7 by 10: a $1,000 difference in Title I grant per student became a $10,000 difference in federal pandemic relief per student. In our analysis, we use this variation to investigate the impact of federal pandemic relief on student achievement.

## FIGURE 8. ESSER ALLOCATIONS PER STUDENT BY PERCENT OF STUDENTS RECEIVING SUBSIDIZED LUNCHES




**Note**: We divide ESSER II and ARP allocations by district total enrollment in 2022 from the Common Core of Data. The percentages of students receiving federal subsidized lunches are from Reardon et al. (2024). The estimates are weighted by district size.

In Figure 8, we report the variation in ESSER II and ARP grants received per student by the percentage of students receiving federally subsidized lunches. Not only is the average funding per student higher in higher poverty districts, but the variation in funds received by similarly poor districts is much wider for the higher poverty rate districts. In the highest poverty districts (those with 80-100 percent of students eligible for federally subsidized lunches), the 10th percentile district received $3,618 per eligible student. However, the 90th percentile district in that group received roughly three times more per student ($10,720).

### Statistical Model

We model the change in scores between 2022 and 2024 as a function of the additional spending over that time period, as well as a set of district characteristics:

$$(1)\ S_{i24} - S_{i,22} = \beta_0 + \beta_1 Increased\ Expenditure + X_i\gamma + \varepsilon_i$$

We use the ESSER allocation per student as a proxy for the increase in expenditure per student. In other words, we assume that the federal aid did not crowd out spending from state and local revenue. This is a reasonable assumption regarding state revenues, as maintenance of effort provisions in the federal law required states to maintain their school funding.[9] If state governments tried to reduce their contribution, it would negatively impact their Title I revenues in the future. However, the maintenance of effort provisions did not apply to contributions from local revenue. If local governments did cut back their contributions, a $1,000 allocation per student in ESSER dollars would have resulted in less than $1,000 in additional expenditures. Importantly, such bias would lead us to understate (not overstate) the impact per federal dollar in aid. (We can evaluate such possible bias when district actual expenditures per student for 2022-23 and 2023-24 are available.)

To estimate the impact per dollar spent for the average student, we weight school districts in the regression models by the size of their grade 3-8 enrollment (the grades for whom our test score measures apply). The estimates are shown in Tables 6 and 7.

9 The maintenance of effort requirements under ESSER did not apply to local governments. However, as the Department of Education indicated in E-14 of ESSER-and-GEER-Use-of-Funds-FAQs-December-7-2022-Update-1.pdf (ed.gov), any district that chose to replace state or local funds with federal ESSER funds risked failing to meet the maintenance of effort requirement under the Title I program itself.

## TABLE 6: ESTIMATED EFFECT OF ESSER FUNDING AND ABSENTEEISM ON MATH RECOVERY (2022-2024)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| ESSER II+III Allocation per Student ($1,000s) | 0.0057*** | 0.0054*** | 0.0038** | 0.0036** | 0.0047** | 0.0044* | | |
| | (0.0013) | (0.0013) | (0.0016) | (0.0016) | (0.0022) | (0.0023) | | |
| ESSER II+III Spent Per Student Before 2023 ($1,000s) | | | | | | | 0.0075*** | 0.0084*** |
| | | | | | | | (0.0026) | (0.0026) |
| ESSER II+III Spent Per Student After 2023 ($1,000s) | | | | | | | 0.0006 | 0.0020 |
| | | | | | | | (0.0027) | (0.0027) |
| % Chronic Absenteeism, Average over 2022-2024 | | | | | | | | -0.0790*** |
| | | | | | | | | (0.0288) |
| % Remote in 2020-21 School Year | | 0.0192*** | 0.0173*** | 0.0179*** | 0.0178*** | 0.0165** | 0.0160** | 0.0178*** |
| | | (0.0064) | (0.0064) | (0.0064) | (0.0064) | (0.0065) | (0.0065) | (0.0066) |
| % Hybrid in 2020-21 School Year | | 0.0253** | 0.0231** | 0.0243** | 0.0236** | 0.0226* | 0.0227** | 0.0271** |
| | | (0.0111) | (0.0112) | (0.0111) | (0.0112) | (0.0117) | (0.0116) | (0.0118) |
| State Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2022 Demographics and Change 2022 to 2024 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| % Remote/Hybrid | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Formula Percent - Every 2% (2020) | No | No | Yes | Yes | Yes | Yes | Yes | Yes |
| EB Trend 2015 to 2019 | No | No | No | Yes | Yes | Yes | Yes | Yes |
| ESSER Allocation Per Student Limit | No | No | No | No | $16,000 | $16,000 | $16,000 | $16,000 |
| N | 8073 | 8073 | 8073 | 8073 | 8050 | 7408 | 7408 | 7408 |
| R2 | 0.226 | 0.228 | 0.235 | 0.237 | 0.236 | 0.232 | 0.233 | 0.235 |

**Note**: The models were conducted with each district's change in achievement in standard deviation units from 2022 to 2024 as the dependent variable. Districts were weighted according to their enrollment of students in grades 3-8 in 2022. Robust standard errors were used without clustering.

Table 6 reports estimates from regressions in which an observation is a district and the outcome variable is the change in the district's average standardized math score between 2022 and 2024. In the first column of Table 6, we report the coefficient on ESSER allocation per student while controlling for state fixed effects and the level and change in district demographics between 2022 and 2024. The demographic controls include log enrollment in the district in 2022, percent Black, percent Hispanic, percent rural, percent suburb, percent town and indicators for 10 percentage point bins of free or reduced-price lunch. We also account for changes in district make-up between 2022 and 2024, including changes in log enrollment, percent Black, percent Hispanic, and percent free or reduced-price lunch. The coefficient on ESSER allocation per student (measured in thousands of dollars) is .0057 SD per $1,000 in math, implying that math achievement rose between 2022 and 2024 by .0057 standard deviations per thousand dollars spent per student.

Lower income districts, which received more ESSER dollars, also spent more time in remote and hybrid instruction during the pandemic. Thus, if districts that were operating remotely for longer periods during 2020-21 experienced faster (or slower) recovery, our estimates could be biased upward (or downward.) Thus, in column (2), we add controls for the share of the 2020-21 school year that schools were remote. It does seem that districts that were remote or hybrid experienced somewhat faster recovery between 2022 and 2024, but the coefficient on ESSER allocation declines only slightly to .0054 SD per $1,000.

As noted above, our estimation strategy relies on the differing state Title I formulas—especially the steepness of the relationship between the percent of eligible children and Title I grants. Thus, in column (3), we control flexibly for district poverty, adding indicators for every two percentage points of children residing in the district who were estimated to be eligible for Title I in FY 2020. The coefficient declines slightly to .0038 but remains statistically significant.

In column (4), we add controls for the trend in math scores in the years before the pandemic, to account for the possibility that our results could be reflecting pre-existing trends in achievement. The coefficient is unchanged.

In column (5), we drop 23 districts with unusually large amounts of ESSER funding per student (more than $16,000 per student), given the high leverage such districts could be having on our estimates. The estimated coefficient on ESSER allocations rises slightly to .0047 per $1,000.

### *Comparison with Prior Research on K-12 Spending*

Jackson and Mackevicius (2024) recently reviewed the literature on the effects of school spending on student outcomes. The authors identified 32 quasi-experimental studies with stronger designs for estimating causal effects—those using regression discontinuity, difference-in-differences, event studies, or instrumental variables. For the subset of studies using test scores as an outcome, their meta-analysis implied an average impact of .0316 standard deviations per $1,000 annual increase in spending over four years, or a total spending increase of $4,000 per student. To compare these impacts, we divide the estimated impact by four, yielding an estimate of .0079 standard deviations per $1,000 in a single year.

In our prior analysis of 2022 to 2023 gains, we found that each thousand dollars of ESSER spending was associated with a .0086 standard deviation rise in math achievement. Our new point estimate is lower—.0047 standard deviations per thousand dollars in math—but the 95 percent confidence interval still includes the mean estimate from Jackson and Mackevicius' meta-analysis.

In our prior analysis, we used estimates of the amount of ESSER dollars spent as of Spring/Summer 2023—in contrast to the total allocations from ESSER II and ARP which we used in columns (1) through (5). In column (6), we limit the sample to the districts for which we had 2022-23 spending and find similar results: .0044 standard deviations per $1000 spending. In column (7), we differentiate between dollars spent before Spring 2023 and any remaining dollars, which we assume were spent during the 2023-24 school year (although some of the funds were likely spent in the summer of 2024 before the expiration date on September 30). When we differentiate in this way, the coefficient on ESSER spent before Spring/Summer 2023 is very similar to our estimate in the prior analysis (.0086 per $1,000 spent), while the coefficient on dollars spent after Spring/Summer 2023 is smaller and not distinguishable from zero.

There are several possible interpretations of this last finding: the spending during the 2023-24 school may have been less focused on academic catch-up than in the previous year, or the districts used the federal relief dollars to offset spending from local dollars as the deadline loomed (since these were not subject to the same maintenance of effort requirements on state funds) or the districts that spent more of their ESSER relief during 2022-23 were simply better organized and more aggressive about COVID recovery. Unfortunately, we cannot distinguish among the alternatives.

In Table 7, we report similar results for reading. As reported in column (5), the estimated impact of ESSER spending on reading scores is .0066 standard deviations per $1,000 of spending, slightly higher than the .0049 estimate we reported for the 2022-23 changes.

## TABLE 7: ESTIMATED EFFECT OF ESSER FUNDING AND ABSENTEEISM ON READING RECOVERY (2022-2024)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| ESSER II+III Allocation per Student ($1,000s) | 0.0065*** | 0.0063*** | 0.0049*** | 0.0049*** | 0.0066*** | 0.0074*** | | |
| | (0.0011) | (0.0011) | (0.0013) | (0.0013) | (0.0018) | (0.0019) | | |
| ESSER II+III Spent Per Student Before 2023 ($1,000s) | | | | | | | 0.0074*** | 0.0082*** |
| | | | | | | | (0.0022) | (0.0022) |
| ESSER II+III Spent Per Student After 2023 ($1,000s) | | | | | | | 0.0074*** | 0.0085*** |
| | | | | | | | (0.0023) | (0.0023) |
| % Chronic Absenteeism, Average over 2022-2024 | | | | | | | | -0.0638** |
| | | | | | | | | (0.0283) |
| % Remote in 2020-21 School Year | | 0.0189*** | 0.0155** | 0.0154** | 0.0153** | 0.0112* | 0.0113* | 0.0128* |
| | | (0.0068) | (0.0067) | (0.0067) | (0.0067) | (0.0066) | (0.0066) | (0.0068) |
| % Hybrid in 2020-21 School Year | | 0.0194* | 0.0148 | 0.0146 | 0.0136 | 0.0103 | 0.0104 | 0.0137 |
| | | (0.0110) | (0.0109) | (0.0109) | (0.0110) | (0.0110) | (0.0110) | (0.0111) |
| State Fixed-Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2022 Demographics and Change 2022 to 2024 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| % Remote/Hybrid | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Formula Percent - Every 2% (2020) | No | No | Yes | Yes | Yes | Yes | Yes | Yes |
| EB Trend 2015 to 2019 | No | No | No | Yes | Yes | Yes | Yes | Yes |
| ESSER Allocation Per Student Limit | No | No | No | No | $16,000 | $16,000 | $16,000 | $16,000 |
| N | 7702 | 7702 | 7702 | 7702 | 7677 | 7064 | 7064 | 7064 |
| R2 | 0.327 | 0.329 | 0.338 | 0.338 | 0.338 | 0.203 | 0.203 | 0.204 |

**Note**: The models were conducted with each district's change in achievement in standard deviation units from 2022 to 2024 as the dependent variable. Districts were weighted according to their enrollment of students in grades 3-8 in 2022. Robust standard errors were used without clustering. The demographic controls include log enrollment in the district, percent Black, percent Hispanic, percentages rural, suburb, and town and indicators for 10 percentage point bins of free or reduced-price lunch. Controls also include changes in log enrollment, percent Black, percent Hispanic, and percent free or reduced-price lunch.

### *California Spending Analysis*

We obtained more detailed data on ESSER spending from the California Department of Education. The California spending data provide us with two advantages over the national data: First, because districts report spending on a quarterly basis, we are able to separate out dollars that were spent before Spring 2022 testing (our baseline) and after Spring 2024 testing (our endpoint). Second, at least for the ARP dollars, districts were asked to separate out the spending qualifying as academic catchup.[10]

10 The California Department of Education directed districts to include in academic recovery spending any "evidence-based interventions that are reasonable and necessary to address the impact of lost instructional time, as a result of the COVID-19 pandemic." As examples, the department lists the costs of summer learning, extended day, comprehensive afterschool programs, extended school year programs and high dosage tutoring. In addition, the department lists full-service community schools, mental health services and cost of integration of social emotional learning into the core curriculum. The full guidance can be found on the CDE website at https://www.cde.ca.gov/fg/cr/reportinghelp.asp#esseriii3214.

The results of the California analyses for math are shown in Table 7 (reading results are in Appendix B). To facilitate comparison, we replicate our national results from the final three columns of Table 2 (math) into the first three columns of Table 4. We report parallel analyses for the California data in columns 4-6. The point estimate of the coefficient on ESSER allocations in California in column 4 (.0094 standard deviations per $1,000) is larger than for the national sample (.0044 standard deviations per $1,000), but the 95 percent confidence interval for California (.0022, .0167) still contains the mean estimate (.0079) from Jackson and Mackevicius (2024).

In column 7, we use the finer detail in the California data to divide ESSER spending into three categories: dollars spent within the testing window (between Spring 2022 and Spring 2024), dollars spent before the testing window (before Spring 2022) and dollars spent after the testing window (over the summer of 2024). The point estimate is largest for dollars spent within the testing window (Spring 2022 to Spring 2024) and not different from zero for dollars spent after Spring 2024. The coefficient on dollars spent before the testing window is positive though not statistically significant. This could reflect real effects of earlier investments. (Jackson and Mackevicius (2024) reported lingering impacts of capital expenditures.) The coefficient on dollars spent on academic catchup (.0440) suggests larger impacts than general spending on math achievement.

### *How Much of the Recovery Can the Pandemic Relief Explain?*

In Figure 9, the light gray line at the bottom portrays the loss in math achievement between 2019 and 2022 by district poverty rate. The dark gray line depicts the losses as of 2024. The lowest poverty districts lost roughly .4 grade equivalents in math by 2022; the highest poverty districts lost .75 grade equivalents. The green dashed line and the shaded area portrays the implied effect of ESSER on 2022 to 2024 recovery. Because the ESSER allocations per student were so much larger for higher poverty districts, the shaded area widens as district share of free/reduced price eligibility increases. The implied improvement in math achievement in the poorest districts is .11 grade equivalents, close to the actual improvement between 2022 and 2024. Thus, the ESSER aid potentially explains all of the improvement in achievement among high-poverty districts. The higher income (lower poverty) districts improved much more than predicted based on the amount of federal aid they received—possibly reflecting the effects of increases in local spending or the strength of local social capital.

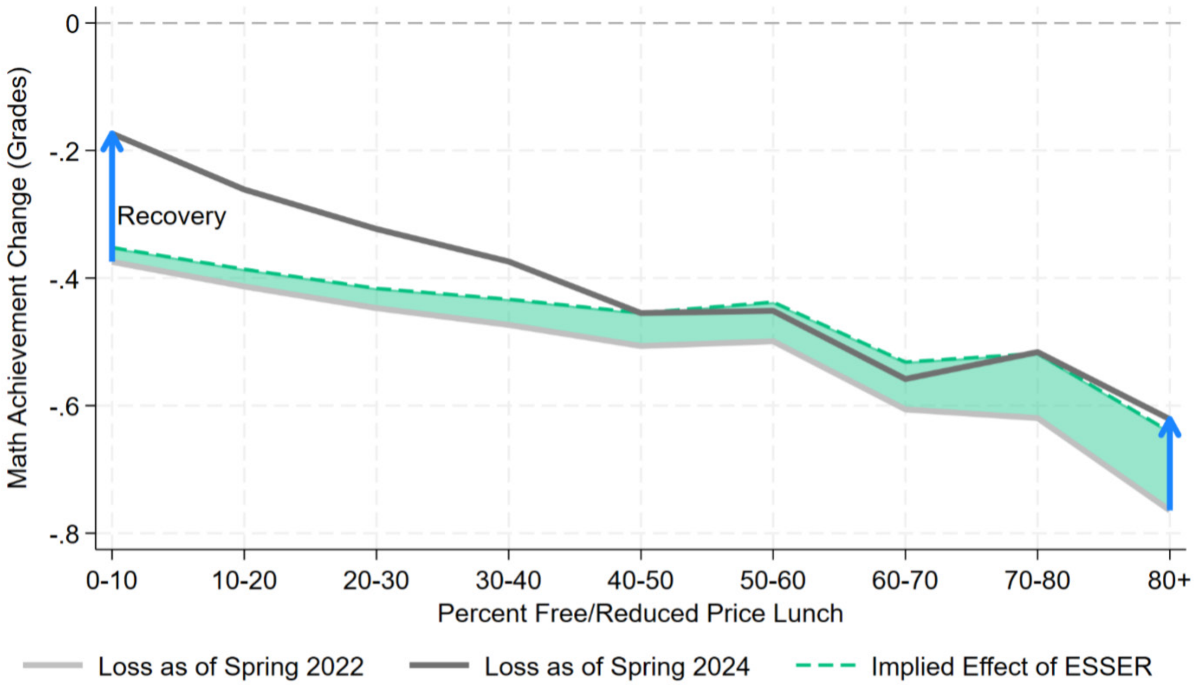
## TABLE 8: ESTIMATED EFFECT OF DETAILED SPENDING AND ABSENTEEISM ON MATH RECOVERY (CALIFORNIA)

| | National | | | California | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ESSER Allocation per Student ($1,000s) | 0.0044* | | | 0.0094** | | | | |
| | (0.0023) | | | (0.0037) | | | | |
| ESSER Spent Per Student Before 2023 ($1,000s) | | 0.0075*** | 0.0084*** | | 0.0132*** | 0.0181*** | | |
| | | (0.0026) | (0.0026) | | (0.0046) | (0.0044) | | |
| ESSER Spent Per Student After 2023 ($1,000s) | | 0.0006 | 0.0020 | | 0.0042 | 0.0094** | | |
| | | (0.0027) | (0.0027) | | (0.0046) | (0.0046) | | |
| % Chronic Absenteeism, Average over 2023-2024 | | | -0.0790*** | | | -0.2932*** | -0.2949*** | -0.2946*** |
| | | | (0.0288) | | | (0.0591) | (0.0591) | (0.0588) |
| ESSER Spent Spring 2022 to Spring 2024 | | | | | | | 0.0174*** | |
| | | | | | | | (0.0044) | |
| ESSER Spent Before Spring 2022 | | | | | | | 0.0103* | 0.0079 |
| | | | | | | | (0.0053) | (0.0082) |
| ESSER Spent After Spring 2024 | | | | | | | 0.0043 | 0.0036 |
| | | | | | | | (0.0059) | (0.0065) |
| ESSER II Spent Spring 2022 - Spring 2024 | | | | | | | | 0.0159 |
| | | | | | | | | (0.0143) |
| ESSER III 20% Spent Spring 2022 - Spring 2024 | | | | | | | | 0.0440* |
| | | | | | | | | (0.0232) |
| ESSER III 80% Spent Spring 2022 - Spring 2024 | | | | | | | | 0.0125* |
| | | | | | | | | (0.0074) |
| % Remote in 2020-21 School Year | 0.0165** | 0.0160** | 0.0178*** | -0.0227 | -0.0233 | -0.0115 | -0.0110 | -0.0104 |
| | (0.0065) | (0.0065) | (0.0066) | (0.0252) | (0.0252) | (0.0256) | (0.0257) | (0.0253) |
| % Hybrid in 2020-21 School Year | 0.0226* | 0.0227** | 0.0271** | 0.0268 | 0.0270 | 0.0324 | 0.0310 | 0.0304 |
| | (0.0117) | (0.0116) | (0.0118) | (0.0304) | (0.0306) | (0.0302) | (0.0301) | (0.0298) |
| State Fixed-Effects | Yes | Yes | Yes | N/A | N/A | N/A | N/A | N/A |
| 2022 Demographics and Change 2022 to 2024 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| % Remote/Hybrid | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Formula Percent - Every 2% (2020) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| EB Trend 2015 to 2019 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| ESSER Allocation Per Student Limit | $16,000 | $16,000 | $16,000 | $16,000 | $16,000 | $16,000 | $16,000 | $16,000 |
| N | 7408 | 7408 | 7408 | 606 | 606 | 606 | 606 | 606 |
| R2 | 0.232 | 0.233 | 0.235 | 0.307 | 0.311 | 0.350 | 0.353 | 0.356 |

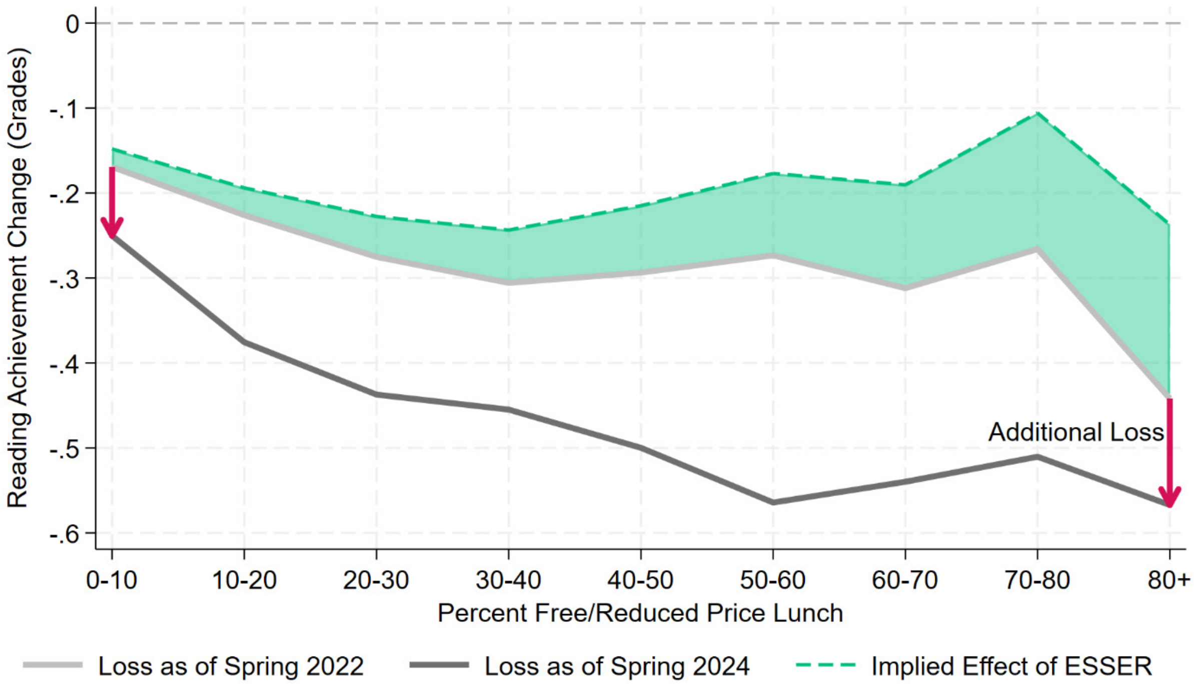
**Note**: The models were conducted with each district's change in achievement in standard deviation units from 2022 to 2024 as the dependent variable. Districts were weighted according to their enrollment of students in grades 3-8 in 2022. Robust standard errors were used without clustering. The demographic controls include log enrollment in the district, percent Black, percent Hispanic, percent rural, percent suburb, percent town and indicators for 10 percentage point bins of free or reduced-price lunch. Controls also include changes in log enrollment, percent Black, percent Hispanic, and percent free or reduced-price lunch.

In Figure 10, the gray line portrays the loss in reading as of 2022, while the black line portrays the loss as of 2024. Unlike with math, students were even further behind in reading than they were in 2022 at all levels of poverty. Factoring in only the implied effect of ESSER aid, we would have predicted more recovery for the lowest poverty districts. There appear to have been other factors driving reading achievement downward, more than offsetting the effects of ESSER relief.

## FIGURE 9. LOSS IN MATH ACHIEVEMENT AS OF 2022 AND 2024 AND PREDICTED RECOVERY




## FIGURE 10. LOSS IN READING ACHIEVEMENT AS OF 2022 AND 2024 AND PREDICTED RECOVERY



### *Comparing Bang for the Buck*

Although .0079 standard deviations per $1,000 from Jackson and Mackevicius (2024) may be the mean impact of spending from general revenues, many targeted academic interventions have been shown to have greater impact per dollar spent. For instance, in summarizing the research from the Tennessee class size experiment, Harris (2009) concluded that the Tennessee classroom size experiment, which reduced K-3 class size from an average of 22 students per teacher to 15 students per teacher, generated average gains of .063 standard deviations.[11] Harris (2009) also summarized the evidence from an evaluation of the Success for All whole school reform model (Borman et al. 2007), and concluded that the implied impact was .085 standard deviations per $1,000 spent (when converted from 2007 to 2022 dollars). More recently, Guryan et al. (2023) report on the effect of two high dosage tutoring programs for secondary students, finding a pooled impact of .28 standard deviations for those participating in a program costing $3,500 per student. That would have translated into .08 standard deviations per $1,000 spent—roughly 10 times the impact of an increase in general funds reported by Jackson and Mackevicius (2024). Thus, even if more spending is related to higher student outcomes, there were higher impact ways to use the dollars to raise student achievement.

### Predicting 2022 to 2024 Recovery: The Role of Absenteeism

How much did the rise in chronic absenteeism impact the recovery? In Tables 6, 7, and 8 (and Appendix B), we report a crude test, by adding each district's average chronic absenteeism rate between 2022 and 2024 as an additional predictor in column (8). Holding the full set of district characteristics constant, we estimate in our national sample that districts with 10 percentage point higher chronic absenteeism (or a 1.8 percentage point rise in average absence rate) experienced .00790 standard deviation slower recovery in math and .00638 standard deviation slower recovery in reading. Since we are measuring the effect of chronic absence rate on achievement growth over two school years, that implies a loss of .0012 standard deviation per additional day of absence in math .00790/(.018*180*2) and .0010 in reading (.00638/(.018*180*2)). In California, we find larger effects: a 10 percentage point rise in chronic absenteeism is associated with a .029 and .021 standard deviations decline in math and reading respectively. These would translate into an estimated loss of .0045 standard deviations per day in math (.029/(.018*180*2)) and .0032 standard deviations per day in reading (.021/(.018*180*2)), considerably larger than the national estimates.

Before the pandemic, a number of high-quality studies estimated the impact of additional days of absence on achievement. All these estimates are based on more plausible research designs than our crude regression and yield impact estimates larger than our national estimate of about 0.001 standard deviation loss per day of cohort absence in math and reading.

Three recent studies estimated the impact of a student's own absences on achievement using longitudinal test-score data for individual students (Goodman, 2014; Aucejo and Romano, 2016; Gershenson et al., 2017). Rather than simply comparing students with many absences to students with few absences in a given year, these studies estimated how changes in a student's days absent from year to year were associated with changes in their test scores (by including student fixed

11 Table 3 in Harris (2009) reports a short-term cost effectiveness ratio for participating students of .086 standard deviations per $1,000 of 2007 dollars. We converted to 2022 dollars using the CPI-U, dividing by 1.37.

effects). Some of these studies also account for year-to-year differences in peers and teachers (with school, teacher, or classroom fixed effects) which may impact both absences and achievement independently. These studies estimate that every day a student is absent reduced their achievement by between .005 and .008 standard deviations in math, and between .003 and .008 in reading. These estimates are 3-8 times larger than our national estimates, but more in line with the estimates from California.

Of course, there may be other reasons that a student's absences vary from one year to another (such as a student's chronic illness or a family disruption). If these are negatively related to achievement, studies using year-to-year changes in student absences would tend to overstate the effect of absences on achievement. Liu, Lee and Gershenson (2021) address this bias using data on attendance in different subjects for high school students during the same school year. Holding the number of days absent in another subject (e.g., English) as a proxy control for a students' work habits or health or family circumstances, the authors test whether those who missed more days in a subject such as math score lower in math. They find that each day of absence in math or English is associated with a .003 to .004 standard deviation loss in achievement, holding constant absences in the other subject.

While these studies focused on how a student's absence affects their own achievement, two recent studies (Gottfried, 2011; Goodman, 2014) distinguished between the effects of absenteeism on the achievement of the individual student who is absent, and the effect of absenteeism on other students in a particular school, grade, or classroom. If an accumulation of student absences affects their peers—as teachers are forced to use class time to reteach material—then the collective effect of one more absence for a whole cohort of students would be larger than the sum of the effects of each additional absence per student. That appears to be the case. For example, using data from Massachusetts, and including student fixed effects (thereby focusing on changes in end of year achievement associated with variation in absences for a given student across different school years), Goodman (2014) reports that one additional day in a student's own absence is associated with .008 standard deviations in lost achievement, and a similar increase in peer absences is associated with a similar .008 loss in achievement. Combining the two, a one day increase in average days absent in a cohort would be associated with a .016 standard deviation loss in achievement. Gottfried (2011) finds very similar combined effects of an extra day of cohort absences (.018 s.d. for math and .015 s.d. for reading).

While incorporating the effects of peer absences suggests even larger total impacts of absences on achievement, there are reasons to worry that these estimates may be overstated. Year-to-year differences in peer absences may proxy for other differences in peers (such as disruptiveness) that directly affect learning in the classroom rather than capture the causal impact of peer absences per se. For that reason, some authors measure the effects of absences using quasi-experimental methods—specifically instrumental variables (Goodman, 2014; Aucejo and Romano, 2016; Goldman and Gracie, 2014). They measure the effect of plausibly exogenous factors—such as the number of days of snowfall or a bad flu season—on both achievement and the number of absences. The ratio of the instrumental variable's effect on achievement to its effect on days of cohort absences provides another way to estimate of the effect of absences—one that is unlikely to be correlated with students' disruptiveness or family characteristics. These studies estimate that the combined effect of a day absent (through own and peer effects) is very large, ranging from .01 to .05 standard deviations loss per day absent. Using the benchmark that one standard deviation in achievement is equivalent to roughly 3 grade levels, these estimates suggest that as little as 10 days of average school or district absences could wipe out a year of learning. However, these estimates may overstate the impact of absences on achievement as well—for example, if a bad flu season affects achievement in other ways (not captured by student absences), such as teacher absences or student fatigue.

Thus, there is strong reason to believe that the rise in absenteeism is slowing the recovery, and that the impact is likely larger than our national estimates suggest. For instance, Goodman and Scott-Clayton (2023), while at the Council of Economic Advisers, co-authored a blog post suggesting that a rise in absenteeism could explain between 16 and 45 percent of the loss in achievement between 2019 and 2022. Moreover, because absence rates have increased more in high poverty districts, the rise in absenteeism is further contributing to the widening of achievement gaps we observe.

# Conclusion

During the pandemic (between 2019 and 2022), the average U.S. student lost half a grade equivalent in math and a third of a grade equivalent in reading.[12] Following the unprecedented loss, Congress provided unprecedented funding—$190 billion—to help pay for the recovery. At the time, there was no reasoned calculation implying that $190 billion would be sufficient to pay for the recovery. Indeed, when the American Rescue Plan passed in March 2021, many school districts were still operating remotely. At the time, much of the focus was on other re-opening expenses such as improved ventilation systems or to offset losses in local revenues. Moreover, there was no national estimate of the magnitude of learning loss until October 2022 (when the 2022 NAEP was released.)

On the contrary, there were reasons to expect that $190 billion would not be sufficient: $190 billion is equivalent to roughly one third of annual K-12 spending, but the loss in math—half a grade equivalent—was larger. Even before the 2023 test results became available, several analysts predicted that the funds would not be sufficient (Shores and Steinberg, 2022 and Goldhaber et al., 2023).

While students have not recovered, our research implies that the federal dollars did prevent larger losses, especially among higher poverty districts. Our estimates of the impact per dollar spent are consistent with prior research on the effects of a general revenue increase.[13] Because the dollars were targeted at higher poverty districts, we estimate that by 2024, the federal pandemic relief reduced the gap between high and low poverty districts by .10 grade equivalents in both math and reading (which is approximately equal to the difference in original loss between 2019 and 2022 between high and low income districts).

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12 Reading achievement has fallen further since 2022, for a total loss of nearly half a grade equivalent, similar to math.

13 Each extra $1,000 in spending per student was associated with a .005 standard deviation rise in achievement in math and .007 standard deviation rise in reading. Those are not statistically different from the .0079 standard deviation per $1,000 in revenue in the review of prior research by Jackson and Mackevicius (2024). If the relationship between achievement and lifetime income is sufficiently high (e.g., 20 percent rise in income per standard deviation) and if discounted lifetime income were over $1.1 million, the implied benefit would be just sufficient to justify the cost.

One of the reasons the aid did not have larger impacts is directly attributable to the American Rescue Plan legislation itself. Ninety percent of the funds were distributed directly to districts, with little room for state or federal direction or coordination. Congress granted districts broad discretion to districts on the use of the dollars. Not surprisingly, some districts made better use of the dollars than others. The dollars truly were analogous to a general revenue increase. The American Rescue Plan law only required districts to spend 20 percent on academic recovery. Our estimates from California imply that the impacts would have been larger if districts had been required to spend a larger share on academic recovery.

An underappreciated constraint on the pace of recovery has been the limited amount of additional time students have had with their teachers. According to the National Center for Education Statistics, only 15 percent of students attended an academic program in the summer of 2023 (despite the fact that nearly 80 percent of districts offered summer learning).[14] Very few districts extended the school year. Meanwhile, students in many districts had lost more than a full grade equivalent between 2019 and 2022. Their achievement losses were larger than the typical amount of improvement a student makes in a whole year. Thus, in order to make up for a full grade equivalent loss within two years would have required students to learn 150 percent of what they would typically learn per year—for two years in a row.

In attempting such a sharp increase in learning per day, districts had to contend with the fundamental laws of physics: most curricula and teacher lesson plans allocate a certain amount of time to teach each topic. And while it is always possible to find a more effective, efficient way to cover a given topic, it is hard to do so quickly. Without lengthening the school year, dramatically increasing summer learning or providing full-year tutoring to more than a minimal share of students, it was close to impossible for districts to recover from a full grade equivalent loss in achievement over two years. Were teachers simply expected to speak more quickly?

The results are disappointing, but they are not surprising, given the small increase in scheduled instructional time.

To make the challenge even more difficult, student absenteeism increased substantially—meaning that students were spending less time in school. And teachers lost more time reteaching when absent students returned.

The continuing loss in achievement is not solely attributable to what happened—or did not happen—in classrooms during the 2020-21 school year. Schools confront new challenges, such as an increase in absenteeism (which emerged only after the pandemic) and a continuing decline in literacy (which began before the pandemic). That is why we have titled the report "From Pandemic Recovery to Long-Term Reform." Our hope is to encourage the transition from short-term concerns, such as deciding how to spend the pandemic relief dollars, to addressing new and continuing long-term challenges.

The federal relief is gone, and many students remain behind. No one would be proud to have low-income children foot the bill for the pandemic with lower lifetime earnings. Yet that is the path

14 https://nces.ed.gov/whatsnew/press_releases/11_8_2023.asp

we are currently on. To help more students rebound, we recommend focusing on four priorities in the next few years:

1. **States and districts should continue to target dollars on academic catchup.**

   Because the federal dollars are gone, states may need to redirect their own dollars and the federal dollars they administer for interventions which have been shown effective, such as tutoring and summer learning.

2. **Mayors, employers, and other community leaders should join schools in tackling student absenteeism, with public information campaigns, parental outreach, etc.**

   Rather than place the responsibility for academic recovery entirely on school leaders alone, reducing absenteeism is one burden that others can help schools carry.

3. **Teachers must inform parents when their child is not at grade level.**

   Since early in the recovery, many parents have been under the false impression that their children were unaffected. Yet parental perceptions are central to many of the challenges districts face. If they are to help lower absenteeism, sign up for summer learning and increase reading at home, parents need to know when their child is behind. And teachers are the most credible messengers to tell them.

4. **We must learn what worked (and what did not) in recent reforms.**

   In recent years, 40 states have implemented "science of reading" reforms. But each state has taken a different approach, placing different emphasis on curriculum, teacher training, coaching, and retaining students who do not demonstrate reading proficiency. In addition, many states and districts have implemented cell phone bans in the hope of accelerating learning.

Policy innovation can be a strength of our federal system—but only if we organize ourselves to learn which of those efforts are working (and which are not) and to spread the most effective solutions. Finding, testing and scaling effective solutions has been the path to improvement in other sectors, from pharmaceuticals to retail trade. It's likely to be the only path to sustained improvement in K-12 education as well.

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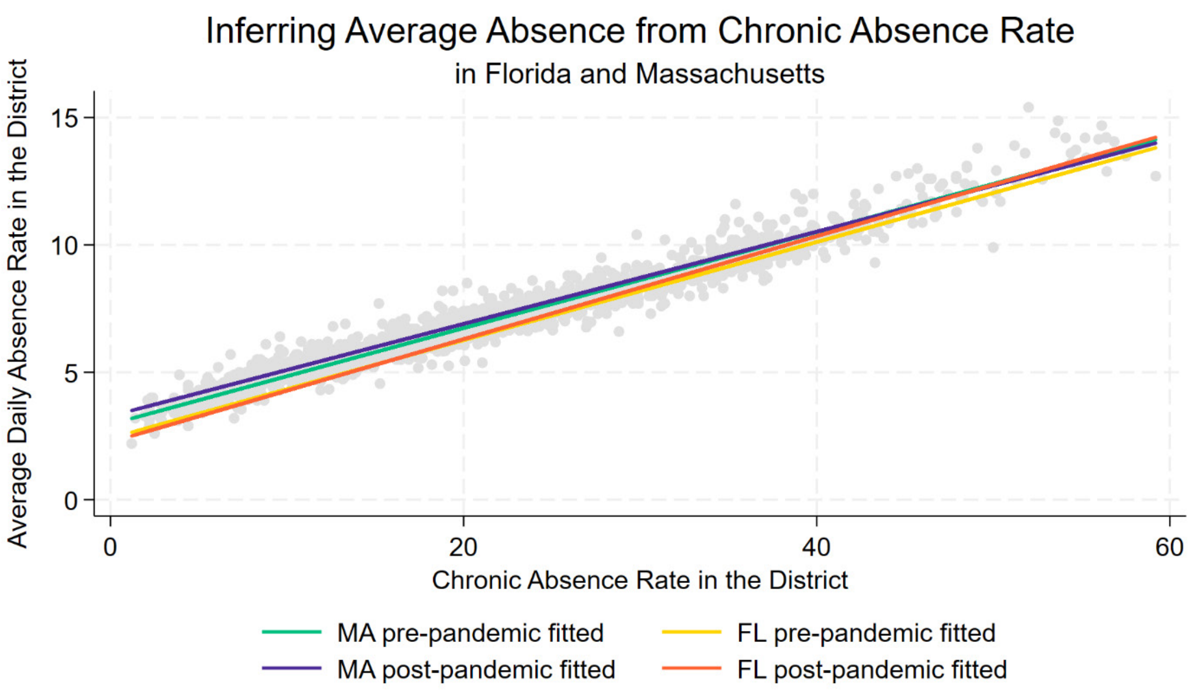
# Appendix A: Imputing Average Absence Rate from Chronic Absence Rate

The chronic absence rate is the share of students absent for more than 10 percent of a school year, while the average absence rate refers to the percent of students missing on a particular day. It is not possible to derive analytically the average absence rate from the chronic rate, because absence rates will vary by student. However, it turns out that there is a surprisingly robust empirical relationship between the share of students chronically absent and average absence rates.

In Appendix Figure 1, we plot districts' average absence rate (on the vertical axis) against the share of students chronically absent (on the horizontal axis) for districts in Florida and Massachusetts—two states which happen to report both statistics. We estimate the relationship between the two measures separately by state and by before the pandemic (2019) and after the pandemic (2022). The relationship is strikingly consistent between states and over time: 1 percentage point rise in chronic absenteeism implies a .18 percentage point rise in the average daily absence rate. We used the pooled linear regression of average absence rate on chronic absence rate (Average Absence Rate=3.12+.182*Chronic Rate) to infer average absence rate in Figures 4, 5 and 6.

**APPENDIX FIGURE 1.**




**Note**: Estimated with district level data on average absence rate and chronic absence rate in Massachusetts and Florida in 2019 and 2022. If pooled across both time periods and two states, the estimated linear relationship is $AvgAbsRate = 3.12 + .182 * Chronic\ Rate,$ with standard errors on the intercept and slope of .03 and .002 respectively.

# Appendix B: The Effect of Spending and Absenteeism on Reading Recovery

## APPENDIX TABLE 1. ESTIMATED EFFECT OF DETAILED SPENDING AND ABSENTEEISM ON READING RECOVERY (CALIFORNIA)

| | National | | | California | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ESSER Allocation per Student ($1,000s) | 0.0074*** | | | 0.0092*** | | | | |
| | (0.0019) | | | (0.0030) | | | | |
| ESSER Spent Per Student Before 2023 ($1,000s) | | 0.0074*** | 0.0082*** | | 0.0084** | 0.0117*** | | |
| | | (0.0022) | (0.0022) | | (0.0037) | (0.0038) | | |
| ESSER Spent Per Student After 2023 ($1,000s) | | 0.0074*** | 0.0085*** | | 0.0104** | 0.0136*** | | |
| | | (0.0023) | (0.0023) | | (0.0041) | (0.0045) | | |
| % Chronic Absenteeism, Average over 2023-2024 | | | -0.0638** | | | -0.2067*** | -0.2076*** | -0.2058*** |
| | | | (0.0283) | | | (0.0567) | (0.0566) | (0.0568) |
| ESSER Spent Spring 2022 - Spring 2024 | | | | | | | 0.0160*** | |
| | | | | | | | (0.0038) | |
| ESSER Spent Before Spring 2022 | | | | | | | 0.0046 | 0.0016 |
| | | | | | | | (0.0049) | (0.0075) |
| ESSER Spent After Spring 2024 | | | | | | | 0.0086 | 0.0094 |
| | | | | | | | (0.0058) | (0.0062) |
| ESSER II Spent Spring 2022 - Spring 2024 | | | | | | | | 0.0114 |
| | | | | | | | | (0.0127) |
| ESSER III 20% Spent Spring 2022 - Spring 2024 | | | | | | | | 0.0264 |
| | | | | | | | | (0.0218) |
| ESSER III 80% Spent Spring 2022 - Spring 2024 | | | | | | | | 0.0159** |
| | | | | | | | | (0.0064) |
| % Remote in 2020-21 School Year | 0.0112* | 0.0113* | 0.0128* | -0.0328 | -0.0327 | -0.0240 | -0.0228 | -0.0223 |
| | (0.0066) | (0.0066) | (0.0068) | (0.0229) | (0.0228) | (0.0232) | (0.0230) | (0.0229) |
| % Hybrid in 2020-21 School Year | 0.0103 | 0.0104 | 0.0137 | 0.0328 | 0.0327 | 0.0364 | 0.0347 | 0.0346 |
| | (0.0110) | (0.0110) | (0.0111) | (0.0284) | (0.0284) | (0.0272) | (0.0271) | (0.0270) |
| State Fixed-Effects | Yes | Yes | Yes | N/A | N/A | N/A | N/A | N/A |
| 2022 Demographics and Change 2022 to 2024 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| % Remote/Hybrid | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Formula Percent - Every 2% (2020) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| EB Trend 2015 to 2019 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| ESSER Allocation Per Student Limit | $16,000 | $16,000 | $16,000 | $16,000 | $16,000 | $16,000 | $16,000 | $16,000 |
| N | 7064 | 7064 | 7064 | 569 | 569 | 569 | 569 | 569 |
| R2 | 0.203 | 0.203 | 0.204 | 0.203 | 0.203 | 0.228 | 0.234 | 0.236 |

# Appendix C: Data Inclusion by State and Subject

## APPENDIX TABLE 2.

| | Math | | RLA | |
|---|---|---|---|---|
| State | Included? | Note | Included? | Note |
| AK | No | Low state-level participation in 2019, 2022 and 2024. | No | Low state-level participation in 2019, 2022 and 2024. |
| AL | Yes | | Yes | |
| AR | Yes | | No | The 2019 data reported in EDFacts in 2019 for Arkansas RLA is not comparable to the 2022 and 2024 data reported by the state in either Reading or English. |
| AZ | Yes | | Yes | |
| CA | Yes | | Yes | |
| CO | No | Low state-level participation in 2019, 2022 and 2024. | No | Low state-level participation in 2019, 2022 and 2024. |
| CT | Yes | | Yes | |
| DC | No | Low state-level participation in 2019. | Yes | |
| DE | Yes | | Yes | |
| FL | Yes | | Yes | |
| GA | Yes | | Yes | |
| HI | Yes | | Yes | |
| IA | Yes | | Yes | |
| ID | Yes | | Yes | |
| IL | Yes | | Yes | |
| IN | Yes | | Yes | |
| KS | Yes | | Yes | |
| KY | Yes | | Yes | |
| LA | Yes | | Yes | |
| MA | Yes | | Yes | |
| MD | Yes | | Yes | |
| ME | No | No 2024 data available. | No | No 2024 data available. |
| MI | Yes | | Yes | |
| MN | Yes | | Yes | |
| MO | Yes | | Yes | |
| MS | Yes | | Yes | |
| MT | No | No 2024 data available. | No | No 2024 data available. |
| NC | Yes | | Yes | |
| ND | Yes | Data are reported in ranges for most districts; only limited districts appear. | Yes | Data are reported in ranges for most districts; only limited districts appear. |
| NE | Yes | | Yes | |
| NH | Yes | | Yes | |
| NJ | Yes | | Yes | |
| NM | No | Insufficient data (only proficient/not proficient) reported in 2022 and 2024. | No | Insufficient data (only proficient/not proficient) reported in 2022 and 2024. |
| NV | Yes | | Yes | |
| NY | No | Low state-level participation in 2019, 2022 and 2024. | No | Low state-level participation in 2019, 2022 and 2024. |
| OH | Yes | | Yes | |
| OK | Yes | | Yes | |
| OR | No | Low state-level participation in 2022 and 2024. | No | Low state-level participation in 2022 and 2024. |
| PA | Yes | | Yes | |
| RI | Yes | | Yes | |
| SC | Yes | | Yes | |
| SD | Yes | | Yes | |
| TN | Yes | | Yes | |
| TX | Yes | | Yes | |
| UT | Yes | | Yes | |
| VA | No | Grade 5-8 math data is not useable in 2019, 2022, and 2024 due to high rates of off-grade testing (e.g., taking the 8th grade test when enrolled in 7th grade). Estimates cannot be produced with only two grades of data. | Yes | |
| VT | No | Data are not reported for supervisory unions in 2022 and 2024. | No | Data are not reported for supervisory unions in 2022 and 2024. |
| WA | Yes | | Yes | |
| WI | Yes | | Yes | |
| WV | Yes | | No | Data for 2019 not reported in EDFacts. |
| WY | Yes | | Yes | |
| Total | 41 | | 41 | |