Equity and Adequacy of Colorado School Funding: A Cost-Modeling Approach
Executive Summary

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By the spring of 2023, Colorado's funding formula had been in place for almost 3 decades, and there was growing recognition that the funding formula was possibly outdated and in need of modernizing (e.g., Brundin, 2021). The Public School Finance Act of 1994 created Colorado's original foundation aid formula, which established a base per-pupil funding amount with adjustments for cost of living and district size, and an additional amount for at-risk students (defined by free or reduced-price lunch [FRL] eligibility). In addition to the formula being considered outdated, there was growing frustration with the "budget stabilization factor," a legacy of the Great Recession that allowed lawmakers to cut a percentage of state education funding each year in order to balance the state budget (Colorado School Finance Project, n.d.).

In May 2023, the Public School Finance Act for the 2023–24 fiscal year (SB23-287) established a Public School Finance Task Force to examine and make recommendations regarding how Colorado's schools are funded and called for two independent entities to conduct studies examining the amount of additional funding needed to provide an adequate education. The Task Force established the parameters that each study should address, including the base amount of funding for students without additional learning needs and funding adjustments for students with additional needs.

The American Institutes for Research® (AIR®) study team was awarded a contract to conduct an outcome-focused adequacy study using a cost-function modeling methodology. The following provides a brief overview of the study and presents the key study findings and recommendations.

Study Overview

The AIR study team conducted an outcome-oriented study using cost-function modeling and other descriptive quantitative analyses. The study also included analyses of input from citizens garnered through townhall meetings and a public engagement survey. Specifically, the study was designed to:

- Evaluate strengths and weaknesses of the current funding formula, particularly as it relates to the equity and adequacy of Colorado's existing school funding system.

- Estimate an appropriate base level of funding and cost adjustments (funding weights) for students with additional needs [at-risk students, English language learners (ELLs), and students with

disabilities (SWDs)], school contextual factors that influence cost (e.g., school/district size, urbanicity), and geographic differences in costs required to hire and retain staff.

The public engagement component of the study helped build public awareness of the study and provided an opportunity for public discourse. The process was designed to help stimulate a spirit of cooperation and to encourage key constituents, including students, parents/guardians, educators, community members, and others, to feel vested in the process. The public engagement component also sought to identify how Coloradans envisioned the goals and priorities of their public schools and how those goals and priorities relate to the funding of Colorado's schools.

To address these study objectives, we collected administrative data to examine the equity of current resource distribution, student outcomes in Colorado, and the adequacy of public school funding using a cost-function methodology. Also, we administered a public engagement survey to ask a broad range of Colorado citizens their perspectives on the quality of education and the sufficiency of funding and resources for Colorado's schools, and we conducted eight townhall meetings to hear directly from Colorado's citizens on these issues.

Key Findings

We identified several key findings that stem from the analyses conducted for this study. Although there are many other findings included in our main report, the following findings most directly inform our recommendations and conclusions.

Colorado's current level of funding is inadequate to meet the state's educational goals.

- We find a gap of $4,600 per student between the funding needed to provide students with an adequate education and existing levels of spending from state and local sources. In total, $4.1 billion in additional funding is needed to provide all Colorado's K–12 students with an adequate education, representing a 33% increase compared to what was spent in 2022–23 (Exhibit 1).

- Coloradans who participated in our public engagement activities felt strongly that the current levels of funding are inadequate. The public also shared that existing funding is insufficient to address the needs of students with additional needs, including students who are economically disadvantaged, ELLs, and SWDs.

> *School funding has definitely been an issue in [my county], and there's a lot of issues around equity, around special education, gifted education, English language development. All those things suffer, and it creates this scarcity mindset that if we are putting money towards a certain group of students then other students are losing out. And it's really, really harmful to the social and communal aspects of public education. And it really complicates and further divides and polarizes the community.*
>
> —*Metro Area Townhall Attendee*

Exhibit 1. Comparison of Total Simulated Formula and Actual Current Spending From State and Local Sources (2022–23)
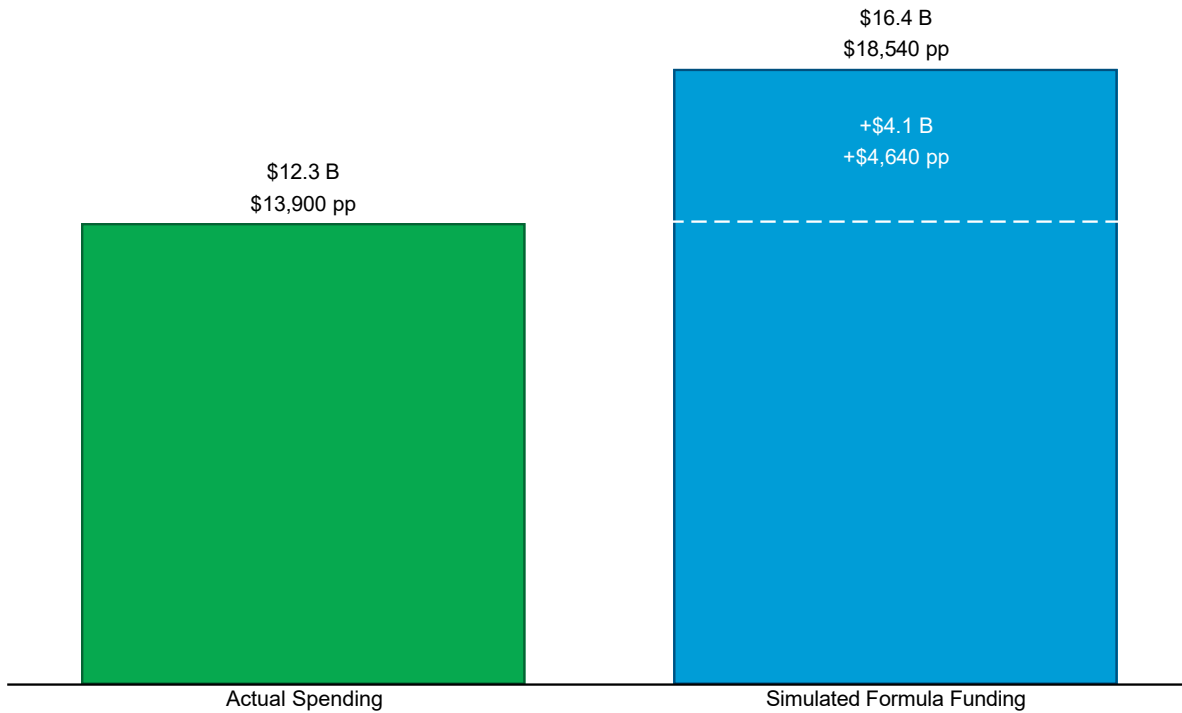
Note: B = billions in total expenditures; pp = per pupil.

- Students in Colorado perform below the level of the state's educational goals and do not meet the state's benchmarks for proficiency or college and career readiness, on average.

- Student outcomes, as measured by the National Assessment of Education Progress, have declined during the past decade, with the decline beginning well prior to the Covid-19 pandemic (Exhibit 2).

I think our district struggles with providing that social-emotional support and those basic life skills because we push academics so much that the kids struggle more because they don't have the access to the social-emotional support that they need to be able to be successful academically.

–Pikes Peak Region Townhall Attendee

I think without the additional staffing and interventions and support we need, I don't know that what we are going to be able to get is really good, especially when it comes to our special needs students.

–Statewide Townhall Attendee

Exhibit 2. Comparison of Fourth- and Eighth-Grade Math and Reading National Assessment of Education Progress Scores to Proficiency Benchmarks and Comparison States
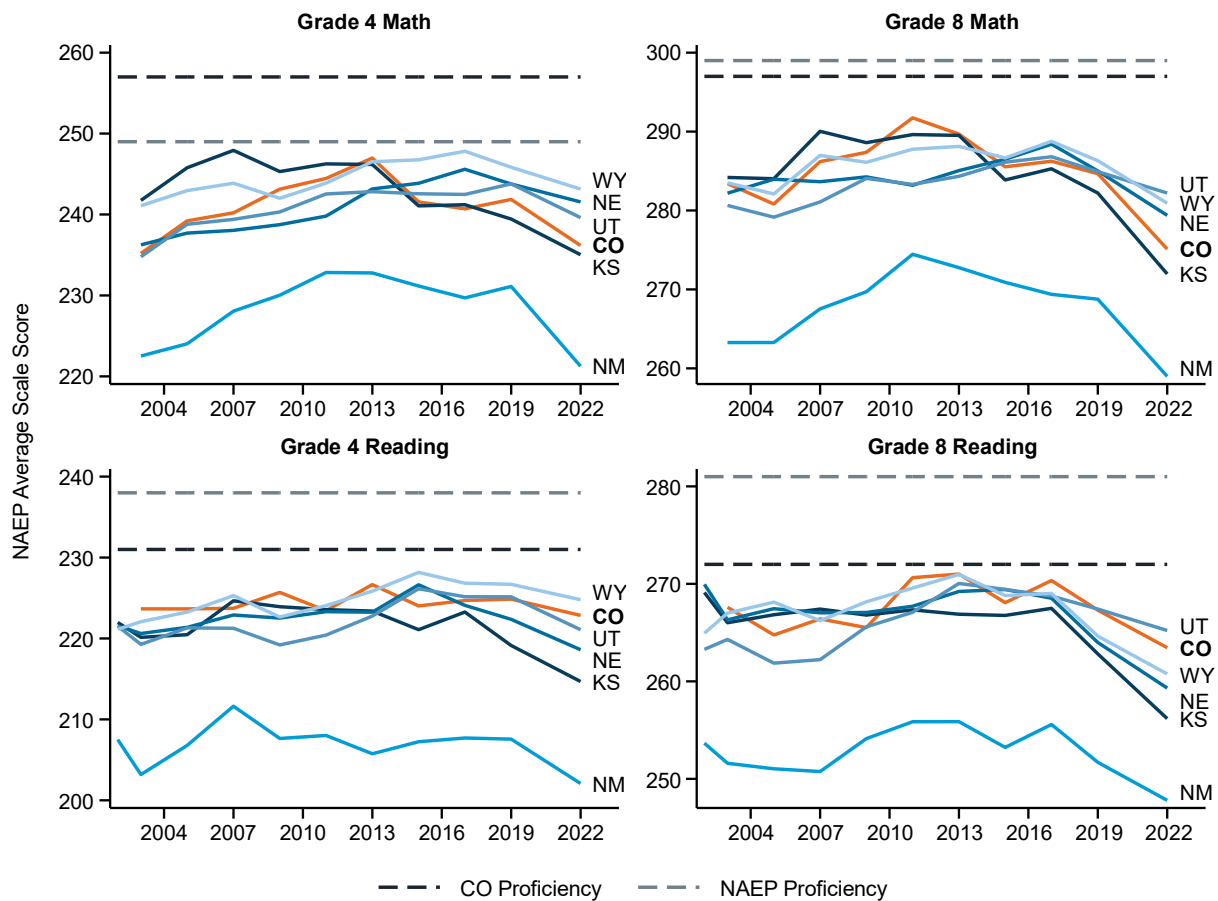

Note. NAEP average scale scores are from https://nces.ed.gov/nationsreportcard/. Colorado's NAEP equivalent proficiency benchmark is from Yi et al. (2021).

Colorado's current school funding system is not sufficiently equitable to provide all students an equal opportunity to achieve the state's student outcome goals.

- The schools in the state with the highest student needs, particularly as measured by the percentage of students eligible for FRL, have systematically lower student outcomes compared to schools with lower levels of student needs (Exhibit 3).

- After accounting for other student-need variables and school characteristics, schools with higher percentages of students eligible for FRL receive less in state and local funding than otherwise similar schools with lower FRL rates.

- Our cost-function analysis and resulting estimation of funding weights indicates a need to provide much stronger funding adjustments on the basis of students eligible for FRL, ELLs, and SWDs. In other words, the districts with the highest levels of student needs require the most additional funding to meet a student outcome target that aligns with state goals (Exhibit 4).

Exhibit 3. Relationship Between School-Level Student Outcomes and Free or Reduced-Price Lunch Percentage (2022–23)
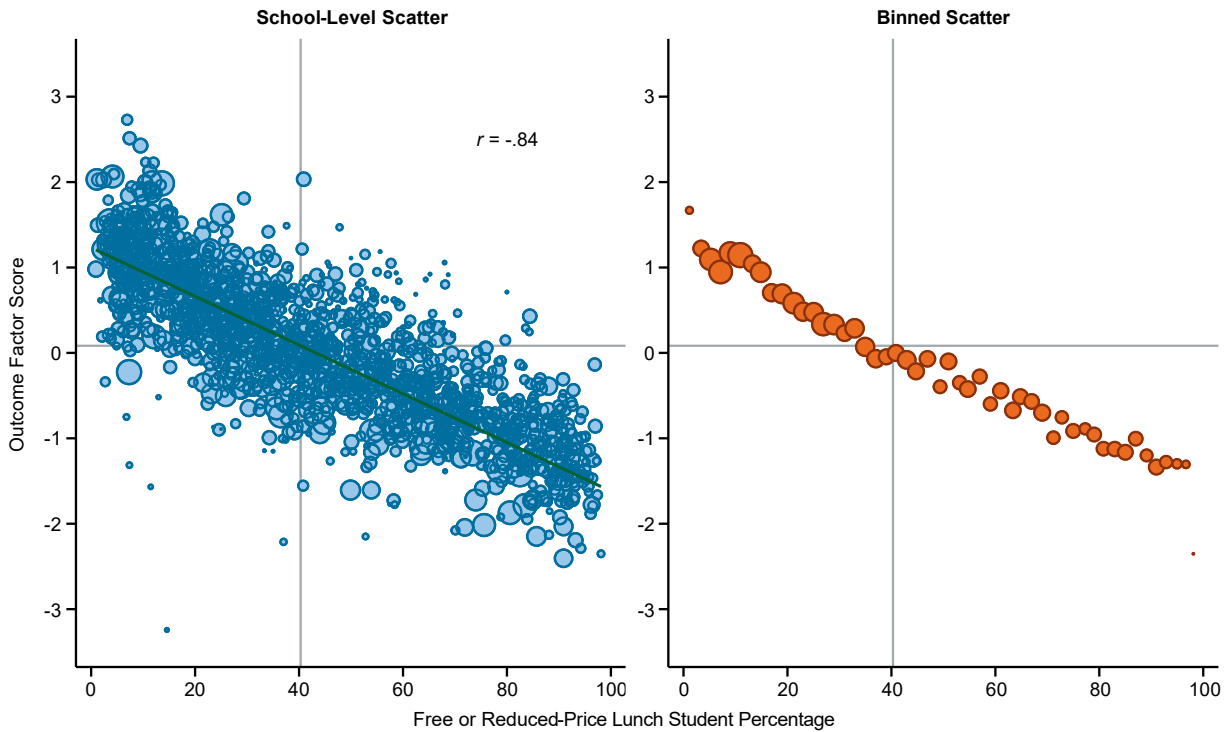

Note. The outcome factor score is a combined measure of school performance that includes student assessment scores, measures of high school completion (dropout and graduation rates), and measures of attendance/absenteeism. Each dot in the school-level scatter represents a school. Each dot in the binned scatter represents the average outcome factor score for all schools within a given bin. Bins are defined using a width of two percentage points. The size of the dots in both panels is weighted by enrollment. The horizontal gray lines show the overall average outcome factor score, and the vertical gray lines show the overall average percentage of students who are economically disadvantaged. The green line in the school-level scatter is the line of best fit. The correlation coefficient in the school-level scatter is denoted by *r*.

Teachers are one of the most important resources in driving student outcomes, but Colorado's teachers are poorly paid and inequitably distributed.

- We conducted an analysis relating the efficiency of schools to how schools use their resources, where efficiency is defined as the difference between observed student outcomes and expected outcomes of schools based on their spending levels, school demographics, and other characteristics. We found that more efficient schools had higher paid and more experienced teachers, suggesting the importance of the teacher workforce in driving better student outcomes.

- The discrepancy in salaries between teachers and other workers with similar education and of similar age is larger in Colorado than in any other state. Colorado also has a higher number of students per teacher than the median state nationally (Exhibit 5).

Exhibit 4. Comparing Actual State and Local Spending and Simulated Formula Funding Across Student-Need Quintiles (2022–23)
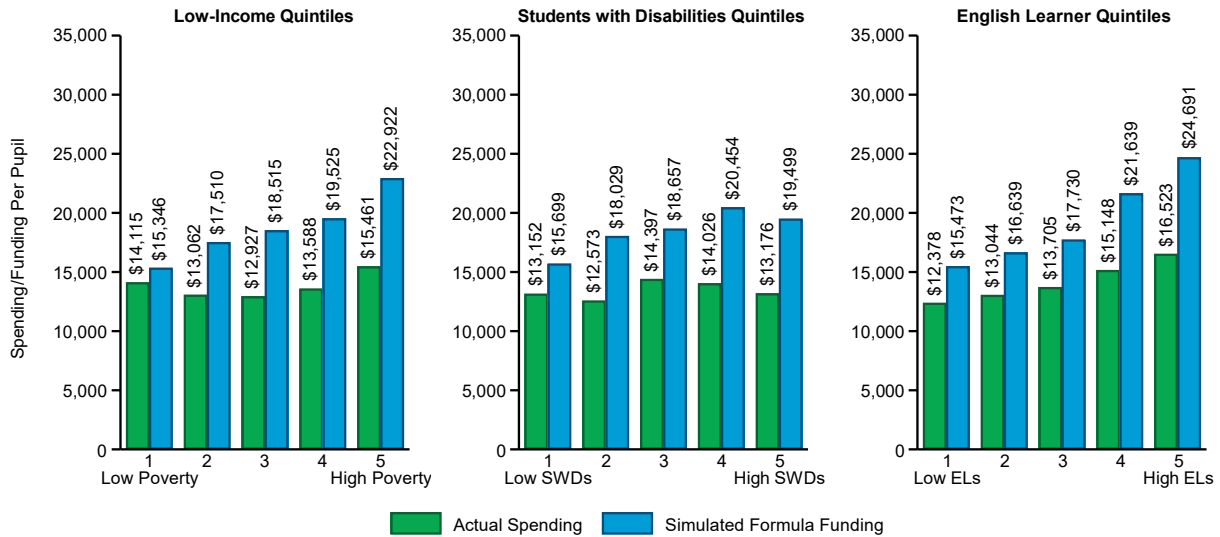
Note. Each quintile represents approximately 20% of districts, when arranged from lowest to highest-need based on the given student need variable. Actuals spending represents the enrollment weighted average of the actual amount spent in the 2022–23 school year for districts in each quintile. Simulated formula funding represents the average required amount of funding needed to meet an outcome target that aligns with the state's educational goals for districts in a given quintile. Calculations are based on data from the CDE and the U.S. Department of Education.

Exhibit 5. Teacher Salaries Compared with Non-Teachers and Teacher Staffing Levels Across States (2000–22)
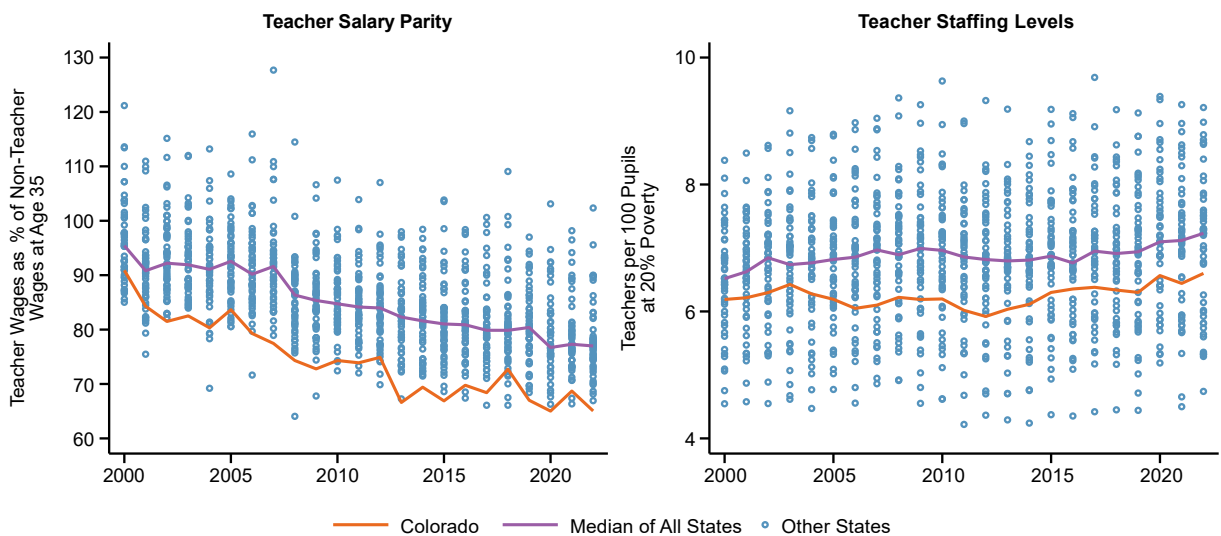
Note. Data are from the School Finance Indicators Database, State Indicators (Baker et al., 2023).

- Teachers in Colorado are also inequitably distributed when considering pay, experience level, and staffing levels. Schools with higher FRL rates have lower-paid, less-experienced teachers and employ fewer teachers relative to student enrollment compared to otherwise similar schools with lower FRL rates, on average.

- Coloradans who took our public engagement survey were most likely to agree that teachers in Colorado are not well paid, class sizes are too large, and there are not enough staff to serve students with additional needs.

Colorado's current funding system does not appropriately account for local capacity in determining the share of funding levels that should come from local revenue, resulting in property tax rates that vary drastically across districts and enabling higher spending levels in high-wealth districts relative to lower-wealth districts.

- Under the current funding system, the state allows for a wide range of tax rates to satisfy the local share requirement. As a result, the state covers a large share of funding for many districts with exceptionally low tax rates while other districts have much higher tax rates.

- On average, districts with lower tax rates are wealthier in terms of their assessed property values per student, meaning that wealthier residents in the state typically pay lower tax rates than poorer residents.

- On average, districts with higher assessed property values per student spend more in state and local funding, meaning that students who reside in wealthier areas typically attend better funded schools.

Recommendations and Conclusion

Based on our study findings and review of Colorado's existing system of school funding, we developed the following five recommendations:

Recommendation 1: Increase education funding so that funding levels are commensurate with the state's educational goals.

Based on our adequacy analyses using cost-function modeling, in order to provide a level of education commensurate with the state's goals, an additional $4,600 per student in state and local funding is required, equating to an additional $4.1 billion, or a 33% increase in the state's education budget for 2022–23.

Although we find that more funding is needed, our model describing the cost of producing outcomes commensurate with the state's educational goals (the high-outcome model) suggests a base per-pupil amount of $8,443 in 2022–23 (inflated to $9,842 in 2025–26)—an amount only slightly higher than what is currently included in Colorado's funding formula. This suggests that most of the necessary

increases in funding should occur through stronger funding weights as opposed to a higher base amount.

Recommendation 2: Increase the strength of funding weights for economically disadvantaged students, ELLs, and SWDs, so that more resources are distributed based on student need. This would help provide more equal opportunities to all students to achieve the state's goals regardless of background.

The results of our adequacy analysis and weight estimation indicate that funding should be more strongly distributed according to student need. In the new funding formula established by HB24-1448, which will begin being implemented in the 2025–26 school year, at-risk students, ELLs, and SWDs are provided additional funding at a rate of 25% of the base cost (a funding weight of 0.25). The results of our analyses indicate that weights of 1.07, 1.28, and 1.20 are needed for at-risk students, SWDs, and ELLs, respectively, resulting in funding amounts more than double the base cost for these student groups. If Colorado districts were funded using our proposed weights, high-need districts would receive substantial increases in funding relative to what they currently spend.

Recommendation 3: Invest more in teachers by: (a) increasing teacher pay to be more comparable to the pay of non-teachers with similar education levels and experience, and (b) increasing the number of teachers to reduce student-to-teacher ratios.

With more adequate funding levels and funding more strongly distributed based on student needs, Colorado's school districts—and particularly those with high student needs—would be able to increase teacher pay and hire more teachers. Better compensation and working conditions (resulting from smaller class sizes and more staff in schools) should help retain teachers longer and boost average teacher experience. Our analysis of efficiency suggests that having higher-paid, more experienced teachers is critical for improving student outcomes in the state.

Recommendation 4: Address tax inequity in the local tax rates that go toward the local share calculations so that the local share required for each district is based on a more uniform property tax rate.

The state's method for determining each district's local share of funding calculated through the state formula allows for widely varying local property tax rates. Whereas many districts in the state pay the maximum allowable rate of 27 mills to satisfy their local obligation, many other districts have tax rates that are but a fraction of the maximum allowable rate. Addressing these inequities would create greater fairness to taxpayers in different locations of the state. It would also help raise additional revenue overall if districts with exceptionally low tax rates were expected to contribute more locally (resulting in a lower state revenue obligation for those districts).

Recommendation 5: Adjust for geographic differences in staffing costs using a comparative wage index to reflect a region's cost of living and available amenities.

Colorado is one of few states that uses a cost-of-living index to adjust funding levels for geographic differences in the level of compensation required to recruit and retain qualified teachers. Two factors

influence geographic differences in needed teacher compensation. One factor is the cost of living, and the other factor is the living conditions or the amenities that certain areas provide. Certain areas have high costs, in part, because they provide rich amenities that improve the quality of life. Because people want to live and work in more desirable locations with abundant amenities, they are willing to accept lower compensation than the cost-of-living index would indicate. In other words, a pure cost-of-living calculation ignores the presence of greater amenities in many high-cost areas, resulting in an overstatement of the compensation required to recruit and retain teachers in such locations. Colorado's Public School Finance Task Force recognized the problem of inflated cost differentials stemming from the cost-of-living index. Their solution was to cap the cost-of-living index to a certain value. A less arbitrary solution would be to use a comparable wage index-based approach. A comparable wage index calculates the differential wages required in certain areas by using the relative differences in actual wages of noneducators. In doing so, this approach captures both cost-of-living differences and differences in living conditions, both of which affect the wages that workers are willing to accept.

CONCLUSION

Colorado operates a foundation aid funding formula that uses a base per-pupil amount and a series of weights to allocate funding to school districts. The structure of Colorado's new funding formula contains much of what is needed for a strong funding formula. It is easy to understand, provides dollars to districts to be used flexibly, includes many legitimate weighting categories to adjust funding for the factors that influence the cost of education (including student needs, scale of operation, and geographic differences in staffing compensation), and embeds a process to help equalize funding across districts based on the capacity of districts to raise revenue locally.

Rather than a wholesale redesign, more equitable and adequate funding could be achieved through further modification of the already newly redesigned funding formula. Results of this study can help the state identify a target level of funding needed to meet state goals and select a set of empirical cost-based funding weights that will provide more funding to districts on the basis of student need. Our study also highlight the need to address loopholes and historical precedence in the determination of the local share that allows for widely varying property tax rates across the state.

Additional Information

For additional information, please see the main report, *Equity and Adequacy of Colorado School Funding: A Cost-Modeling Approach* as well as the accompanying Technical Appendix. The main report provides descriptions of the data and methods, descriptions of each analysis undertaken as part of the study, the results from each analysis, recommendations, and conclusions. The Technical Appendix provides additional details regarding the methods, additional detailed exhibits, and further information on the public engagement activities.

References

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