

TECHNICAL APPENDIX

Making the Grade 2022: How Fair is School Funding in Your State? analyzes the condition of school finance systems using three indicators of fair school funding: funding level, funding distribution and funding effort. States are both ranked and graded on these indicators, providing important information on how states perform relative to other states. The report does not include any specific benchmarks in terms of the level of funding, how that funding is distributed, or how much effort states should be making to fund their schools. The answers to these questions vary according to each state's unique circumstances.

- Funding levels must be sufficient to meet each state's curricular standards.
- Funding distribution should always be progressive, but the degree of progressivity is also unique to the conditions in each state.
- The appropriate funding effort is dependent on the level of funding required and the size of the state's economy.

The fair funding indicators are interrelated and complex. Each of the indicators is important on its own, but any analysis must also consider the interplay between measures. The sections below describe both the technical details of how indicators were constructed and how they should be interpreted.

General Notes

All data are from the 2019-20 school year, the most recent data available. Rankings in this report, therefore, should be viewed in light of school funding activity that may have occurred within the last three annual budget cycles and therefore not reflected in this report.

Poverty is measured using the U.S. Census Bureau's [Small Area Income and Poverty Estimates](#), calculated at the school district level and restricted to school-aged children (age 5 – 17). This is a more conservative measure of poverty than free (130% Census poverty) or reduced lunch (185%) eligibility under the National School Lunch Program (NSLP). Although the NSLP is the more common metric of school poverty, the measure is becoming increasingly inconsistent as many districts move to community eligibility and are therefore not required to collect family income information for all students.

Grades are assigned using the typical "curve." A standardized score is calculated as the state's difference from the mean, expressed in standard deviations. Grades are as follows: A = 2/3 standard deviation above the mean ($z > 0.67$); B = between 1/3 and 2/3 standard deviations above the mean ($.33 < z < .67$); C = between 1/3 standard deviation below and 1/3 standard deviation above the mean ($-.33 < z < .33$); D = between 1/3 and 2/3 standard deviations below the mean ($-.33 > z > -.67$); F = 2/3 standard deviation below the mean ($z < -.67$).

Funding Level

Funding level is calculated from the U.S. Census Bureau's [Annual Survey of School System Finances](#) (F33). We include total state (TSTREV) and local (TLOCREV) revenue. Federal revenue is not included, except for Impact Aid (B10) and Native American education revenue (B12), as they are intended to replace state and local funds. We also exclude revenue for capital outlay and debt service programs (C11). These revenues tend to be uneven from year to year; one-time or short-term investments may obscure more prevalent funding patterns.

We also exclude certain expenditure variables that are associated with students who are not educated within the school district. In this edition, we expand the definition of pass-through funding beyond payments to charter schools (V92), as in previous years, to also exclude payments to private schools (V91) and payments to other school systems (Q11).¹ In most states, these expenditure variables represent funds that are passed through the district to fund students who are excluded from district enrollment counts. Failing to exclude these funds artificially inflates per pupil revenues in districts with significant pass-through revenue. The impact of pass-through funding on district-level per pupil revenues varies both between and within states, potentially biasing both our funding level and funding distribution measures.²

The F33 handles charter pass-through funding differently in Massachusetts and Ohio, requiring modifications in these states.³ Beginning in 2015, the full charter payment is already subtracted from the state revenue totals in Ohio. To avoid double counting these revenues in our adjustments, we do not exclude V92 in 2015 and beyond. In Massachusetts, beginning in 2019, tuition for charter and other virtual schools is not longer included in the local revenue of the sending districts. In this case, subtracting the entire V92 expenditure would over-adjust the revenue totals since the local share of these charter tuition payments has already been excluded from the local total. We use [data](#) from the Massachusetts Department of Elementary and Secondary Education to create a state share percentage of formula aid, and then multiply V92 by this percentage, so that we are only excluding the state's portion of charter funding.

Figure 1 shows the effect of these adjustments in two districts with large charter populations. In Boston, the blue line shows that the adjusted V92 variable results in a more consistent per pupil revenue trend, compared to the yellow line, which leads to a significant drop in per pupil revenue in 2019 if the entire V92 total is excluded. Excluding the full V92 amount in 2020 would underestimate Boston's per pupil revenue by over \$3,700. Similarly, continuing to exclude V92 in Columbus in 2020 would underestimate per pupil revenue by over \$3,300.

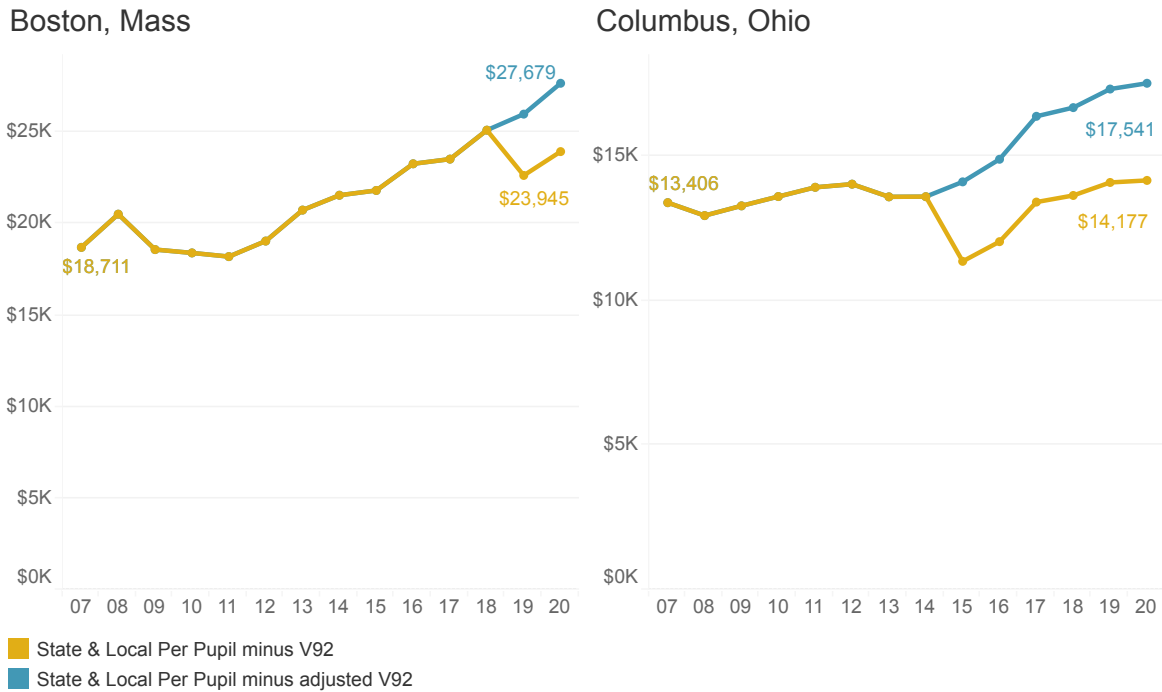
¹ For more explanation of the effect of charter expenditures on our funding measures, see the *Making the Grade 2020 Technical Appendix*.

² For a more detailed discussion of the pass-through funding issues, see Matt Kelly and Danielle Farrie, *Misrepresented Funding Gaps in Data for Some States*, Education Researcher, forthcoming.

³ *Annual Survey of School System Finances, Public Elementary-Secondary Education Finance Data Technical Documentation*. 2020. <https://www.census.gov/programs-surveys/school-finances/technical-documentation/complete.html>

Figure 1.

V92 Adjustment to State and Local Revenue Per Pupil



These funding levels are then adjusted by National Center for Education Statistics' (NCES) [Comparable Wage Index for Teachers](#) (CWI). This index measures regional variations in wages and salaries of non-teachers to account for geographic differences in the costs of running a school district. Adjusting revenues by this index allows us to compare revenue levels among states while accounting for the fact that in some states it costs a lot more, and other states a lot less, to staff their schools. For school districts where we are unable to match between the F33 and CWI files, where possible, we use the county-level CWI as a replacement.

Finally, revenues are divided by student enrollment (V33) to calculate per pupil funding levels.

Inflation Adjustment

When examining the changes in funding level over time, we use the State and Local Government Implicit Price Deflator (S&L IPD) to adjust for inflation. Data are retrieved from the Federal Reserve Bank of St. Louis.⁴ This measure accounts for the effects of inflation on state and local government expenditures and is preferable over the Consumer Price Index (CPI), which accounts for inflation in the price of goods typically purchased by households. We use the quarterly indices to create an annual index that matches most school districts' fiscal year (July-June).

INTERPRETATION

States are ranked from highest funding level to lowest, with grades assigned using the grading methodology discussed above. Again, because there is no national benchmark defining an adequate level of school funding, the findings are simply comparative. They should be used to compare the relative funding levels of states and not to assess whether any state is meeting its obligation to adequately fund its schools.

Funding Distribution

Describing the pattern of funding distribution relative to student poverty requires advanced statistical methods. We utilize a modified version of the regression-based method developed by Bruce Baker and published in *Is School Funding Fair? A National Report Card* (eds 1-7).⁵ The analysis essentially asks, once we account for differences in costs related to district size and geography, do states provide more or less funding to districts as the poverty rate increases?

The District of Columbia and Hawaii are excluded from this indicator because they fund all their schools as a single district or governance unit. We also exclude Vermont because of changes in the way the state reports poverty data. Beginning in 2014, instead of reporting data for each individual school district, SAIPE data is only reported at the supervisory union level. Without accurate data on the poverty rates for the individual school districts, it is difficult to establish an accurate relationship between student poverty and funding levels.⁶

A fixed effects linear regression model is used to identify the state-specific relationships between poverty and funding levels. The dependent variable is the natural log of district-level state and local revenue, as described in the funding level section above. The model controls for two main education cost-drivers: district size and regional wage variation. District size is a categorical variable measured using the enrollment variable (V33) from the F33 and included as categorical variable using deciles. Wage variation is measured using the NCES wage index. The model is weighted by district enrollment so that small districts do not unduly influence the findings.

⁴ U.S. Bureau of Economic Analysis, *Government consumption expenditures and gross investment: State and local (implicit price deflator)* [A829RD3A086NBEA], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/A829RD3A086NBEA>.

⁵ See Baker, Bruce D., Danielle Farrie, David Sciarra. *Is School Funding Fair? A National Report Card, 7th Ed.*, Education Law Center/Rutgers Graduate School of Education (Feb. 2018).

⁶ In 2015, Vermont began reporting some of its data to the federal government at the supervisory union level instead of the individual school district level. As a result, the SAIPE data reports include 276 districts in 2014, but only 60 districts from 2015 on. The F33 continues to report financial data using the smaller district units. Some school districts split across the supervisory unions, making it difficult to aggregate the district units up to the supervisory unions. For the 2019 report, NCES provided us with recoded F33 files that allocate the enrollment and financial data from the district level to the appropriate supervisory union and included the correct wage index data. Because funding decisions are made at the district level, the utility of the analysis at the supervisory union is less relevant, so we chose to exclude Vermont from subsequent analyses.

A very conservative approach was taken to exclude outlier districts. Districts with per pupil revenues over \$100,000 or enrollments less than 10 were excluded from the models. Estimates are produced setting the enrollment category to districts with between 750 and 1000 students.

The funding distribution measure is calculated as the difference in predicted per pupil funding levels in low poverty (5%) and high poverty (30%) districts.

INTERPRETATION

States are ranked and graded by the predicted per pupil funding gap between high and low poverty districts. States that provide higher per pupil funding levels to high poverty districts are deemed progressive, states that provide less to high poverty districts are regressive, and states where there is no meaningful difference are “flat.” A state may be classified as flat because districts are all funded at relatively similar levels or because there is variation in funding levels, but that variation is unrelated to student poverty.

Because the funding distribution measure is attempting to create a simple summary from the complex interactions of many factors, the findings should be interpreted with caution. The complicated relationship between funding and poverty is difficult to distill. There will inevitably be districts within each state that do not match the overall pattern presented. The funding distribution measure is intended to provide a high-level view of the relationship between funding and poverty and cannot substitute for a deeper analysis of the specific state conditions that influence the distribution of funding. View the [report online](#) for interactive tools that explore the relationship between the funding distribution measure and the raw district-level data for each state.

Funding Effort

Funding effort is measured as total state (TSTREV) and local (TLOCREV) revenue from the F33 divided by the state’s total gross domestic product (GDP) for all industries. State GDP is measured from the [Bureau of Economic Analysis](#) (table [SAGDP2](#)). Because the District of Columbia’s GDP is better compared to other cities, rather than other states, we exclude it from this analysis.

INTERPRETATION

GDP is the value of all goods and services produced by each state’s economy and represents the state’s economic capacity to raise funds for schools. While states are ranked and graded by the percentage of GDP allocated to PK-12 education, those rankings must be placed in the context of the fairness of the state’s funding system and its comparative wealth. For example, a low-wealth state could exert high effort, but still produce low funding levels. Conversely, a high-wealth state could exert low effort and still generate higher than average funding levels. A low effort grade combined with either low funding levels or poor funding distribution indicates that the state could do more to improve their finance system. Likewise, a high effort grade combined with low funding levels or poor funding distribution indicates that the state may not have the economic capacity to improve its finance system without additional help from federal resources.