Study of the Educational Costs of Serving Students Who Are Economically Disadvantaged

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Chapter 1. Introduction

The state of Ohio's FY 2024–25 budget (2023) directed the Ohio Department of Education and Workforce (ODEW) to

> conduct a study to determine the needs of Ohio's economically disadvantaged students, the most effective services for meeting those needs, and the cost of implementing those services using Ohio cost data, including all current expenditures and inputs supporting economically disadvantaged students.

In October 2023, the American Institutes for Research (AIR), in partnership with WestEd, was awarded a contract to conduct an independent and comprehensive education cost study based on economically disadvantaged students' needs, as stipulated by Ohio House Bill 33 (2023) and the subsequent request for proposals. This report documents the activities and analyses undertaken to complete the study of the costs of providing an adequate education to economically disadvantaged students, presents the results of those analyses, and provides policy recommendations.[1]

Study Overview

To provide an exhaustive study of the costs associated with educating economically disadvantaged students in Ohio, the AIR study team designed a multifaceted investigation to address the following research questions:

- How does Ohio's current public funding system for K–12 schools provide additional financial support to serve the needs of economically disadvantaged students and how does this compare to funding adjustments used by other states to support this student population?
- What differences in funding and educational outcomes exist between economically disadvantaged K–12 students and their more advantaged peers in Ohio?
- What are the unique needs of K–12 economically disadvantaged students in Ohio, and what differences exist in these needs across grade levels and locales?
- What is the relationship between educational spending, student outcomes, and student needs across public schools in Ohio?
- What sources of funding are used to support students who are economically disadvantaged in Ohio, what types of services and resources do these funds provide, and do services and resources vary according to incidence of student economic disadvantage or the efficiency with which outcomes are produced?

[1] The study team would like to acknowledge and thank

- What are the costs associated with providing effective educational programming to students who experience economic disadvantage, and how do these differ from the costs of adequately serving students with no additional needs?
- To what extent do key federal and state funding sources pay for educational programming provided to students who experience economic disadvantage, including Title I, Disadvantaged Pupil Impact Aid (DPIA), and Student Wellness and Success Funds (SWSFs)?
- What changes can Ohio make to the way it funds economically disadvantaged students to better ensure districts and schools are provided with the funding necessary to support an adequate educational opportunity for economically disadvantaged students?

To answer these questions, we engaged in the data collection and analysis activities outlined in Exhibit 1.1.

Exhibit 1.1. Study Data Collection and Analysis Activities

Activity	Description
Data collection activities	
Collection of administrative data	Gathered and compiled extant administrative data on school enrollment and demographics, student and school outcomes, spending, and other school characteristics.
Surveys of local education agencies (community school and traditional public school district) leaders	Administered two surveys to better understand the funding sources for economically disadvantaged students, the services they are offered, and the personnel and nonpersonnel resources leveraged to provide these services.
Convening of professional judgment panels	Recruited expert educators within Ohio to participate in panels responsible for described school-level programs and the corresponding resources required to provide an adequate education for economically disadvantaged students.
Analysis activities	
Analysis of administrative data	Performed quantitative analysis of administrative data on spending, student outcomes, and student needs to examine whether there is equal opportunity for students who are economically disadvantaged to achieve at the same level as their noneconomically disadvantaged peers.
Review of state funding policy documents	Reviewed policy documentation on Ohio and other state funding systems to understand the different ways in which funding for economically disadvantaged students is allocated to districts and schools.
Analysis of survey responses	Analyzed survey responses from LEA leaders to identify key themes and findings regarding funding and programming for economically disadvantaged students.
Analysis of professional judgment panel data	Quantitatively estimated costs of adequately educating economically disadvantaged students based on resources specified by professional judgment panels and compared adequate costs to actual spending in schools in Ohio. Qualitatively analyzed program design descriptions to understand common themes in programming across panels.

Description of Data

We engaged in several different data collection activities, including (a) surveys for educational practitioners, (b) surveys for staff from community-based organizations (CBOs), and (c) school program designs and resources specifications obtained in workshops with groups of educational practitioners (professional judgment panels [PJPs]). In addition, our analysis draws upon extant survey data from the Ohio Disadvantaged Pupil Impact Aid and Student Wellness and Success Funds (DPIA/SWSF) Data Reporting Tool.

Primary Survey Collection–Project Surveys

To support the study needs assessment and analysis of current services to students who are economically disadvantaged (Chapters 3 and 5), we developed two original statewide survey instruments. These surveys gathered perception data from key groups closely engaged with students who are economically disadvantaged and their families: educational practitioners and staff from CBOs. Both surveys were sent to their respective audiences in April 2024.

Due to their focus on serving local education agencies (LEAs) and schools with high populations of students who are economically disadvantaged, Title I coordinators (district professionals that work to coordinate federal funding related to Title I of the Elementary and Secondary Education Act) were invited to complete the practitioner survey and encouraged to extend the invitation to other educational practitioners (such as school leaders and teachers), families, and community members closely involved with these students. The study team analyzed responses received as of September 2024, when the survey was closed to additional responses.

The CBO survey was distributed to 56 organizations across Ohio that provide services to students who are economically disadvantaged.[2] CBOs were selected based on the counties with the highest child poverty rate across various geographical areas within the state. Selected CBOs represent a diverse range of offered services affecting students and families who are economically disadvantaged; for example, community-based afterschool programs (e.g., Junior Achievement, YMCA), social services (e.g., food banks), and hospitals and health clinics. The Community-Based Organization Survey Contact List section in Appendix B provides a detailed list of contacted CBOs, along with their respective locations.

A total of 155 individuals responded to the surveys, with 150 responses to the practitioner survey and 5 responses to the CBO survey. Additionally, 103 LEAs were represented in the practitioner survey, and the response rate for the practitioner survey was calculated based on

[2] Fifty-two organizations were directly invited to the survey, and four additional organizations were forwarded the survey from CBOs that were originally invited.

the total number of LEAs. These responses reflect overall response rates of 11% (103 LEAs out of 931 total) and 9% (5 out of 56 total) for the practitioner and CBO surveys, respectively.

Nonresponse bias analysis suggests that practitioner response rates were strongest for those from traditional public school districts, rather than STEM, dropout and recovery, or community schools. Thus, it is important to note that the practitioner survey findings more strongly reflect the perspectives of those in traditional LEAs and provide limited data about the views of practitioners in Community School LEAs. Additionally, our practitioner respondent pool captures LEAs that are larger, with slightly smaller populations of non-White students, and more suburban schools compared to the nonrespondent group. Regarding the CBO survey, the small sample size means it may not be representative of the entire population of CBOs engaged. However, it is worth noting that responses were received from Regions 3 and 7, as well as from both rural and suburban locales. Additional details about the composition of our survey respondents can be found in the Survey Respondent and Nonresponse Bias Analysis section in Appendix B.

Ohio DPIA/SWSF Data Reporting Tool–ODEW Survey

To support the analysis of current services to students who are economically disadvantaged, we also leveraged the ODEW DPIA/SWSF Data Reporting Tool. This survey collection is required for every LEA that received DPIA and/or SWSF funding in the prior academic year. Through this survey, LEAs provide information on initiatives funded through DPIA or SWSF funds, including the service category and amount of funding for each initiative. The responses analyzed for this memo come from the collection administered online between June and September 2023 and completed by a senior administrator at the LEA.

Eight hundred forty-three LEAs responded to the survey, or about 91% of all LEAs in the state (843 out of 931), reflecting that most LEAs are receiving funds from one or both funding programs and thus provided a report on the use of the funding. Response rates by LEA types are provided in the Additional Methodology Detail section in Appendix D.

Professional Judgment Panels

The analysis of cost to adequately serve students who are economically disadvantaged (Chapter 6) leveraged data collected from expert educators from across Ohio on specific practices, programming, and resources necessary to provide an adequate education to this student group. Specifically, we conducted an extensive effort to recruit educators to serve on one of seven PJPs, each with an average of eight participants representing the following educational roles: a superintendent, a principal and teacher at each schooling level (elementary, middle and high), and a specialist on serving economically disadvantaged students (e.g., Title 1 coordinator,

social worker, etc.). In total, 51 expert educators from Ohio participated in these panels. Furthermore, each panel was made up exclusively of educators working in districts located in one of the four ODEW major typology groupings: rural, small town, suburban, and urban.[3]

Panels were charged with first developing program designs documenting best-practice educational programs that would provide an adequate education for a series of hypothetical schools defined by three different schooling levels (elementary, middle, and high) and varying percentages of students who are economically disadvantaged (high, medium and low).[4] Next, they had to report the personnel and nonpersonnel resources necessary to support the programs they developed for each hypothetical school. The study team then calculated the costs associated with the program resources specified for each school program. The final data collected contained rich information on the types of programs and resources the panels felt were necessary to provide an adequate education in the various school settings and the corresponding costs of doing so.

To gather these data, the study team convened a series of virtual meetings with the seven panels from April through July 2024. Study team members served as dedicated facilitators guiding the panel discussions as well as documenting their program designs and resource specifications. The panels were convened separately and completed their work independently from each other.[5] Each panel met at least five times, with each meeting lasting approximately 2 hours. Panel facilitators also followed up with panels as necessary to gain clarification and fill in any gaps in the information that was collected.

Administrative Data

Administrative data collected through the Ohio School Report Card system and provided directly by ODEW were also essential for our analyses. The administrative data used for this study, described in the following paragraphs, and referenced throughout this report, include expenditures, enrollments, student outcomes, school characteristics, and geographic contexts.[6] The enrollment, outcome, and fiscal data are for school years 2017–18 through 2022–23.

[3] A detailed description of the Ohio district typology can be found at https://education.ohio.gov/Topics/Data/Frequently-Requested-Data/Typology-of-Ohio-School-Districts.
[4] An adequate education is defined as one that will allow students an opportunity to achieve a desired set of outcomes documented in a *goals statement*. The goals statement provided to panelists for this study is included in Appendix E.
[5] Moreover, panelists were instructed not to communicate about their work with individuals outside their panels until the PJP process was complete.
[6] Appendix A provides a comprehensive list of the data sources used for the study.

Enrollments, School Characteristics, Student Outcomes, and Geographic Context

School-level student enrollment data (including counts and percentages of students by grade level, race/ethnicity, gender identity, students with disabilities [SWD], economically disadvantaged students, and English learners [ELs]) were downloaded from the ODEW Report Card system. School-level student outcome measures, including graduation rates, math and ELA achievement, and chronic absenteeism rates, were also collected from the ODEW School Report Card.

Additional contextual data on schools, districts, and their students were collected using federal data sources. These include school characteristics data, such as locale, zip code, school type, schooling level, and charter status, gathered from the National Center for Education Statistics (NCES). Data from NCES's Comparable Wage Index for Teachers (CWIFT) for the years 2017–2019 and 2021 and NCES's Education Demographic and Geographic Estimates (EDGE) income-to-poverty ratios (IPR) from 2017–18 through 2020–21 were also used in the analysis. Finally, U.S. Census Bureau data on zip code-level population characteristics, such as population density, percentage of the population who are female, and percentage of the population who are age 5 or younger, were collected from the 2020 census data file. Lastly, we used the Urban Institute's Model Estimates of Poverty in Schools (MEPS) data from 2017–18 through 2020–21 to gauge poverty.

Fiscal Data

The fiscal data used in this report were collected from ODEW School Report Card Data or provided directly by ODEW. Specifically, total school spending from state and local sources for the 2021–22 and 2022–23 school years was collected from the School Report Card Data. We also obtained school- and district-level expenditure data for school years 2017–18 through 2022–23 from ODEW, organized by the state's chart of accounts, which allowed for the identification of operational expenditures by purpose and object codes (expenditures related to transportation, administrative services, pupil support, operations, instructional staff, instruction materials, food, general, and other). To arrive at comprehensive school-level spending measures, centralized district-level expenditures from each category were attributed to individual schools based on school share of the district's total enrollment.

Estimating Adequacy for Economically Disadvantaged Students

While all the activities and analyses conducted for this school funding study are important, the heart of the study lies in estimating the cost of providing an adequate education for economically disadvantaged students in Ohio. All state funding formulas implicitly acknowledge that various student needs and educational contexts are associated with differential costs and therefore require varying levels of resources. Studies that estimate the adequate cost of

educating students with different educational needs, such as those who are economically disadvantaged, can inform the design of new or updated funding adjustments for student needs.

In this study, we primarily relied on an input-oriented approach known as professional judgment. Input-oriented analyses attempt to identify the inputs or resources necessary for providing an adequate education and then determine the cost of those resources. One basic method for input-oriented analysis, known since the late 1970s by two names—the Ingredients Method and Resource Cost Modeling (RCM)—is used in this study (Chambers, 1999, 2001; Chambers & Hartman, 1981; Levin, 1983; Levin & McEwan, 2001; Levin et al., 2018). The method involves three basic steps:

- identifying quantities of the various personnel and nonpersonnel resources, or "ingredients," necessary to implement educational programming and services
- determining appropriate input prices for these resources
- combining the necessary resource quantities with their corresponding prices to calculate a total cost estimate (Cost = Resource Quantities × Price)

Convening PJPs is one approach for identifying the resources in the first step, which was done for this study. As mentioned above, it involves convening panels of expert educators to propose the resource quantities needed to achieve specific outcome goals at a minimum cost for hypothetical schools that reflect the different contexts found within a given state.[7] For our study, hypothetical school exercises were developed with varying levels of economic disadvantage, ELs, SWD, and enrollment within combinations of schooling level (elementary, middle, high), and locale (rural, town, suburban, urban). Once the resources for the hypothetical schools are gathered and costed out, the relationship between estimated costs and levels of economic disadvantage across the schools can be analyzed. Using those relationships, we can estimate an average cost for educating economically disadvantaged students in Ohio and develop policy recommendations for how the state can support these costs through its funding formula.

[7] The Evidence-Based (EB) approach is one alternative input-oriented approach for identifying resources. The EB approach involves two steps: (a) the compilation of published research studies on existing school interventions that have proved effective at producing specific outcomes and (b) deriving the resources used and their associated costs to generate cost estimates for adequate education. Studies are selected on the basis that they have been shown to generate a desired outcome. However, as with any study, these findings are contextual, having occurred in particular school and district contexts (defined by the needs of students served, scale of operations, and geographic setting of the school, etc.) at a given point in time. Therefore, the extent to which the amalgamated findings of research studies performed in a variety of contexts and time periods are generalizable to the current needs and interests of the state of Ohio is unknown. We therefore opted to employ the PJP approach to gathering the inputs used to estimate adequate costs.

Key Findings

This section highlights the findings that most strongly informed our main conclusions and recommendations for providing an adequate education for economically disadvantaged students in Ohio. These findings are described as they relate to key desirable properties of education funding systems. Chambers and Levin (2009) indicate that systems for distributing educational resources should ideally:

- provide adequate levels of resources appropriate to meet the needs of the unique populations served by schools and districts;
- provide equitable resources, such that program quality meets the needs of the students served and funding levels are not associated with the amount of local wealth of school districts;
- be transparent and understandable by all concerned parties with straightforward calculations and procedures that avoid unnecessary complexity;
- be predictable and stable, such that policymakers can count on receiving a certain level of resources from year to year and develop the long-term planning necessary to allocate resources properly;
- allow for flexibility in resource use, such that resources can be used to address specific circumstances and conditions unique to a given school or district; and
- be cost-based, such that funding amounts are related to measured cost differences in providing adequate programming across educational contexts.

Adequate

Our analyses indicate that Ohio is not currently funding economically disadvantaged students at an adequate level to meet the state's education objectives. Analysis of data collected through the PJP process indicates that to meet target outcomes in 2023–24, Ohio would need to invest an additional $3,294 per economically disadvantaged student.

Equitable

Descriptive analysis suggests that under Ohio's current system, more is spent per pupil in schools serving higher proportions of students living in poverty (as reported by the Urban Institute MEPS measure) when examining funds from local, state, and federal sources. For example, a school with 38.7% students in poverty (the 90th percentile) compared to a school with 5.1% of students in poverty (the 10th percentile) is expected to spend 11.2% more per pupil. However, when only state and local funding are considered, the association between poverty and school spending is negative, where schools at the 90th percentile of poverty are

expected to spend 22% less per pupil than those at the 10th poverty percentile. This indicates that the current distribution of state and local funding in Ohio is regressive with respect to student poverty.

This finding mirrors a consistently negative relationship between the share of a school's enrollment that is in poverty and various measures of academic outcomes, including English language arts (ELA) and math achievement, graduation rates, and chronic absenteeism. That is, as the concentration of poverty increases in a school, students tend to perform worse on ELA and math standardized tests, have lower 4-year graduation rates, and have higher rates of chronic absenteeism. The results of the analyses presented in this report indicate a need to differentiate funding more strongly based on student economic disadvantage in order to provide an equal opportunity for this group of students to achieve at common levels of student outcomes as their noneconomically disadvantaged peers.

Transparent

Ohio's current system for funding economically disadvantaged students can make it difficult to have a clear and comprehensive understanding of the funding allocated for economically disadvantaged students. While the SWSF is a straightforward resource allocation ratio of one funding unit for a counselor for every 250 students (with a minimum of 5 units per district), the allocation of this funding is not based on the numbers of economically disadvantaged students. In contrast, the DPIA is directly targeted towards allocating additional funding to districts that serve economically disadvantaged students but is distributed through a formula that is more complicated than those used by many other states. The additional funding allocated to districts per economically disadvantaged student depends on the ratio of a district's rate of economic disadvantage to the statewide rate of economic disadvantage. This means that districts with higher rates of economic disadvantage receive more funding per economically disadvantaged student. However, it also means that the additional funding per economically disadvantaged student must be calculated for each individual district. This level of complexity is not found in other state funding mechanisms that also have a graduated scheme for allocating additional support for students who are economically disadvantaged. For example, Michigan also escalates funding for economically disadvantaged students as district incidence of this group increases but does so by assigning five fixed funding weights to five defined bands of economic disadvantaged concentration.

Predictable and Stable

One noted shortcoming of current funding for economically disadvantaged students in Ohio is that the DPIA, the primary formula for targeting additional funding for economically disadvantaged students, is neither predictable nor stable. This is primarily because the DPIA

formula alters the amount each district receives per economically disadvantaged student by the district's rate of economic disadvantage relative to the statewide rate of economic disadvantage. Because all DPIA funding is adjusted according to the statewide economic disadvantage rates, as economic disadvantage rates increase in the state, the amount of funding per economically disadvantaged student received by districts with very high rates of these types of students can decrease substantially. Our analysis findings show that over the three-year period from 2021–22 to 2023–24 the amount of DPIA funding per economically disadvantaged pupil for the districts with the highest concentrations of economic disadvantage decreased from $1,821 to $1,431 or 21%. Moreover, even if the statewide average rate of student economic disadvantage remains stable from year to year, districts experiencing substantial reductions in their rate could result in a sizable reduction in the amount of funding they receive.

Flexible

Both the DPIA and the SWSF are relatively flexible in how districts are allowed to spend funds targeted for economically disadvantaged students. The DPIA has 19 broad initiatives for which spending is allowed, while the SWSF has a subset of 10 of the DPIA's initiatives. We find that districts leverage this flexibility in various ways to meet the needs of their students. Mental health services is the most common service category and the category with the largest average share of spending supported by dollars from these funding programs. However, as the share of students in an LEA who are economically disadvantaged increases, so does the likelihood that academic supports and extended-day-and-year service categories are the primary spending category for these state funding programs.

Cost-Based

The discrepancy between actual spending and projected adequate cost generated in the PJP analysis demonstrates that the current school finance system does not provide funding that is sufficient to support an adequate educational opportunity for economically disadvantaged students. Our interviews with educational practitioners reinforce this finding, with many participants indicating that economically disadvantaged students are often not receiving adequate school-based programs or lack out-of-school support to meet their basic needs.

Recommendations

Based on our key findings, we offer several policy alternatives and recommendations for reforming Ohio's system of funding education for economically disadvantaged students.

Restructuring or Replacing the Disadvantaged Pupil Impact Aid

Our findings identified a substantial gap between the current funding level for economically disadvantaged students and the estimated cost of adequately educating these students.

Additionally, as highlighted in Chapter 7, the DPIA as currently constructed provides little to no additional funding for economically disadvantaged students in school districts with low rates of these types of students. We offer two recommended policy alternatives to address these points:

Option 1. Supplementing the Disadvantaged Pupil Impact Aid Formula

Under this policy alternative, Ohio would implement a modified DPIA formula that retains a similar general structure but adds a minimum level of funding per economically disadvantaged student, valued at $3,294 for the 2023–24 school year. This minimum funding level would ensure that the costs of educating economically disadvantaged students are addressed even in districts with a relatively low shares of these types of students. Under Option 1, funding for economically disadvantaged students would still increase as the district-level percentage of students who are economically disadvantaged increases. For example, under this proposal, a district with a 100% economic disadvantage rate in the 2023–24 school year would receive $4,725 per economically disadvantaged pupil.

Option 2. Replacing the Disadvantaged Pupil Impact Aid Formula

Under this policy alternative, Ohio would adopt a simple single-weight funding adjustment for economically disadvantaged students that would replace the existing DPIA formula. Our cost analysis results suggests that economically disadvantaged students cost approximately 48% more than the funding provided by the current state school finance formula mechanism for students who are not economically disadvantaged or an English learner, or who do not have a disability. Under Option 2, Ohio would implement a single funding weight of 0.4773 for each economically disadvantaged student, which would be applied to the statewide average based per-pupil funding amount. This is equivalent to an additional $3,934 per economically disadvantaged student in the 2023–24 school year.

Each of these policy options has its strengths and weaknesses. Option 2 has the advantage of simplicity and transparency, as it utilizes one weight for all economically disadvantaged students and aligns this funding adjustment with how the state currently funds students who are English learners or have a disability. Further, this weight ensures that school districts serving economically disadvantaged students have the resources needed to offer adequate educational opportunities. Alternatively, Option 1 maintains funding differentiation according to economic disadvantage concentrations using the DPIA formula, with districts with higher rates of economic disadvantage receiving additional funds per economically disadvantaged pupil. However, this nonlinear escalation of funding per economically disadvantaged student can still be muted as the statewide percentage of economically disadvantaged pupils grows larger, as the modified DPIA formula is still anchored to the statewide average economic disadvantage rates.

Discretion on the Use of Additional Supplementary Funds

Under both policy alternatives described above, our recommendation is that Ohio needs to invest additional funding to support the education of economically disadvantaged students. Pertinent to this discussion is the amount of discretionary authority afforded to school districts for spending funding related to economically disadvantaged students.

We recommend that Ohio adopt an approach that balances local control with guardrails to ensure that funds for economically disadvantaged students are spent effectively to provide these students with adequate educational opportunities. Specifically, we suggest guardrails that could include:

- prioritizing evidence-based interventions that address the specific challenges faced by economically disadvantaged students, which are highlighted in detail below, and
- requiring periodic reporting of how funding for economically disadvantaged students is being utilized and what impact these funds are having on these students.

Effective Programming for Students Who Are Economically Disadvantaged

Our findings demonstrate that offering an equal educational opportunity to economically disadvantaged students requires meeting their specific educational needs, which are associated with higher costs. We offer recommendations on four key areas of educational support that our findings suggest are pertinent to the success of economically disadvantaged students and may serve as appropriate spending priorities around which guardrails might be developed:

Classroom Conditions: Class size and classroom support

Expert educators on the PJPs noted the value of smaller class sizes and additional instructional aides in reinforcing learning and supporting prosocial behaviors, especially for younger students.

Teacher Characteristics: Recruiting and retaining experienced teachers

Panelists also emphasized the need for experienced teachers (those with more than 5 years of experience) in schools with higher percentages of economically disadvantaged students, who may be better equipped to meet the needs of these students and serve as role models to early-career teachers.

Professional Development: Centering the needs of economically disadvantaged students

Program designs developed by the PJPs noted the importance of teachers and staff receiving training on topics especially relevant to working with economically disadvantaged students, such as trauma-informed training, student behavioral issues, and mental health. Our analysis of

effective services found that currently, DPIA and SWSF funds are rarely dedicated to professional learning and development and that professional learning is often not tailored to the needs of economically disadvantaged students.

School Staffing and Resources: Coordinated systems for mental and physical health
Expert educators on the PJPs consistently emphasized the need for support staff in schools to support the mental and physical well-being of students. All panels recommended increasing these supports (e.g., nurses, guidance counselors, social workers, etc.) in schools with higher concentrations of economically disadvantaged students. The need for staff and resources dedicated to coordinating services within schools and across community partnerships was also consistently highlighted, particularly in schools with higher rates of economic disadvantage.

Report Organization

The rest of this report is organized as follows:

- Chapter 2 describes the ways states adjust funding to account for various education cost factors, such as student needs and school and district contexts, with a particular focus on how Ohio and a set of peer states adjust funding for economically disadvantaged students.
- Chapter 3 details the differences in education resources and outcomes between economically disadvantaged students and their more advantaged peers, as well as detailing the unique educational needs of economically disadvantaged students across school and district contexts.
- Chapter 4 measures the current degree of spending equity for economically disadvantaged students and the association between economic disadvantage and student outcomes.
- Chapter 5 summarizes the sources of funding in Ohio for economically disadvantaged students and the resources these funds are spent on, and whether these resources vary according to the concentration of economic disadvantage in schools and districts or the efficiency with which they produce student outcomes.
- Chapter 6 presents the PJP approach used to estimate the cost of providing an adequate education to economically disadvantaged students in Ohio.
- Chapter 7 presents our policy recommendations for Ohio to better meet the costs of adequately educating its economically disadvantaged students.
- Chapter 8 concludes the report and summarizes our findings.

References

Chambers, J. G. (1999). *Measuring resources in education: From accounting to the resource cost model approach*. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics. https://nces.ed.gov/pubs99/199916.pdf

Chambers, J. G. (2001). Measuring resources in education: A comparison of accounting and the resource cost model approach. *School Business Affairs*, *66*(11), 26–34.

Chambers, J. G. & Hartman, W. (1981). *A cost-based approach to the funding of educational programs: An application to special education*. Stanford, CA: Institute for Research on Educational Finance and Governance.

Chambers, J. and Levin, J. (2009). *Determining the cost of providing an adequate education for all students*. National Education Association.

Levin, H. (1983). *Cost-effectiveness: A primer*. Sage.

Levin, H. M., & McEwan, P. J. (2001). *Cost-effectiveness analysis: Methods and applications*. Sage.

Levin, J., Brodziak, I., Atchison, D., Manship, K., Arellanes, M., & Hu, L. (2018). *What does it cost to educate California's students? A professional judgment approach*. San Mateo, CA: American Institutes for Research.

Chapter 2. Exploring Alternatives for Funding Adequate Education for Economically Disadvantaged Students in Ohio

Introduction

In this chapter, we offer an in-depth exploration of how Ohio funds its schools and the alternative funding systems that are currently used across the United States. Central to this examination is the notion of educational adequacy. Virtually all states are constitutionally responsible for providing an education to all students that is deemed sufficient, often referred to in the research literature as *adequate*. While the notion of what constitutes an adequate education can be both vague and varied across state constitutions, the work performed for this study uses a conception stipulating that all students should have equal opportunity to achieve a common set of outcomes at the same target level, regardless of their specific educational needs or learning circumstances, including where they attend school.[8] Providing an adequate education to all students necessitates that educational funding differs across districts to account for the differing needs of students and other contextual characteristics (cost factors) that influence the cost of producing student outcomes.

State education funding formulas offer a variety of approaches for providing an adequate education for all students. Each system makes numerous choices on what educational cost factors to adjust funding for, and in what quantity of dollars these adjustments should be made. Because of this, while our study focuses on addressing the cost of adequately addressing the cost of educating students who are economically disadvantaged, the survey of funding adjustments reported below is more expansive. Specifically, we also examine additional cost factors, including other types of student need, school and district contextual characteristics, such as enrollment size, and regional price differences. In doing so, we aim to contextualize Ohio's education funding system and approach to funding students who are economically disadvantaged, among the rest of the United States.

We begin this chapter by offering a framework for understanding how educational costs differ across student, school, and district characteristics. We then summarize whether and to what extent funding mechanisms in each state attempt to address cost differences. Finally, we offer a detailed comparative analysis of the economic disadvantage adjustments used in the K–12

[8] For more on conceptions of educational equity and adequacy, see Baker and Green (2015).

public education funding systems in Ohio and a set of peer states (Kentucky, Indiana, Michigan, and Pennsylvania).

Examining State School Funding Systems

Students come to school with different learning needs and socioeconomic backgrounds and require different types and levels of educational support to achieve state standards and outcomes deemed adequate. Similarly, schools in different contexts may require different levels of resources because they differ in enrollment size (scale of operations) or in the prices they must pay for staff and nonpersonnel inputs. Resource requirements that vary based on student needs and context translate to differences in the cost of producing educational outcomes across districts and schools.

Presently, all states operate school funding formulas and supplemental grants-in-aid programs that attempt to address differences in educational costs across school districts. However, the policies used to adjust for cost differences vary considerably across states. In this section, we present a framework for understanding differences in educational costs across school districts. We then describe the range of cost factors that states adjust for in their education funding policies and present a typology of the different approaches used by states to allocate additional aid to school districts to offset these differences in costs.

Understanding Funding Differentiation Across Educational Costs

States may choose to differentiate educational funding based on a variety of cost factors and programmatic preferences. The cost of educating students to a common level of outcomes varies across schools and districts based on the level of student needs or other contexts, known as cost factors. Cost factors are characteristics of students, schools, or districts that affect the level of spending required to achieve stated educational outcome goals for students *and* are outside the control of local school and district administrators (Chambers & Levin, 2009). Legislators, parents, and other stakeholders may also have preferences or imposed mandates for specific educational programs, such as career and technical education (CTE), which may be reflected in education funding policy.

Exhibit 2.1 describes the four main types of factors by which states may choose to differentiate education funding due to costs or preferences: (a) student need, (b) context and programming, (c) grade range, and (d) price level of inputs. Student need factors can include both individual and collective population characteristics. Individual students with specific educational needs (e.g., SWD, ELs, and those experiencing economic disadvantage) may need specialized programs, services, or interventions to achieve common outcomes. These efforts require

additional resources that come at a higher cost to schools and districts, which states may seek to address through additional funding.

Collectively, student populations served by districts may have other characteristics—such as the local concentration of student economic disadvantage—that require schoolwide intervention and additional funding to achieve common outcomes. For example, a student who is economically disadvantaged may not have a specific educational need to be remediated, but a school population with many economically disadvantaged students may require smaller classes, early childhood programs, and other services to provide students with an equal opportunity to achieve common educational goals. These schoolwide interventions increase costs for schools and districts with high concentrations of student need.

School context—particularly the enrollment size of a district or school and the population density of the community in which it is located—may also affect costs and necessitate differentiated funding. For example, research has shown that districts with fewer than 100 students operate at almost double the per-pupil cost of districts with 2,000 students, and districts with 100 students to 300 students are about 50% more costly than those with 2,000 students (Baker, 2005). These cost differences are largely attributable to differences in underlying staffing ratios, particularly for positions that are relatively fixed in nature. For example, principal is a position that is typically not sensitive to the number of students enrolled in a school, which results in diseconomies of scale for smaller districts. Population sparsity can also result in higher transportation costs because students must travel further distances, on average, to get to school.

State-level programming requirements may also create a need for funding differentiation. For example, if the state requires gifted and talented programs or CTE programs, these represent costs to local districts because they may require additional nonpersonnel resources or smaller class sizes to meet these mandates with fidelity. The need for educational resources also differs across grade ranges. For example, younger students in early elementary school may require smaller class sizes or instructional aides, increasing costs. High schools, on the other hand, often provide departmentalized, subject-specific classes as well as specialized courses and extracurricular activities (such as athletics or marching band) that may require additional resources.

Finally, school districts within the same state may require different levels of funding to obtain educational inputs (staff and nonpersonnel). In particular, the compensation required to recruit and retain a similarly qualified teacher may differ across districts within a state due to competing job opportunities, differences in the cost of living, and certain districts being

considered more desirable places in which to live and work (Chambers & Fowler, 1995; Cornman et al., 2019; Taylor, 2015).

Exhibit 2.1. Factors Considered in Education Funding Differentiation

Student need	Contexts/programming	Grade range	Price level of inputs
Individual student characteristics • Economic disadvantage • Disability status • EL status • Gifted and talented status **Collective population characteristics** • Concentrations of economically disadvantaged students or ELs	• District or school enrollment size • Population sparsity or extent of rurality • Career and technical education (CTE)	• Differences in academic and nonacademic programming needed for students in different grades	• Geographic differences in staff compensation and prices of nonpersonnel resources

Adjusting for Differences in Costs Using State School Finance Policy

Most states implement K–12 education funding policies that in some way address differences in the cost of educating different students. A key goal of these policies is to provide additional resources to school districts with higher costs, driven by the factors mentioned above, particularly those located in communities that are less able to raise revenues locally to pay for education (Baker, 2018).

Although each state's school funding formula is structured differently, all state policies have the following two features:

- They recognize a core set of cost factors that contribute to differences in educational costs across districts.
- They use one or more mechanisms to distribute supplemental aid to offset the additional costs introduced by these factors.

Together, the cost factors and mechanisms incorporated into school funding formulas comprise the building blocks of state efforts to redistribute educational resources among school districts.

Mechanisms by Which Additional Funding Is Allocated

For each cost differentiation considered, state school finance formulas apply different mechanisms to adjust for differences in cost. The most frequently used mechanisms are (a)

single student weights or stipends, (b) multiple student weights, (c) resource-based allocations, (d) cost reimbursement, (e) categorical grant programs, and (f) capitated funding.

- **Single student weights or a flat per-pupil amount.** Most states use a foundation formula to distribute funds to schools. These models establish a baseline amount of funding per enrolled student. District funding is then determined by multiplying the baseline amount by a weighted student count of enrollment, which is modified to account for additional costs associated with students' needs or other contextual characteristics of the district or its schools. Some states use a single weight for a given student group to provide additional funding to school districts. For instance, all ELs in Oregon count for an additional 0.5 enrollment when totaling the district enrollment counts used to calculate funding allocations. Alternatively, rather than tying additional funding to some percentage of the base, states may simply provide a district with a flat per-pupil amount (e.g., an additional dollar amount per enrolled student experiencing economic disadvantage).
- **Multiple student weights.** States may adjust funding from their foundation formula using multiple weights or dollar amounts that are tied to different levels of need within a student group. For example, states may use multiple weights corresponding to the amount of time a student has been classified as an EL (Ohio) or differences in students' English proficiency (Maine) (Augenblick, Palaich and Associates et al., 2018). Multiple weights are also used to adjust for differences in costs associated with educating students with disabilities who have different needs (e.g., by disability category or more general categories of mild or moderate disability), as in Ohio (Danks et al., 2022).
- **Resource-based allocations.** Under this model, states allocate specific tangible resources (e.g., teacher time, paraprofessionals, and teacher aides) based on the number of students with certain characteristics, such as being deemed at risk or an EL. The amount of additional state revenues a district receives is based on the additional costs (determined by the state) of the resources. For example, Delaware provides one teaching position and some nonpersonnel funding for every 16.2 students in Grades K–3 (Atchison et al., 2023).
- **Cost reimbursement.** Under this model, the state reimburses districts for additional costs associated with providing educational services and supports to certain students. This approach differs from the other mechanisms; rather than providing a fixed dollar amount, state aid is tied directly to district expenditures. For example, Vermont provides school districts with supplemental state aid to educate students with disabilities using a reimbursement system in which the state reimburses school districts for up to 60% of allowable expenses (Kolbe et al., 2019).

- **Categorical grant programs.** Some states operate categorical grant programs that provide additional state aid to school districts for specific purposes from separate (stand-alone) appropriations. For example, most states provide supplemental funding for special education and related services through a categorical grant program that operates separately from the state's general education funding formula. States may also use categorical grant programs to direct additional funding to school districts for educational programs for at-risk, gifted and talented, and ELs. With this mechanism, districts qualify for additional funding through a formula that ties state aid to student need or through a competitive process that awards funding based on demonstrated need or merit. For example, Delaware's Opportunity Fund distributes a $55 million categorical grant to districts based on the number of students who are either economically disadvantaged or ELs, which is equivalent to approximately $1,000 dollars per eligible pupil (Atchison et al., 2023).
- **Capitated funding.** Capitated (also called census-based) funding mechanisms allocate state funds to local education agencies based on the number of students within a school district. Typically, funding takes the form of a flat grant paid to a district based on its overall average daily membership (ADM), rather than the number of students who meet specific eligibility criteria. This approach is used infrequently and exclusively to adjust funding for students with disabilities and gifted and talented students. For example, New Jersey asserts that 15.4% of students in each district are eligible for weighted funding for SWD (Baker et al., 2020). Alabama sets a much lower threshold, asserting that 5% of students in each district are eligible for SWD weighted funding. The rationale for this funding mechanism is to avoid incentivizing the overidentification of students where there may be some amount of discretion and subjectivity.

Cost Factors Considered in State Funding Formulas

Student Need

State funding policies incorporate adjustments for differences in the cost of educating students with higher levels of need, including:

- **Economically disadvantaged or at-risk students.** Most state school finance formulas (45) currently consider district-level differences in student economic disadvantage (Exhibit 2.2). These funds aim to address the costs associated with investments in compensatory

programs and student support services for students who are economically disadvantaged or who have been identified as at risk for academic failure.[9]

- In schools and districts, the extent of financial need is typically tied to either the number of students who meet specified criteria or the percentage of a district's population who are identified as economically disadvantaged. States use different indicators to identify economically disadvantaged students. The most used indicator is the share of students in a school district who receive or are eligible to receive nutrition benefits through the National School Lunch Program (NSLP). Under the NSLP, the thresholds for eligibility are 130% of the Census poverty line or below for free lunch and 130% to 185% for reduced-price lunch. An increasing number of states and districts are using indicators of economic disadvantage from other administrative data sources collected by the state to reduce the administrative burden on families. For example, Illinois uses eligibility for Medicaid, the Children's Health Insurance Program, Temporary Assistance for Needy Families, or the Supplemental Nutrition Assistance Program as proxies for students from low-income households.
- Some states distinguish funding based on the concentration of students who are economically disadvantaged or at risk in a district. For example, California's formula includes a concentration grant that allocates additional funds to districts in which more than 55% of students meet the state's definition of an at-risk student, distributing an additional 65% of the base grant amount for each student above the 55% threshold.[10] Other states use a sliding scale to allocate state aid, in which districts with greater concentrations of students experiencing economic disadvantage receive more aid per student than those with lower concentrations (e.g., Nebraska, New Jersey).
- Alabama, Arizona, Florida, and Georgia define at-risk students using noneconomic measures or proxies (ECS, 2016). For example, Georgia provides funding for 20 additional days of instruction for 10 percent of the enrolled students in districts identified as not reaching or maintaining adequate academic achievement relative to grade level.

[9] Six states (Alaska, Florida, Georgia, Idaho, South Dakota, and West Virginia) do not have policies for providing additional state funding to account for the impacts of economic disadvantage on student achievement. Wisconsin has a policy for additional funding for school districts serving high concentrations of economically disadvantaged students, but it was not funded in the 2023–25 biennium.

[10] California's definition of an at-risk student includes the unduplicated count of students who are eligible for free- or reduced-price lunch (FRPL) under the NSLP, EL, or foster youth.

Exhibit 2.2. Cost Adjustments for Economically Disadvantaged or At-Risk Students, 50-State Summary

Cost adjustment	Total number of states applying adjustment	Formula adjustments					Categorical grant
		Single weight/ dollar amount	Multiple weights/ dollar amounts	Resource-based allocation	Cost reimbursement	Capitated	
Economically disadvantaged or at-risk students	45	18 (AZ, FL, GA, HI, **KY**, LA, ME, MS, MO, NM, NV, ND, OK, OR, RI, SC, UT, VT)	21 (AR, CA, CO, CT, IA, **IN**, KS, MA, MD, **MI**, MN, NH, NE, NJ, NY, **OH**, **PA**, TN, TX, VA, WY)	3 (IL, NC, WA)			3 (AL, DE, MT)

Note. In subsequent analysis, we compared Ohio's funding adjustments for students who are economically disadvantaged to a set of peer states (Kentucky, Indiana, Michigan, and Pennsylvania). These states, if present, are bolded (Ohio in **orange** and peer states in **green**) to highlight their cost adjustment approaches.
Source. The summary of state funding policies is based on information reported by Augenblick, Palaich and Associates et al. (2018), EdBuild (n.d.), and the Education Commission of the States (ECS) (2024). Individual states' statutes and other documents were reviewed when further information or clarification was needed.

- **English learners.** All but two states provide additional funding to educate ELs—that is, students who cannot communicate fluently or face challenges learning effectively in English (Exhibit 2.3).[11] ELs have a variety of different educational needs and require specialized instruction and support services to meet common academic standards.
  - Many states provide a constant level of per-pupil EL supplemental funding based on either the number or share of ELs served by a school district. Maine, however, applies a sliding scale that corresponds with the concentration of ELs in a district. Larger concentrations of ELs result in increasingly large weighting factors. In some states, EL funding adjustments vary based on the level of proficiency or grade level of the EL. For example, Hawaii assigns different weights according to students' level of English language proficiency (larger weights are given for students who are less proficient in English and smaller weights for students with greater proficiency). Massachusetts's formula places additional weight on ELs, but the weight varies according to grade level.

[11] Mississippi and Montana are the only two states that do not have existing policies to provide school districts with additional funding to offset the cost of providing supplemental educational supports to ELs.

Exhibit 2.3. Cost Adjustments for English Learners, 50-State Summary

Cost adjustment	Total number of states applying adjustment	Formula adjustments					Categorical grant
		Single weight/ dollar amount	Multiple weights/dollar amounts	Resource-based allocation	Cost reimbursement	Capitated	
English learners	48	19 (AR, FL, GA, KS, KY, LA, MD, MO, NE, NH, NM, NV, OK, OR, PA, RI, SC, SD, UT)	20 (AL, AK, AZ, CA, CO, CT, HI, IA, IN, ME, MA, MI, MN, NJ, ND, NY, **OH**, TN, TX, VT)	5 (IL, NC, VA, WA, WY)	1 (WI)		3 (DE, ID, WV)

Source. The summary of state funding policies is based on information reported by Augenblick, Palaich and Associates et al. (2018), EdBuild (n.d.), and ECS (2024). Individual states' statutes and other documents were reviewed when further information or clarification was needed.

- **Students with disabilities.** All states provide local school districts with some form of supplemental funding to help pay for special education and related services for students with disabilities (Exhibit 2.4). Funding is typically tied to either the overall share of students with disabilities in a district or differentiated according to the number of students identified for special education using one of 13 federally defined disability categories (e.g., specific learning disability, autism spectrum disorder, visual impairment; Kolbe et al., 2019).

  Twenty-three states, including Ohio, operate high-cost reimbursement programs, in which the state pays a significant portion of the cost of services and support provided to students with severe disabilities (Exhibit 2.5). Students with severe disabilities require intensive or unique supports that can exceed the typical costs of supports for students with disabilities. For students with disabilities who require the most expensive supports (i.e., the top 5% in terms of expenditures), spending has been documented to be as much as 5.5 times to 8.7 times greater than average spending for a general education student and 8.8 times to 13.6 times greater for students in the top 1% of per-pupil special education student expenditures (Chambers et al., 2003). Qualifying for reimbursement or a supplemental grant from a state's high-cost pool is typically tied to a specific spending threshold. In 10 states, this threshold is determined by a set dollar value, over which districts may be partially or fully reimbursed for the expenses occurred serving a child with a high-cost disability. For example, school districts in Ohio may request reimbursement from ODEW for up to half the

district costs above a spending threshold, which varies according to the type of student disability. These thresholds range from $27,375 for speech and language impairments to $32,850 for deafness and blindness, autism, or traumatic brain injuries (Ohio Rev. Code Ann. § 3317.0214). Additionally, districts receive reimbursement for 50% of their excess costs *times* the proportion of their state and local spending that comes from state sources.

In 12 other states, reimbursement eligibility is determined by using a multiplier of the state's average per-pupil spending (Exhibit 2.5). For example, Washington's high-cost disability reimbursement threshold is set at two times the statewide average per-pupil expenditure (PPE) for districts with fewer than 1,000 fulltime equivalent (FTE) students and 2.2 times the statewide average PPE in districts with more than 1,000 FTE students.

Exhibit 2.4. Cost Adjustments for Students with Disabilities, 50-State Summary

Cost adjustment	Total number of states applying adjustment	Formula adjustments					Categorical grant
		Single weight/ dollar amount	Multiple weights/dollar amounts	Resource-based allocation	Cost reimbursement	Capitated	
Students with disabilities	50	7 (LA, MD, MO, NH, NY, OR, SC)	30 (AB, AK, AL, AR, AZ, CA, CO, FL, GA, HI, ID, IL, IN, IA, KY, MA, ME, MN, MT, NM, NV, ND, **OH**, OK, PA, SD, TN, TX, UT, WA)	3 (DE, MS, VA)	5 (KS, MI, NE, WI, WY)	2 (NJ, VT)	2 (NC, WV); 1 (for high-cost students only: RI)

Source. The summary of state funding policies is based on information reported by Augenblick, Palaich and Associates et al. (2018), EdBuild (n.d.), and ECS (2024). Individual states' statutes and other documents were reviewed when further information or clarification was needed.

Exhibit 2.5. High-Cost Disability Student Reimbursement Programs and Eligibility Determination, 50-State Summary

High-cost disability reimbursement programs:	States
Eligibility determined by fixed spending threshold	10 (AR, CA, KS, MA, NJ, **OH**, OR, VT, WV, WI)
Eligibility determined by per-pupil spending multiplier	13 (AL, AK, CT, LA, ME, MO, NH, NM, ND, NY, RI, SD, WA)
Total	23

Source. The summary of state funding policies is based on information reported by Fatima et al. (2024) and on individual states' statutes and other documents when further information or clarification was needed.

- **Gifted and talented students.** Thirty-seven states implement policies that provide school districts with additional funding for programs targeted at gifted and talented students (Exhibit 2.6). Most states allocate funding using weights or resource allocation adjustments. However, there is no commonly accepted approach across states for identifying the number or share of gifted and talented students in a school district. For example, for 2023–24, Indiana allocated $15 million towards their High Ability Program Grant for the whole state (Ind. Code Ann. § 20-36-2-1). North Carolina uses a capitated (census-based) approach for gifted and talented funding, which assumes that 4% of a school district's membership qualifies as gifted and talented and provides funding on this basis. Georgia embeds funding for gifted and talented students in its special education funding programs. Ohio, however, utilizes a resource allocation model that reimburses the costs associated with gifted coordinators and intervention specialists. More specifically, the state provides one gifted coordinator FTE per 3,300 students, with a minimum of 0.5 FTEs and a maximum of 8 FTEs. They also provide one gifted intervention specialist each for Grades K–8 and 9–12 per 140 students, with a minimum of 0.3 FTEs per district (Ohio Department of Education and Workforce, 2023).

Exhibit 2.6. Cost Adjustments for Gifted and Talented Students, 50-State Summary

Cost adjustment	Total number of states applying adjustment	Formula adjustments					Categorical grant
		Single weight/ dollar amount	Multiple weights/dollar amounts	Resource-based allocation	Cost reimbursement	Capitated	
Gifted and talented students	37	10 (AZ, GA, IL, LA, MD, MN, NV, OK, SC, TX)	5 (AK, HI, IA, ID, WA)	6 (DE, MS, **OH**, VA, WV, WY)	3 (KS, ME, ND)	1 (NC)	12 (AL, AR, CO, FL, IN, KY, MI, MT, NE, OR, UT, WI)

Source. The summary of state funding policies is based on information reported by Augenblick, Palaich and Associates et al. (2018), EdBuild (n.d.), and ECS (2024). Individual states' statutes and other documents were reviewed when further information or clarification was needed.

Contexts and Programming

State policies identify districts and schools that qualify for supplemental aid based on enrollment size, geography, or some combination of both size and geography. Many states provide supplemental funding to offset differences among school districts in the cost of transportation. With respect to specialized programs, several states provide additional funding for CTE.

- **Geographic location or population density.** Thirteen state school finance formulas include cost adjustments for either the geographic location or the population density of the community in which a district or school is located (Exhibit 2.7).
  - State policies differ in how they measure population density and define thresholds to determine which districts are in sparsely populated areas. For example, Michigan defines a sparsely populated school district as having fewer than 4.5 students per square mile. Wisconsin identifies districts with fewer than 10 students per square mile, and New York identifies districts with fewer than 25 students per square mile. By contrast, North Dakota defines sparsity as fewer than 100 students in a 275 square-mile area (equivalent to 0.36 students per square mile).
  - In addition to population density, some state policies incorporate criteria based on a school district's physical geography and the distance between neighboring districts and schools. When considering physical geography, states recognize that some school districts operate in remote or geographically isolated areas. In Maine, additional consideration is given to districts in remote areas of the state and "island schools,"

which are located on islands accessible only by boat (EdBuild, n.d.). Michigan provides supplemental aid to small and remote schools in the Upper Peninsula that are at least 30 miles from any other public school or located "on islands that are not accessible by bridge" (EdBuild, n.d.). In Arkansas, a school is identified as geographically isolated if no more than 50% of the bus route is on hard-surfaced roads or if geographic barriers impede travel to other schools.

  - Some states further condition aid on the driving distance between districts or schools. In Arkansas, for example, a district must not only have low enrollment and be in a geographically sparse area but must also be at least 12 miles from the nearest out-of-district high school. To qualify for additional aid in Colorado, a small school must be at least 20 miles from the nearest district school with the same grade levels. In Nebraska, small elementary schools must be at least 7 miles away from the nearest elementary school or must be the only elementary school in their district.

Exhibit 2.7. Cost Adjustments for Geographic Isolation or Population Density, 50-State Summary

Cost adjustment	Number of states applying adjustment	Formula adjustments				Discretionary grant program or appropriation
		Single weight	Multiple weights	Resource-based allocation	Flat grant per pupil	
Geographic isolation or population density	14	6 (AR, CO, FL, ND, NE, PA)	4 (AK, AZ, NY, SD)	2 (ID, WV)		2 (MI, TX)

Note. Discretionary grant program or appropriation refers to states that have a pot of money set aside for a given purpose but do not have an explicit formula for allocating these funds. In such cases, the state decides how to allocate the money set aside for the given purpose.
Source. The summary of state funding policies is based on information reported by EdBuild (n.d.), Verstegen (2018), and ECS (2023). In addition, individual states' statutes and other documents were reviewed when further information or clarification was needed.

- **District or school enrollment size.** Twenty-nine states recognize that small districts and schools are less able to take advantage of operational economies of scale and must spend more on a per-student basis to provide equivalent educational opportunities (Exhibit 2.8). Of the states that incorporate an adjustment for district or school size into their formula, half (13) condition this funding on some measure of geographic isolation (i.e., districts and schools that are both small and in a geographically isolated or sparsely populated area).
  - Most states use student enrollment to determine at what point a district or school becomes sufficiently small to qualify for additional assistance but apply different cut

points for receiving aid. For example, Arizona classifies districts with fewer than 600 students as small, whereas Michigan's definition is fewer than 250 students. In Colorado, districts with fewer than 5,000 students receive "Size Factor" funding. New Mexico uses different enrollment criteria for schools and districts: Small schools have fewer than 400 students, and small districts have fewer than 2,000 students.

- Other states set enrollment thresholds based on the number of students in a grade or the average class size in a school. For example, Maine defines small elementary schools (Grades PK–8) as those with fewer than 15 students per grade (and located no less than 8 miles from the nearest PK–8 school) and small secondary schools as those with fewer than 29 students per grade or 200 total students or fewer (and located no less than 8 miles from the nearest high school).
- Only a handful of states identify small districts and schools using staff-based criteria. For example, New York defines a small district as one that employs fewer than eight full-time equivalent (FTE) teachers.

Exhibit 2.8. Cost Adjustments for District or School Enrollment, 50-State Summary

Cost adjustment	Number of states applying adjustment	Formula adjustments				Discretionary grant program or appropriation
		Single weight	Multiple weights	Resource-based allocation	Flat grant per pupil	
District or school enrollment	29	4 (IA, OK, PA*, WV*)	11 (AK, AR*, AZ, CO, FL, KS, LA, ME, ND, NM, TX)	5 (NC*, SD, UT*, WA, WY)	4 (MN*, MO, OR*, WI*)	5 (CA*, GA, ID, MI*, VT)

Note. * Indicates states for which the funding adjustment for enrollment is applied only to small districts or schools that are also geographically isolated. *Discretionary grant program or appropriation* refers to states that have a pot of money set aside for given purposes but do not have an explicit formula for allocating these funds. In such cases, the state decides how to allocate the money set aside for the given purposes.
Source. The summary of state funding policies is based on information reported by EdBuild (n.d.), Verstegen (2018), and ECS (2023). Individual states' statutes and other documents were reviewed when further information or clarification was needed.

- **Transportation.** Most states (44) provide additional support for student transportation (Exhibit 2.9). Transportation aid usually operates as a categorical grant program, separate from adjustments for school size or population density and in addition to base funding provided by the state. The criteria for receiving aid differ across states. For example, Oregon reimburses 90% of costs to districts at or above the 90th percentile of the statewide

distribution of transportation expenses, 80% for districts between the 80th and 90th percentiles, and 70% for districts below the 80th percentile. In contrast, Wyoming simply reimburses local school districts for 100% of their transportation costs. Other states condition funding on miles driven or the average distance between students' homes and schools or provide a flat grant amount for each student the district transports to school.

Exhibit 2.9. Cost Adjustments for Transportation Grant/Aid Program, 50-State Summary

Cost adjustment	Number of states applying adjustment	Discretionary grant program or appropriation
Transportation grant/aid program	44	AK, AL, AR, AZ, CA, CO, DE, FL, GA, HI, ID, IA, IL, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NJ, NM, NV, NY, **OH**, OK, OR, PA, RI, SC, TN, TX, UT, VT, WA, WI, WY

Note. Discretionary grant program or appropriation refers to states that have a pot of money set aside for given purposes but do not have an explicit formula for allocating these funds. In such cases, the state decides how to allocate the money set aside for the given purposes. In most states, supplemental aid for student transportation operates as a categorial program, relying on an array of bespoke distribution strategies (e.g., percentage reimbursement, per student or per route, flat grants).
Source. The summary of state funding policies is based on information reported by EdBuild (n.d.), Verstegen (2018), and ECS (2023). In addition, individual states' statutes and other documents were reviewed when further information or clarification was needed.

- **CTE programming.** Every state provides dedicated funding for CTE programs although the definition and extent of funding vary by state (Exhibit 2.10). Most states provide CTE funding as a categorical funding adjustment. Other states use a single weight for CTE programs in their funding formula. For example, South Carolina provides a 1.29 weight for each pupil in Grades 9–12 enrolled in a CTE program in a school district. Florida adds a weight of 1.072 for each student enrolled in career education in grades 9-12. Texas uses multiple weights for CTE programs, ranging from 1.10 to 1.47, depending on whether courses are part of an approved program of study. Similarly, Ohio assigns multiple weights for their CTE programs based on area of study, ranging from 1.157 to 1.623. Ohio applies these weights to a CTE-specific base per-pupil amount that is distinct from the base per-pupil amount used for the majority of students who are not CTE learners. Washington uses a resource-based formula for CTE programs, providing a 23:1 student–teacher ratio for CTE classes in Grades 7–12 and a ratio of 19:1 for skills centers (regional centers that provide CTE programs deemed too expensive to offer at high schools).

Exhibit 2.10. Cost Adjustments for Career and Technical Education, 50-State Summary

Cost adjustment	Number of states applying adjustment	Formula adjustments				Discretionary grant program or appropriation
		Single weight	Multiple weights	Resource-based allocation	Flat grant per pupil	
Career-technical education	50	12 (FL, GA, IA, KS, LA, MA, MN, NJ, NY, SC, VT, WY)	8 (AK, AZ, AR, IN, KY, **OH**, TX, UT)	5 (DE, MS, NC, TN, WA)	4 (ID, MI, VA, WI)	21 (AL, CA, CO, CT, HI, IL, MD, ME, MO, MT, ND, NE, NV, NH, NM, OK, OR. PA, RI, SD, WV)

Note. *Discretionary grant program or appropriation* refers to states that have a pot of money set aside for given purposes but do not have an explicit formula for allocating these funds. In such cases, the state decides how to allocate the money set aside for the given purposes.
Source. The summary of state funding policies is based on information reported by EdBuild (n.d.), Verstegen (2018), and ECS (2023). Individual states' statutes and other documents were reviewed when further information or clarification was needed.

Grade Range

Thirty states adjust funding for differences in educational costs across grade levels, allocating different levels of funding for each student who falls within a given grade range (Exhibit 2.11). Cost differences across grade levels can be tied to smaller class sizes in early elementary grades and increased course offerings and supplemental academic and nonacademic programming in middle and secondary grades. This is exemplified by the fact that most states consider cost differences across multiple grade spans, though the grade range criteria used in formulas vary across states (Exhibit 2.12).

Exhibit 2.11. Grade Range Adjustments, 50-State Summary

Cost adjustment	Total number of states applying adjustment	Formula adjustments				Different base amount
		Single weight	Multiple weights	Resource-based allocation	Flat grant per pupil	
Grade range	30	4 (ME, MN, TX, VT)	8 (AZ, FL, GA, HI, NJ, NM, OK, OR)	12 (AL, AR, DE, ID, IL, NC, **OH**, TN, UT, VA, WA, WY)	2 (LA, MI)	4 (CA, MA, MT, SC)

Source. EdBuild (n.d.).

Exhibit 2.12. Grade Levels Considered in Grade Range Adjustments, 50-State Summary

Grade level	Number of states
Kindergarten	6
Elementary (Grades K–3, Grades K–2, Grades 1–3, Grades 1–2)	21
Intermediate (Grades 4–6, Grades 4–5)	10
Middle (Grades 4–8, Grades 7–8, Grades 6–8, Grades 7–9)	9
Comprehensive elementary/middle (Grades K–8)	1
Secondary (Grades 9–12)	9
Comprehensive middle/secondary (Grades 4–12, Grades 6–12, Grades 7–12)	9

Source. EdBuild (n.d.).

Resource Prices or Geographic Cost Differences

Twelve states adjust for differences in the price school districts must pay to hire similarly qualified teachers (Taylor, 2015). States use one of three approaches to adjust for these labor costs: (a) a comparable wage index, which measures regional differences in the cost of hiring teachers by comparing regional differences in the cost of hiring nonteachers who are college graduates (e.g., Florida, Massachusetts, and New York); (b) a comparable cost-of-living index, which measures differences among communities in the cost of purchasing a similar "basket" of consumer goods and services (e.g., Colorado); or (c) a hedonic wage index, which adjusts costs based on factors that affect teacher employment choices and attempts to provide districts with comparable resources to recruit and retain teachers of similar quality (e.g., Maine and Texas).[12] These indices create district-level cost-difference data that are then applied to modify district funding. For example, Massachusetts uses a wage adjustment factor, which uses wage data reported by the state's Department of Employment to calculate the ratio between the average wage of all workers in the area surrounding a school district and the statewide average wage for all workers. For districts with an average wage that falls below the statewide average, no adjustment to funding is made. However, in districts with average wage levels that are above the statewide average, funding related to employee salaries are positively weighted by dividing the relative difference between the district and statewide average wages by three. For example, the cost of labor for Boston Public Schools is 26.1% higher than the statewide average. Thus, all funding related to salaries in this district is weighted as follows:

$$1 + \left(\frac{.261}{3}\right) = 1.087$$

[12] Additional information on state-level strategies for adjusting funding for regional differences in the cost of teacher wages can be found in Baker (2008), Cornman et al. (2019), Silverstein and Brown (2024), and Taylor (2015).

Vignettes of Ohio and Peer State Funding Systems

All states incorporate multiple cost factors and funding mechanisms into their overarching school funding policies. Together, these factors and mechanisms provide different types and amounts of supplemental aid to school districts to offset differences in education costs. In this section, we specifically focus on how Ohio adjusts funding to address the costs associated with educating economically disadvantaged students. We then compare and contrast Ohio's approach to funding economically disadvantaged students with four peer states: Pennsylvania, Kentucky, Indiana, and Michigan. Exhibit 2.14 offers a high-level summary of each state's funding adjustments for economically disadvantaged students.

The descriptions of economically disadvantaged funding policies used across these states are not intended to serve as nationally representative policy archetypes. Rather, they offer examples of the range of cost factors and mechanisms that have been incorporated into state education funding policies within this set of peer states.

Ohio

Funding for students who are economically disadvantaged is based on the enrollment share of a school district that is economically disadvantaged *and* the district economic disadvantage rate relative to the statewide rate of economic disadvantage. First, the state calculates the proportion of students identified as economically disadvantaged in a district using ADM. Second, it calculates the same proportion using all students in traditional districts, community schools, and STEM schools across the state. For fiscal year 2024, 54.3% of students in Ohio were identified as economically disadvantaged (Strawser, 2024). Using the district and statewide percentages of economically disadvantaged students, the state calculates the total amount of DPIA allocated to a district using the following formula:

$$DPIA = \$422 \times EconDisADM \times \left(\frac{DistEconDis\%}{StateEconDis\%}\right)^2$$

where the DPIA base of $422 is multiplied by both the number of economically disadvantaged student ADMs in a district *and* the Economically Disadvantaged Index (EDI), which is the square of the ratio of the district percentage of economically disadvantaged students to the statewide percentage of economically disadvantaged students.

Because the EDI is a squared ratio, the distribution of the DPIA funding increases exponentially as the district percentage of economically disadvantaged students also increases, at a fixed level of statewide economic disadvantage. While this relationship progressively distributes more funding per economically disadvantaged pupil to districts with higher economic disadvantage percentages, the current construction of the DPIA formula has no minimum floor

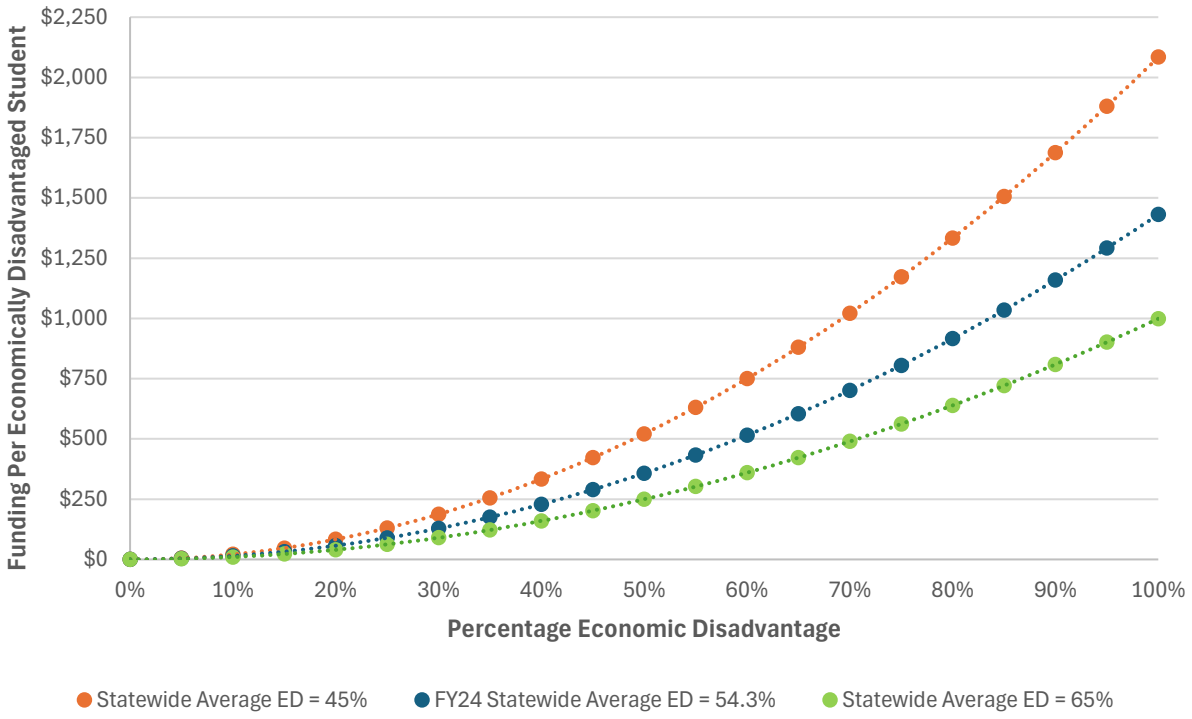
for per-economically disadvantaged pupil funding. This means that school districts with relatively small percentages of students who are economically disadvantaged receive very low levels of DPIA funding despite serving students who are economically disadvantaged with additional educational costs that need to be addressed.

Furthermore, since the relationship between district economically disadvantaged rates and additional funding per economically disadvantaged pupil also depends on the statewide percentage of students who are economically disadvantaged, changes in the statewide economic disadvantaged rate greatly affect the progressivity of DPIA funding. Exhibit 2.13 visualizes this relationship, with the blue line displaying how the DPIA funding amount per pupil varies as the share of economically disadvantaged students in a district increases when the statewide rate is 54.3%, the actual rate for the 2023–24 school year (Strawser, 2024). The orange and green lines in the exhibit demonstrate how the relationship between district economic disadvantage rates and DPIA funding per pupil changes when statewide economic disadvantage is at 45% and 65%, respectively. These three curves show that while districts with greater economic disadvantage will always receive a higher level of DPIA funding per economically disadvantaged pupil compared to those with less economic disadvantage, an increase in the statewide economic disadvantage rate results in a flattening of the DPIA funding schedule. This effectively puts downward pressure on the per- economically disadvantaged pupil funding provided for all districts but results in districts with the greatest rates of economic disadvantage receiving relatively less DPIA funding per economically disadvantaged pupil.

For example, in the 2023–24 school year, a district wherein 100% of students were economically disadvantaged received approximately $1,431 per economically disadvantaged student in additional funding. If the statewide economically disadvantaged rate were reduced by 9.3 percentage points to 45%, the same districts would receive $2,084 per pupil, a 45.6% increase in funding per economically disadvantaged pupil. Conversely, if the statewide percentage of students who are economically disadvantaged were raised to 65%, a district with 100% economically disadvantaged would receive $999 per economically disadvantaged pupil, a 30.2% decrease from the amount allocated at a 54.3% statewide percentage.

This relationship is notable because Ohio has experienced an increase in the percentage of economically disadvantaged students, from 46.7% in the 2021–22 school year to 54.3% in 2023–2024 school year. Over this period, school districts with the highest rates of economic disadvantage would have experienced a decrease in the amount of DPIA funding received per economically disadvantaged pupil. In districts whose students consistently experience high rates of economic disadvantage, this effectively represents a funding penalty, as less funding is received, despite having a constant level of student need across this period.

Exhibit 2.13. Schedule for DPIA Funding Allocations Per-Economically Disadvantaged Student for Fixed Statewide Percentages of Economically Disadvantaged Students



Note. This chart displays the per-pupil funding of economically disadvantaged students at different school district percentages. Each curve represents a fixed statewide percentage of economically disadvantaged students.
Source. Data simulated using Ohio Department of Education & Workforce's DPIA formula (Ohio Department of Education & Workforce, 2023).

Peer State Funding Systems

Kentucky

For economically disadvantaged students, Kentucky applies a single weight of 1.15 to the base per-pupil amount based on the average daily attendance (ADA) of economically disadvantaged students. Kentucky defines an economically disadvantaged student as one that qualifies for FRPL under the NSLP (Engstrom, 2023).

Indiana

Indiana applies multiple weights for economically disadvantaged students, as identified by the state's Complexity Index (CI). The index is defined as the percentage of students receiving Supplemental Nutrition Assistance Program (SNAP) benefits, Temporary Assistance for Needy Families (TANF) benefits, or foster care services. The amount of funding distributed per economically disadvantaged student is based on the concentration of economically

disadvantaged students in a school district. In the 2023–24 school year, a district with 100% of students identified by the CI received $3,983 per CI pupil (equivalent to a weight of 1.604). Funding per CI pupil in districts below 100% is calculated by multiplying $3,983 by the percentage of a district identified by the CI (IN Code § 20-43-6-3; IN Code § 20-43-13-4).

Indiana also provides additional support for students with disabilities, and the amount of support provided depends on the severity of each disability. For the 2023-24 school year, school districts received an additional weight of 2.685 ($11,104 per pupil of additional funds) per student with any severe disability and 1.42 ($2,790) for any student with any mild or moderate disability. If a student with any disability also has a communication disorder, the district would receive an additional weight of 1.08 ($525) of funding in addition to the amount corresponding to the level of severity (IN Code § 20-43-7-6).

Michigan

Michigan provides additional funding for economically disadvantaged students. However, Michigan is relatively unique in that this adjustment is distributed through categorical grants outside of the funding formula. Typically, these funds are distributed on a per-eligible-pupil basis at rates related to the base per-pupil Foundation Allowance (making them function like funding weights). However, the actual value of each of these adjustments per eligible pupil is contingent on the level of funding allocated to the economic disadvantage categorical grant in a given funding year.

Michigan allocated $952 million of nonformula categorical grant funding for economically disadvantaged students in the 2023–24 school year. Michigan defines a student who is economically disadvantaged as one who qualifies for FRPL, receives SNAP or TANF benefits, or is homeless, a migrant, or in foster care. As of the 2023–24 school year, Michigan further allocates this funding by applying one of six weights to the foundation allowance, depending on their Opportunity Index, which corresponds to the percentage of students in each district who are economically disadvantaged.[13] The band ranges are: 0%–19.9%; 20%–43.9%; 44%–58.9%; 59%–72.9% ; 73%–84.9%; >85%. If fully funded, the Opportunity Index weights would provide a weight of 1.35 for each economically disadvantaged student in a school district for districts in which less than 20% of students are economically disadvantaged. This weight would be as high as 1.47 for each economically disadvantaged student, where at least 85% of students are economically disadvantaged. However, Michigan is not currently fully funding the Opportunity Index; the state is allocating only $952 million of the $2.9 billion that would be required to fully meet these weights (Education Trust, 2024). Therefore, the state is required to prorate funds

[13] Previously, the state applied a single weight of 1.115 to any student identified as economically disadvantaged.

such that no district receives a weight of less than 1.115 for at-risk students (MCL–Section 388.1631a). In the 2023–24 school year, this meant that Opportunity Index weights ranged from 1.115 to 1.153 across the six index levels.[14]

Pennsylvania

Pennsylvania allocates additional funding for economically disadvantaged students. It does so primarily by assigning additional weights for these student groups onto the district-by-district base per-pupil funding level. For economically disadvantaged students, Pennsylvania applies multiple weights to provide additional funding. Students considered economically disadvantaged are identified using U.S. Census child poverty data via the American Community Survey. These census data are reported as district-level rates of poverty. These rates are multiplied by the district ADM to calculate the number of economically disadvantaged students. The additional funding amount per economically disadvantaged student varies according to the concentration of poverty in a district and the level of poverty students experience. The percentage of a school district's students who reside in households between 100% and 184% of the federal poverty line receive a weight of 1.3, while students from households below the poverty line receive a weight of 1.6. Districts where more than 30% of students reside in households that are below the federal poverty line receive an additional weight of 1.3 for each student below the poverty line (24 Pa. Stat. Ann. § 25-2502.53).

Exhibit 2.14. Overview of Ohio and Peer States' School Economic Disadvantage Funding Adjustments

	Ohio	Kentucky	Indiana	Michigan	Pennsylvania
Adjustments for economically disadvantaged students	Multiple weights depending on district and statewide economic disadvantage rates	Weight = 1.15	Weight = $4,042 times economic disadvantage percentage	Multiple weights depending on district economic disadvantage concentration	Multiple weights depending on district economic disadvantage percentage

Note. Weights are reported as the additional per-pupil allocation assigned to meet the cost of educating a student with a given need.

Source. The summary of state funding policies is based on information reported by EdBuild (n.d.), ECS (2024), and Verstegen (2018). Individual state statutes and other documents were reviewed when further information or clarification was needed.

[14] For a more detailed breakdown and history of this funding change, see Mrozowski (2023).

Summary

All states operate school funding formulas and supplemental grants-in-aid programs to address differences in education costs across school districts. States commonly differentiate funding to districts based on (a) student needs, including economically disadvantaged and at-risk students, ELs, SWD, and gifted and talented students; (b) district and school enrollment size and other characteristics; (c) CTE or other specialized programming; (d) grade range; and (e) resource price levels. State funding formulas use different mechanisms to adjust for cost differences, including weights, resource-based allocations, cost reimbursement, and categorical funding.

The policy frameworks used by other states to adjust funding for economic disadvantage point to several potential considerations for school finance reforms in Ohio:

- Ohio utilizes a unique method to apply multiple weights to economically disadvantaged students. Ohio applies additional weights based on the DPIA formula that adjusts dynamically with the Economically Disadvantaged Index. Because this index is the squared ratio of the district economic disadvantage percentage to the statewide percentage of students that are economically disadvantaged, additional funding that each district receives adjusts exponentially with changes in either percentage. However, the exponential nature of this funding adjustment also means that school districts with relatively low economic disadvantage rates receive very little additional funding, despite students who are economically disadvantaged in these districts still having educational needs that require supports. It may therefore be worth considering changes to the DPIA to address these concerns.
- Although Ohio's school funding system accounts for the concentration of student economic disadvantage in a school district, it does this by comparing the district's concentration of economic disadvantage to the state's overall economic disadvantage concentration. Consequently, the DPIA formula reduces funding for economically disadvantaged students as statewide rates of economic disadvantage increase, and school districts with the highest rates of economic disadvantage experience the largest reductions in aid. Other states that account for student concentration typically provide additional funding that varies as rates of student economic disadvantage in each district change, but do not consider changes in statewide economic disadvantage. For example, Michigan utilizes six district-level economic disadvantage ranges to provide additional weights that increase as the percentage of economically disadvantaged students increases. Indiana, like Ohio, also uses a formula to calculate weights, but the formula does not account for changes in statewide economically disadvantaged rates and adjusts funding proportionally with changes in the district rate. Given that no other state uses statewide economic disadvantage rates to adjust economic disadvantage funding in this way, adopting an alternative method of adjusting funding

according to economic disadvantage concentration, which ignores changes in statewide economic disadvantage rates, may also be worth considering.

While the empirical analysis described in the rest of this study details specific factors and corresponding cost differentials associated with providing an adequate education to economically disadvantaged students in Ohio, state policymakers will ultimately need to decide whether and how best to incorporate these findings into the state funding mechanism. The state vignettes provide several examples of how different peer states approach providing adequate funding for students who are economically disadvantaged. Like many states, Ohio adjusts funding for students who are economically disadvantaged to account for the concentration of economic disadvantage in a district. However, as noted previously, the DPIA lacks any per-pupil funding minimum for economically disadvantaged students and uniquely includes statewide economic disadvantage rates in its determination of economic disadvantage intensity. These choices are potentially leading to unmet costs for economically disadvantaged students and a lessening of the progressivity of DPIA funding as statewide economic need increases. We recommend reevaluating both features of the DPIA.

References

Atchison, D., Levin, J., Fatima, S., Trauth, A., Srikanth, A., Herberle, C., Gannon-Slater, N., Junk, K., & Wallace, L. (2023). *Assessment of Delaware public school funding*. American Institutes for Research. https://education.delaware.gov/wp-content/uploads/2023/12/23-22933_1_Delaware_Full_Report-FMT-ed103023-Version-2.pdf#:~:text=1%20|%20AIR.ORG%20Assessment%20of%20Delaware%20Public%20School%20Funding%201.

Augenblick, Palaich and Associates, Education Commission of the States, & Picus, Odden and Associates. (2018). *Nevada school finance study*. https://www.leg.state.nv.us/App/InterimCommittee/REL/Document/12828

Baker, B. D. (2005). The emerging shape of educational adequacy: From theoretical assumptions to empirical evidence. *Journal of Education Finance*, *30*(3), 259–287.

Baker, B. D. (2008). Doing more harm than good? A commentary on the politics of cost adjustments for wage variation in state school finance formulas. *Journal of Education Finance*, *33*(4), 406–440.

Baker, B. D. (2018). *Educational inequality and school finance: Why money matters for America's students*. Harvard Education Press.

Baker, B. D., & Green, P. C. (2015). Conceptions of equity and adequacy in school finance. In H. Ladd & M. Goertz (Eds.), *Handbook of research in education finance and policy.* Routledge.

Baker, B., Kearns, C., Atchison, D., & Levin, J. (2020). *State finance reform vignettes New Jersey*. American Institutes for Research. https://carsey.unh.edu/sites/default/files/media/2020/06/20-11882_5._primer_statevignettes_new_jersey_air_formatted_v3.pdf

Chambers, J., & Fowler, W. J. (1995). *Public school teacher cost differences across the United States*. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics. https://nces.ed.gov/pubs95/95758.pdf

Chambers, J., & Levin, J. (2009). *Determining the cost of providing an adequate education for all students*. National Education Association.

Chambers, J. G., Shkolnik, J., & Perez, M. (2003). *Total expenditures for students with disabilities, 1999–2000: Spending variation by disability*. American Institutes for Research. https://files.eric.ed.gov/fulltext/ED481398.pdf

Cornman, S.Q., Nixon, L.C., Spence, M.J., Taylor, L.L., & Geverdt, D.E. (2019). *Education Demographic and Geographic Estimates (EDGE) Program: American Community Survey Comparable Wage Index for Teachers (ACS-CWIFT) (NCES 2018- 130)*. U.S. Department of Education. Washington, DC: National Center for Education Statistics. https://nces.ed.gov/programs/edge/docs/EDGE_ACS_CWIFT_FILEDOC.pdf

Danks, A., Fatima, S., Rettiger-Lincoln, E., Junk, K., Harris, P., Levin, J., Ruedel, K., Atchison, D., Neering, K., & Kolbe, T. (2022) *Special education in Ohio: Best practices, costs, and policy implications*. Washington, D.C.: American Institutes for Research. https://education.ohio.gov/getattachment/Topics/Special-Education/Sections/Accountability-and-Funding/Special-Education-Cost-Study.pdf.aspx?lang=en-US

EdBuild. (n.d.). *Funded: Reports download standard and custom reports*. Retrieved September 19, 2024, from http://funded.edbuild.org/reports, policy, funding, education, 50

Education Commission of the States. (2016). *The importance of at-risk funding*. https://www.ecs.org/wp-content/uploads/The-Importance-of-At-risk-Funding.pdf

Education Commission of the States. (2023). *Secondary career and technical education 2023*. https://reports.ecs.org/comparisons/secondary-career-and-technical-educationthe -2023-02

Education Commission of the States. (2024). *50-state comparison: K–12 funding*. https://www.ecs.org/50-state-comparison-k-12-funding-2024/

Engstrom, S. (2023). *SEEK at risk manual*. https://www.education.ky.gov/districts/enrol/Documents/KDE%20SEEK%20At%20Risk%20Manual%20(ADA)%20May%202023.pdf

Fatima, S., Kolbe, T., & Srikanth, A. (2024). *State approaches to funding special education*. American Institutes for Research.

House Bill 33–135th General Assembly, Ohio Rev. Code Ann. § 3317.022 (2023). https://codes.ohio.gov/ohio-revised-code/section-3317.022

House Bill 33–135th General Assembly, Ohio Rev. Code Ann. § 3317.051 (2023). https://codes.ohio.gov/ohio-revised-code/section-3317.051.

House Bill 33–135th General Assembly, Ohio Rev. Code Ann. § 3317.0214 (2023). https://codes.ohio.gov/ohio-revised-code/section-3317.0214

Indiana Code, IN Code § 20-36-2-1 (2023). https://iga.in.gov/laws/2023/ic/titles/20#20-36-2-1

Indiana Code, IN Code § 20-43-3-8 (2023). https://iga.in.gov/laws/2023/ic/titles/20#20-43-3-8

Indiana Code, IN Code § 20-43-6-3 (2023). https://iga.in.gov/laws/2023/ic/titles/20#20-43-6-3

Indiana Code, IN Code § 20-43-7-6 (2023). https://iga.in.gov/laws/2023/ic/titles/20#20-43-7-6

Indiana Code, IN Code § 20-43-10-4 (2023). https://iga.in.gov/laws/2023/ic/titles/20#20-43-10-4

Indiana Code, IN Code § 20-43-13-4 (2023). https://iga.in.gov/laws/2023/ic/titles/20#20-43-13-4

Indiana Department of Education. (2024). *Digest of public school finance: 2023-2025 biennium*. https://www.in.gov/doe/files/Public-School-Digest-2023-2025.pdf

Kentucky Department of Education. (2024). *SEEK calculations*. https://www.education.ky.gov/districts/SEEK/Documents/FY2023-2024%20SEEK%20Final%20Calculations%203.1.2024.pdf

Kentucky Revised Statutes, KY Rev Stat § 157.200 (2012). https://apps.legislature.ky.gov/law/statutes/statute.aspx?id=40170

Kentucky Revised Statutes, KY Rev Stat § 160.470 (2021). https://apps.legislature.ky.gov/law/statutes/statute.aspx?id=51320

Kolbe, T., Baker, B., Atchison, D., & Levin, J. (2019). *Study of pupil weights in Vermont's education funding formula*. Vermont Agency of Education. https://legislature.vermont.gov/assets/Legislative-Reports/edu-legislative-report-pupil-weighting-factors-2019.pdf

Mrozowski, J. (2023, June 28). *Michigan makes history with new school funding formula to account for needs of students living in areas of concentrated poverty*. Education Trust-Midwest. https://midwest.edtrust.org/2023/06/28/michigan-makes-history-with-new-school-funding-formula-to-account-for-needs-of-students-living-in-areas-of-concentrated-poverty/

National Center for Education Statistics (NCES). (2021). *Table 235.20. Revenues for public elementary and secondary schools, by source of funds and state or jurisdiction: 2018-19*. https://nces.ed.gov/programs/digest/d21/tables/dt21_235.20.asp

Ohio Department of Education & Workforce. (2023). *FY 2024 school finance payment report: Line by line explanation*. https://education.ohio.gov/getattachment/Topics/Finance-and-Funding/School-Payment-Reports/State-Funding-For-Schools/Traditional-School-Districts/FY24-SFPR-Funding-Line-by-Line-Explanation-11-2-2023.pdf.aspx?lang=en-US

Pennsylvania Department of Education (2024). *2024–25 estimated basic education funding* (July 2024) [Data set]. Pennsylvania Department of Education. https://www.pa.gov/content/dam/copapwp-pagov/en/education/documents/schools/grants-and-funding/school-finances/education-budget/2024-25-estimated-basic-education-funding.xlsx

Public School Code of 1949, 24 Pa. Stat. Ann. § 13-1372 (2022). https://www.legis.state.pa.us/cfdocs/legis/LI/uconsCheck.cfm?txtType=HTM&yr=1949&sessInd=0&smthLwInd=0&act=14&chpt=13&sctn=72&subsctn=0

Public School Code of 1949, 24 Pa. Stat. Ann. § 25-2502.53 (2022). https://www.legis.state.pa.us/cfdocs/legis/LI/uconsCheck.cfm?txtType=HTM&yr=1949&sessInd=0&smthLwInd=0&act=14&chpt=25&sctn=2&subsctn=53

Public School Code of 1949, 24 Pa. Stat. Ann. § 25-2509.5 (2022). https://www.legis.state.pa.us/cfdocs/legis/LI/uconsCheck.cfm?txtType=HTM&yr=1949&sessInd=0&smthLwInd=0&act=14&chpt=25&sctn=9&subsctn=5

Public School Code of 1949, 24 Pa. Stat. § 25-2509.8 (2022). https://www.legis.state.pa.us/cfdocs/legis/LI/uconsCheck.cfm?txtType=HTM&yr=1949&sessInd=0&smthLwInd=0&act=14&chpt=13&sctn=72&subsctn=0

Silverstein, J., & Brown, A. (2024). *Regional cost adjustments*. Augenblick, Palaich, and Associates. https://webapp-strapi-paas-prod-nde-001.azurewebsites.net/uploads/apa_rca_presentation_3_22_24_0ae49bfd19.pdf

Strawser, E. (2024). Shifting poverty indicators and K12 poverty funding in Ohio. Collaborate Blog Post. Ohio Association of School Business Officials. https://collaborate.oasbo-ohio.org/blogs/ernie-strawser1/2024/06/05/shifting-poverty-indicators-and-k12-poverty-fundin#:~:text=The%20average%20indicates%20that%20statewide%2054.3%%20of,the%20signi%EF%AC%81cant%20shift%20in%20this%20statewide%20average

Taylor, L. L. (2015). *Options for updating Wyoming's regional cost adjustment*. https://www.wyoleg.gov/InterimCommittee/2015/SSRRpt1001AppendixC-1.pdf

The State School Aid Act of 1979, MCL–Section 388.1620 (2024). https://legislature.mi.gov/Laws/MCL?objectName=MCL-388-1620

The State School Aid Act of 1979, MCL–Section 388.1622d (2024). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-388-1622d

The State School Aid Act of 1979, MCL–Section 388.1635a (2024). https://www.legislature.mi.gov/Laws/MCL?objectName=MCL-388-1635A

The State School Aid Act of 1979, MCL–Section 388.1631a (2024). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-388-1631a

The State School Aid Act of 1979, MCL–Section 388.1641 (2024). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-388-1641

The State School Aid Act of 1979, MCL–Section 388.1651a (2024). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-388-1651a

The State School Aid Act of 1979, MCL–Section 388.1653a (2024). https://www.legislature.mi.gov/Laws/MCL?objectName=mcl-388-1653a

Verstegen, D. A. (2018). *A quick glance at school finance.* https://schoolfinancesdav.wordpress.com/

Chapter 3. Needs Assessment

The forthcoming chapter summarizes findings from the research team's assessment of the needs of students who are economically disadvantaged, and how these services vary with respect to the percentage of students in this population and other LEA characteristics.

The chapter is organized into five key sections including a review of the **Needs Assessment Scope and Research Questions**, a **Needs Assessment Data and Methods** section, a section detailing key findings, **Needs Assessment Findings**, a **Summary of Identified Unmet Needs**, as well as a **Limitations** section and a concluding section.

Finally, the analyses presented in this chapter and additional related analyses are available in a supplementary, comprehensive needs assessment memo.

Needs Assessment Scope and Research Questions

When students' physiological and psychological needs are met, they are better positioned to thrive socially emotionally, cognitively, and academically. Conversely, poverty can create significant barriers to their success, including negative impacts to their health, literacy, and overall well-being (Parrett & Budge, 2012)

This needs assessment chapter provides a comprehensive assessment of needs for students in Ohio who are economically disadvantaged. The key questions addressed in the needs assessment include:

- Are there systematic differences in available resources or educational outcomes between Ohio public school students who are economically disadvantaged and their more advantaged peers?
- What are the unique needs of students who are economically disadvantaged in Ohio public schools?
- Do the needs of students who are economically disadvantaged vary by factors such as locale (rural, town, suburban, or city) and grade level? If so, how?

To address these questions, the research team completed analyses of public administrative data, as well as both survey and interview data collected as part of this study. In brief, results of the needs assessment point to the following unmet needs for students who are economically disadvantaged:

- A systemic, coordinated approach to services is needed to better support students who are economically disadvantaged.
- Students who are economically disadvantaged have fewer opportunities to benefit from the skills of experienced teachers.

Needs Assessment Data and Methods

Data

The research questions guiding the needs assessment were examined through the collection and analysis of several sources of data, including both existing publicly available data and a novel collection of data gathered through a survey and interview process. These data are common to several chapters of this study and detail about them can be found in the Data section of the study Introduction. The specific sources of data alongside the analysis for which each were used—resource or student outcomes—are provided in the Quantitative Analysis Variables and Data Sources section in Appendix B. Additionally, original survey and interview data were analyzed separately and in combination with many of the public data sources. This was done as part of an independent and holistic review to complement the analysis of extant quantitative data.

It should be noted that the sample for the analysis of publicly available data excludes 380 schools. These excluded schools include those where students with disabilities make up more than 50% of the student population, as well as schools with incomplete data or insufficient historical data to ensure consistent inclusion across all project analyses.

Methodology

The research team leveraged a three-pronged approach to data collection and analysis including a quantitative analysis of publicly available data, an analysis of responses from a statewide survey of educational practitioners and community-based and youth-based organizations (CBOs), and feedback from group and individual interviews with practitioners and CBOs.

Extant Data Analysis

To understand the potential needs of the population of students who are economically disadvantaged in Ohio, the research team assessed the extent to which schools with larger populations of such students tend to have relatively fewer resource inputs and/or lower student outcomes. Specifically, we examined differences in a variety of resource input measures, including per-pupil spending, pupil–teacher ratio, and the share of inexperienced teachers. We also looked at differences in student outcomes, including chronic absenteeism rates, graduation rates, and grade-level proficiency rates in mathematics and English language

arts (ELA). While the outcomes of all students were considered in brief, the analysis focused primarily on the outcomes of those who are economically disadvantaged.

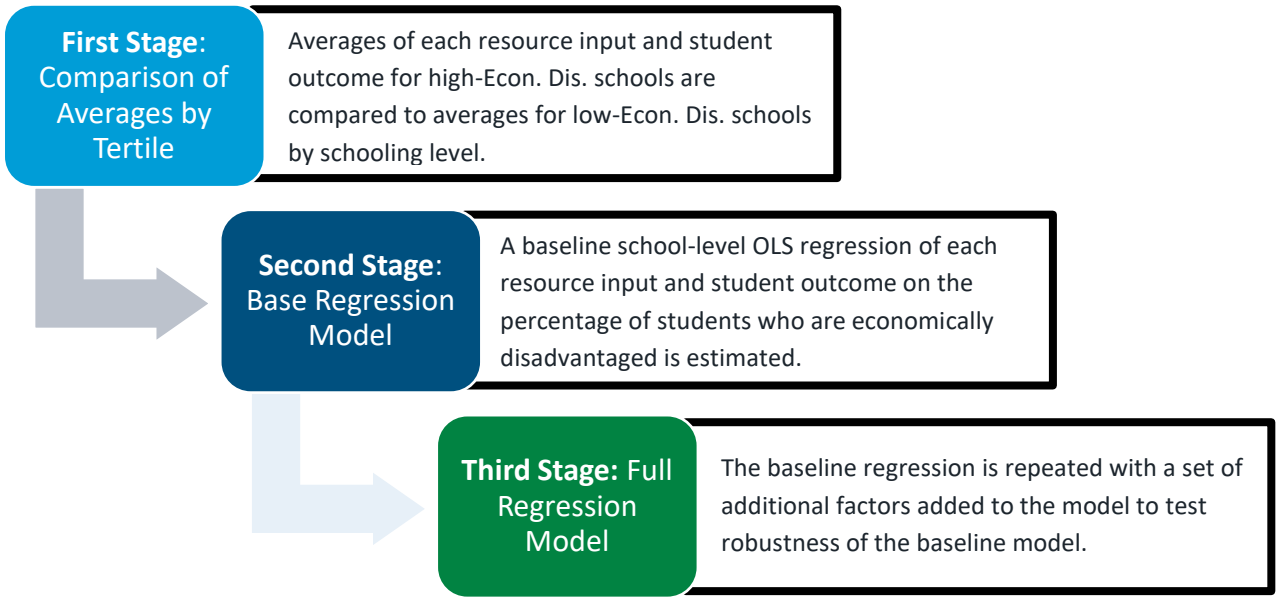
Differences in any of these measures between economically disadvantaged students and their peers may reveal gaps, suggesting potential unmet need. However, the direction of these gaps depends on the measure. For example, lower figures in per-pupil spending, graduation rates, and proficiency rates have negative implications and thus reflect unmet need for students who are economically disadvantaged. Conversely, higher pupil–teacher ratios, percentages of inexperienced teachers, and chronic absenteeism rates also suggest negative conditions and reflect unmet needs.

Any statistically significant difference reflecting a gap is presented as evidence of a potential unmet need. For example, if schools with more students who are economically disadvantaged tend to have higher percentages of inexperienced teachers, this suggests a need for improved access to experienced teaching staff in these schools.

Approach

To conduct this analysis, the research team leveraged both a straightforward comparison of averages across groups of schools serving various proportions of students who are economically disadvantaged and a more detailed multiple regression analysis using publicly available data, primarily from the Ohio State Report Card and the NCES. The stages of this approach are illustrated in Exhibit 3.1. This approach provides information about the extent of any gaps in resource inputs or student outcomes. Building on the first stage, stage two and three improve upon the simple comparisons of average resource inputs and student outcomes between schools with low and high concentrations of students who are economically disadvantaged, to control for other factors which also impact inputs and outcomes. These stages are essential because if these factors are not accounted for, such comparisons may lead to inaccurate conclusions.

Exhibit 3.1. Needs Assessment Extant Data Analysis by Stages



Note. Econ. Dis. = economic disadvantage; OLS = ordinary least squares.

The following sections summarize each stage of the extant data analysis.

First Stage: Comparison of Averages by Tertile

In the first stage of the analysis, we divided schools into tertiles based on the percentage of students identified as economically disadvantaged. The tertiles divide schools into three roughly equally sized groups that are defined by their percentage of students who are economically disadvantaged. Thus, these groups are characterized as schools with low (bottom third), medium (middle third), and high (top third) concentrations of students who are economically disadvantaged. For ease of interpretability, we will refer to these throughout as low-economic disadvantage, mid-economic disadvantage, and high-economic disadvantage schools.

The research team presents findings by each tertile for each schooling level separately because elementary schools tend to be overrepresented in the upper tertile group (top third), potentially biasing comparisons across tertiles if schooling level is not accounted for. More information and analysis that supports this choice can be found in the Quantitative Analysis Variables and Data Sources section in Appendix B.

Finally, it is important to determine whether any differences in averages for resource inputs or student outcomes are statistically significant, meaning they are unlikely to be due to random chance. To test the statistical significance of any difference in averages identified in this stage of the analysis, we conducted a two-tailed *t*-test of significance.

Second and Third Stages: Base and Full Regression Analyses

In the second and third stages of this analysis, the research team used linear regression to assess if differences in resource inputs or student outcomes between schools with relatively low and high concentrations of students who are economically disadvantaged identified in the first stage are moderated by other school characteristics or populations of students served. For example, is an average observed level of a given resource input higher in high-economic disadvantage schools because those schools also tend to be in a particular type of setting or serve other specific populations of students?

In the second stage, before accounting for these additional factors, the research team estimated a base regression model of each resource input and student outcome on a continuous measure of the concentration of students who are economically disadvantaged, as opposed to tertile groups. This intermediary stage tests the extent to which identified differences are significant when including the full range of variation.

Then, in the third stage, the research team added a range of additional factors to estimate the full multiple linear regression model. The research team included several specific factors that could influence outcomes, including measures of geographic region; other student populations (i.e., percentages of students with disabilities, English learners, and non-White students); and other school characteristics (i.e., school locale, school enrollment, and whether a school is a community school or not). School enrollment was included in this analysis to account for the fact that resource inputs and student outcomes may vary systematically with school size. For resource inputs, this may reflect economies of scale, or the tendency for per-unit resources to decline as scale increases, and at very large scales, potentially increase as scale increases (see, for example, Andrews & Duncombe, 2002; Atchison et al., 2023; and Jacobson et al., 2021). To define geographic regions in this analysis, the research team used the State Support Team regions, which define regions of state support within Ohio's Statewide System of Support.

Additionally, the prices that school districts must pay for equivalent resources vary by geographic region within the state, primarily due to differences in local economic conditions and community amenities available. This variation may help explain differences in resource inputs, for example. To account for this, the research team included the NCES Comparable Wage Index for Teachers (CWIFT), a standard national measure of regional variation in the price of teacher labor.

Finally, all regressions in the second and third stages were estimated for each schooling level separately and weighted by school enrollment, with robust standard errors. Descriptive data for all variables included in the regression analyses are included in the Additional Data Analysis Tables section in Appendix B.

Throughout these stages of the extant data analysis, we routinely report on the statistical significance of any differences in averages or estimated relationships. In line with convention, we indicate statistical significance for any estimates at or below the 5% level via stars (*) and define relationships as statistically significant at the 5% level in the discussion. It is important to note that statistical significance on its own does not necessarily imply the identified result is "meaningful" in a practical sense. Generally, we consider the relative magnitude of the estimated relationship to be indicative of the "meaningfulness" of a result.

The Quantitative Analysis Variables and Data Sources section in Appendix B includes additional information about the quantitative analysis methods and additional detail on its findings.

Statewide Surveys

WestEd developed two statewide surveys to gather perception data from key groups closely engaged with students who are economically disadvantaged and their families: educational practitioners and staff from CBOs. Initial findings from the quantitative analysis informed the development of the surveys. The surveys aimed to collect respondents' views on the most urgent needs of students who are economically disadvantaged, the impact of COVID-19 on these needs, the effectiveness of school-based and out-of-school programs in supporting this population, and which subgroup within this population exhibited the highest needs. To ensure clarity and alignment with the research questions, the surveys were tested internally at WestEd. The Survey Respondents and Nonresponse Bias Analysis section in Appendix B summarizes, for each target group, the roles, the response rate, and the detailed results of a nonresponse bias analysis.

In April 2024, both surveys were sent to their respective audiences. ODEW sent the practitioner survey to Title I coordinators at 931 local education agencies (LEAs). Due to their focus on serving districts and schools with high populations of students who are economically disadvantaged, Title I coordinators were invited to complete the survey and encouraged to extend the invitation to other educational practitioners (such as school leaders and teachers), families, and community members closely involved with these students. The results reported here are based on responses received as of September 2024 when the survey was closed to additional responses.

The CBO survey was distributed to 56 organizations across Ohio that provide services to students who are economically disadvantaged.[15] CBOs were selected based on the counties with the highest child poverty rate across various geographical areas within the state. Selected

[15] Fifty-two organizations were directly invited to the survey and four additional organizations were forwarded the survey from CBOs that were originally invited.

CBOs represent a diverse range of services affecting students and families who are economically disadvantaged; for example, community-based afterschool programs (e.g., Junior Achievement, YMCA), social services (e.g., food banks), and hospitals and health clinics. The Community-Based Organization Survey Contact List section in Appendix B provides a detailed list of contacted CBOs, along with their respective locations.

A total of 155 individuals responded to the surveys, with 150 responses to the practitioner survey and 5 responses to the CBO survey. Additionally, 103 LEAs were represented in the practitioner survey, and the response rate for the practitioner survey was calculated based on the number of LEAs. This response reflects overall response rates of 11% (103 LEAs out of 931 total) and 9% (5 out of 56 total) for the practitioner and CBO surveys, respectively.

Nonresponse bias analysis suggests that practitioner response rates were strongest for those from Traditional LEAs, rather than STEM, Dropout and Recovery, or Community Schools. Thus, it is important to note that the practitioner survey findings more strongly reflect the perspectives of those in Traditional LEAs and provide limited data about the views of practitioners in Community School LEAs. Additionally, our practitioner sample captures LEAs that are larger, with slightly smaller populations of non-White students, and more suburban schools compared to the nonrespondent group. Regarding the CBO survey, the small sample size means it cannot be representative of the entire population of CBOs engaged. However, it is worth noting that responses were received from Regions 3 and 7, as well as from rural and suburban locales.

Additional details about the composition of our survey respondents can be found in the Survey Respondent and Nonresponse Bias Analysis section in Appendix B.

Interviews

Group and individual interviews were conducted to further understand the statewide survey results in different educational and community contexts, as well as how respondents perceive the way resources (i.e., inputs) translate into programs and services for students.[16]

Educational practitioners and CBOs who completed the statewide survey were invited to participate in these interviews. Development of the interview protocol was guided by emergent trends from the quantitative analysis and survey results. Questions were tailored to probe for additional information about the topics examined in the survey and quantitative analyses (e.g., sufficiency of in-school and out-of-school supports for students who are economically disadvantaged, student outcomes such as chronic absence) and to understand how these manifest within specific community and educational contexts. Specifically, interviewees were

[16] Focus group and interview protocol can be provided upon request.

asked to respond to questions, given their experience, on the primary needs of students who are economically disadvantaged, changes in student needs resulting from the COVID-19 pandemic, and the subgroups of students are who economically disadvantaged with the most significant levels of need.

To analyze the interview data, the research team transcribed the interviews and engaged in thematic content analysis. Themes were selected based on the topics most frequently shared in the interviews and their relevance to the research questions. Codes were then created based on the themes, and the research team counted the number of interview responses that mentioned each code. If the code was present in a given interview, researchers indicated whether the interviewee described the code as either an addressed need or an unaddressed need. For example, the code "mental health support" could refer either to mental health supports that are currently provided or to mental health supports that are an unaddressed need.

The research team conducted 11 interviews, including interviews with district staff (*n* = 2), school administrative staff (*n* = 8), and youth-based and CBO staff (*n* = 1). Most interviewees (70%) were from schools in urban and suburban areas. While the sample size of the interviews was small, they nonetheless captured important information that will be explored alongside other analyses in later phases of the study. Exhibit 3.2 provides a summary of the interview sample.

Exhibit 3.2. Interview Sample Counts by Sample Group and Roles

Sample group	Respondent count	Roles
District Administrative Staff (Educational Practitioners)	8	E.g., director of federal programs, director of pupil services
School Administrative Staff (Educational Practitioners)	2	Principal, assistant principal
Community-Based and Youth-Based Organizations	1	Vice president of programs

Source. Study team's analysis of interviews of CBOs and practitioners, 2024.

Needs Assessment Results

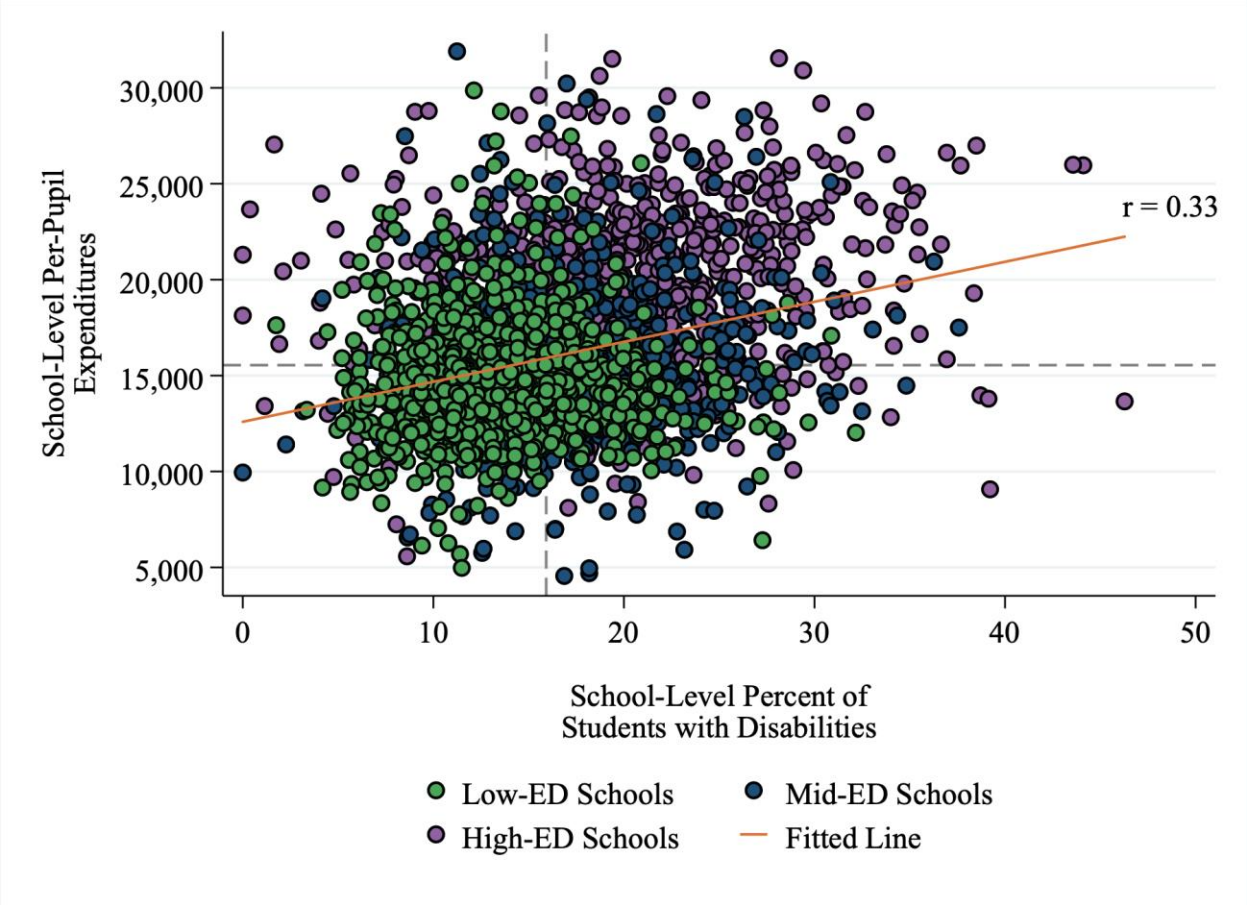
Extant Data Analysis

The extant data analysis examines resource inputs and student outcomes primarily among students who are economically disadvantaged. This analysis is conducted in three stages, as described in the Methodology section, and concludes with a multiple linear regression analysis to produce the most accurate and comprehensive results. Before summarizing the findings, an overview of the value of regression analysis in this context may be helpful. As noted in the Methodology section, regression analysis allows us to account for factors that could bias the analysis, if left unaccounted for.

For example, consider Exhibit 3.3, which compares per-pupil spending and the percentage of students with disabilities for all schools in the analysis. The figure includes a fitted line illustrating the positive and statistically significant relationship between the two.[17] This can also be seen in the figure through the color coding, which illustrates that as a school's percentage of students with disabilities grows, the school also tends to move from low-economic disadvantage to high-economic disadvantage tertiles. As a result, schools with relatively high percentages of students who are economically disadvantaged are also likely to be schools with relatively high percentages of students with disabilities. Thus, unless the relationships between each of these measures and per-pupil spending are accounted for separately, our assessment of how per-pupil spending tends to change with the percentage of students who are economically disadvantaged will be biased.

[17] Specifically, the enrollment-weighted correlation coefficient is .334 and statistically significant, $p < .001$. This finding also occurs when analyzing the relationship within each schooling level (elementary, middle, and high), where the enrollment-weighted correlation coefficients range from .3715 to .6469 and are consistently statistically significant, $p < .001$.

Exhibit 3.3. Scatterplot of Per-Pupil Spending and Percentage of Students with Disabilities with Linear Fitted Line



Note. N = 2,992 total schools. Figure plots per-pupil expenditures and percentages of students with disabilities for all schools. The dashed gray lines represent the enrollment-weighted averages of each variable, and the diagonal red line represents a linear line of best fit. R is the enrollment-weighted correlation coefficient, and is statistically significant, $p < .001$. *Source.* ODEW Detailed Expenditure Data 2022/23, ODEW Report Card - Building Disaggregated Disability 2022/23.

This example underscores the importance of testing our initial findings with multiple linear regression and highlights the risks associated with simpler comparisons of averages between low-economic disadvantage and high-economic disadvantage schools.

Resource Inputs

Regarding resource inputs, the research team examined two school-level measures: per-pupil pupil-teacher ratios and the percentage of inexperienced teachers.[18] To introduce this section, each of these resource input measures will be described in more detail.

The research ream considered whether teacher resources differ for high-economic disadvantage compared to low-economic disadvantage schools. Teachers are widely understood to be the most influential school-based factor affecting students' success (Chetty et al., 2014; Hanushek, 2002; Rivkin et al., 1998). Our first measure of teacher resources is the pupil–teacher ratio, which is a readily available measure of the relative level of teaching resources. In the context of a needs assessment, our analysis of these ratios will assess the extent to which students who are economically disadvantaged are more likely to experience higher ratios, indicating a lower level of teacher resources compared to their advantaged peers. If this is the case, it may suggest an unmet need for instructional support.

The second measure of teacher resources examined is the rate of inexperience among teachers, as indicated by the percentage of inexperienced teachers, and how this rate differs between high-economic disadvantage and low-economic disadvantage schools.[19] The level of experience among teaching staff is a common measure used to assess a school's overall teacher resources; a higher rate of inexperience generally reflects lower resources. Specifically, the rate of teacher inexperience generally reflects to some extent the level of turnover within a school, which has been found to incur costs in both additional spending and negative impact on student learning (Ronfeldt et al., 2013; Sorenson & Ladd, 2020).

Furthermore, there is relatively strong evidence that teacher effectiveness increases during a teacher's first few years in the profession (Rockoff, 2004). While some literature suggests that the benefits of experience plateau later in a teacher's career, a more recent study finds returns to experience continue, though at a reduced rate (Papay & Kraft, 2015). Therefore, if high-economic disadvantage schools tend to have higher rates of inexperienced teachers compared to low-economic disadvantage schools, this may suggest lower quality teaching resources and/or instability in teaching staff, potentially reflecting unmet student needs.

[18] The research team also analyzed per-pupil expenditures. Since these are also analyzed in Chapter 4, the results of these analyses are included in the Additional Data Analysis Tables section in Appendix B.

[19] In the Ohio report card data, an "inexperienced teacher" is a teacher with 2 years of experience or less.

First Stage: Tertile Analysis

In the first stage, average resource inputs for low-economic disadvantage schools were compared to high-economic disadvantage schools, for each schooling level separately. Exhibit 3.4 summarizes the results of this analysis for all inputs.

Exhibit 3.4. Difference In Pupil–Teacher Ratios and Percentage of Inexperienced Teachers Between High-Economic Disadvantage and Low-Economic Disadvantage Schools, by Schooling Level

Schooling level	Pupil–teacher ratio	Percentage of inexperienced teachers in percentage points
Elementary school	-1.3***	9.8***
Middle school	-1.4***	6.9***
High school	0.4	10.9***

Note. n = 2,987 schools for the student–teacher ratios and inexperienced teacher data. Averages are unweighted. Asterisks indicate that the value for high-economic disadvantage schools is statistically significantly different than in low-economic disadvantage schools based on a two-tailed t-test: * $p < .05$, ** $p < .01$, *** $p < .001$. *Source.* Study team analysis of data from the following sources: ODEW Report Card – Building Teacher Information 2022/23; Building Disaggregated Economically Disadvantaged 2022/23; Building Details 2022/23, and NCES CCD Public Elementary/Secondary School Universe Data, School Directory.

For pupil–teacher ratios, high-economic disadvantage schools have statistically significantly lower average ratios than low-economic disadvantage schools for elementary and middle schools, ranging from -1.3 to -1.4. Though average ratios are higher in high-economic disadvantage high schools, the difference is not statistically significant. Paired with per-pupil expenditure findings presented in the cost function analysis in Chapter 4 and the Additional Data Analysis Tables section in Appendix B, these findings suggest no gap in terms of these two inputs, as higher spending and lower ratios generally have positive implications in education.

However, the percentage of inexperienced teachers was consistently higher on average in high-economic disadvantage schools compared to low-economic disadvantage school, with differences ranging from 6.9 to 10.9 percentage points, and all statistically significantly different ($p < .001$). This result indicates a gap and a potentially unmet need, as higher shares of inexperienced teachers generally have negative implications for students.

The results of the descriptive tertile analysis indicate a gap with respect to the share of inexperienced teachers, and no gaps with respect to the other two resource inputs. Detailed results of this analysis can be found in Additional Data Analysis Tables section in Appendix B, including averages for all resource inputs by tertile and schooling level.

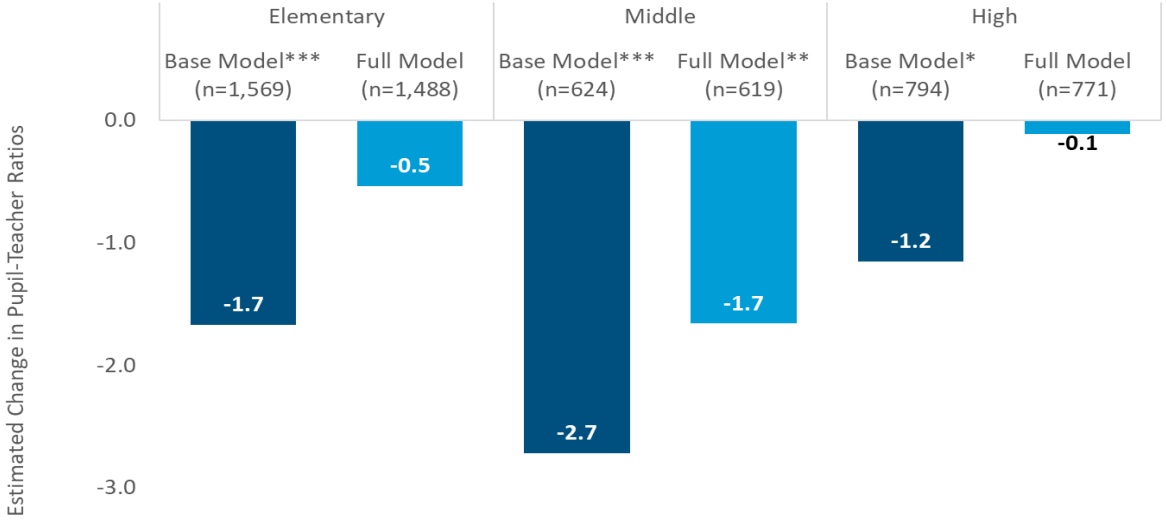
Second and Third Stages: Regression Analyses

Teacher Resource Inputs

With respect to pupil–teacher ratios, the tertile analysis results suggest that ratios decline as the percentage of students who are economically disadvantaged grows. These results generally hold up after the inclusion of additional factors in our regression analysis.

As illustrated in Exhibit 3.5, in both our base model (which does not account for other factors) and full model (which does account for other factors), pupil–teacher ratios have a negative association with the percentage of students who are economically disadvantaged. However, once our full model accounts for additional factors, the magnitude of this relationship declines, and the relationship is not significant in elementary or high schools. Thus, in the full model, a middle school with 100% students who are economically disadvantaged is predicted to have, on average, a pupil–teacher ratio that is 1.7 lower than schools with no students who are economically disadvantaged. It should also be noted that the models for pupil-teacher ratios do not perform as well as the models of per-pupil spending (detailed in the Additional Data Analysis Tables section in Appendix B) in terms of explained variation. Specifically, even after including additional relevant factors, full models explain no more than 21% of the observed variation in pupil–teacher ratios (the full regression results in the Additional Data Analysis Tables section in Appendix B).

Exhibit 3.5. Regression Analysis Results for Pupil–Teacher Ratios, Base and Full Model Results

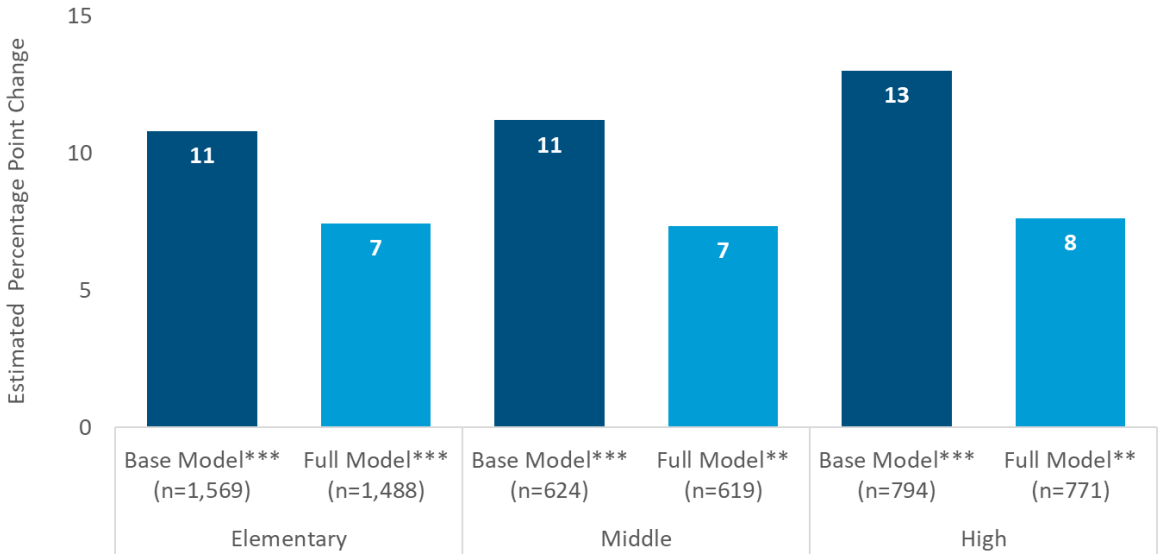


Note. Figure displays the predicted change in pupil–teacher ratios from a school with 0% students who are economically disadvantaged to one with 100%. Standard errors are robust, and the regressions are weighted by school enrollment: * $p < .05$, ** $p < .01$, *** $p < .001$. *Source.* Study team analysis of data from the following sources: ODEW Report Card – Building Teacher Information 2022/23, Building Disaggregated Economically Disadvantaged 2022/23, Building Details 2022/23, Building Disaggregated English Learner 2022/23, Building Disaggregated Disability 2022/23, and Building Disaggregated Race/Ethnicity 2022/23; NCES CCD Public Elementary/Secondary School Universe Data – School Directory and Geographic Data, 2022/23; NCES Comparable Wage Index for Teachers (CWIFT) 2021.

For the rate of inexperience among teachers, the tertile analysis pointed to the only gap in resource inputs, suggesting that the percentage of inexperienced teachers goes up as the percentage of students who are economically disadvantaged goes up. This initial result generally holds up in the fully specified regression analysis.

As illustrated in Exhibit 3.6, the regression analysis results suggest that after accounting for other relevant factors, the rate of inexperience among teachers is significantly and positively associated with the percentage of students who are economically disadvantaged in all schooling levels. Specifically, schools with 100% of students who are economically disadvantaged are predicted to have, on average, about a 7 to 8 percentage point higher share of inexperienced teachers compared to schools with no students who are economically disadvantaged, holding other factors constant.

Exhibit 3.6. Regression Analysis Results for the Percentage of Inexperienced Teachers, Base and Full Model Results



Note. The figure displays the predicted change in the percentage of inexperienced teachers from a school with 0% students who are economically disadvantaged compared to one with 100%. Standard errors are robust, and the regressions are weighted by school enrollment: ** $p < .01$, *** $p < .001$. *Source.* Study team analysis of data from the following sources: ODEW Report Card – Building Teacher Information 2022/23, Building Disaggregated Economically Disadvantaged 2022/23, Building Details 2022/23, Building Disaggregated English Learner 2022/23, Building Disaggregated Disability 2022/23, and Building Disaggregated Race/Ethnicity 2022/23; NCES CCD Public Elementary/Secondary School Universe Data – School Directory and Geographic Data, 2022/23; NCES Comparable Wage Index for Teachers (CWIFT) 2021.

Considering the full regression results, found in the Additional Data Analysis Tables section in Appendix B, we observe that community school status is also a significant predictor of the share of inexperienced teachers for elementary and high schools.[20]

In summary, the results with respect to teacher resources are mixed. First, pupil–teacher ratios are only significantly related to the percentage of students who are economically disadvantaged in middle schools, after accounting for other relevant factors. This does not suggest an unmet need with respect to the level of teacher staffing. However, rates of inexperience among teachers have a positive and statistically significant association with percentages of students who are economically disadvantaged in all schooling levels. This result points to a resource gap and may suggest lower quality staff and/or less stability among teaching staff in settings with larger percentages of students who are economically disadvantaged. This is a potential unmet need worthy of consideration.

Student Outcomes

With respect to student outcomes among students who are economically disadvantaged, the research team examined three specific measures: chronic absenteeism rates, graduation rates, and grade-level proficiency rates. Each of these student outcome measures are described here in more detail.

The research team first reviewed rates of chronic absenteeism.[21] As a part of Ohio's state accountability system, chronic absenteeism is a statewide measure of school quality and also part of the state's goals for closing gaps in outcomes between student subgroups.[22] Likewise, there is evidence that higher rates of chronic absenteeism are associated with declines in academic outcomes and other measures of student educational success (Aucejo & Romano, 2016; Goodman, 2014; Liu et al., 2021).

Another key measure of school quality in Ohio's state accountability system is high school graduation, as this milestone represents the culmination of K–12 education and has been associated with a host of positive long-term outcomes for students and society (e.g., Heckman et al., 2014; Rouse, 2005).[23]

[20] This variable could not be included for middle schools due to missing data.

[21] Chronic absenteeism, as defined by Ohio's Every Student Succeeds Act Plan, is missing 10% or more of the school year for any reason.

[22] More information about Ohio's Every Student Succeeds Act plan is at https://education.ohio.gov/Topics/Every-Student-Succeeds-Act-ESSA.

[23] Due to data suppression, graduation rates for students who are economically disadvantaged needed to be imputed for about 20% of high schools. Imputed values were the midpoint within the possible range of the true value. Specifically, if the suppressed value was "< 5" then the imputed value was 2.5%. Likewise, if the suppressed value was "> 95" then the imputed value was 97.5%. As a result, the absolute difference between the imputed value and the true value could be no more than 2.5 percentage points.

The final student outcome measure examined by the research team is the academic proficiency rates of students who are economically disadvantaged in four key grades; Grades 3, 5, 6, and 8. These grades were chosen specifically to examine if proficiency rates shift at critical periods of transition in grade progression, including the transition from elementary school to middle school—Grade 5 to Grade 6—and the anticipated transition to high school reflected in Grade 8. Moreover, the research team examined if rates were systematically related to the percentage of students who are economically disadvantaged across all grades, or if this relationship was different within individual grades.

Comparing Outcomes for All Students and Students Who are Economically Disadvantaged

While this analysis focuses primarily on outcomes for students who are economically disadvantaged, it is important to consider how outcomes for these students compare to all students. On each of the three outcomes, the average outcome for students who are economically disadvantaged is lower when compared to the statewide average for all students. This difference is also statistically significant across all measures. The largest difference is present for Grade 6 Math proficiency, where the average for students who are economically disadvantaged is 12 percentage points below the statewide average. Detailed results of these analyses highlighting these differences are included in the Additional Data Analysis Tables section in Appendix B.

The following sections explore whether outcomes for students who are economically disadvantaged vary systematically across schools with different concentrations of this population for each outcome measure.

First Stage: Tertile Analysis

Average student outcomes for students who are economically disadvantaged in low-economic disadvantage schools compared to high-economic disadvantage schools are summarized in Exhibits 3.7 and 3.8.

Exhibit 3.7. Difference In Average Chronic Absenteeism Rates and Graduation Rates Among Students Who Are Economically Disadvantaged Between High-Economic Disadvantage and Low-Economic Disadvantage Schools, by Schooling Level

Schooling level	Average chronic absenteeism rate	Average graduation rate
Elementary school	21.0***	N/A
Middle school	12.0***	N/A
High school	23.1***	-14.6***

Note. n = 2,971 schools for the chronic absenteeism analysis and n = 702 schools (all high schools) for the graduation rate. Averages are unweighted. Asterisks indicate that the value for high-economic disadvantage schools is statistically significantly different than in low-economic disadvantage schools based on a two-tailed t-test: *** $p < .001$. *Source.* Study team analysis of data from the following sources: ODEW Report Card – Building Disaggregated Economically Disadvantaged 2022/23 and Building Details 2022/23; NCES CCD Public Elementary/Secondary School Universe Data – School Directory.

Exhibit 3.8. Difference In Average Proficiency Rates Among Students Who Are Economically Disadvantaged Between High-Economic Disadvantage and Low-Economic Disadvantage Schools, by Grade

Grade level	Average math proficiency rate	Average ELA proficiency rate
Grade 3 *n* (math) = 1,303 *n* (ELA) = 1,306	-23.1***	-21.0***
Grade 5 *n* (math) = 1,215 *n* (ELA) = 1,215	-27.2***	-23.0***
Grade 6 *n* (math) = 965 *n* (ELA) = 964	-25.0***	-22.8***
Grade 8 *n* (math) = 859 *n* (ELA) = 865	-27.5***	-20.3***

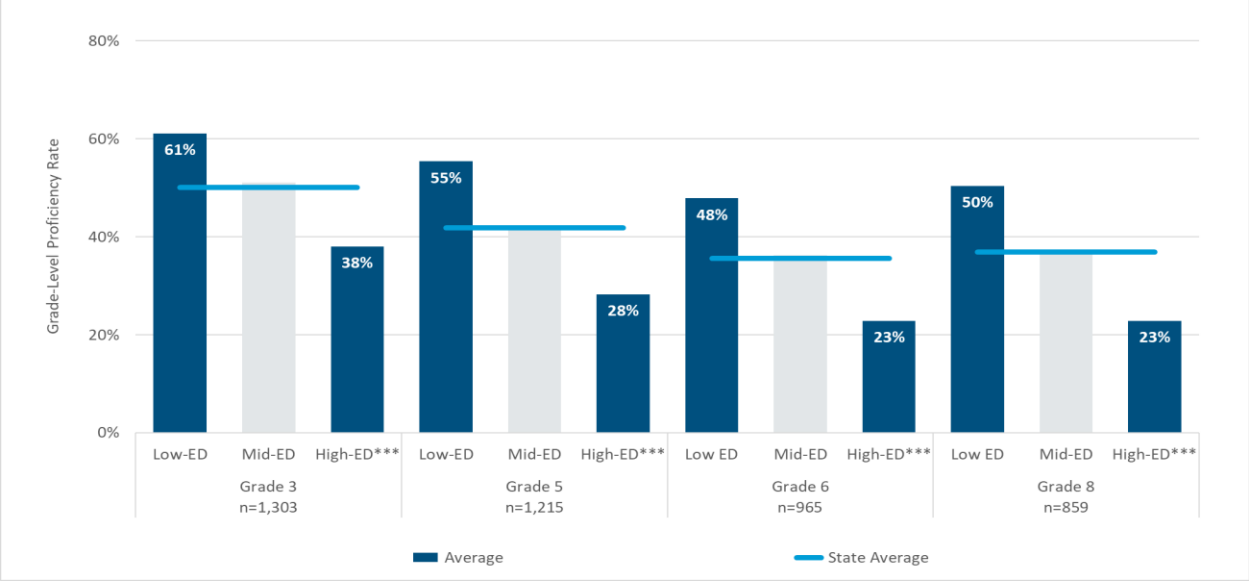
Note. n-size varied by subject and grade, see exhibit for specific counts. Averages are unweighted. Asterisks indicate that the value for high-economic disadvantage schools is statistically significantly different than in low-economic disadvantage schools based on a two-tailed t-test: *** $p < .001$. *Source.* Study team analysis of data from the following sources: ODEW Report Card – Building Disaggregated Economically Disadvantaged 2022/23.

As illustrated, we find that chronic absenteeism rates are statistically significantly higher in high-economic disadvantage settings across all schooling levels ($p < .001$). Specifically, high-economic disadvantage schools have chronic absenteeism rates for students who are economically disadvantaged between 12 and 23.2 percentage points higher than low-economic disadvantage schools. This is also the case for the graduation rates of students who are economically disadvantaged. Specifically, high-economic disadvantage high schools have 14.6 percentage points lower average rates than low-economic disadvantage schools. In both cases, the differences indicate a gap and potential unmet need.

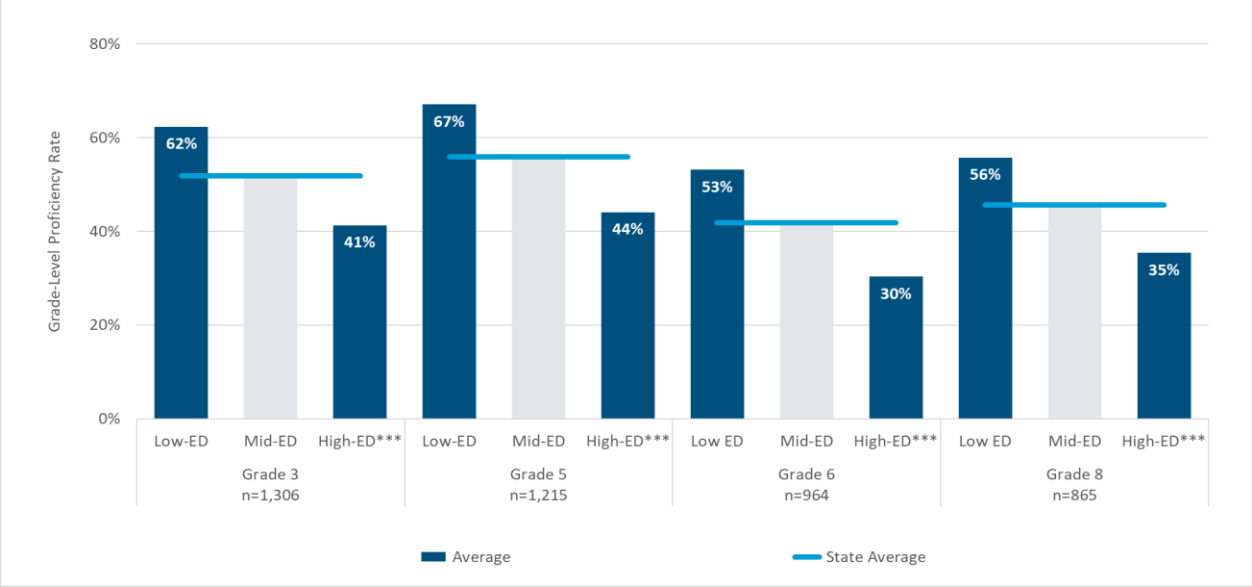
We also find that proficiency rates among students who are economically disadvantaged are statistically significantly lower in high-economic disadvantage schools, and this is true across all grades and subjects. Specifically, high-economic disadvantage schools observed mathematics proficiency rates of 23.1 to 27.5 percentage points lower than low-economic disadvantage schools, and ELA proficiency rates of 21 to 23 percentage points lower than low-economic disadvantage schools. In fact, as illustrated in Exhibit 3.9, students who are economically disadvantaged in high-economic disadvantage schools have average rates consistently below the state grade-level average in all grades and both subject areas. These differences also indicate a gap.

Exhibit 3.9. Students Who Are Economically Disadvantaged Proficiency Rates in Mathematics and English Language Arts for Grades 3, 5, 6, and 8 by Poverty Tertile with Grade-Level State Averages, 2022/23

Mathematics



English Language Arts



Note. Sample sizes vary by grade and subject and are included in the figure. Height of the columns represents the average value for each quantile, grade, and subject area. The yellow dashed line denotes the statewide average for a given grade and subject area. Averages are unweighted. Stars next to high-economic disadvantage denote whether the average for high-economic disadvantage schools is statistically significantly different than the average for low- economically disadvantaged schools; *** $p < .001$. *Source.* ODEW Report Card – Building Disaggregated Economically Disadvantaged 2022/23; Building Details 2022/23.

The results of the student outcomes tertile analysis indicate gaps with respect to all student outcome measures. Detailed results of this analysis can be found in the Additional Data Analysis Tables section in Appendix B, which provide averages for all student outcome measures by tertile and schooling level for chronic absenteeism and graduation rates, and grade level for proficiency rates.

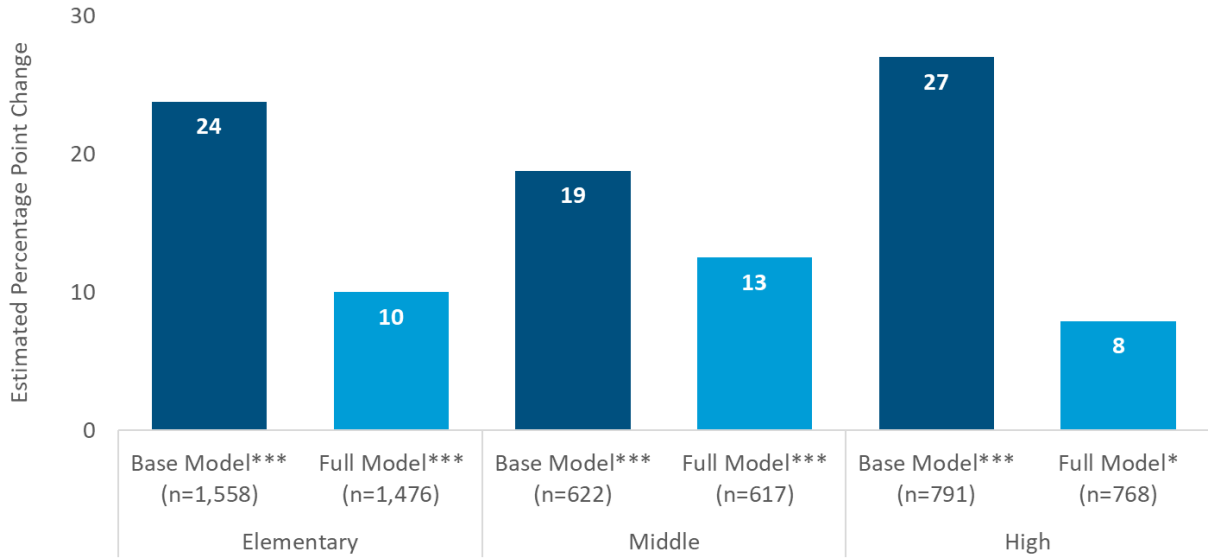
Second and Third Stages: Regression Analyses

Chronic Absenteeism

With respect to chronic absenteeism rates among students who are economically disadvantaged, first stage analysis results suggest rates are higher on average as the percentage of students who are economically disadvantaged increases. This initial result is consistent with regression analysis results.

Specifically, as illustrated in Exhibit 3.10, regression analysis suggests that in the base model and after accounting for other relevant factors, chronic absenteeism rates among students who are economically disadvantaged have a positive and statistically significant relationship with the percentage of students who are economically disadvantaged in all schooling levels. Specifically, schools with 100% students who are economically disadvantaged are predicted to have rates of chronic absence of between 8 and 13 percentage points higher than schools with no students who are economically disadvantaged.

Exhibit 3.10. Regression Analysis Results for Chronic Absenteeism Rates Among Students Who Are Economically Disadvantaged, Base and Full Model Results



Note. Figure displays the predicted change in chronic absenteeism rates among students who are economically disadvantaged from a school with 0% students who are economically disadvantaged to one with 100%. Standard errors are robust, and the regressions are weighted by school enrollment: * $p < .05$, *** $p < .001$. *Source.* Study

team analysis of data from the following sources: ODEW Report Card – Building Disaggregated Economically Disadvantaged 2022/23, Building Details 2022/23, Building Disaggregated English Learner 2022/23, Building Disaggregated Disability 2022/23, and Building Disaggregated Race/Ethnicity 2022/23; NCES CCD Public Elementary/Secondary School Universe Data – School Directory and Geographic Data, 2022/23; NCES Comparable Wage Index for Teachers (CWIFT) 2021.

As illustrated in the full regression results, which can be found in the Additional Data Analysis Tables section in Appendix B, for all three schooling levels, the percentage of students with disabilities, locale, and community school status are also strong predictors of chronic absenteeism rates.

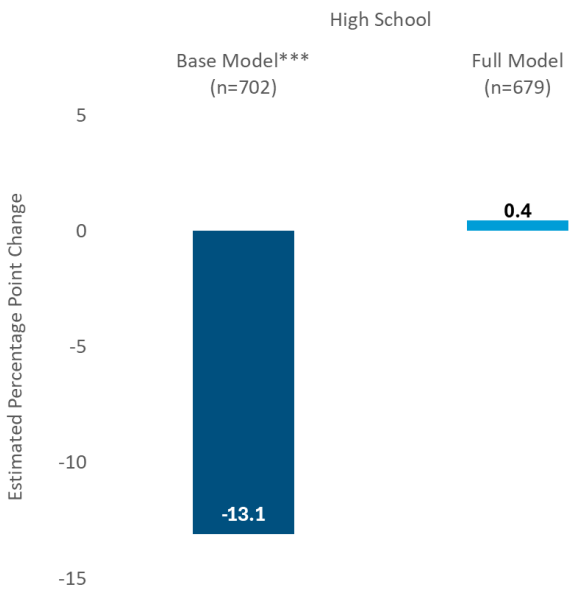
Graduation Rate

With respect to graduation rates among students who are economically disadvantaged, first stage analysis results suggest rates are lower on average as the percentage of students who are economically disadvantaged increases. However, this initial result is not consistent with regression analysis results.

As illustrated in Exhibit 3.11, the results from our regression analysis suggest that though graduation rates are negatively and statistically significant in the base model, after accounting for other relevant factors, they have no significant relationship with the percentage of students who are economically disadvantaged.[24]

[24] Given the relatively high level of imputation in our measure of graduation rates among students who are economically disadvantaged, the research team estimated the base and full graduation rate models without imputed data. The main results are consistent; the percentage of students who are economically disadvantaged has a negative and statistically significant association with graduation rates in the base model, but this association is no longer significant in the full model.

Exhibit 3.11. Regression Analysis Results for Graduation Rates Among Students Who Are Economically Disadvantaged, Base and Full Model Results



Note. Figure displays the predicted change in graduation rates among students who are economically disadvantaged from a school with 0% students who are economically disadvantaged to one with 100%. Standard errors are robust, and the regressions are weighted by school enrollment: *** $p < .001$. *Source.* Study team analysis of data from the following sources: ODEW Report Card – Building Disaggregated Economically Disadvantaged 2022/23, Building Details 2022/23, Building Disaggregated English Learner 2022/23, Building Disaggregated Disability 2022/23, and Building Disaggregated Race/Ethnicity 2022/23; NCES CCD Public Elementary/Secondary School Universe Data – School Directory and Geographic Data, 2022/23; NCES Comparable Wage Index for Teachers (CWIFT) 2021.

The full regression results, which can be found in the Additional Data Analysis Tables section in Appendix B, suggests that a handful of other variables are strong predictors of graduation rate, including the percentage of English learners, locale, school enrollment, and if a school is a community school.

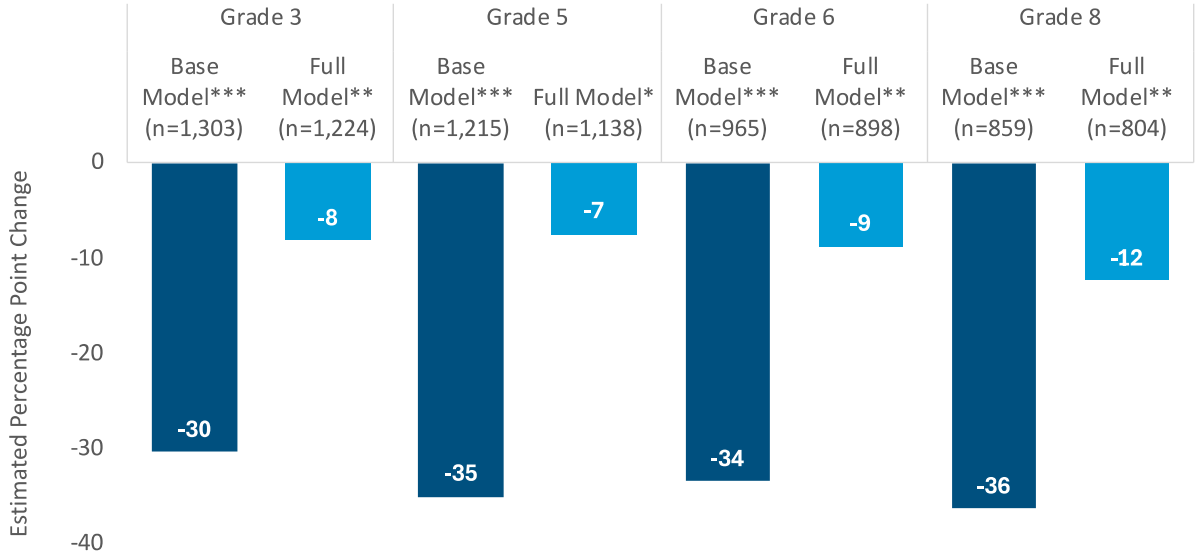
Academic Proficiency

With respect to grade-level proficiency rates among students who are economically disadvantaged, first stage analysis results suggest rates are lower on average as the percentage of students who are economically disadvantaged increases. Regression analysis results confirm these initial results.

As illustrated in Exhibits 3.12 and 3.13, regression analysis suggests that proficiency rates among students who are economically disadvantaged in Grades 3, 5, 6, and 8 for both mathematics and ELA have a negative and significant relationship with the percentage of

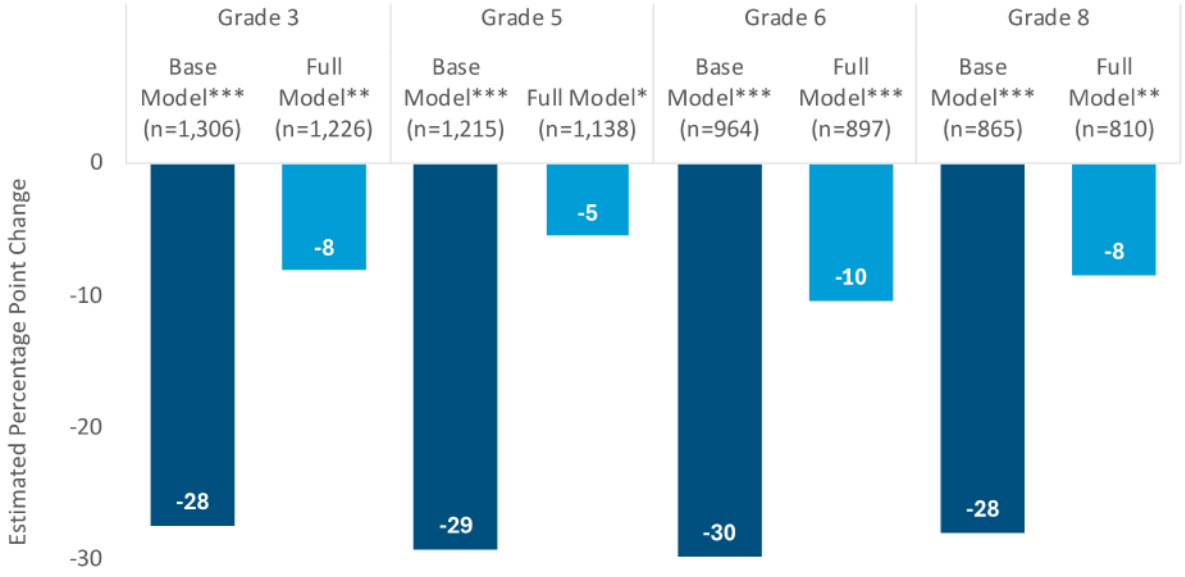
students who are economically disadvantaged. However, the magnitude of the relationship attenuates after controlling for other factors. Specifically, in Grades 3, 5, 6, and 8, schools that have 100% of students who are economically disadvantaged are predicted to have proficiency rates among students who are economically disadvantaged between 7 and 12 percentage points lower in mathematics and between 5 and 10 percentage points lower in ELA compared to schools with no students who are economically disadvantaged.

Exhibit 3.12. Regression Analysis Results for Mathematics Proficiency Rates Among Students Who Are Economically Disadvantaged, Base and Full Model Results



Note. Figure displays the predicted change in grade-level mathematics proficiency rates among students who are economically disadvantaged from a school with 0% students who are economically disadvantaged to one with 100%. Standard errors are robust, and the regressions are weighted by school enrollment: ** $p < .01$, *** $p < .001$.
Source. Study team analysis of data from the following sources: ODEW Report Card – Building Disaggregated Economically Disadvantaged 2022/23, Building Details 2022/23, Building Disaggregated English Learner 2022/23, Building Disaggregated Disability 2022/23, and Building Disaggregated Race/Ethnicity 2022/23; NCES CCD Public Elementary/Secondary School Universe Data – School Directory and Geographic Data, 2022/23; NCES Comparable Wage Index for Teachers (CWIFT) 2021.

Exhibit 3.13. Regression Analysis Results for English Language Arts Proficiency Rates Among Students Who Are Economically Disadvantaged, Base and Full Model Results



Note. Figure displays the predicted change in grade-level ELA proficiency rates among students who are economically disadvantaged from a school with 0% students who are economically disadvantaged to one with 100%. Standard errors are robust, and the regressions are weighted by school enrollment: * $p < .05$, ** $p < .01$, *** $p < .001$. *Source.* Study team analysis of data from the following sources: ODEW Report Card – Building Disaggregated Economically Disadvantaged 2022/23, Building Details 2022/23, Building Disaggregated English Learner 2022/23, Building Disaggregated Disability 2022/23, and Building Disaggregated Race/Ethnicity 2022/23; NCES CCD Public Elementary/Secondary School Universe Data – School Directory and Geographic Data, 2022/23; NCES Comparable Wage Index for Teachers (CWIFT) 2021.

Also, as illustrated in the full regression results, which can be found in the Additional Data Analysis Tables section in Appendix B, the percentages of students with disabilities and non-White students generally appear to be strong predictors of proficiency rates among students who are economically disadvantaged across all grades and in both subject areas.

Conclusion

To summarize, the extant data analysis points to a few key results:

1. **Pupil–Teacher Ratios and Rates of Inexperience**: While pupil–teacher ratios are only significantly related to the percentage of students who are economically disadvantaged in middle schools, after accounting for other relevant factors, rates of inexperience among teachers have a positive and statistically significant association with percentages of students who are economically disadvantaged in all schooling levels. In the first case, lower ratios reflect higher levels of staffing and thus do not point to any unmet needs in this area.

In the second case, the higher rates of inexperience do point to a resource gap and may suggest lower quality staff and/or less stability among teaching staff in high-economic disadvantage settings.

2. **Chronic Absenteeism Rates**: Students who are economically disadvantaged appear to have systematically higher rates of chronic absenteeism statewide. After accounting for other relevant factors, regression analysis suggests that chronic absenteeism rates *among students who are economically disadvantaged* have a positive and statistically significant relationship with the percentage of students who are economically disadvantaged in all schooling levels.
3. **Graduation Rates**: Though students who are economically disadvantaged generally have more varied and worse outcomes with respect to graduation in Ohio, regression analysis suggests that graduation rates *among students who are economically disadvantaged* have no significant relationship with the percentage of students who are economically disadvantage after accounting for other relevant factors.
4. **Grade-Level Proficiency Rates**: Comparing averages for high-economic disadvantage and low-economic disadvantage schools, we find that proficiency rates *among students who are economically disadvantaged* are statistically significantly lower in high-economic disadvantage schools across all grades and subjects. After controlling for other relevant factors, regression analysis suggests that proficiency rates among students who are economically disadvantaged have a negative and significant relationship with the percentage of students who are economically disadvantaged in Grades 3, 5, 6, and 8 for both mathematics and ELA.

Statewide Survey Findings

Responses to the statewide surveys offered insights into the unique challenges faced by students who are economically disadvantaged in Ohio, enhancing our understanding of the results of analysis of publicly available data.

As noted, survey topics included categories of urgent student needs, in-school and out-of-school supports, and the resources that provide those supports. Throughout this section, results from the two surveys are reported separately. Due to the small number of respondents on the CBO survey, direct comparisons between the results of the survey should be interpreted with a degree of skepticism. Student needs and in-school and out-of-school supports are the focus of this analysis, while the resources involved will be used to inform the Current Services chapter (Chapter 5) of this study.

Urgent Student Needs

In the surveys, practitioner and CBO respondents were asked to select the top three needs of students who are economically disadvantaged from a predetermined list based on the social determinants of health (U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2024). They were also asked to identify which subgroup of students who are economically disadvantaged had the most significant level of need, and to describe any changes in the needs of these students since the COVID-19 pandemic.

The research team found a slightly different pattern of results for practitioners than for CBO respondents on these three questions. However, direct comparisons of results from the two surveys should be interpreted with a degree of skepticism (see Exhibit 3.14 for full results). The top three categories of needs of students who are economically disadvantaged identified by practitioners were mental health and wellness (22%), work stability of parents/guardians (20%), and food security (19%). For CBO respondents, food security and access to housing were the most commonly selected categories (27%), followed by access to health care (13%). Only 13% and 7% of CBO responses indicated that mental health and wellness or work stability of families (top needs identified by practitioners) were urgent needs of students who are economically disadvantaged, respectively.

Exhibit 3.14. Urgent Needs Identified by Respondents to the Statewide Survey

Urgent need	Practitioner responses count (%)	CBO responses count (%)
Access to housing	47 (10.44)	4 (26.66)
Access to quality education	7 (1.56)	0
Access to quality health care	48 (10.67)	2 (13.33)
Community/neighborhood safety	12 (2.67)	0
Food security	84 (18.67)	4 (26.66)
Mental health and wellness	101 (22.44)	2 (13.33)
Transportation	49 (10.89)	1 (6.67)
Work stability of parent/guardian	90 (20.00)	1 (6.67)
Other, please specify	12 (2.67)	*Child Care* 1 (6.67)
Total	**450 (100)**	**15 (100)**

Note. Respondent count is limited to survey takers who answered at least one survey question (beyond the opening information section). Each respondent was required to select the top three urgent priorities. This results in 450 responses to this question for practitioners (*n* = 150) and 15 responses for CBOs (*n* = 5). *Source.* Study team's analysis of survey to statewide survey, 2024.

However, as illustrated in Exhibit 3.15, students with disabilities who are also economically disadvantaged were the group identified as having the highest level of need by the largest shares of respondents for both practitioners and CBO respondents (48% and 60% of respondents, respectively). In addition, as illustrated in Exhibit 3.16, the research team found that both practitioners and CBOs indicated a large or moderate increase in need among students who are economically disadvantaged over the past 3 years (93% and 60%, respectively).

Exhibit 3.15. Statewide Survey Identification of Subgroup Within Students Who Are Economically Disadvantaged with Highest Level of Need

Student group	Practitioner responses count (%)	CBO responses count (%)
English learners who are also economically disadvantaged	7 (5.15)	0
Migrant students who are also economically disadvantaged	6 (4.41)	0
Newcomer English learners with limited or interrupted formal education who are also economically disadvantaged	8 (5.58)	0
Students experiencing homelessness who are also economically disadvantaged	23 (16.91)	1 (20)
Students involved in the foster care system who are also economically disadvantaged	8 (5.88)	1 (20)
Students involved in the justice system who are also economically disadvantaged	6 (4.41)	0
Students with disabilities who are also economically disadvantaged	65 (47.79)	3 (60)
Not sure	5 (3.68)	0
Other, please specify	8 (5.88)	0
Total	**136 (100)**	**5 (100)**

Note. Practitioner *n* = 150 and CBO *n* = 5. Respondent count is limited to survey takers who answered at least one survey question (beyond the opening information section). Total counts in the exhibit represent the number of respondents who answered the question. *Source.* Study team's analysis of statewide survey, 2024.

Exhibit 3.16. Statewide Survey Indication of Change in Overall Need Over Last 3 Years

Level of change in overall need (last 3 years)	Practitioner responses count (%)	CBO responses count (%)
Large increase in need	64 (42.67)	0
Moderate increase in need	76 (50.67)	3 (60)
No change in need	10 (6.67)	2 (40)
Moderate decrease in need	0	0
Large decrease in need	0	0
Total	**150 (100)**	**5 (100)**

Note. Practitioner *n* = 150 and CBO *n* = 5. Respondent count is limited to survey takers who answered at least one survey question (beyond the opening information section). Total counts in the exhibit represent the number of respondents who answered the question. *Source.* Data are from the study team's analysis of survey to statewide survey, 2024.

In-School and Out-of-School Supports

The research team also asked respondents whether they thought students who are economically disadvantaged had sufficient in-school and out-of-school supports and if CBO–school partnerships were effective at meeting the needs of students who are economically disadvantaged. The majority of practitioners indicated that students who are economically disadvantaged have the necessary school-based programs (67%) but only 25% indicated that students had sufficient out-of-school supports. CBOs showed a similar pattern of responses: 60% indicated that students who are economically disadvantaged have the necessary school-based programs and 40% indicated that students had sufficient out-of-school supports. With respect to the perception of school–CBO partnerships, over two thirds of practitioners (77%) and the majority of CBOs (60%) indicated that partnerships effectively met the needs of students who are economically disadvantaged. Detailed results are summarized in the Survey Respondents and Nonresponse Bias Analysis section in Appendix B.

Interview Findings

Group and individual interviews helped contextualize the descriptive data analysis and survey findings. Participants were asked if survey findings about student needs were true in their communities, how those needs affected student outcomes, and how COVID-19 affected student needs. The interviews provided further information about the needs surfaced by the survey as well as the impact on student outcomes, including attendance, graduation, and academic performance. The paragraphs below describe key findings highlighted by the interviewees.

Interview participants reported that basic resource insecurity, exacerbated by COVID-19 and recent economic conditions, has had a significant impact on the outcomes of students who are economically disadvantaged.

Participants provided context for the survey findings related to the perceived insufficiency of out-of-school supports and the identification of mental health and wellness, work stability of parents and guardians, and food security as top needs of students who are economically disadvantaged. Specifically, participants emphasized that the school experiences of students who are economically disadvantaged, particularly after the pandemic, are significantly influenced by insecurity in basic resources at home.

Five out of 11 participants pointed to rising inflation and the cost of living since the pandemic as contributing to the economic instability of families. Participants from districts that mainly serve schools in suburban and small-town regions articulated a drastic increase in the number of families experiencing poverty who were housing insecure or could no longer afford to live in the area. Participants also described efforts to connect students to various in-school and out-of-

school programs to meet these needs. Examples of in-school services included on-site meal programs, health clinics, and family resource centers. Faith-based entities, such as churches, were commonly (seven out of 11 participants) described as providing support to students and families when schools were unable to meet certain needs, such as for short-term financial resources like money to cover rent or a mortgage payment.

Interview participants also linked students' mental health and wellness needs to their basic resource needs.

Four of 11 interview participants directly attributed the recent increase in students' mental and behavioral health needs to economic instability within families. Social workers were consistently highlighted as crucial in-school supports by interviewees, particularly in light of the heightened mental and behavioral health challenges among students, exacerbated since the pandemic. Participants noted that economic challenges and inadequate basic resources at home compounded other pandemic-related mental health issues, such as limited social interaction.

Interview participants reported that a digital divide, amplified by the pandemic, set back students who are economically disadvantaged.

Nearly all participants (10 out of 11) described challenges associated with implementing hybrid school models and integrating more digital technology in classrooms since the pandemic, affecting all students, not just those who are economically disadvantaged. This shift was perceived to disproportionately affect students who are economically disadvantaged, due to their limited access to computers and reliable internet at home. Participants from rural areas of the state also identified that digital access issues are a barrier to learning for students who are economically disadvantaged in these regions. Two out of 11 participants described attempting to address internet access issues by providing students with hotspots. However, limited internet service in these regions made it difficult for students to use the hotspots at all.

Students with disabilities and English learners are the subgroups of students who are economically disadvantaged with the most need.

Nine out of 11 participants identified students with disabilities as the subgroup of students who are economically disadvantaged with the most significant level of need. Additionally, several participants noted that English learners also constitute a subgroup with specific needs. Participants reported a notable increase in the student populations of these groups. Regarding students who are economically disadvantaged with disabilities, participants suggested there had been a rise in this demographic since the pandemic. Practitioners indicated that students with disabilities and English learners faced the greatest challenges, on average, in terms of academic outcomes such as performance and graduation. Participants also emphasized that these subgroups required substantial resources for unique assessment and support. They

expressed a need for dedicated staff and programs to address these students' needs, in addition to addressing issues related to economic disadvantage.

For instance, one participant described their district's recent implementation of a SLIFE (Students with Limited or Interrupted Formal Education) program at one of their schools.[25] This program involved various coordinating staff roles, including interpreters, social workers, and community/family liaisons, in addition to teachers. Similarly, another participant discussed challenges in staffing to determine appropriate learning services for these students. Practitioners emphasized that students with disabilities and English learners have unique needs requiring specific staffing, programs, and services, in addition to addressing their economic disadvantages.

Interview participants reported that chronic absenteeism remains a critical need for students who are economically disadvantaged.

Five out of 11 interviewees said chronic absence among students who are economically disadvantaged had increased since the pandemic. Student disengagement during periods of online/hybrid schooling, mental and behavioral health issues, and factors associated with economic instability (e.g., moving out of the area, or, at the secondary level, needing to assist family with work responsibilities) were seen as contributing to high rates of students missing school. This is consistent with the quantitative analysis finding that suggested significantly higher chronic absence rates for students who are economically disadvantaged, and that these rates increase as the concentration of students who are economically disadvantaged grows in elementary and middle schools. Specifically, one participant stated:

"Since COVID, chronic absenteeism is an issue. We are around a quarter of students chronically absent. Most of our district is considered economically disadvantaged. It seems like county by county, despite the attendance laws like House Bill 410, despite the attendance plans and meeting with parents, and doing home visits and incentives, it's still been really challenging to move the needle on attendance."

Summary of Identified Unmet Needs

By triangulating the findings across the three primary sources of data and analysis, the research team identified the following unmet needs for students who are economically disadvantaged in Ohio.

1. *A systemic, coordinated approach to services is needed to better support students who are economically disadvantaged.*

[25] SLIFE participants are generally a subgroup of newcomer English learners who have only recently entered the U.S. public education system.

5. *Students who are economically disadvantaged have fewer opportunities to benefit from the skills of experienced teachers.*

The following section offers a summary of the quantitative and qualitative data findings that led the research team to these two key areas of need.

Students who are economically disadvantaged could benefit from a systemic approach of coordinated services.

Economic disadvantage limits students' and families' access to essential resources (Miller et al., 2019). This is consistent with survey findings that stated the top needs of students who are economically disadvantaged relate mainly to economic stability and access to basic resources outside of school, including the following priorities identified by the practitioners: mental health and wellness (22%), work stability of parent/guardian (20%), food security (19%), access to health care (11%), and housing (10%).

Moreover, insecurity in basic resources has been shown to create substantial barriers to learning. For example, students experiencing housing or food insecurity tend to miss more school days and face greater challenges in achieving academic success compared to their more secure peers (Miller et al., 2019). This is consistent with the descriptive analysis that showed students who are economically disadvantaged in Ohio had higher rates of chronic absenteeism and lower proficiency in mathematics and ELA than their more affluent peers.

When students struggle academically, in-school supports, such as targeted academic support or additional tutoring, can support their learning. Similarly, when students and families need basic resource support, out-of-school support, such as social services or CBOs, can provide the necessary assistance. Unfortunately, a third of practitioner survey respondents believe that students who are economically disadvantaged lack adequate school-based programs, while 75% reported insufficient out-of-school supports for basic needs. This is particularly pronounced in rural areas, as interview participants noted that students who are economically disadvantaged in rural settings are less likely to access necessary out-of-school and in-school supports.

These data suggest that existing programs and interventions may not adequately support positive outcomes for students who are economically disadvantaged in Ohio. There is a clear need for a coordinated, systemic approach to providing resources and services that address poverty-related challenges and promote the health and overall well-being of students in this population. Moreover, effectively addressing the needs of students who are economically disadvantaged may require comprehensive strategies that extend beyond the scope of individual schools, districts, and CBOs to state agencies.

Ohio's key agencies are tasked with providing essential services to support the overall health and well-being of its residents. The ODEW strives to ensure equal access to learning opportunities for all students, address community conditions and inequities contributing to health disparities, and provide social services to support economic mobility and meet basic needs. However, the efforts of these agencies may not be fully accessible to students and families who are economically disadvantaged due to various barriers. For example, stigma of receiving services is a barrier to enrollment. Thirty percent of interview participants conveyed that stigma related to participation in programs and services for students who are economically disadvantaged was a barrier to enrollment. Interview participants conveyed that having staff responsible for managing students' unique cases and cultivating relationships with their families (e.g., family coordinators, social workers) has made an important difference in working against this stigma and increasing enrollment in programs and services. As one interview participant stated, "Families do their best within their means."

Moreover, the individual efforts of these agencies also may not fully or adequately address the needs of students and families who are economically disadvantaged. Consequently, a more coordinated approach between agencies may be necessary to effectively meet the needs of students who are economically disadvantaged and support their learning.

Students who are economically disadvantaged have fewer opportunities to benefit from the skills of experienced teachers.

Research consistently shows that teachers with more experience generally achieve better student outcomes (Papay & Kraft, 2015). However, as previously stated, one extant data finding revealed that inexperienced teachers in Ohio disproportionately teach in schools with higher percentages of students who are economically disadvantaged. This disparity means that students who are economically disadvantaged have fewer opportunities to benefit from the skills and expertise of experienced educators.

Teachers play a crucial role in student achievement, with their experience and teaching methods affecting reading and math performance two to three times more than other school factors (Hattie, 2008; Opper, 2019). This aligns with previous findings that students who are economically disadvantaged are often taught by inexperienced teachers and demonstrate lower proficiency rates in math and ELA compared to their more affluent peers.

Additionally, teachers significantly influence critical outcomes such as attendance, college enrollment, and future earnings (Chetty et al., 2014; Jackson, 2018). Similarly, the data indicate that students who are economically disadvantaged in Ohio, who are more likely to be taught by inexperienced teachers, also exhibit higher rates of chronic absenteeism compared to their more affluent peers.

Teacher effectiveness typically improves with experience, particularly in understanding students' backgrounds and adapting lessons accordingly (Leinhardt, 1989; Westerman, 1991; Boyd et al., 2008). Experienced teachers are also better equipped to identify and address students' academic and emotional needs (cite?), which is crucial given the reported lack of coordination staff to connect students and families with necessary services.

Novice teachers in high-poverty schools, often in urban or rural areas, face higher turnover rates and fewer years of service compared to those in more affluent districts (Ingersoll, 2001; Papay & Kraft, 2015). They also encounter challenges in classroom management and instructional strategies, contributing to burnout. Reflecting on these challenges, one participant shared, "Our teachers are getting burned out much sooner because of the growing needs in the classroom. The landscape has changed significantly over the years."

These findings underscore the multiple ways lacking access to experienced teachers negatively affects learning opportunities for students who are economically disadvantaged.

Additional Needs

In addition to the needs identified through triangulation of the three data sources, interview participants highlighted the following needs, which are considered significant:

1. **Thirty percent of interview participants perceived that certain accountability measures for school attendance presented unintended challenges for students who are economically disadvantaged.** Participants expressed concern that the negative repercussions of chronic absenteeism on a school's report card could adversely affect public perceptions of programs and services for students who are economically disadvantaged, as well as for subgroups within this demographic. Interviewed practitioners perceived that existing accountability measures regarding attendance could feel punitive for students who are economically disadvantaged, exacerbating their academic setbacks without addressing the underlying causes. Practitioners advocated for solutions that support, rather than penalize, these students to help them stay on track academically.
6. **Twenty percent of interview participants perceived that Ohio's graduation requirements pose significant challenges for students who are economically disadvantaged to graduate within 4 years.** In addition to fulfilling standard curriculum requirements, Ohio students are mandated by state law to demonstrate readiness by obtaining at least two diploma seals. Many diploma seals require students to exhibit mastery of advanced content, acquire a trade license or credential, fulfill community service obligations, or enlist in the military—each of which demands resources already scarce for many students who are economically disadvantaged.

Additionally, participants highlighted the challenges and complexities of garnering support from families who are economically disadvantaged and who might lack awareness of graduation requirements beyond the standard curriculum and instruction. According to participants, the absence of scaffolds or support mechanisms alongside these robust graduation requirements made it arduous for students who are economically disadvantaged, who are likely already academically behind and managing competing priorities, to graduate within the traditional 4-year timeframe. One participant shared:

"Parents and guardians are busy working and don't know what is required from their child for graduation. The complexities of graduation requirements make it impossible for parents to keep track. Seals and credentials on top of graduation requirements are a barrier. We are creating 100 percent barriers with good intentions. It is more of a barrier to students and parents to have these additional requirement—they are intimidated by what they don't know."

Limitations

Several important limitations should be considered when interpreting the results of this needs assessment and the identified unmet needs.

First, the extant data analysis seeks only to describe the resource inputs found in settings with varying concentrations of students who are economically disadvantaged and refine these descriptive results using regression analysis. The analysis *cannot* determine if any identified associations reflect a causal relationship, such as whether the percentage of students who are economically disadvantaged is *causing* a change in their chronic absenteeism rates. Moreover, the regressions were estimated solely to determine if the findings from the initial tertile analysis align with those from the regression analysis, particularly after controlling for other relevant factors. Therefore, while we discuss the strength of other associations, readers should avoid interpreting any potential relationships identified between these additional factors, resource inputs, or student outcomes as causal.

Secondly, with respect to the results of the survey analysis, the relatively low response rate suggests that survey findings cannot be assumed to reflect the general views of individuals beyond the analysis sample. In particular, the survey sample primarily reflects perspectives of staff in traditional LEAs that are relatively large and have lower percentages of non-White students compared to LEAs that did not respond to the survey.

Finally, with respect to the interview results, the small sample size (n = 11) suggests that the perceptions conveyed reflect those who were interviewed. Specifically, the interview sample primarily reflects perspectives from schools in urban and suburban areas. Information captured through the interviews will be explored alongside other analyses in later phases of the study.

Conclusion

Similar to trends across the country, students who are economically disadvantaged in Ohio face numerous barriers to learning. Through the needs assessment, the research team found that rates of inexperience among teachers have a positive and statistically significant association with percentages of students who are economically disadvantaged in all schooling levels. Additionally, practitioners and CBO leaders identified mental health and wellness, economic stability, and access to basic resources as urgent challenges for students in this population. Despite existing in-school and out-of-school programs and services, students who are economically disadvantaged exhibit higher chronic absenteeism rates and lower math and ELA proficiency rates compared to their more affluent peers.

Overall, the research team found that students who are economically disadvantaged in Ohio have fewer opportunities to benefit from the skills of experienced teachers and could greatly benefit from a systemic approach of coordinated services at the state level.

References

Andrews, M., Duncombe, W., & Yinger, J. (2002). Revisiting economies of size in American education: Are we any closer to a consensus? *Economics of Education Review, 21*(3), 245–262. http://dx.doi.org/10.1016/S0272-7757(01)00006-1

Annie E. Casey Foundation. (2023). *2022 KIDS COUNT Data Book*. [Dataset]. https://www.aecf.org/resources/2022-kids-count-data-book

Atchison, D., Levin, J., Fatima, S., Trauth, A., Srikanth, A., Heberle, C., Gannon-Slater, N., Junk, K., Wallace, L., & Baker, B. (2023). *Assessment of Delaware Public School Funding*. American Institutes for Research.

Aucejo, E. M., & Romano, T. F. (2016). Assessing the effect of school days and absences on test score performance. *Economics of Education Review, 55*, 70–87. https://doi.org/10.1016/j.econedurev.2016.08.007

Boyd, D., Grossman, P., Lankford, H., Loeb, S., & Wyckoff, J. (2008). *Who leaves? Teacher attrition and student achievement* (No. w14022). National Bureau of Economic Research.

Chetty, R., Friedman, J. N., & Rockoff, J. E. (2014). Measuring the impacts of teachers II: Teacher value-added and student outcomes in adulthood. *American Economic Review, 104*(9), 2633–2679. https://doi.org/10.1257/aer.104.9.2633

Denworth, L. (2019). The significant problem of P values. Standard scientific methods are under fire. Will anything change? *Scientific American*. https://www.scientificamerican.com/article/the-significant-problem-of-p-values/

Duncombe, W., & Yinger, J. (2004). *How much more does a disadvantaged student cost?* (Center for Policy Research Working Paper 60). Syracuse University.

Goodman, J. (2014). *Flaking out: Student absences and snow days as disruptions of instructional time* (No. w20221). National Bureau of Economic Research.

Hanushek, E. (2002). *Publicly provided education*. National Bureau of Economic Research, Working Paper 8799. https://econpapers.repec.org/paper/nbrnberwo/8799.htm

Hattie, J. (2008). *Visible learning: a synthesis of meta-analyses relating to achievement*. Routledge.

Heckman, J. J., Humphries, J. E., Veramendi, G., & Urzua, S. S. (2014). *Education, health, and wages* (No. w19971). National Bureau of Economic Research.

Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38*(3), 499–534. https://psycnet.apa.org/doi/10.3102/00028312038003499

Jacobson, A., Silverstein, J., Willis, J., Diaz, J., Fermanich, M., Piscatelli, J., Lewis, R., McClellan, P., & Durodoye, R. (2021). *Utah funding study: Phase 2 report*. WestEd, Augenblick, Palaich and Associates.

Kini, T., & Podolsky, A. (2016). *Does teaching experience increase teacher effectiveness. A review of the research*. Learning Policy Institute, pp. 1–72.

Kraft, M. A., Simon, N. S., & Lyon, M. A. (2020). Sustaining a sense of success: The importance of teacher working conditions during the COVID-19 pandemic. *Journal of Educational Administration, 14*(4), 727–769. https://doi.org/10.1080/19345747.2021.1938314

Leinhardt, G. (1989). Math lessons: A contrast of novice and expert competence. *Journal for Research in Mathematics Education*, *20*(1), 52–75. https://doi.org/10.2307/749098

Liu, J., Lee, M., & Gershenson, S. (2021). The short-and long-run impacts of secondary school absences. *Journal of Public Economics, 199*, 104441. https://doi.org/10.1016/j.jpubeco.2021.104441

Miller P., Votruba-Drzal, E., & Coley R. L. (2019). Poverty and academic achievement across the urban to rural landscape: Associations with community resources and stressors. *Russel Sage Foundation Journal of the Social Sciences*, *5*(2), 106–122. http://dx.doi.org/10.7758/RSF.2019.5.2.06

Ohio Department of Education and Workforce. (2021). *Economically disadvantaged students: A review of definitions and methods across states*. https://www.lsc.ohio.gov/assets/organizations/legislative-service-commission/monthly-agency-reports/agency-reports/files/mar-138-economically-disadvantaged-students-2020.pdf

Opper, I.M. (2019). *Teachers matter: Understanding teachers' impact on student achievement*. RAND Corporation. https://www.rand.org/pubs/research_reports/RR4312.html

Papay, J., & Kraft, M. (2015). Productivity returns to experience in the teacher labor market: Methodological challenges and new evidence on long-term career improvement. *Journal of Public Economics, 130* (October), 105–19. https://doi.org/10.1016/j.jpubeco.2015.02.008

Parrett, W., & Budge, K. (2012). Turning high-poverty schools into high-performing schools. Alexandria, VA: ASCD.

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (1998). *Teachers, schools, and academic achievement*. Working Paper 6691. National Bureau of Economic Research. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=122569

Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *American Economic Review, 94*(2), 247–252. http://dx.doi.org/10.1257/0002828041302244

Ronfeldt M., Loeb S., & Wyckoff J. (2013). How teacher turnover harms student achievement. *American Educational Research Journal, 50*(1), 4–36. https://doi.org/10.3102/0002831212463813

Rouse, C. E. (2005, October). *The labor market consequences of an inadequate education*. In Symposium on the Social Costs of Inadequate Education, Teachers College Columbia University.

Sorensen, L. C., & Ladd, H. F. (2020). The hidden costs of teacher turnover. *Aera Open, 6*(1), 233285842090581, https://doi.org/10.1177/2332858420905812

Sutcher, L., Darling-Hammond, L., & Carver-Thomas, D. (2016). *A coming crisis in teaching? Teacher supply, demand, and shortages in the U.S.* Learning Policy Institute. https://learningpolicyinstitute.org/sites/default/files/product-files/A_Coming_Crisis_in_Teaching_REPORT.pdf

U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2024). *Healthy people 2030*. https://health.gov/healthypeople/objectives-and-data/social-determinants-health

Westerman, D. A. (1991). Expert and novice teacher decision making. *Journal of Teacher Education, 42*(4), 292–305. https://doi.org/10.1177/002248719104200407

Chapter 4. Cost Function and Identification of Efficient Schools

Introduction

This chapter conducts analyses that investigate the relationships between spending, student outcomes, and the costs associated with K–12 schools in Ohio, the results of which are then used in later study chapters that focus on describing practices and spending dedicated to addressing the educational needs of students from economically disadvantaged backgrounds. The analyses conducted on the population of public K–12 schools in Ohio include the following:

- Spending equity Analysis – A spending equity analysis that describes the relationship between per-pupil spending and economic disadvantage.
- Outcomes Analysis – An outcomes analysis to better understand the relationship between student outcomes and economic disadvantage.
- Cost Function Analysis – A cost function analysis that measures the cost of providing an equal opportunity for students with varying needs (including those who are economically disadvantaged) learning in different school environments to succeed, the results of which are used to identify the relative efficiency with which schools generate student outcomes.

Identifying schools that are relatively more efficient represents an exploratory strategy to better understand best practices in education, particularly for economically disadvantaged students. Specifically, the efficiency measure is used in Chapter 5 to analyze how funding is currently used to support students who are economically disadvantaged and whether spending patterns differ between more and less efficient school districts.

The remainder of this chapter details the methodology, data, and findings of the analyses. Specifically, the methodology section outlines the three key analyses investigating school spending equity, student outcomes, and costs, while the data and findings sections present the information used and results, respectively.

Methodology

This section explains the three key analyses listed in Exhibit 4.1: the spending equity analysis, the student outcomes analysis, and the cost function analysis. The spending equity analysis identifies the direction and strength of the various relationships between different student needs and per-pupil spending. That is, we may find positive relationships between spending and student needs characteristics across schools (e.g., the percentage of students who are economically disadvantaged), which is sometimes referred to as *progressive.* However, if the observed relationship is negative (e.g., spending per pupil decreases with respect to an increase in student need), it is sometimes described as *regressive*. Building on the spending equity analysis, the student outcomes analysis explores factors influencing educational success by examining correlations between outcome measures and measures of student needs, including economic disadvantage. Finally, the cost function analysis estimates the cost differential for generating outcomes for students who are economically disadvantaged students and is used to measure school efficiency in generating outcomes. Together, these analyses will contribute to a comprehensive understanding of the equity with which spending on public K–12 schools in Ohio occurs, the relationship between spending per pupil and the incidence of students who are economically disadvantaged, and a measure of the relative efficiency with which schools are generating student outcomes.

Exhibit 4.1. List and Description of Analyses Conducted

Analysis	Description
Spending equity analysis	The spending equity analysis aims to identify and address disparities in education spending, showing whether resources are distributed equitably across schools serving higher versus lower levels of student needs. By examining the relationship between current spending per student and school-level incidence of students who are economically disadvantaged, this analysis provides important insights that provide a "what-is" basis upon which to guide improvements in funding equity.
Outcomes analysis	The student outcomes analysis helps us understand student needs and other factors that influence educational success. Through examining the relationships between student outcomes and measures of student needs, this analysis provides valuable insights as to the importance of adjusting funding for needs such as economic disadvantage.
Cost function analysis	The cost function analysis estimates the cost differential for generating outcomes for various categories of student need, including economic disadvantage. The findings can be used to measure the extent to which some schools are generating outcomes at a lower cost, which can then be used to further gain valuable insights into how these schools use programming and services to support students who are economically disadvantaged.

Spending Equity Analysis

The spending equity analysis investigates the distribution of educational resources as measured by per-pupil spending, focusing on how spending aligns with student demographics. Three main components contribute to this analysis:

- **Relationships between current per-pupil spending and the percentage of economically disadvantaged students.** By taking simple correlations between these measures, we can determine if schools with higher percentages of students who are economically disadvantaged tend to be spending more to address the unique needs of the students they serve.
- **Regression analysis examining equity of education spending.** Through regression analysis, we assess the equity of education spending across schools with various needs, including student economic disadvantage. This type of analysis helps us understand whether funding is distributed fairly while simultaneously taking into account multiple types of student needs and other factors, such as enrollment size and population density. The findings provide information about which factors are most strongly related to spending and in which direction. This allows us to pinpoint spending inequities and identify potential funding adjustments through the cost function analysis, which might ensure a more balanced distribution of resources.
- **Summary of spending at demographic extremes.** For more compact reporting, we use estimated regressions to predict per-pupil spending at the 10th and 90th percentiles of the incidence of student economic disadvantage, ELs, and SWDs. By reporting the predicted spending at relatively low and high incidences of different student needs, we are able to gain insight into spending disparities for the various student-needs populations.

Outcomes Analysis

The outcomes analysis delves into the multifaceted factors influencing student success. This analysis is structured around three key components:

- **Structural equation model used to generate a single outcome factor score.** In order to take into account multiple measures of student outcomes, we conducted confirmatory factor analysis using a structural equation model.[26] This effectively reduces several student outcome measures (academic performance on ELA and mathematics assessments, graduation rates, and chronic absenteeism) into a single outcome dimension (a factor score) that takes into account the complex relationships between the individual outcome measures.

[26] Rather than make an arbitrary decision to weight each outcome equally or choose some arbitrary weighting scheme, the model uses the existing variation across all outcomes to identify the relative importance of each measure to the aggregate outcome factor score.

- **Correlations between outcome measures.** Examining the correlations between various outcome measures helps identify patterns and relationships within the data. This analysis sheds light on how different aspects of student performance are interrelated, offering insights into the broader dynamics of educational achievement.
- **Relationships between student outcome measures and student needs.** Exploring the correlations between student outcome measures and student needs highlights which student needs most strongly influence outcomes and therefore provides guidance on which needs should be taken into account when determining equity-driven funding adjustments (i.e., those that will provide an equal opportunity for all students to achieve the same outcomes, regardless of their needs).

Cost Function Analysis

The purpose of a cost function analysis is to measure the amount of spending necessary to generate a given level of outcomes and how this may be influenced by different "cost" factors. In the context of educational outcomes, we consider student needs, scale of operations (enrollment size), and salary levels in the local labor market as key cost factors. The analysis for this study provides estimates of how much more spending is needed to generate the same level of outcome for schools with different percentages of various student needs operating in different contexts, with respect to enrollment size and salary levels. [27] Particularly, it focuses on the following three analyses:

- **Regression results examining equity of predicted spending.** We employ a statistical cost function to examine cost differentials associated with school characteristics related to student needs and other cost factors. Specifically, we attempt to estimate whether the cost of providing an equal opportunity is higher for students with different types of needs attending schools in different contexts. The results provide estimates on what costs to give all students an equitable opportunity to succeed.
- **Predicted costs for low- and high-need schools.** We leverage the estimated cost function model to predict per-pupil spending at the 10^{th} and 90^{th} percentiles of student economic disadvantage, ELs, and SWDs. By comparing these predictions, we can gain insights into predicted funding disparities between schools serving students with different levels of needs.
- **Measuring school efficiency from cost function estimates.** Using predictions from the cost function model, we develop a measure that can be used to describe school efficiency at producing student outcomes.

[27] Schools where more than 50% of enrollment were reported to have a disability were omitted from our analytic sample. High student disability incidence suggest that the school may offer specialized services and therefore their expenditures may not be representative of the cost of educating economically disadvantaged students in traditional school settings.

Data

Data from multiple sources were processed to create an analytical dataset for these analyses.[28] Student enrollment data (including counts and percentages of students by grade, disability status, economic disadvantage status, race/ethnicity, gender, and EL status), and student outcome data (including graduation rates, math and ELA achievement, and chronic absenteeism) between the 2017–18 and 2022–23 school years were downloaded from the ODEW report card system. Per-pupil spending from state/local sources between the 2021–22 and 2022–23 school years were also obtained from the report card data. We also gathered disaggregated fiscal data for schools and districts from ODEW that included school and district expenditures related to transportation, administrative services, pupil support, operations, instructional staff, instruction materials, food, etc. Centralized district-level expenditures from each respective category were allocated across schools proportionally to each school's share of the total district enrollment.

We also drew upon sources other than those provided by ODEW. School characteristics including urbanicity, zip code, school type, school level, and charter status from 2017–2018 and 2022–2023 were taken from NCES. Data from NCES's CWIFT were downloaded for the years between 2017 and 2019 and 2021. NCES's EDGE IPR are used for years between 2018 and 2021 (Geverdt, 2018). Information provided at the zip code level (e.g., population density, percentage of the population who are female, percentage of the population who are age 5 or younger) were derived from the U.S. Department of Census 2020 decennial census.

Importantly, instead of using the percentage of students who are economically disadvantaged from the ODEW report card data, our analysis makes use of the modified MEPS data produced by the Urban Institute, averaging data from 2018 to 2022. We decided to utilize MEPS in these analyses due to the overestimation of student need in the current measure of student economic disadvantage caused by the use of the Community Eligibility Provision (CEP).[29] While we acknowledge that MEPS represents student poverty and therefore is a more stringent indicator of student need compared to the current measure of economic disadvantage reported by ODEW, it does not suffer from the same mismeasurement issues. To this end, the remainder of the analysis in this chapter uses the MEPS poverty measure as a proxy for student economic disadvantage.

[28] Table A.1 in Appendix A lists the data sources used for the analyses described in this chapter.

[29] The CEP allows districts or schools to provide universal free meals to students without tracking student eligibility. In these cases, the free- or reduced-price meal percentage is coded at 100%, which effectively overestimates the true student need at these locations (Strawser, 2024). Exhibit C.1 in Appendix C illustrates the discrepancy between MEPS and the current student economic disadvantage measure.

Findings

This section presents findings from the comprehensive set of analyses described above, addressing spending equity, student outcomes, and costs. From the cost function model results, we further develop a measure of school efficiency.

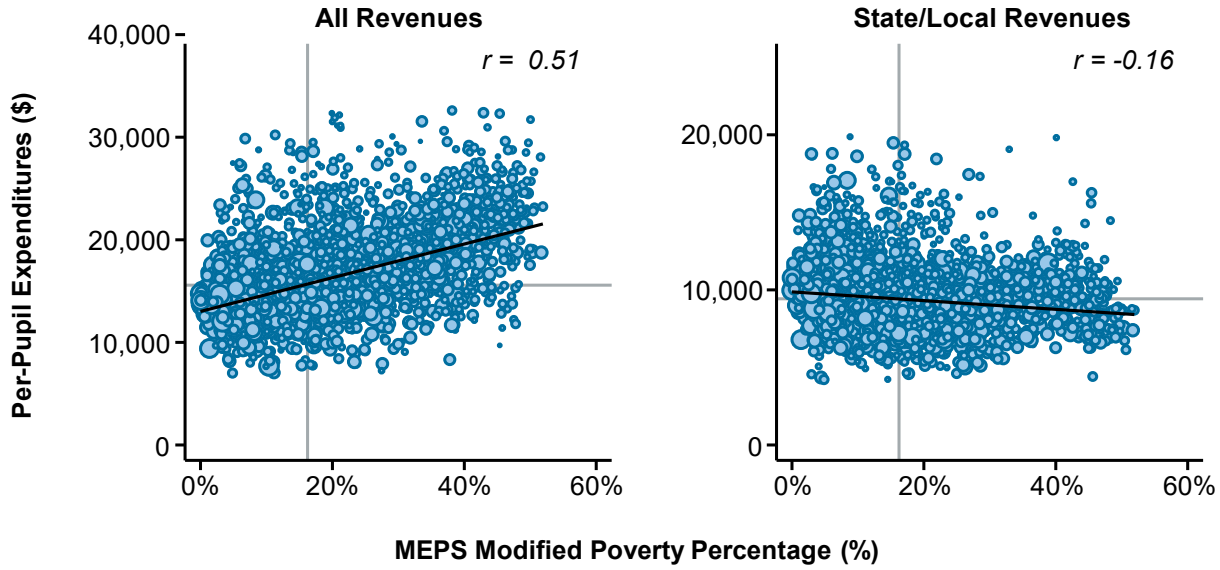
Spending Equity Analysis Findings

In this section, we explore the equity of school spending in Ohio, focusing on the relationship between per-pupil expenditures and MEPS poverty levels. By analyzing data between the 2017-18 and 2022-23 school years, we aim to uncover how operational spending varied across schools with respect to student poverty and other needs. Our analysis includes a detailed examination of both expenditure per-pupil from all revenue sources, as well as spending supported by only state and local revenues, providing insights into how spending from these specific funding sources are related to student poverty.

Exhibit 4.2 shows both overall per-pupil school expenditures and per-pupil expenditures supported only by state or local sources. Each dot on the scatterplot represents a school in Ohio in the 2022–23 school year. The black line represents the line of best fit and is weighted by each school's total enrollment, which is depicted in the scatterplot as the size of each school-specific dot. The correlation coefficient (*r)* is stated in the top-right corner of each plot. We additionally provide the statewide averages of per-pupil expenditure and percentage of students experiencing poverty, depicted as the light gray horizontal and vertical lines, respectively.

The scatterplot in the left panel of the exhibit shows that per-pupil expenditure from all funding sources exhibits a positive (progressive) relationship with student poverty (r = 0.51), while the scatterplot on the right shows a weakly negative (regressive) relationship when spending is limited to expenditures from state/local revenue sources (r = -0.16). For example, a typical school with a negligible percentage of students from families who are in poverty is expected to spend around $12,000 per pupil taking into account all revenue sources while a typical school with around 40% of the student population experiencing poverty would be expected to spend approximately $20,000 per student from all revenue sources. In contrast, the expected average per-pupil expenditure from state or local sources changes very little regardless of student poverty level. These limited findings imply that the observed progressivity in relationship between overall spending and student poverty is attributable to the way in which spending made with federal funding is distributed across schools.

Exhibit 4.2. Relationship Between Current Per-Pupil Spending and MEPS Modified Poverty Percentage (2022–23)



Note. The size of plotted points is scaled according to school enrollment size.
Source. ODEW Report Card 2022–23, Urban Institute MEPS data.

However, this analysis considers only student poverty as the sole cost factor by which spending varies. To expand our exploration into the equity of current expenditures in Ohio, we now turn to considering other factors that might also explain variation in educational spending and may be potentially related to student poverty. We therefore conduct a more comprehensive regression analysis to account for student poverty and other factors that may influence spending, including the percentages of students with disabilities or who are ELs; school enrollment shares in the elementary, middle and high school grades; total school enrollment; and regional differences in the price of staff. We provide three regression models from the available data: per-pupil expenditure from all revenue sources in the years 2017–18 to 2022–23, per-pupil expenditure from all sources from 2021–22 to 2022–23, and per-pupil expenditure from state/local revenues from 2021–22 to 2022–23.[30]

We have run regression models that estimate *relative* differences in per-pupil spending associated with each of the model factors, such as student poverty. Specifically, we ran Poisson regression models and report exponentiated coefficient estimates, which represent the relative difference corresponding with a 1-unit change in the factor. In the current context, exponentiated

[30] The second and third regressions exclude years that are marked by the COVID-19 pandemic and therefore may be more indicative of the "new normal."

coefficients greater than 1 indicate that larger factor values are associated with higher expected per-pupil spending, and values less than 1 indicate lower expected per-pupil spending.

For example, the results listed in Exhibit 4.3 show after controlling for the full host of model factors, the relationship between school percentage of students who are in poverty (our proxy for economic disadvantage) and spending per pupil is somewhat flat. In Model A, which illustrates spending from all funding sources from the 2017-18 and 2022-23 school years, the exponentiated coefficient for student poverty is 1.287. This suggests that, based on data covering all study years, a school with 100% impoverished student enrollment is expected to spend 28.7% more than an otherwise similar school with 0% impoverished student enrollment. This association is more positive (1.665) when using data from only the most recent two years (Model B). In contrast, when limiting spending only to that supported by state and local funding over the two more recent years our findings show that a school with 100% student poverty is expected to spend 54% less than an otherwise similar school with 0% poverty. This finding indicates that the positive relationship found between spending and student poverty in Model B was driven by spending of federal funding [31]

We also included school enrollment size variables in this regression that have a clear negative relationship with total expenditures in all models. The smallest enrollment category, indicating schools with less than 300 students, was omitted and used as the reference level. Under this model, the expected spending per pupil decreases as enrollment increases, indicating there are economies of scale at play. For example, Model A suggests that schools with enrollments between 300 and 499 are expected to spend around 3% less than schools that are otherwise similar but serve fewer than 300 students (the reference group). As enrollment increases the expected spending per pupil consistently declines to a difference of 15% between the smallest and largest enrollment categories. In contrast, as the population density (number of inhabitants per square mile in the zip code of a school) in the area surrounding a school increases, per-pupil spending is expected to be higher. Here, all estimates are relative to schools located in an area with a population density that is less than 100 (i.e., the reference group). For example, schools in the densest areas (with a population density of 3,000 or more), spend around 10% more than schools in the least dense areas (where the density is less than 100).

We further explore the relationship between aspects of regression model A and C (showing total spending between the 2017–18 and 2022–23 school years and state/local spending

[31] Exhibit 4.3 demonstrates that EL incidence estimates are directionally similar to those for MEPS poverty rates, with a statistically significant and negative, but milder, relationship between EL incidence and spending from state and local sources from the 2021-22 and 2022-23 school years. SWD incidence shows a large and statistically significant positive association with spending from all sources in Models A and B, and a negative, but not statistically significant, association in Model C, when only expenditures from state and local sources are considered in the two most recent years of data.

Exhibit 4.3. Regression Results Examining Equity of Education Spending with Respect to Student Needs and Other Factors (2017–18 through 2022–23)

Model Factor	(A) Per-Pupil Expenditures from All Sources (2017–18 to 2022–23)	(B) Per-Pupil Expenditures from All Sources (2021–22 to 2022-23)	(C) Per-Pupil Expenditures from State/Local Sources (2021–22 to 2022–23)
MEPS modified poverty percentage	1.287***	1.665***	0.458***
% SWD enrollment	2.400***	2.183***	0.799
% EL enrollment	1.221***	1.058	0.839*
Enrollment share (Reference group = % 9–12 enrollment)			
% K–5 enrollment	0.892***	0.865***	0.865***
% 6–8 enrollment	0.863***	0.907***	0.931***
Enrollment (reference group = <300)			
Enrollment 300–499	0.968***	0.966**	0.979
Enrollment 500–799	0.915***	0.920***	0.922***
Enrollment 800–1,199	0.877***	0.877***	0.884***
Enrollment >1,200	0.846***	0.826***	0.820***
Population density (reference group = <100)			
Population density: 100–399	0.963***	0.954***	0.938***
Population density: 400–799	0.961**	0.964*	0.974
Population density: 800–1,499	1.009	1.001	0.991
Population density: 1,500–2,999	1.072***	1.066***	1.068***
Population density: >3,000	1.105***	1.104***	1.077**
CWIFT estimate	1.413***	1.751***	0.987
Base per-pupil spending	9511.8***	8556.6***	12299.6***
Number of observations	16,222	6,180	5,946
R-squared	0.251	0.316	0.107

Note. Figures are exponentiated coefficients from Poisson regression. Reference group is a school serving students in Grades 9–12 with enrollment less than 300 and in a location with population density that is less than 100. ** $p <$ .01, *** $p <$ .001

Source. ODEW Report Card 2022–23, Urban Institute MEPS data, NCES, 2020 Census.

between the 2021–22 and 2022–23 school years) by calculating the differences in spending levels between schools at the 10th and 90th percentiles of percentage of students in poverty, students with disabilities, or ELs (Exhibit 4.4). The table shows that a school at the 10th percentile of poverty (5.1% poverty) is expected to spend approximately $1,664 less in total than a school in the 90th percentile of poverty (38.7% poverty), all else equal. When looking at state/local expenditures, however, we see that schools in the 10th percentile of poverty spend $2,264 per-pupil more than schools in the 90th percentile of poverty. This discrepancy between margins reaffirms the findings presented above that schools with higher levels of economic disadvantage are expected to spend slightly more on average when compared to low-poverty schools, but this additional spending is supported by federal rather than state/local sources.

A similar pattern can be found in schools with extreme percentiles of students with disabilities. We estimate that, on average, schools in the 90th percentile of SWD enrollment spend a total of around $1,678 more per-pupil than schools in the 10th percentile, whereas state/local expenditures decrease by $403. It should be noted that while the regression between SWD populations is significant for total expenditures, it is not for state/local expenditures. Schools at the margins of EL enrollment have relatively similar spending—the 90th percentile of EL enrollment spends nearly the same amount per student. State/local expenditure differentials are also relatively low, with 90th percentile schools spending around $198 less than schools in the 10th percentile of EL enrollment.

Exhibit 4.4. Predicted Overall and State/Local Expenditures for Schools with Low Versus High Levels of Student Needs

Student subgroup	Percentile margins	Percentage of students at margin	Per-pupil expenditure from all sources	Predicted expenditure differential from all sources (90th–10th percentiles)	Per-pupil expenditure from state/local sources	Predicted expenditure differential from state/local sources (90th–10th percentiles)
MEPS %	10th	5.1%	$14,876	$1,664	$10,138	-$2,263
	90th	38.7%	$16,541		$7,875	
SWD %	10th	9.8%	$14,806	$1,678	$9,549	-$403
	90th	24.5%	$16,484		$9,146	
EL %	10th	0.0%	$15,436	$42	$9,456	-$198
	90th	11.8%	$15,478		$9,257	

Note. Per-pupil expenditures at percentile margins are based on school years between 2017–18 and 2022–23. State/local per-pupil expenditure at percentile margins are based on school years between 2021–22 and 2022–23. MEPS % = MEPS Modified Poverty Percentage. SWD % = percentage students with disabilities. EL % = percentage English learners.

Source. ODEW Report Card 2022–23, data provided by ODEW upon request, Urban Institute MEPS data, NCES, and 2020 Census.

Outcome Analysis Findings

In this analysis, we use a novel approach to develop a comprehensive student outcome measure that integrates multiple performance indicators into a single cohesive metric. Specifically, we use a structural equation model (SEM) to create an outcome score that accurately reflects the diverse aspects of student achievement and other measures of school performance.

Instead of simply looking at a limited number of individual measures in isolation, we combined four unique outcomes—ELA test scores, math test scores, chronic absenteeism rates, and 4-year graduation rates—to create a single robust and holistic measure that depicts student outcomes at a school. To create the outcome score, we applied confirmatory factor analysis through a structural equation model, treating the overall outcome measure as a latent (unobserved) variable and estimating it to best align with the data.[32] Instead of arbitrarily assigning equal weight to each outcome or choosing another random weighting method, the model uses the existing variations in outcomes across each measure to determine their relative importance to the unobserved aggregate outcome score. Moreover, this method also allows the statistical program to generate a factor score even when some measures are not available for certain schools (e.g., a middle school would have an outcome score even though it does not have a graduation rate).

Exhibit 4.5 shows correlations between our outcome factor score and the individual outcomes from which it was derived. The correlations between the factor score and individual outcomes all prove to be high, while a few of the correlations between the individual measures are modest. For example, ELA test score correlations have an absolute magnitude between 0.72 and 0.78 with graduation rate and chronic absenteeism, respectively, but a 0.99 correlation with the outcome factor score.

A higher outcome factor score can be thought of as "better," while a lower score would be "worse." The same is true for test scores, where higher ELA or math achievement is better than lower achievement. In these cases, the correlation between math test score and the outcome factor score is positive. Notably, all correlation coefficients have positive scores besides chronic absenteeism, which is an inverse measure (i.e., higher values indicate a lower outcome). For chronic absenteeism, a higher rate is worse than a lower one. Therefore, a higher outcome factor score is associated with lower chronic absenteeism, thus the negative correlations for this outcome.

[32] Data on student outcomes between 2017-—18 and 2022–23 were used in the SEM modeling.

Exhibit 4.5. Correlations Between Outcome Factor Score and Individual Outcome Measures

Outcome	Outcome factor score	ELA test scores	Math test scores	Chronic absenteeism	4-year graduation rate
Outcome factor score	1.00				
ELA test scores	0.99	1.000			
Math test scores	0.94	0.92	1.000		
Chronic absenteeism	-0.83	-0.78	-0.74	1.000	
4-Year graduation rate	0.77	0.72	0.59	-0.61	1.000

Note. Correlations were weighted by each school-by-year observation's total enrollment.
Source. ODEW Report Card 2022–23.

While understanding how student outcome measures relate to one another, it is also important to look at the relationships between student outcomes and the needs of the student that a school serves. Understanding these relationships is crucial for identifying and addressing educational inequities. We next show the relationships between school-level outcomes and student need measures (Exhibit). The outcome factor score is negatively correlated with all of the student need measures; students experiencing poverty, SWDs, and ELs all have lower outcomes. Student poverty is most strongly related to outcome measures, with correlations ranging between 0.57 and 0.83 in absolute value. Out of all of the student needs measures, school EL enrollment is most weakly related to the student outcome measures, with the absolute magnitude of correlations ranging between 0.24 and 0.33.

Exhibit 4.6. Correlations Between Outcome Measures and Student Needs

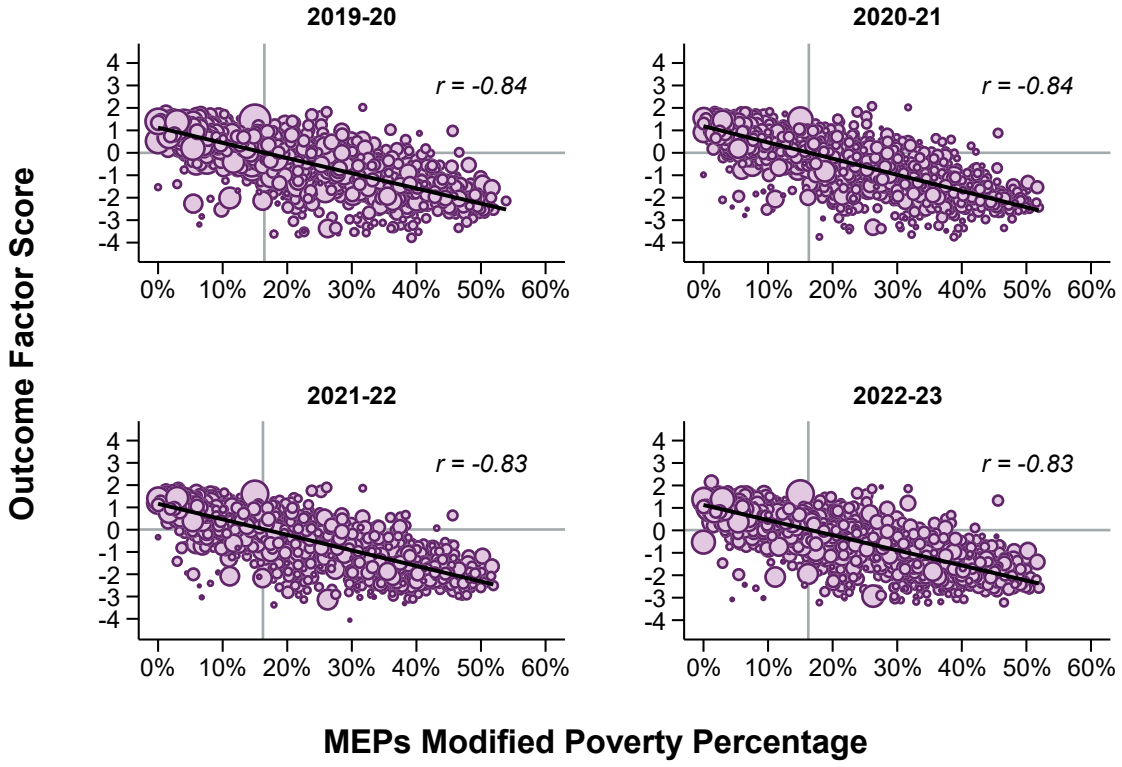
Outcome measure	MEPS modified poverty percent	% SWD	% EL
Outcome factor score	-0.83	-0.54	-0.31
ELA achievement	-0.82	-0.55	-0.33
Math achievement	-0.81	-0.42	-0.29
Chronic absenteeism	0.74	0.46	0.25
4-Year graduation rate	-0.57	-0.57	-0.24

Note. Correlations were weighted by each school-by-year observation's total enrollment. MEPS = MEPs Modified Poverty Percentage. SWD = Students with Disabilities. EL = English Learner
Source. ODEW Report Card 2022–23, Urban Institute MEPS data, NCES.

Exhibit 4.7 shows scatterplots depicting the relationship between the outcome factor score and student poverty levels for 2019–20, 2020–21, 2021–22 and 2022–23 school years. Each dot denotes a school with its size representing enrollment count. The black line of best fit represents the average relationship between the two variables, while the light gray horizontal

and vertical lines represent the average outcome factor score and school poverty population, respectively. The scatterplots visually express the relationships measured by the correlations presented above. Specifically, we can see a negative relationship between outcome factor score and student poverty for each year. Further, the correlation coefficients listed in the year-specific scatter plots are consistent over time, measuring between –0.83 and –0.84. In each year, schools with nearly 0% poverty have an outcome factor score that is about 1 standard deviation above the state average, while those with 50% poverty tend to score around 2 standard deviations below average.

Exhibit 4.7. Relationship Between Outcome Factor Score and Student Poverty Levels (2019–20 to 2022–23)



Note. The size of dots represents total school enrollment.
Source. ODEW Report Card 2022–23, Urban Institute MEPS data.

Cost Function Analysis Findings

Our spending equity analysis revealed how current spending patterns align with high-needs populations, such as students experiencing poverty, SWDs, and ELs. The student outcomes analysis showed that these populations are negatively correlated with student outcomes and demonstrated a large outcome gap between schools serving higher versus lower percentages of students in poverty. The following cost function analysis that we present seeks to uncover what

it would cost to ensure these high-needs populations have adequate resources to achieve at the state average.[33] The basic form of the cost function is as follows:

$$Per\text{-}Pupil\ Spending = f(Student\ Outcomes, Cost\ Factors, Efficiency\ Factors)$$

where:

- *Per-Pupil Spending* = School-level measure of operational spending per enrolled pupil
- *Student Outcome* = School-level outcome factor score
- *Cost Factors* = A host of school- and district-level variables measuring student needs (economic disadvantage, English proficiency, and disability), scale of operations and remoteness (enrollment size, population density), and the cost of hiring/retaining staff associated with the regional labor market.
- *Efficiency Factors* = Various measures most often at the district level that help explain the relative efficiency with which outcomes are produced, including local wealth, tastes for education, and competition.

We utilize an instrumental variables (IV) approach to estimate the cost of providing an equitable opportunity for all schools to perform at the statewide average of the outcome factor score, regardless of the needs of the students they serve. This approach recognizes the potential simultaneous relationship between school spending and student outcomes, which can bias the estimated relationship between outcomes and spending (Duncombe & Yinger, 2011).[34] Overcoming this potential bias requires the identification of one or more exogenous variables (instruments) that are used to predict outcomes from a first-stage equation, which are then used in the second-stage spending equation. For the instruments used to explain variation in outcomes in the first stage equation to be acceptable, they must be significantly correlated with our endogenous variable (outcome factor score) but not related to the dependent variable of interest (spending). Our analysis indicated two instruments would be appropriate: the income-to-poverty ratio of the zip codes surrounding a school and the percentage of the population surrounding a school that has a bachelor's degree or higher.[35]

Exhibit 4.8 shows the results of the second-stage cost function equation, which regresses school-level per-pupil spending on a host of control variables, including the instrumented outcomes, cost factors, and efficiency factors. We see that the outcome factor score has a

[33] For an in-depth description of the application of cost functions to understand the educational costs, see Baker et al. (2020).
[34] That is, while the level of outcomes achieved influences spending, spending also may simultaneously influence outcomes.
[35] Specifically, the instruments passed tests of instrument validity and strength, including a review of the Hansen J statistic for identification and a partial-F statistic for instrument relevance.

coefficient of 0.342 and is statistically significant, which indicates a positive relationship between school-level per-pupil spending and outcome factor score. For example, our model estimates that for every 1 standard deviation increase in outcome factor score, per-pupil expenditures will increase by around 34%. Conversely, relative to Grades 9–12 enrollment, schools serving higher levels of either K–5 or 6–8 enrollment tend to have lower expenditure levels. For instance, the results suggest that a school that serves 100% K–5 students would spend around 23% less than a school serving 100% of its students in Grades 9–12.

The factors that have the most influence on school per-pupil expenditures are the needs factors of student poverty and SWD, which are expected to increase school spending by 230% and 196%, respectively. That is, the findings suggest that the cost of producing outcomes in a school where 100% of its students are in poverty is expected to be 230% higher than an otherwise similar school with serving no students in poverty. Similarly, the cost of producing outcomes in a school with 100% SWD is estimated to be 196% higher than an otherwise similar school where none of the students have a disability.

Our model also includes five categories of school enrollment size, ranging between schools with fewer than 300 students to schools with more than 1,200 students (this latter category is omitted and serves as the reference level against which the coefficients for the other enrollment categories should be based). Although there is a clear and significant positive relationship between school enrollment size and cost, the magnitude of this effect diminishes as enrollment increases. For example, the lowest category of school enrollment, schools with fewer than 300 students, are expected to spend 19% more than a school in the highest enrollment category (schools with more than 1,200 students). Schools whose enrollments are between 800 and 1,199, however, spend on average only 5% more than those with the highest enrollments. This relationship indicates that per-pupil costs decrease as enrollment size becomes larger, representing a commonly observed phenomenon known as economies of scale.

The year of operation also has a positive effect on educational cost—each year has a larger regression coefficient than the last, relative to 2017–18 (which was omitted as the reference level). Each year sees a higher cost of achieving outcomes over time, with 2022–23 expenditures an average of 22% higher than in 2017–18. This effect is influenced by inflation and the level of public school funding provided by local, state, and federal sources.

There are other statistically significant positive relationships evidenced by our second-stage regression, including the cost of hiring/retaining teachers relative to those with similar educational levels working outside of the education sector, as measured by the CWIFT, the percentage of the population aged 65 or above, the percentage of households who are vacant, and EL enrollment.

Exhibit 4.8. Second-Stage Regression Cost Function

Variable	Total per-pupil expenditures
Outcome factor score	0.342***
% EL enrollment	0.595***
MEPS modified poverty percentage	2.329***
% SWD enrollment	1.961***
Enrollment share (Reference group = % 9–12 enrollment)	
% K–5 enrollment	-0.229***
% 6–8 enrollment	-0.255***
Charter school = 1	-0.135
Enrollment (reference group = <300)	
Enrollment <300	0.193***
Enrollment 300–499	0.125***
Enrollment 500–799	0.0777***
Enrollment 800–1,199	0.0502**
Population density (reference group = <100)	
Population density: 100–399	-0.000178
Population density: 400–799	-0.00849
Population density: 800–1,499	0.0144
Population density: 1,500–2,999	0.0983***
Population density: >3,000	0.142***
CWIFT estimate	1.099***
Herfindahl index	-0.118
% Population 65+	0.717***
% Vacant	0.759***
Year (reference group = 2017–18)	
Year = 2018–19	0.0334***
Year = 2019–20	0.0509***
Year = 2020–21	0.0968***
Year = 2021–22	0.172***
Year = 2022–23	0.216***
Constant	8.376***
Number of observations	18,044
R^2	0.100

Note. Figures are exponentiated coefficients from Poisson regression. Reference group is a school serving students in Grades 9–12 with enrollment less than 300 and in a location with population density that is less than 100. ** $p < .01$, *** $p < .001$. MEPS = MEPs Modified Poverty Percentage. SWD = Students with Disabilities. EL = English Learner

Source. Information from 2017–18 through 2022–23 includes ODEW Report Card data, additional data provided by ODEW upon request, Urban Institute MEPS data, NCES data, and 2020 Census data.

To better understand our predictive cost model, it is important to look at the predicted cost differentials at demographic extremes. Below, we show the predicted costs for schools at the 10th and 90th margins of percentage poverty, EL, and SWD to achieve the statewide average outcome factor score (Exhibit 4.9). For example, our model predicts that it would cost a school with 5% student poverty (at the 10th percentile) $11,464 per pupil to achieve the statewide average outcome factor score. In contrast, if a school has 39% poverty (equal to the 90th percentile), the expected cost increases to $25,105. Consequently, it would cost $13,641 more per pupil to give schools in the 90th percentile of poverty the same opportunity. While the cost gap between the 10th and 90th poverty percentiles is the largest of the three student needs presented, it would take $4,659 per pupil to allow schools with a high level of SWD to achieve at the same target level as a school with low SWD enrollment. These margins give us specific examples of why equitable funding is so important and how the specific cost of offering equal educational opportunity differs between students with different needs.

Exhibit 4.9. Predicted Costs for Schools with Low Versus High Levels of Student Needs

Student subgroup	Percentile of subgroup	% of students at margin	Predicted cost	Predicted cost differential (90th – 10th percentiles)
MEPS %	10th	5.1%	$11,464	$13,641
	90th	38.7%	$25,105	
SWD %	10th	9.8%	$13,875	$4,659
	90th	24.5%	$18,534	
EL %	10th	0.0%	$15,447	$1,126
	90th	11.8%	$16,573	

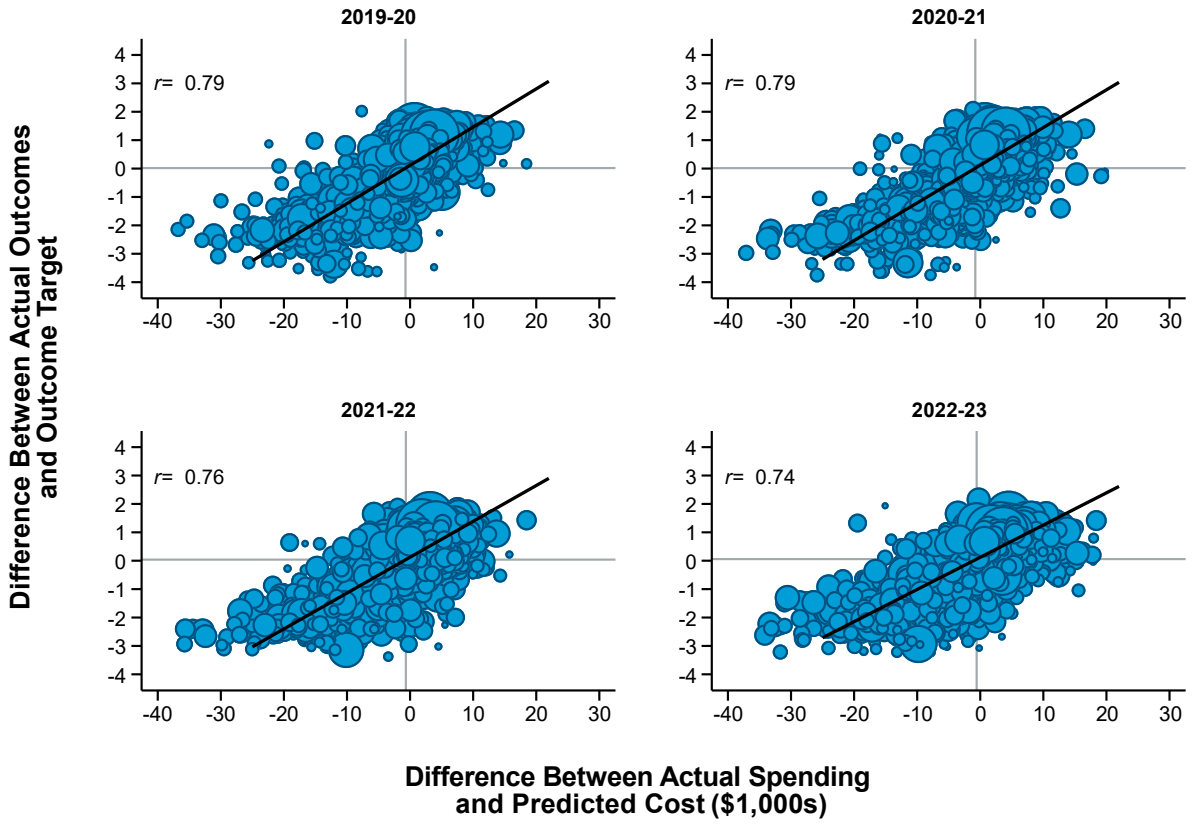
Note. MEPS % = MEPS Modified Poverty percentage. SWD % = percentage students with disabilities. EL % = percentage English learners.
Source. ODEW Report Card 2022–23, data provided by ODEW upon request, Urban Institute MEPS data, NCES.

The above regression analyses and cost estimates help us better understand the relationships between school spending, outcomes, and student needs. We can further leverage the analysis findings generated by the cost function model to determine the extent to which schools differ in the efficiency with which they generate student outcomes.

The charts in Exhibit 4.10 plot the difference between actual school outcomes and the outcome target (the state mean) against the difference between actual school spending and predicted cost of reaching the outcome target for the most recent four school years. This graph essentially tells us whether a school spends more or less than predicted as necessary to close the gap between its outcome level and the statewide average. This information allows us to

determine the relative efficiency with which schools produce outcomes. For example, if a school has an outcome differential of -1 and a cost differential of $15,000 (i.e., its performance is 1 standard deviation below the statewide average, and its spending is $15,000 more per pupil than is deemed necessary to produce statewide average outcomes), this would be a good indicator that it is operating inefficiently. Conversely, if a school has an outcome differential of 1 and a cost differential of –$10,000, that school performed 1 standard deviation above the statewide average outcome and spent $10,000 less than our model predicts it would cost to achieve this average, a good indication of it operating efficiently.

Exhibit 4.10. Relationship Between Expected Outcome and Expected Cost Differentials



Note. The size of dots represents total school enrollment.
Source. ODEW Report Card 2022–23, data provided by ODEW upon request, Urban Institute MEPS data, NCES, 2020 Census.

However, we can use the findings to describe school efficiency more formally. We specifically use the fitted solid line through the scatter plots that represents the predicted outcome gap based on the difference between actual spending and projected adequate cost to derive our measure of efficiency. The measure is defined as the average of the vertical distance between a

school's actual outcome gaps and their predicted outcome gaps across all analysis years (2017–18 through 2022–23). Relatively efficient schools are those that lie above the fitted line and have outcome gaps that exceed their expectation given the observed difference between their actual spending and projected cost of reaching statewide average outcomes. Conversely, those schools with actual outcome gaps that are lower than their expected value (below the fitted line) are considered relatively inefficient.

This information was leveraged to support the analysis in Chapter 5, where the efficiency measure was used to analyze the services provided to students who are economically disadvantaged, the resources allocated to support these activities, and how these services/resources vary with respect to school efficiency.

Summary

Our analysis of school-level spending, student outcomes, and costs reveals some critical insights. These findings are pivotal in better understanding the extent to which student needs and other factors influence the cost of producing student outcomes and the relative efficiency with which schools generate outcomes.

The spending equity analysis highlights complex relationships between school spending and key student needs. Schools with higher percentages of students experiencing poverty or students with disabilities tend to have higher total per-pupil expenditures, primarily due to federal funding. For example, schools with high poverty levels spend $1,664 more total per student on average than schools with low poverty levels but approximately $2,263 less from state/local sources. This indicates that federal funds are crucial in supporting schools with higher poverty rates, as state and local funding does not increase with poverty levels. Additionally, schools with higher percentages of SWDs and ELs also spend more than schools with lower percentages of students in these need categories. Our regression analyses show that a school with 100% SWD students spent on average 240% more than a school with no students with disabilities and those with 100% EL students spent 22% more than their counterparts with no EL students.

Our student outcomes analysis reveals that schools serving higher populations of students experiencing poverty, EL, and SWD tend to have lower student outcomes. These negative correlations highlight the significant challenges faced by these schools and emphasize the necessity for targeted interventions and resources. Even though these schools already have higher expenditures, these disparities underscore the need for equitable funding to ensure all students have access to quality education. Ensuring equitable funding and support is crucial for improving educational outcomes and providing all students with the opportunity to succeed.

The cost function analysis further illustrates the importance of equitable funding in closing the achievement gap. Schools with higher poverty rates or larger populations of students with disabilities require substantially more funding to achieve average state outcomes. For instance, the findings suggest that schools at the 90th percentile of poverty need $13,641 more per student compared to those at the 10th percentile. This stark difference highlights the financial challenges faced by schools serving high-needs populations and underscores the necessity for equitable funding policies. Adequate resources are essential not only for fairness but also for improving educational outcomes for all students.

Our findings in this chapter have significant implications for education finance policy. Policymakers must consider the disparities in funding needs when allocating resources to schools. A one-size-fits-all approach to school funding is inadequate; instead, funding formulas should account for the varying needs of different student populations. By adopting policies that ensure equitable distribution of resources, we can create a more level playing field and improve educational outcomes across the board.

References

Baker, B., Atchison, D., Levin, J., & Kearns, C. (2020). *Using cost modeling to inform education funding formulas*. Washington, DC: American Institutes for Research. https://carsey.unh.edu/sites/default/files/media/2020/06/20-11882_3._primer_usingcostmodeling_air_formatted_v3.pdf

Duncombe, W., & Yinger, J. (2011). Are education cost functions ready for prime time? An examination of their validity and reliability. *Peabody Journal of Education, 86*(1), 28–57.

Geverdt, D. (2018). *Education Demographic and Geographic Estimates Program (EDGE): School neighborhood poverty estimates–Documentation* (NCES 2018-027). U.S. Department of Education. Washington, DC: National Center for Education Statistics. https://nces.ed.gov/programs/edge/docs/EDGE_SIDE_PUBSCH_FILEDOC.pdf

Gutierrez, E., Blagg, K., & Chingos, M. (2022). *Model estimates of poverty in schools: A new school-level measure of economic need*. https://www.urban.org/sites/default/files/2022-06/Model%20Estimates%20of%20Poverty%20in%20Schools.pdf

Strawser, E. (2024). *Shifting poverty indicators and K12 poverty funding in Ohio*. Collaborate blog post. Ohio Association of School Business Officials. https://collaborate.oasbo-ohio.org/blogs/ernie-strawser1/2024/06/05/shifting-poverty-indicators-and-k12-poverty-fundin#:~:text=The%20average%20indicates%20that%20statewide%2054.3%%20of,the%20signi%EF%AC%81cant%20shift%20in%20this%20statewide%20average

Chapter 5. Current Services

The forthcoming chapter summarizes findings from the research team's analysis of current services provided to students who are economically disadvantaged, the resources allocated to support these activities, and how these services vary with respect to the efficiency of schools and LEAs.

The chapter is organized into a few key sections including a review of the **Analysis Scope and Research Questions**, a **Key Methods** section, a section detailing key findings, **Effective Services Analysis Findings**, as well as a **Limitations** section and a concluding section.

Finally, the analyses presented in this chapter and additional related analyses are available in a supplementary, comprehensive analysis memo.

Analysis Scope and Research Questions

We focus the analysis of this chapter primarily on services provided through the two key state funding programs—Disadvantaged Pupil Impact Aid (DPIA) and the Student Wellness and Success Fund (SWSF). We chose these sources of funding given their emphasis on the population of students who are economically disadvantaged. This also provides a narrow enough scope to effectively leverage available detailed data and conduct in-depth analysis.

Specifically, through an analysis of two sources of survey data and extant administrative data we identified the types of services implemented through these state funding programs, the extent to which these types of services vary depending on the local context, and to what specific activities tend to be included in each type of service. We identify two research questions:

1. What types of services and resources currently provide support for students who are economically disadvantaged in Ohio?
7. Do the services and resources provided systematically differ depending on the percentage of students who are economically disadvantaged or the efficiency with which LEAs generate student outcomes?

Through this analysis, the research team reached the following key conclusions:

- Initiatives funded through the DPIA and SWSF funding programs largely support Mental Health Services overall, but as an LEA's percentage of students who are economically disadvantaged increases, investments in Academic Supports and Extended Day and Extended Year are increasingly more likely relative to Mental Health Services.

- While the Project Survey does not point systematic differences in the types of resources supporting these services (i.e., personnel or non-personnel), qualitative analysis of the ODEW Survey suggests that resource types are notably different for Mental Health Services compared to Academic Supports.

Background

Key Funding Programs

To better understand the types of services Ohio LEAs are providing to students who are economically disadvantaged, this memo focuses on two key state funding programs —DPIA and the SWSF. An understanding of the allowable uses of funding for each of these programs may be helpful when considering the analysis findings.

Exhibit 5.1 summarizes the distribution formulas and key requirements for each of the four funding programs and compares the extent of flexibility in their allowable uses. In general, the allowable use of funds is flexible for both programs, though notably less so for SWSF starting in the 2024/25 school year due to a new requirement that not less than 50 percent of the spending must be in either "mental health services" or "physical health services." Specific allowable initiatives are provided in the Additional Methodology Detail in Appendix D.

Exhibit 5.1. Features of Key Federal and State Funding Programs

Associated program feature	DPIA	SWSF
Distribution formula	Funds are allocated based upon an LEA's percentage of students who are economically disadvantaged, increasing funding for LEAs with higher percentages.	Funds are allocated based upon an LEA's average daily membership, a fixed ratio of students to full-time counseling positions, and fixed compensation per counseling full-time positions.
Allowable initiatives	Allows for 19 broad types of initiatives.	Allows for 10 broad types of initiatives that are a subset of DPIA initiatives.
Other key restrictions on the use of funds	N/A	Not less than 50 percent of the spending must be in either "mental health services" or "physical health services".
Accountability process	Annual report.	Annual report with the potential for a corrective action plan if found to be noncompliant.

Notes. DPIA = Disadvantaged Pupil Impact Aid, SWSF = Student Wellness and Success Fund. Sources: Ohio Revised Code, 2023a, and Ohio Revised Code, 2023b. Additional details about the allocation of DPIA and SWSF funding can be found on the ODEW website at https://education.ohio.gov/Topics/Student-Supports/School-Wellness/Supporting-Student-Wellness.

Data and Methods

Data

We used multiple sources of data in our analysis – including: 1) publicly-available administrative data from federal and state sources that describe district characteristics; and 2) two surveys that were administered to Ohio LEAs to learn more about their funding and services for students who are economically disadvantaged. We used data for the 2022/23 school year, except for the Project Survey, which was administered in April 2024 and the NCES Comparable Wage Index for Teachers, for which the most recent year is 2021.

We provide additional information for each data source in the sections that follow and Exhibit 5.2 lists each data source and the research questions the data were used to answer.

Survey Data

We used information from two surveys in our analyses: 1) the Project Survey, which was administered to LEAs statewide in spring 2024 to learn more about how practitioners provided services to students who are economically disadvantaged; and 2) the ODEW Survey administered in the fall of 2023, which captures LEA initiatives funded through DPIA and SWSF programs in the 2022/23 school year.

ODEW Survey

The ODEW DPIA/SWSF Data Reporting Tool (ODEW Survey) is required for every LEA that received DPIA and/or SWSF funds in the prior academic year. Through this survey, LEAs provide information on initiatives funded through DPIA or SWSF funds including a service category and amount of funding for each initiative. The responses analyzed for this memo come from the collection administered online between June and September 2023 and completed by a senior administrator at the LEA.

843 LEAs responded to the survey, or about 91 percent of all LEAs in the state (843 out of 931), reflecting that most LEAs are receiving funds from one or both funding programs and thus providing a report on the use of the funding. Response rates by LEA types are provided in the Additional Methodology Detail in Appendix D.

Project Survey

The research team developed a statewide survey to gather information from the practitioners most closely engaged with students who are economically disadvantaged about services currently provided to these students, the associated funding programs, and the personnel and non-personnel resources leveraged to provide these services. This information was analyzed to address research questions for this analysis.

The survey was administered in April 2024, with the state's 931 LEAs receiving an invitation to participate. LEA Title I coordinators were asked to complete the survey on behalf of their LEA. Altogether, 150 individuals responded, representing 103 LEAs, for an 11 percent response rate.[36] Subsequent non-response analyses suggests that the survey respondents were from LEAs that are larger, with slightly smaller populations of non-White students, and more suburban LEAs compared to those LEAs that did not respond.[37] These systematic differences should be kept in mind when reviewing the results of analyses relying on the Project Survey. Because of this, results from the survey should be interpreted with caution and are often supported with evidence from other data sources. Additional detailed data summarizing response rates and nonresponse bias analysis results can be found in the Additional Methodology Detail in Appendix D.

Comparing the ODEW Survey and Project Survey

The Project Survey and ODEW Survey collections have important similarities and differences that should be kept in mind as the analysis results and findings in this memo are reviewed.

First, both surveys gather information about the types of services currently provided to students who are economically disadvantaged within a discrete set of initiative categories. As part of the development of the Project Survey, the ODEW Survey categories were consolidated into broader categories to reduce the time burden on respondents while still allowing for comparisons between instruments. The Additional Methodology Detail in Appendix D provides additional detail about the specific ODEW Survey service categories nested within the Project Survey categories.

Both surveys also gather information about the sources of funding leveraged to support services for students who are economically disadvantaged. Though, as illustrated in the Additional Methodology Detail in Appendix D, the ODEW Survey only provides four funding programs to choose from — DPIA, SWSF, ESSER, and Other — while the Project Survey offers up to 12 choices including the key state funding programs, a range of federal programs, and the option to identify other state and federal funds.

[36] The larger number of individual responses compared to unique LEAs represented reflects that in some LEAs both district and school staff responded to the survey. In these cases, relevant responses were collapsed into a single response capturing the full scope of information provided. For example, if any respondent noted a given funding source or type of service, this was included in the consolidated response, even if not all other respondents responded in kind.

[37] We also found that respondents were more likely to come from traditional LEAs, rather than STEM, Dropout and Recovery, or Community Schools. Moreover, the share of responses coming from Traditional LEAs is disproportionately higher than their share of the statewide population of LEAs, while the respondent share associated with Community Schools is far lower than their statewide population share. Thus, it is important to note that analyses relying on the Project Survey more strongly reflect the perspectives of those in Traditional LEAs and provide limited data about the views of practitioners in other types of LEAs, particularly Community School LEAs.

Finally, the scopes of the two surveys, while similar, have one important difference. The ODEW Survey includes only initiatives and services undertaken through either the DPIA and/or the SWSF state funding programs. Conversely, the Project Survey scope is much broader and includes *all initiatives and services provided to support the needs of students who are economically disadvantaged*. As a result, the Project Survey should include all services in the ODEW Survey and potentially additional services not within the scope of the noted state funding programs.

Efficiency Measure and Other Data Describing School and LEA Characteristics

We used a measure of school efficiency constructed as part of this study and described in Chapter 4 of this study.

To allow for an analysis of efficiency at the LEA-level, a LEA efficiency metric was also constructed. Specifically, an enrollment-weighted average of school efficiency scores in each LEA was calculated by schooling level (i.e., Elementary, Middle, and High). Then an unweighted average of the resulting values was calculated for each LEA. Both the school- and LEA-level efficiency measures are used in this analysis to determine if findings relative to each research question vary systematically with efficiency.

Publicly available data was also leveraged for these analyses as described in the Data section of the Introduction (Chapter 1).

Notably, in Ohio the term "economically disadvantaged" is defined as a student eligible for free or reduced-price lunch under the National School Lunch Program or residing in a home with an eligible student, identified as meeting the qualifying income guidelines for Title I whose parent or guardian completed the income form, or receiving public assistance. This is because program's eligibility has historically been based upon a student's family having a relatively low income. While this approach to identifying students of a low socio-economic status is common and well-established, as noted in ODEW (2021), it has been complicated in recent years by the USDA's Community Eligibility Provision (CEP). Under this policy, eligible schools or LEAs can include all its students in the NSLP without verifying that they meet its income eligibility requirements. As a result, students, regardless of their families' income, may be reported as "economically disadvantaged," and the validity of the measure is diluted as more schools and LEAs participate in CEP. In summary, the effect of CEP on Ohio's reliance on NSLP eligibility to define "economically disadvantaged" dilutes the measures validity and likely affects the precision with which the present analysis can identify systematic relationships between this measure and key outcomes of interest.

Methodology

Exhibit 5.2 provides an overview of the methods and data sources, and the sections below summarize the methodological approach for each research question. Additional detailed information is available in the Additional Methodology Detail in Appendix D.

Exhibit 5.2. Overview of Analytical Approach and Data Sources by Research Question

Research question	Methodology	Data sources
Research Question 1: What types of services and resources currently provide support for students who are economically disadvantaged in Ohio?	Descriptive Analysis Qualitative Analysis	Project Survey ODEW Survey Public Data
Research Question 2: Do the services and resources provided systematically differ depending on the percentage of students who are economically disadvantaged or the efficiency with which LEAs generate student outcomes?	Regression (Binary and Multinomial Logistic)	ODEW Survey Public Data

Research Question 1

To address research question 1, the research team leveraged descriptive analysis.

- **Descriptive Analysis**: We conducted a simple descriptive analysis of the survey responses reporting on current types of services (e.g., Mental Health Services, Academic Supports, etc.) and resource types (i.e., personnel and non-personnel) to provide a high-level summary of the responses and identify any apparent sources of systematic variation using a chi-squared test of independence (e.g., with respect to geographic location, locale, etc.).

Research Question 2

To address research question 2, the research team leveraged logistic regression; specifically binomial and multinomial logistic regression to investigate the commonality of current service categories and how these services vary by LEA characteristics, including the percentage of students who are economically disadvantaged and LEA efficiency.[38] To dig deeper into this variation, we also conducted an exploratory analysis of the qualitative differences in services and resource types between LEAs with relatively low efficiency compared to those with relatively high efficiency.

- **Regression (binomial)**: We leveraged binomial logistic regression to examine the variation in primary service categories, or those commanding the largest share of reported spending,

[38] Regression analysis in general is a research analysis method used to estimate relationships between an outcome of interest (i.e., dependent variable) and a set of measures thought to predict the given outcome (i.e., independent variables). These particular types of logistic regression are applied in cases where the outcome of interest is an indicator of a discrete outcome or set of outcomes. Specifically, binomial logistic regression deals with measures that have two possible outcomes while multinomial logistic regression deals with measures that have more than two possible outcomes.

with an emphasis on Mental Health Services. Specifically, we estimated a binomial logistic regression where having Mental Health Services as the primary service category is the outcome of interest, again assessing if this outcome depends on the percentage of students who are economically disadvantaged or LEA efficiency.

- **Regression (multinomial)**: Building on the binomial regression, we leveraged multinomial logistic regression to assess if the likelihood of a primary service category *as opposed to* Mental Health Services is systematically associated with the percentage of students who are economically disadvantaged or LEA efficiency. For example, we might find that Physical Health Services is more likely to be primary *instead of* Mental Health Services as the percentage of students who are economically disadvantaged increases.
- **Qualitative Analysis**: To understand what specific activities and resources are included in initiatives for a given type of service and how these vary by LEA we conducted a qualitative analysis of open-ended written descriptions in the ODEW Survey of the initiatives implemented by LEAs with SWSF and DPIA funds. We did this for a sample of respondents stratified by LEA efficiency so that we could report on if and to what extent the results differ by an LEA efficiency. There were 245 LEAs included in the sample with a relatively even split between high-efficiency quintile LEAs (135, 55.1%) and low-efficiency quintile LEAs (110, 44.9%).

Effective Services Analysis Findings

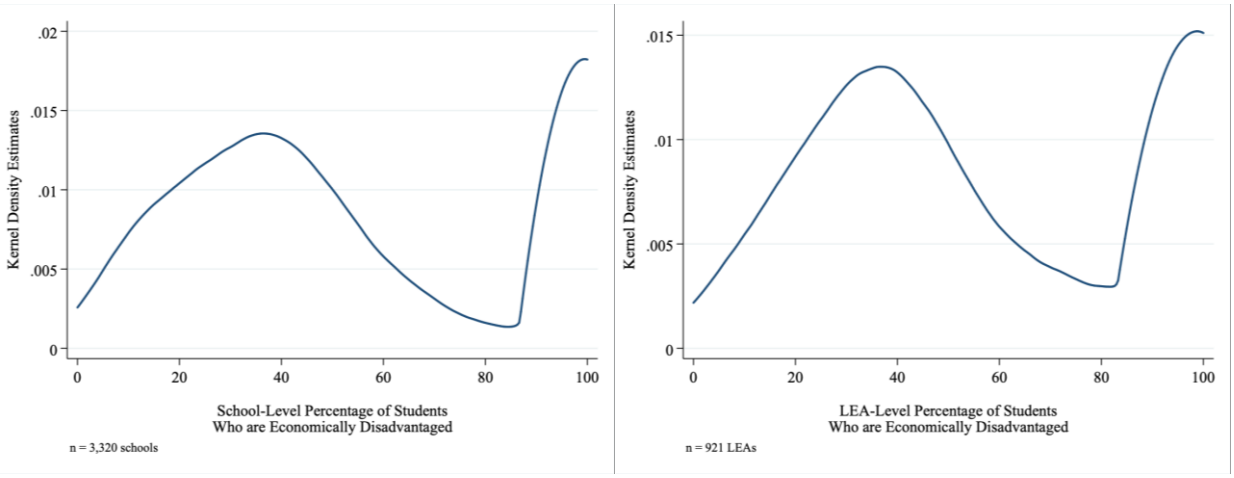
As a part of addressing research question 2, we examined whether the results vary significantly depending on two characteristics: (1) the percentage of students who are economically disadvantaged and (2) the level of efficiency in an LEA or school.

As noted in the Data and Methods section, the term "economically disadvantaged" is defined primarily as a student eligible for free or reduced-price lunch under the National School Lunch Program (NSLP). While this approach to identifying students of a low socio-economic status is common and well-established, as noted in ODEW (2021), it has been complicated in recent years by the USDA's Community Eligibility Provision (CEP). Under this policy, eligible schools or LEAs can include all its students in the NSLP without verifying that they meet its income eligibility requirements. As a result, students, regardless of their families' income, may be reported as "economically disadvantaged," and the validity of the measure is diluted as more schools and LEAs participate in CEP.

Given this context, it is not surprising that we find a cluster of schools and LEAs with 100 percent of students identified as economically disadvantaged in available state data. Specifically, within our analysis sample, the average percentage of students who are economically disadvantaged is 57 percent at the school level and 59 percent at the LEA level,

with clusters of schools and LEAs just below 40 percent, and clusters centered on 100 percent (see Exhibit 5.3). The latter cluster likely reflects the effect of CEP in that schools and LEAs that would otherwise spread out to values between 40 and 100 percent are all labeled as 100 percent, cutting down on the true variation in the measure.

Exhibit 5.3. Distribution of the Percentage of Students Who Are Economically Disadvantaged



School-Level **LEA-Level**

Note. The number of schools and districts is noted in the figures. Figure plots kernel density estimates, an approach to smoothing a probability density function and a common way of displaying the distribution of a measure. In general, the height of the line, or the kernel density estimate, represents the relative likelihood that any given value of a measure will be at or around a particular point within the range of possible values. This figure illustrates, therefore, that school- and LEA-level percentage of students who are economically disadvantaged have bimodal distributions, centered around just below 40 percent and 100 percent. *Source.* ODEW Report Card, Building Disaggregated Economically Disadvantaged 2022/23.

In short, the effect of CEP on Ohio's reliance on NSLP eligibility to define "economically disadvantaged" dilutes the measure's validity and likely affects the precision with which the present analysis can identify systematic relationships between this measure and key outcomes of interest.

More information about our measure of efficiency and how it varies across the state and in our survey samples, is provided in the Additional Analysis Results in Appendix D.

Research Question 1—Current Service and Resource Types

What types of services and resources currently provide support for students who are economically disadvantaged in Ohio?

To address research question 1, the research team investigated the commonality of current services categories and resource types.

Key Takeaways

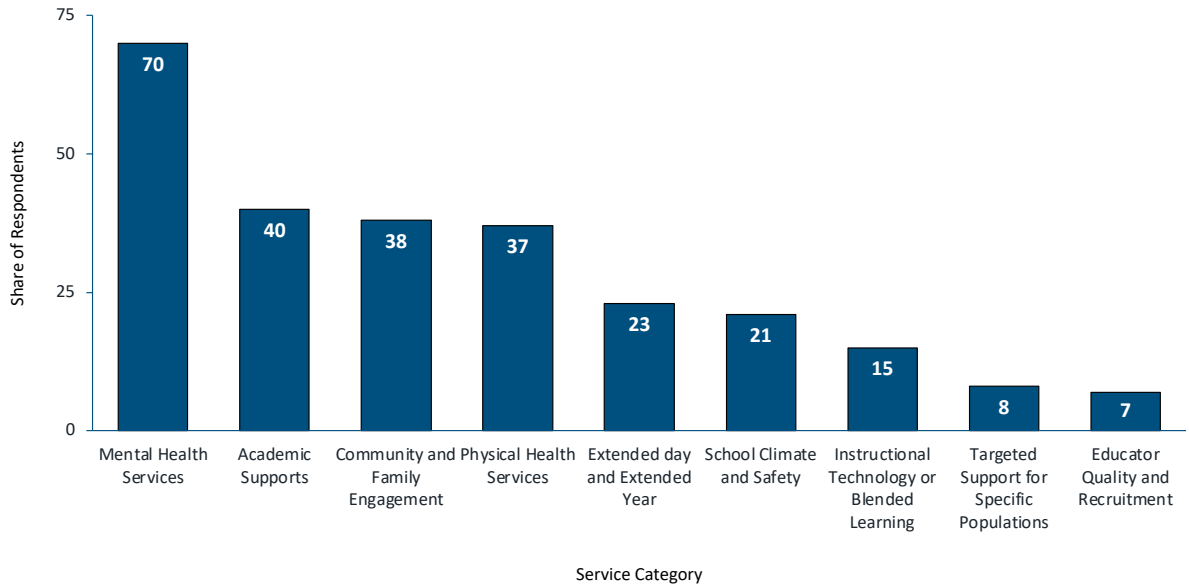
1. According to the ODEW Survey, Mental Health Services is the most common service category and the category with the largest average share of spending for these initiatives.
8. Based upon the Project Survey, personnel and non-personnel resources do not appear to vary systematically across LEA characteristics.

The following sections provide a full summary of each key takeaway and their associated analyses.

According to the ODEW Survey, Mental Health Services is the most common service category and the category with the largest average share of spending for these initiatives.

LEAs are using the largest portion of the SWSF and DPIA funding to invest in Mental Health Services, both for students who are economically disadvantaged and for their peers. Though LEAs reported investing in services in all of the allowable categories, Mental Health Services were reported by the highest share of LEAs (70%) The next three most common, Academic Supports, Community and Family Engagement, and Physical Health, were reported at very similar levels, 40, 38, and 37 percent respectively, as shown in Exhibit 5.4.

Exhibit 5.4. Share of Respondents Reporting Each Service Category, ODEW Survey—2022/23



Note. n=843 respondent LEAs. This exhibit displays the percentage of responding LEAs that had at least one initiative for each service category. *Source.* Research team analysis of ODEW Survey, 2022/23.

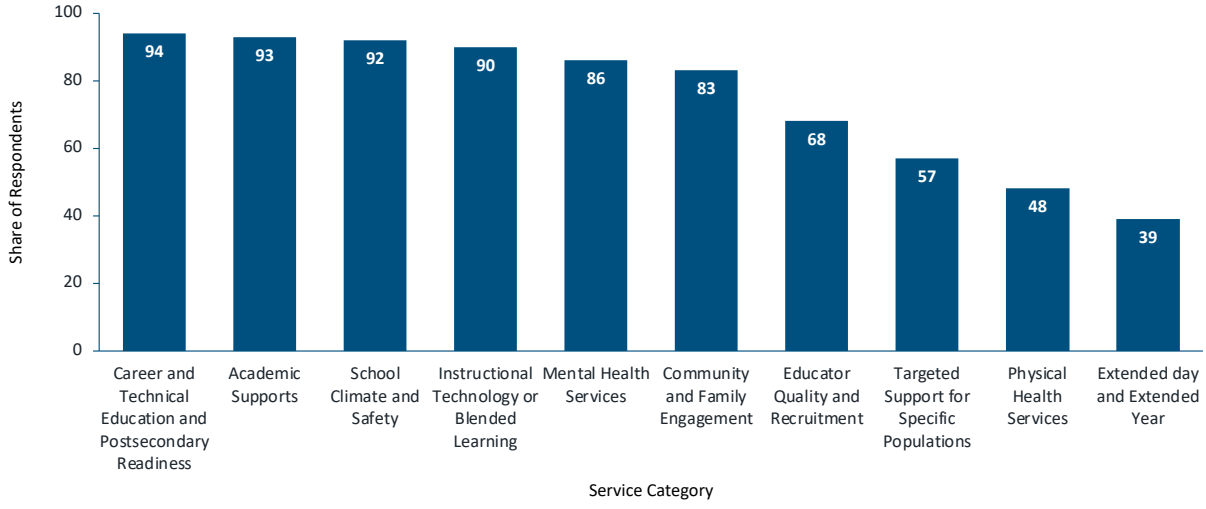
As previously noted, the ODEW survey only collects information on initiatives funded in part or whole by SWSF or DPIA, though the Project Survey asked LEA respondents about all of the current services provided to support students who are economically disadvantaged.

A review of the responses to the Project Survey, displayed in Exhibit 5.5, suggests that LEAs provide a wide range of strategies, and several of these services were reported by the vast majority of respondents. Academic Supports was the most commonly reported category, identified by 93 percent of respondents, though School Climate and Safety, Instructional Technology or Blended Learning, Mental Health Services, and Community and Family Engagement are very close behind, and each is reported by over 80 percent of respondents.

Overall, when compared to the results from the ODEW survey, it is clear that all service categories are reported by a greater share of Project Survey respondents than in the ODEW Survey. It is possible this is a result of the wider scope of the Project Survey, though since the Project Survey sample is significantly smaller than the ODEW Survey, it is also possible this difference is simply due to differences in responding LEAs.

However, a comparison of the results for LEAs responding to both surveys suggests that even when comparing the same LEAs, responses are significantly different. This analysis is described in more detail the Additional Analysis Results in Appendix D.

Exhibit 5.5. Percentage of Respondents Reporting Each Service Category, Project Survey—2023/24

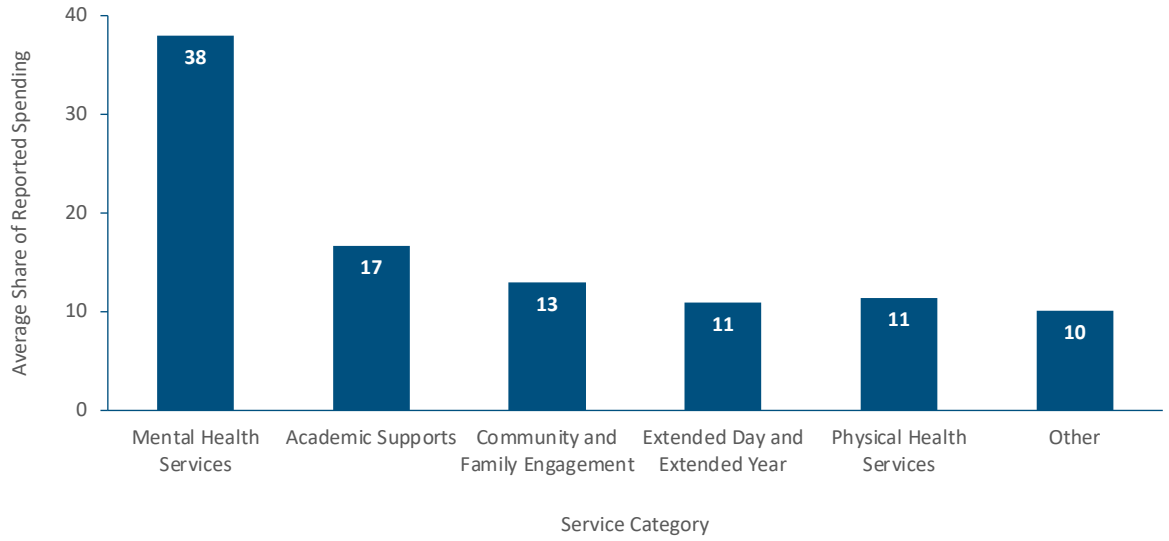


Note. n=84 respondent LEAs. This exhibit shows the percentage of respondents to the Project Survey who indicated that a service category is currently used to support students who are economically disadvantaged.
Source. Project Survey, 2023/24.

The incidence of a service category does not necessarily indicate anything about the level of investment in a given service category. The share of spending reported in the ODEW Survey spent on each service category may be a better indicator of its relative importance rather than incidence.

Mental Health Services also make up the highest percentage of this spending. As shown in Exhibit 5.6, the shares for the next five largest categories are notably lower and clustered together between 11 and 17 percent. This reinforces the prominence of Mental Health Services; not only is this category the most commonly reported, but it also makes up the highest share of reported spending on average.

Exhibit 5.6. Average Share of LEA Spending Allocated to Each of the Top Five Service Categories, ODEW Survey—2022/23

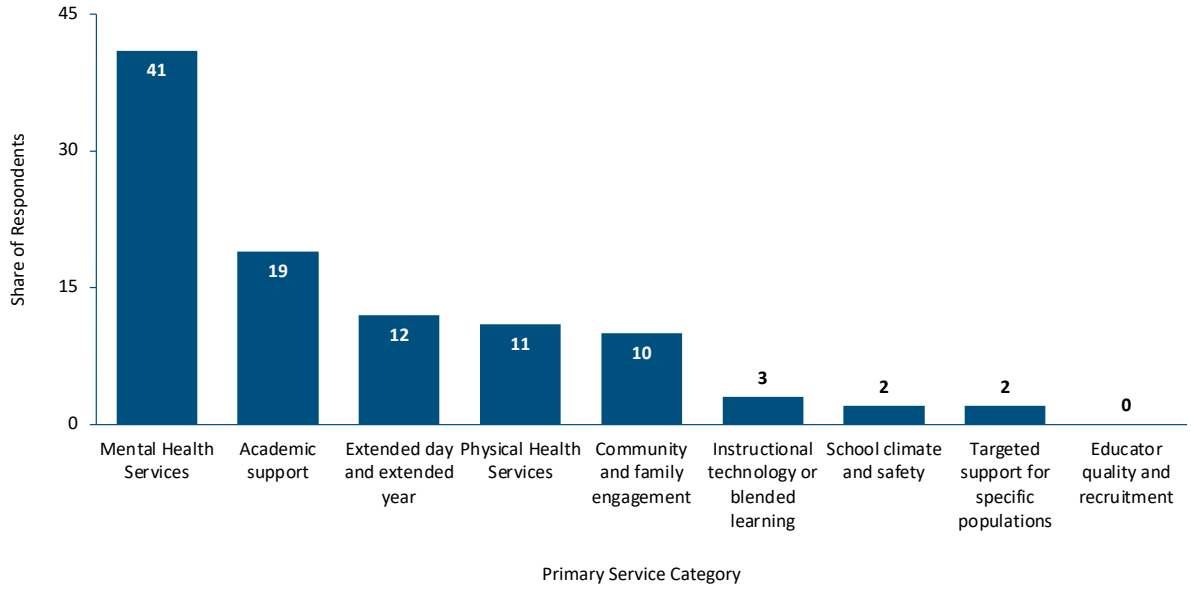


Note. n=843 respondent LEAs. This exhibit displays the average share of total DPIA/SWSF initiative spending by service category for the top five service categories. *Source.* Research team analysis of ODEW Survey, 2022/23.

With respect to the primary service category, or the category in which an LEA invests the largest share of its overall spending reported in the ODEW Survey, Mental Health Services is once again the most common (see Exhibit 5.7). Similar to the incidence and investment results, the next most common primary service category is Academic Supports. However, unlike the incidence results, Extended Day and Extended Year is the third most common primary category, followed by Physical Health Services and Community and Family Engagement.

In other words, while Community and Family Engagement is reported more often compared to Extended Day and Extended Year, more LEAs report spending a larger share of their funds on Extended Day and Extended Year. That said, Mental Health Services is significantly more common as a primary category than its closest competitors, at 41 percent, compared to 19 percent for Academic Supports.

Exhibit 5.7. Share of Respondents by Primary Service Category, ODEW Survey—2022/23



Note. n=843 respondent LEAs. This exhibit displays the share of responding LEAs with each primary service category (i.e., service category with the largest share of their DPIA/SWSF initiative spending). *Source.* Research team analysis of ODEW Survey, 2022/23.

In short, Mental Health Services is the most prevalent and most often commands the highest share of spending across the full sample.[39]

Based upon the Project Survey, personnel and non-personnel resources do not appear to vary systematically across LEA characteristics.

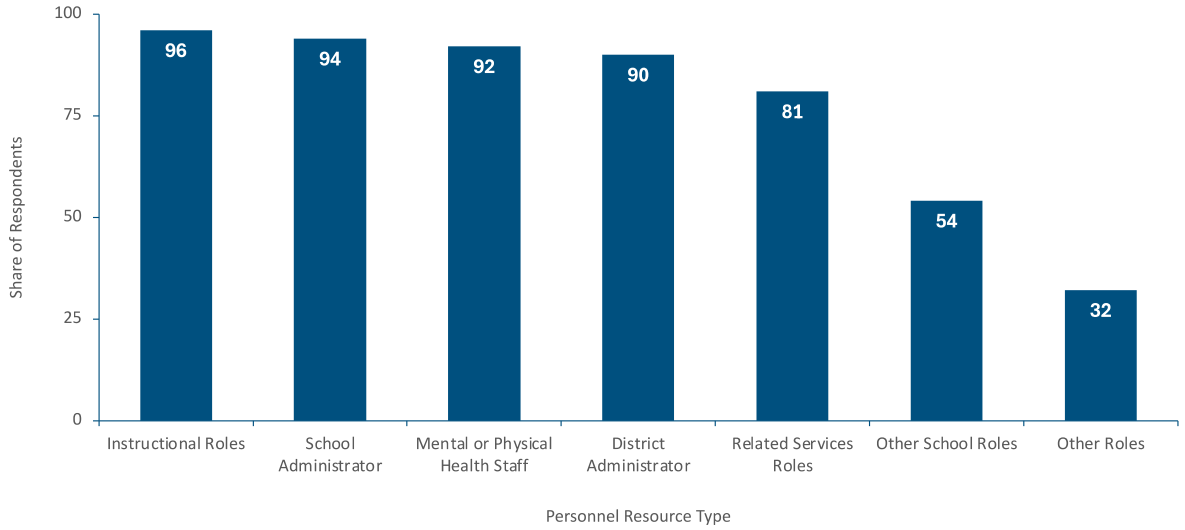
While there were clear variations in services across the state as reported in the ODEW survey, this does not necessarily imply there is meaningful variation in personnel and non-personnel resources leveraged to provide these services. In fact, responses to the Project Survey suggest minimal variation in the types of resources leveraged to implement these services. This may be because the types of resources offered were sufficiently broad as to encompass roles that might apply to several different services. For example, it is not surprising that a range of distinct

[39] Additional detailed summary data are provided in the Additional Analysis Results section in Appendix D.

services provided specifically for students who are economically disadvantaged would include instructional and administrative roles and thus be identified by most respondents to the survey. On the other hand, because the Project Survey sample size is fairly small—with 84 responses to this item in particular—differences due to anything other than random chance are more difficult to detect.

The most common personnel role identified was an instructional role, followed by school administrator, and mental or physical health staff (see Exhibit 5.8). Several roles are extremely common; for example, 90 percent of respondents or higher report that instructional roles, school administrators, mental or physical staff, and district administrators support implementation of these services.

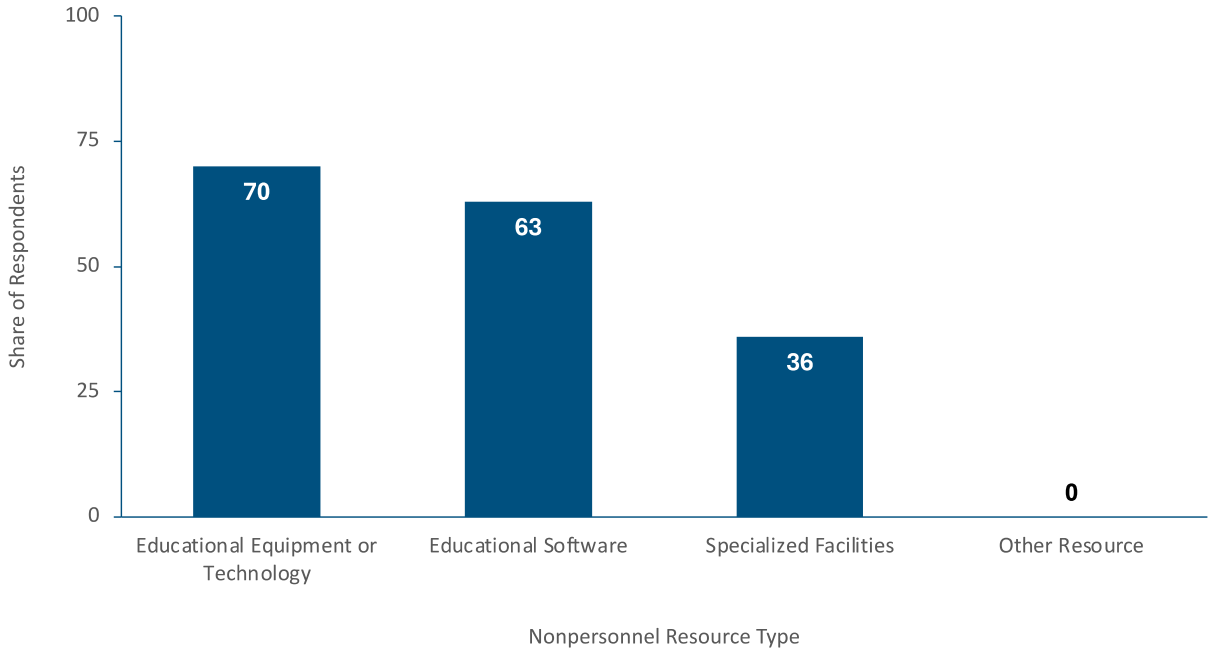
Exhibit 5.8. Share of Respondents by Personnel Role, Project Survey—2023/24



Note. n=84 respondent LEAs. This exhibit shows the share of respondents reporting that specific roles involved in services for students who are economically disadvantaged. *Source.* Research team analysis of Project Survey, 2023/24.

For non-personnel resources, Educational Equipment or Technology and Educational Software are both reported by a large share of respondents—70 and 63 percent, respectively (see Exhibit 5.9). Specialized Facilities were less commonly reported at 36 percent, and no respondents cited Other Resource types.

Exhibit 5.9. Share of Respondents by Nonpersonnel Resource, Project Survey—2023/24



Note. n=84 respondent LEAs. This exhibit shows the share of respondents reporting that specific non-personnel resources that support services for students who are economically disadvantaged. *Source.* Research team analysis of Project Survey, 2023.

Based upon descriptive analysis, the average share of respondents reporting specific personnel and non-personnel resources did not vary systematically by the percentage of students who are economically disadvantaged or LEA efficiency. Likewise, we do not find systematic differences in personnel roles by any of our analytic groupings including locale, LEA type, and region.[40]

To supplement these descriptive statistics, the research team also attempted analysis of variation by estimating binary logistic regressions of personnel or non-personnel resource indicators on the percentage of students who are economically disadvantaged, LEA efficiency, and other previously noted covariates, including other student populations, LEA CWIFT, and LEA enrollment.[41] In general, these models did a poor job of explaining the variation in the

[40] Additional detailed summary data are provided in the Additional Analysis Results section in Appendix D.
[41] Insufficient variation in the sample with respect to LEA locale, region, and LEA type caused issues with model convergence and precluded the inclusion of these covariates.

identification of these resource types.[42] This is likely due to the minimal overall variation and, possibly, also the relatively low sample size.

Taken together, these results based upon the Project Survey suggest that resource types do not vary systematically by the key analytic groups.

Research Question 2—Variation in Current Service and Resource Types

Do the services and resources provided systematically differ depending on the percentage of students who are economically disadvantaged or the efficiency with which LEAs generate student outcomes?

To address research question 2, the research team investigated how current service categories vary by LEA characteristics, including the percentage of students who are economically disadvantaged, and LEA efficiency, including analysis of the qualitative differences in services and resource types between LEAs with relatively low efficiency compared to those with relatively high efficiency.

Key Takeaways

1. Typically, when LEAs spend the largest share of their DPIA/SWSF initiative funds on Mental Health Services, this share is well above the next most heavily invested service category.
9. The probability of an LEA having Mental Health Services as their primary service category decreases as the percentage of students who are economically disadvantaged increases. Conversely, the probability of having Academic Supports and Extended Day and Extended Year as primary service categories instead of Mental Health Services increases as the percentage of students who are economically disadvantaged increases.
10. ODEW Survey respondents' descriptions of initiatives suggest that Mental Health Services include more purchased services, whereas Academic Supports activities involve providing compensation for existing instructional staff. Moreover, specific subsets of these categories were more common among low-efficiency LEAs.

The following sections provide a full summary of each key takeaway and their associated analyses.

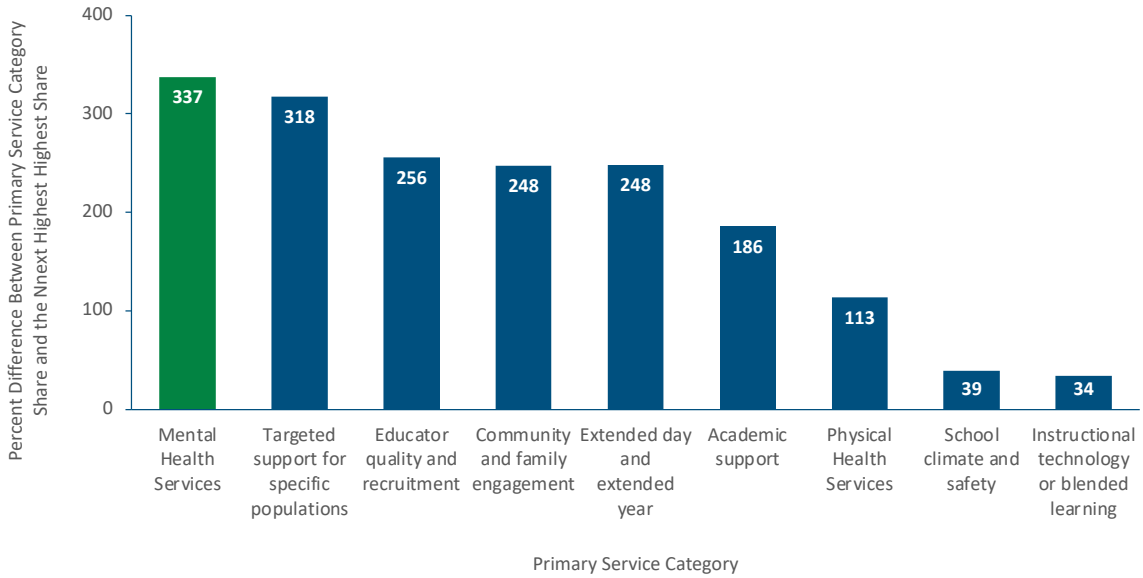
[42] Specifically, a measure of overall model strength or goodness of fit showed all models were jointly statistically insignificant (i.e., p-value > 0.05) for all but the Related Services Roles model. That said, the latter showed minimal explanatory power with a pseudo r-squared of 0.28, and a link test of the model suggests the model overall is mis-specified. Further, as we would expect, given the goodness of fit results, for all models but the Instructional Roles and Related Services Roles model, no individual variable coefficients were statistically significant.

Typically, when LEAs spend the largest share of their DPIA/SWSF initiative funds on Mental Health Services, this share is well above the next most heavily invested service category.

It is possible that a LEA might distribute resources relatively equally between service categories, allowing for the possibility that one category is primary, but the next highest category constitutes a similar share of resources. If this were true, the measure of 'primary service category' may not be as useful because there would not be a meaningful difference between the service category with the highest share of investment and the second highest.

To test this, we calculated the ratio of the share of investment in the primary service category over the share in the next highest service category to generate the percentage difference between the primary service category share and the next highest share. As shown in Exhibit 5.10, when Mental Health Services are the primary service category, the share of investment in this category is roughly four times the investment in the next highest service category (over 300% higher). In other words, Mental Health Services is not only more likely to have the largest investment, but when it does, it makes up a much larger share of investment than other service categories the LEA provides. The results are similar for other service categories with differences above 100 percent, with the exception of School Climate and Safety and Instructional Technology and Blended Learning.

Exhibit 5.10. Median Percentage Difference Between the Primary Service Category Share of Spending and the Next Highest Category Share, ODEW Survey—2022/23



Note. n=843 respondent LEAs. This exhibit displays the ratio of spending for the primary service category compared to the next largest service category by each service category. *Source.* Research team analysis of ODEW Survey, 2022/23.

Given the clear prominence of Mental Health Services and its prominence in the previously reported needs assessment, we investigate this service category further using regression analysis. Specifically, we estimate the relationship between Mental Health Services and the percentage of students who are economically disadvantaged. While Mental Health Services is clearly dominant statewide in terms of incidence and share of investment, this varied by a range of LEA characteristics, suggesting that different kinds of LEAs were offering a different combination of services.[43] Importantly, there appear to be differences in the incidence and top primary service categories between LEAs with low and high percentages of students who are economically disadvantaged. The binomial regression discussed later in this section sheds light on which LEA characteristics impact the probability of having Mental Health Services as the primary service category, while the multinomial regression highlights which LEA characteristics impact the likelihood of investing more heavily in another service category instead of Mental Health Services.

The probability of an LEA having Mental Health Services as their primary service category decreases as the percentage of students who are economically disadvantaged increases. Conversely, the probability of having Academic Supports and Extended Day and Extended Year as primary service categories instead of Mental Health Services increases as the percentage of students who are economically disadvantaged increases.

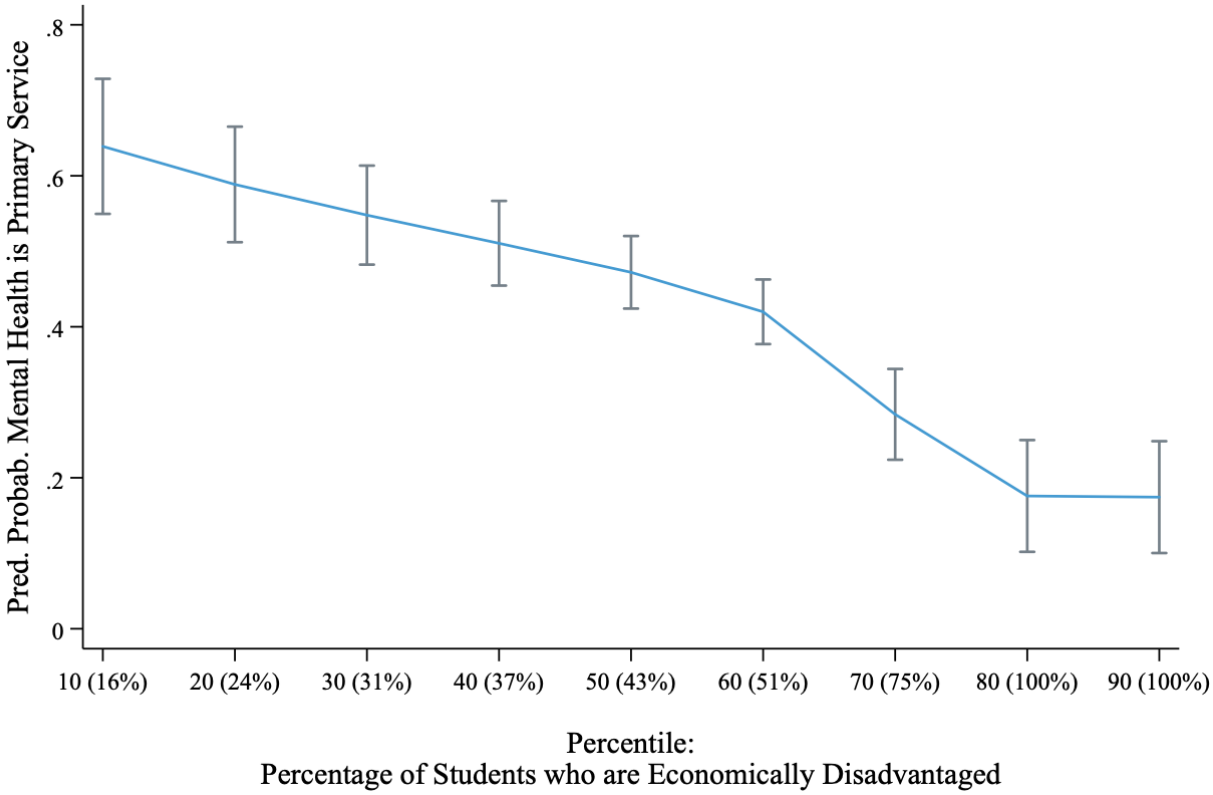
The binomial and multinomial regression analyses help isolate the relationship between a LEA's level of economic disadvantage and the probability of offering Mental Health Services as a primary service category, while holding other factors constant.

To begin with, the binomial logistic regression analysis suggests that as the percentage of students who are economically disadvantaged increases, the probability of having Mental Health Services as the primary service category decreases. In other words, all else equal (i.e., controlling for characteristics like LEA type and LEA size), LEAs with higher percentages of students who are economically disadvantaged are less likely to invest the plurality of their reported spending in Mental Health Services.

Exhibit 5.11 shows this relationship for each decile within the distribution of percentage of students who are economically disadvantaged. As illustrated, the predicted probability of having Mental Health Services as a primary category drops from about 64 percent at the 10th percentile to 17 percent at the 90th percentile, a drop of nearly 50 percentage points.

[43] For example, a chi-square test for independence showed there is statistically significant relationship between incidence of service category and all analytic groupings, including LEA type and quartile with respect to the percentage of students who are economically disadvantaged, suggesting that service categories do vary by these LEA characteristics.

Exhibit 5.11. Marginal Predicted Probability of Having "Mental Health Services" as the Primary Service Category by Deciles with Respect to the Percentage of Students Who Are Economically Disadvantaged—2022/23



Note. n=759 respondent LEAs. The exhibit displays a plot of the model-predicted probability of Mental Health being the primary service category at each decile with respect to percentage of students who are economically disadvantaged with all other values held at their average. This exhibit shows that as the share of students who are economically disadvantaged goes up, the predicted probability of having mental health as the primary service category goes down. The bars around each point illustrate the 95 percent confidence intervals. *Source.* Research team analysis of ODEW Survey, 2022/23 and other data sources.

Exhibit 5.12 summarizes which other factors have a meaningful relationship with the probability of having Mental Health Services as the primary service category, as well as the direction of the relationship. The only other variable that has a statistically significant relationship in the model is a measure of regional variation in teacher salaries, CWIFT, measured at the LEA level. Specifically, the probability of having Mental Health Services as the primary category increases as CWIFT increases. That is, relatively more expensive places, all else equal, are associated with a greater likelihood of having Mental Health Services as the primary category.

Also of note, there is no statistically significant relationship between LEA efficiency and the probability of Mental Health Services as the primary service category. This means that all else

equal, differences in LEA efficiency are not associated with changes in the likelihood of having Mental Health Services as the primary category.[44]

Exhibit 5.12. Binomial Logistic Regression Results; Variables with a Significant Estimated Relationship

Variable	Direction of the relationship to probability of offering mental health services
Economically Disadvantaged Students (percent)	↓
District-level CWIFT	↑

Note. n=759 LEAs. This exhibit displays the covariates that have a statistically significant relationship with the probability of offering mental health in a binomial logistic regression. Arrows that are red and downward facing indicate that the associated covariate has a negative relationship with the probability of offering mental health (i.e., as that variable goes up, the probability of mental health as primary service category goes down). Arrows that are green and upward facing indicate that the associated covariate has a positive relationship with the probability of offering mental health (i.e., as that variable goes up, the probability of mental health as primary service category goes up). *Source.* Research team analysis of ODEW Survey, 2022/23 and other data sources.

Building on the binomial regression, multinomial regression provides insight into which factors impact the likelihood of another service category being primary relative to Mental Health Services.

The multinomial results suggest that the percentage of students who are economically disadvantaged is statistically significantly associated with an increase in the probability of Academic Supports, Extended Day and Extended Year, and Instructional Technology or Blended Learning being primary *instead of* Mental Health Services.

Exhibit 5.13 shows which other factors are associated with impacting the probability of each service category as primary instead of Mental Health Services.[45]

[44] Full regression results are provided in the Additional Analysis Results section in Appendix D.
[45] Full regression results are provided in the Additional Analysis Results section in Appendix D.

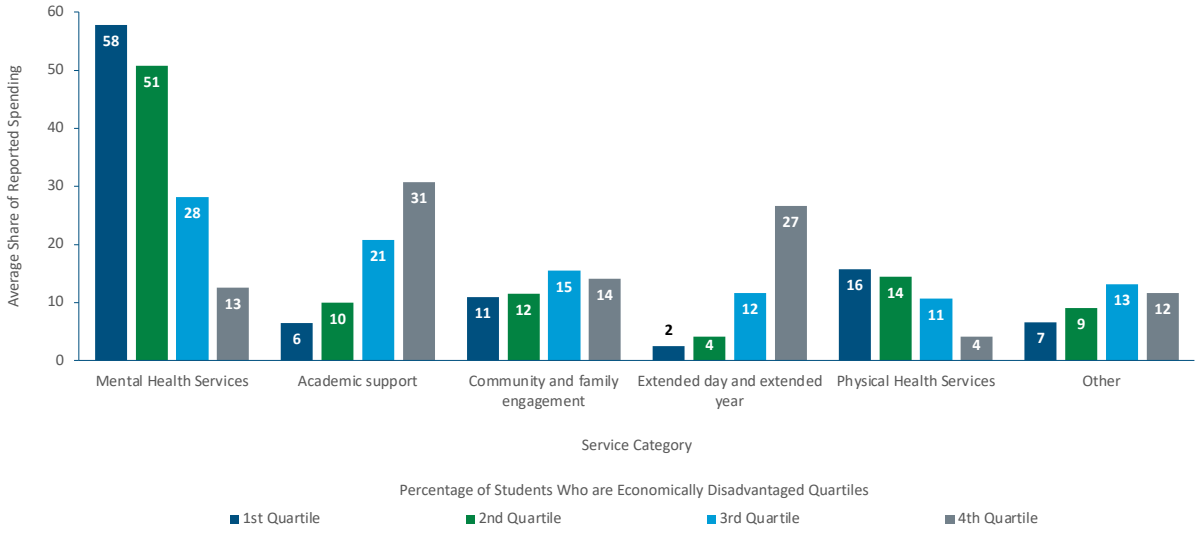
Exhibit 5.13. Multinomial Logistic Regression Results; Variables with a Significant Estimated Relationship

Variable	Academic supports	Community and family engagement	Educator quality and recruitment	Extended day and extended year	Instructional technology or blended learning	Physical health	School climate	Targeted support
Economically Disadvantaged Students (percent)	↑			↑	↑			
English Learners (percent)			↓					
Non-White Students (percent)					↓			
Rural	↓		↓		↓			
Town	↓		↓		↓			↓
Suburban			↓		↓			
LEA Enrollment (natural log)		↓		↓				
LEA CWIFT	↓		↓			↓		
LEA Mean Efficiency		↓	↓				↓	↓

Note. n=759 LEAs. This exhibit displays the covariates that have a statistically significant relationship with the probability of offering mental health in a multinomial logistic regression. Arrows that are red and downward facing indicate that the associated covariate has negative relationship with the probability of having the respective service category as primary relative to mental health (i.e., as that variable goes up, the probability of that service category as primary service category over mental health goes down). Arrows that are green and upward facing indicate that the associated covariate has a positive relationship with the probability of the respective service category being primary relative to mental health (i.e., as that variable goes up, the probability of that service category being primary over mental health goes up). *Source.* Research team analysis of ODEW Survey, 2022/23 and other data sources.

The results of the multinomial regression analysis with respect to the percentage of students who are economically disadvantaged are evident in more simple descriptive data. Specifically, the share of spending allocated to mental health initiatives decreases in higher quartiles with respect to percentage of students who are economically disadvantaged decreases. As shown in Exhibit 5.14, on average 58 percent of spending is allocated to Mental Health Services in LEAs in the lowest quartile with respect to the percentage of students who are economically disadvantaged, compared with only 13 percent in the highest quartile. Conversely, the average share of reported spending for Academic Supports and Extended Day and Extended Year increases notably as the percentage of students who are economically disadvantaged increases.

Exhibit 5.14. Share of Reported Spending for the Top Five Service Categories, by Quartile with Respect to the Percentage of Students Who Are Economically Disadvantaged



Note. n=843 respondent LEAs. This exhibit displays the share of spending for DPIA/SWSF initiatives by top five most common primary service categories and all others combined and by quartile with respect to students who are economically disadvantaged. *Source.* Research team analysis of ODEW Survey, 2022/23.

Though these analyses do not explain the mechanisms behind an LEA's tendency to allocate more spending to a specific service category, there are some features of the DPIA funding to consider. Between DPIA and SWSF, DPIA is the more flexible source of funding, providing LEAs with more options for how to spend this money. In particular, it's important to keep in mind that DPIA funds can be used for Academic Supports and Extended Day and Extended Year, while SWSF cannot be used for these purposes. Further, the DPIA formula increases funding as the percentage of economically disadvantaged students increases. Thus, the results may reflect that, in general, these categories are preferred but because LEAs with a lower share of students

who are economically disadvantaged receive lower amounts of DPIA funds, they are less able to direct funds to them.

Conversely, given that DPIA is the older, more established funding program of the two, inertia may be at play rather than preference. It is particularly important to consider that Mental Health Services was only added to the allowable types of services for DPIA within the past two years. And, these results suggest that, in that short time LEAs that had already established Academic Supports and Extended Day and Extended Year services under DPIA tended to continue these services rather than shift DPIA funds to Mental Health Services when that option became available to them.

Additionally, an LEA's efficiency seems to be related to the probability of certain service categories being primary instead of Mental Health Services. Holding all other school factors constant, more efficient schools are less likely to have Community and Family Engagement, School Climate, and Targeted Support as their primary service categories instead of Mental Health Services. These results offer insight into the trade-offs made by LEAs with relatively more effective schools.

Aside from the percentage of students who are economically disadvantaged and LEA efficiency, two other covariates show statistically significant relationships. Specifically, relative to city LEAs, towns, suburban, and rural locale LEAs are less likely to have Instructional Technology and Blended Learning as primary service categories over Mental Health Services. The same is true for rural and town areas for Academic Supports and for town areas when compared to cities for Targeted Support. In other words, this suggests city LEAs are relatively *more* likely than the other locales to have Mental Health Services as primary instead of these other categories, all else equal.

Finally, CWIFT is also negatively related to the probability of Academic Supports, Educator Quality and Recruitment, and Physical Health relative to Mental Health Services. This sheds new light on the findings from the binomial regression. Specifically, Mental Health Services is more likely in more expensive LEAs, as reflected in the binomial results. The multinomial results expand on this finding, suggesting Mental Health Services is more likely to be primary *instead of* Academic Supports, Educator Quality and Recruitment, and Physical Health in more expensive LEAs, all else equal.

ODEW Survey respondents' descriptions of initiatives suggest that Mental Health Services include more purchased services, whereas Academic Supports activities involve providing compensation for existing instructional staff. Moreover, specific subsets of these categories were more common among low-efficiency LEAs.

The research team also conducted a qualitative analysis of a sample of LEAs from the bottom and top 20 percent of the overall distribution with respect to LEA efficiency, applying a coding structure to the open-ended ODEW Survey responses to gain further detail about the kinds of

activities associated with the reported service categories. There were 245 LEAs included in the sample with a relatively even split between high-efficiency quintile LEAs (135, 55.1%) and low-efficiency quintile LEAs (110, 44.9%).

Overall, most initiatives received at least one code for activities (83.4% of initiatives; 90.2% of LEAs). For the LEAs that received at least one code, responses from low-efficiency LEAs (40.7% of LEAs with at least one code) were coded for activities less frequently than high-efficiency LEAs (59.3% of LEAs with at least one code). According to this review of open-ended responses, purchased services, providing salary and benefits for support and prevention staff, hiring support and prevention staff, and providing support and prevention or instructional programming were the most common activities.

As illustrated in Exhibit 5.15, a common activity for Mental Health Services initiatives in particular was purchased services (e.g., making available for students the services of mental health therapists), whereas Academic Supports initiatives more frequently involved providing compensation for existing instructional staff. For both service categories, purchasing services or providing salary and benefits for existing staff was more common than hiring new staff; though overall, hiring new staff was more common among low-efficiency LEA initiatives than high efficiency.

Exhibit 5.15. Activities Code Counts for Mental Health Services and Academic Supports Initiatives With At Least One Activity Code

Analysis code	Number of mental health services initiatives (% of initiatives)		Number of academic supports initiatives (% of initiatives)	
	Low efficiency	High efficiency	Low efficiency	High efficiency
Purchased services	18 (25.3%)	40 (25.8%)	2 (5.8%)	2 (5.0%)
Salary and benefits for existing staff	21 (29.6%)	48 (31.0%)	11 (32.4%)	12 (30%)
Support and Prevention	16 (22.5%)	42 (27.1%)	1 (2.9%)	2 (5.0%)
Instructional	1 (1.4%)	1 (0.6%)	10 (29.4%)	9 (22.5%)
Coordination and Case Management	4 (5.6%)	5 (3.2%)	0	1 (2.5%)
Student financial services	1 (1.4%)	0	0	2 (5.0%)
Infrastructure	8 (11.3%)	6 (3.9%)	4 (11.8%)	7 (17.5%)

Analysis code	Number of mental health services initiatives (% of initiatives)		Number of academic supports initiatives (% of initiatives)	
	Low efficiency	High efficiency	Low efficiency	High efficiency
Materials	5 (7.0%)	3 (1.9%)	4 (11.8%)	3 (7.5%)
Equipment/facilities	0	2 (1.3%)	0	0
Technology	3 (4.2%)	1 (0.6%)	0	4 (10.0%)
Transportation	0	0	0	0
Hire new staff	20 (28.2%)	34 (21.9%)	8 (23.5%)	7 (17.5%)
Support and Prevention	13 (18.3%)	21 (13.5%)	1 (2.9%)	1 (2.5%)
Instructional	1 (1.4%)	1 (0.6%)	4 (11.8%)	4 (10.0%)
Coordination and Case Management	6 (8.5%)	12 (7.7%)	3 (8.8%)	2 (5.0%)
Train staff	7 (9.9%)	12 (7.7%)	1 (2.9%)	3 (7.5%)
Support and Prevention	3 (4.2%)	11 (7.1%)	0	0
Instructional	4 (5.6%)	1 (0.6%)	1 (2.9%)	3 (7.5%)
Coordination and Case Management	0	0	0	0
Programming	11 (15.5%)	33 21.3%)	11 (32.4%)	8 (20%)
Support and Prevention	7 (9.9%)	27 (17.4%)	5 (14.7%)	0
Instructional	3 (4.2%)	2 (1.3%)	4 (11.8%)	8 (20.0%)
Coordination and Case Management	1 (1.4%)	4 (2.6%)	2 (5.9%)	0
Total	71	155	34	40

Note. The exhibit displays the count of initiatives labeled by respondents as Mental Health Services or Academic Supports that received at least one activities code. Counts represent, for each activity code, the number of initiatives labeled as Mental Health Services or Academic Supports. The percentages reflect, for each activity code, the share of initiatives that received that code out of the total Mental Health Services or Academic Supports initiatives that received at least one code. *Source.* ODEW Survey.

Given that Academic Supports and Mental Health Services are composites created by the research team, the categories were broken into their component parts to gain additional detail about initiative programming. These included:

Mental Health Services:

- Culturally appropriate, evidence-based or evidence-informed prevention education, youth-led programing, and social and emotional learning curricula to promote mental health and prevent substance use and suicide
- Mental health services, including telehealth services

Academic Supports:

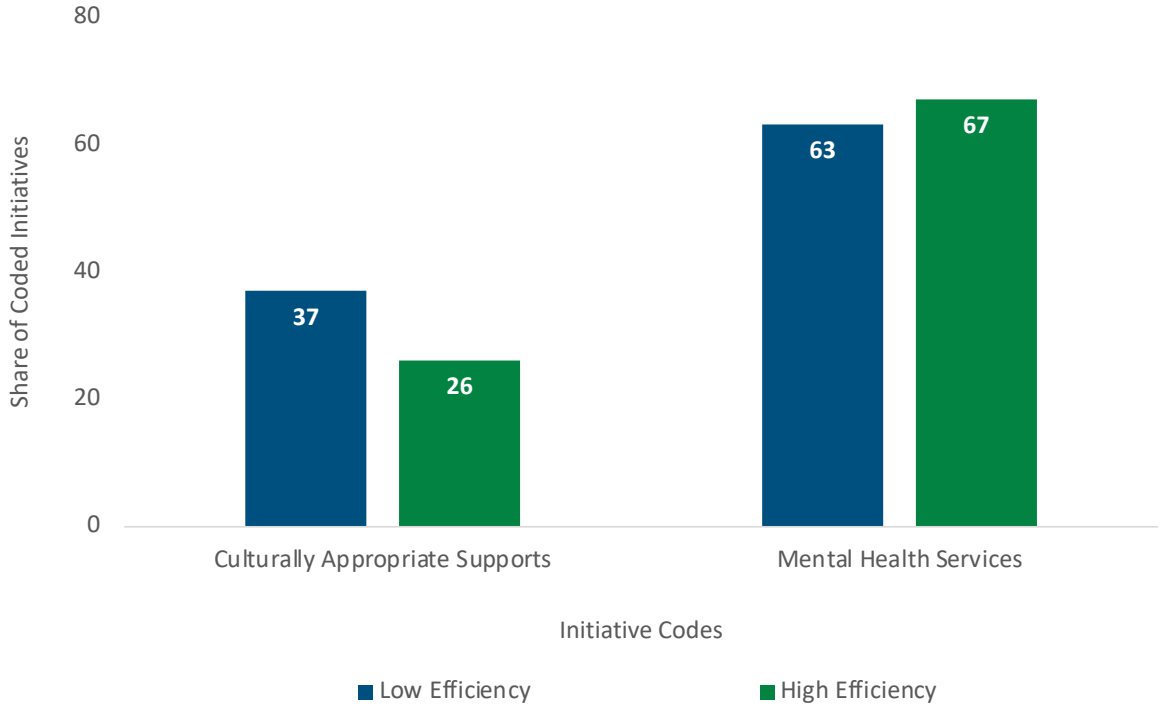
- Academic interventions for students in grades 6-12 (DPIA funding only)
- Dropout prevention (DPIA funding only)
- Reading improvement and intervention (DPIA funding only)

Academic Interventions and Dropout Prevention were examined together in the analysis to compare Reading Improvement to these more general types of academic intervention and support.

Analysis results suggest that, among initiatives coded for activities, there were differences based on efficiency in the types of initiatives provided by LEAs. Specifically, within Mental Health Services initiatives, Prevention Education was more common among low-efficiency LEAs, whereas high-efficiency LEAs had a slightly higher share of initiatives labeled specifically as Mental Health Services (see Exhibit 5.16).

While speculative, greater labeling of initiatives as Prevention Education among low- efficiency LEAs suggests more initiatives that involve programming other than mental health services specifically, given that this category involves a wide range of programming such as social emotional learning and substance use prevention.

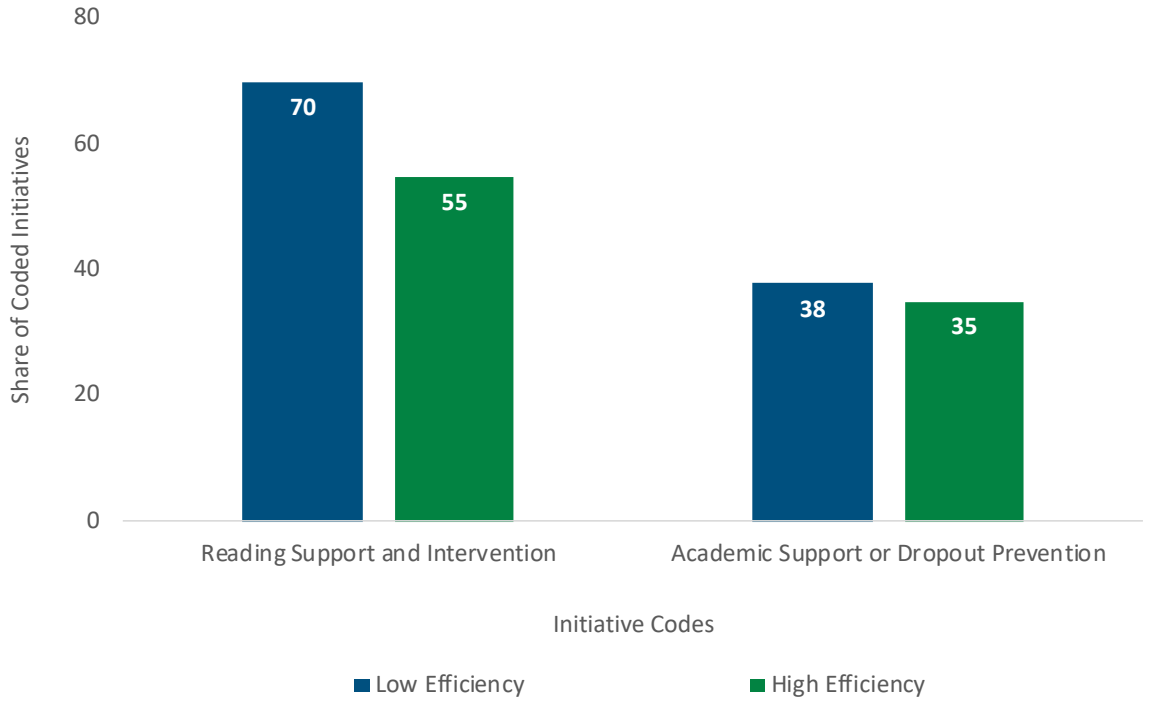
Exhibit 5.16. Share of Coded Initiatives Labeled as Prevention Education or Mental Health Services by Efficiency Quintile



Note. n=689 total coded initiatives. The exhibit displays the share of initiatives, coded for activities, which were labeled as Prevention Education or Mental Health Services by efficiency quintile. *Source.* ODEW Survey.

In addition, overall, Academic Supports programming was largely labeled as Reading Intervention. Integrating this finding with the result that Academic Supports programming appear to often involve compensation with instructional staff, it might be the case that the staff are often related to Reading Intervention (see Exhibit 5.17). However, Reading Intervention programming was more common among low-efficiency LEA initiatives than high efficiency. Specifically, a majority of Academic Supports initiatives among low-efficiency LEAs involved Reading Intervention.

Exhibit 5.17. Share of Coded Initiatives Labeled as Reading Intervention or Academic Supports/Dropout Prevention by Efficiency Quintile



Note. n=689 total coded initiatives. The exhibit displays the share of initiatives, coded for activities, which were labeled as Reading Intervention or Academic Intervention/Dropout Prevention by efficiency quintile.
Source. ODEW Survey.

Finally, the research team also conducted exploratory focus groups with three high-efficiency schools from the ODEW Survey sample. Each focus group included a member from the LEA and one to two staff from the school. A central theme that emerged from these discussions was the importance of coherence between schools and an LEA.

Specifically, interview participants articulated that a core aspect of their decision making about services for students who are economically disadvantaged was establishing a unified set of goals and improvement plans within the LEA. The importance of system coherence between LEAs and schools echoes the literature on organizational behavior, which finds that alignment between leadership and lower levels of an organization drives organizational performance (e.g., The Congruence Model, Tushman and O'Reilly, 2002).

While the sample is very limited and the results should be viewed as anecdotal, this theme perhaps underscores the importance of understanding the strategic decision-making processes LEAs use in the design and implementation of services. The extent to which LEAs set a shared

strategic vision for the district in partnership with schools might contribute to their overall efficiency and thus could be an important direction for future investigation.

Limitations

Several important limitations should be considered when reviewing the results presented in this memo.

First, most analyses are subject to potential omitted variable bias. That is, any apparent association between two variables might be driven by another variable that has a relationship with both. For example, it may be the case that the percentage of students who are economically disadvantaged and the share of spending invested in Mental Health Services may be associated with the local level of health care infrastructure such that this is driving the apparent negative relationship between the two. Descriptive analyses do not account for this possibility at all, while regression analyses do attempt to control for this issue. Nonetheless, regression analysis results may still be biased by unaccounted for or even unobserved factors.

Second, none of the analyses presented in this memo can determine if any identified associations reflect a *causal relationship*, such as an increase in the percentage of students who are economically disadvantaged is *causing* a change in the investment in Mental Health Services.

Additionally, the possibility of measurement error in the reported data is another limitation on the results, especially with respect to the survey data. In the case of the ODEW Survey, for example, measurement error would entail the misidentification of service categories, spending amounts, or funding programs. While some random measurement error is likely and not as concerning, if a particular subgroup of respondents systematically misreported key information, this would bias the results.

An especially important potential source of measurement error in the ODEW Survey is the possibility that respondents interpreted the scope of the survey differently. The survey calls for all spending leveraged to support initiatives funded with DPIA and/or SWSF, including for example ESSER funds. Leveraging these other sources would be an example of a practice commonly referred to as "blending and braiding funding."

However, it is possible that some respondents understood the scope of the survey to include *only* DPIA and SWSF funds, and as a result did not report spending from any other sources even if blending and braiding was taking place. If this were a widespread issue, it would mean that for some respondents the reported spending is lower than true spending because funding programs other than DPIA and SWSF were not included.

The potential bias stemming from this issue is not known but would be most significant if those LEAs who did not include funding programs other than DPIA and SWSF are systematically more likely to be LEAs investing an amount of funding from these other programs that is much higher than the typical amounts reported in the survey. Conversely, if the level of investment of funds from these potentially omitted programs is typically small for all LEAs and those LEAs omitting these funding programs are not associated with any particular characteristic or level of investment, then the resulting bias would be minimal and unlikely to impact the analysis findings.

Also, in the case of the Project Survey, the relatively low response rate suggests that its results cannot be assumed to reflect the general views of individuals beyond the analysis sample. In particular, the Project Survey sample primarily reflects perspectives of staff in traditional LEAs that are relatively large and have lower percentages of non-White students compared to LEAs that did not respond to the survey.

With respect to the qualitative analysis, one limitation is that the number of initiatives in disaggregated categories may be relatively small, especially in the case of Academic Supports initiatives that received at least one activities code. In addition, the analysis is limited to the detail provided by respondents in the descriptions of initiatives. The extent to which these descriptions provide accurate insight into the kind of initiatives provided is unclear.

Conclusion

If the state is to take action to improve services for students who are economically disadvantaged, it is crucial that policymakers be aware of what services are currently being provided, and how this varies depending on local context.

Through the analyses in this chapter, the research team found that for services provided to students who are economically disadvantaged, a wide range of sources of funding may be common.

Moreover, we found that the types of services currently provided to students who are economically disadvantaged also vary depending on the size of this population. Specifically, Mental Health Services are more likely to be primary where percentages of students who are economically disadvantaged are low, whereas Academic Supports are more likely to be primary than Mental Health Services where percentages of students who are economically disadvantaged are high. And this difference in primary service category likely translates into qualitatively distinct types of investments and experiences for students.

In general, there was minimal evidence of major differences between more efficient LEAs and schools and their less efficient peers. That said, the qualitative analysis did identify some

differences, in particular with respect to Mental Health Services and Academic Supports, which may be suggestive of both the differences in chosen investments and differences in how these choices are made.

Overall, the results presented here illuminate the current constellation of services provided to students who are economically disadvantaged in greater detail than previously available and can inform discussions about opportunities to improve funding policy or available support for improvement.

References

Andrews, M., Duncombe, W., & Yinger, J.M. (2002). Revisiting Economies of Size in American Education: Are We Any Closer to a Consensus? *Economics of Education Review, 21*, 245-262.*https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=bcca2eb5515e3c96486b62c4e39096d6f6fc7653*

Atchison, D., Levin, J., Fatima, S., Trauth, A., Srikanth, A., Heberle, C., Gannon-Slater, N., Junk, K., & Wallace, L. (2023). *Assessment of Delaware Public School Funding.* AIR. https://education.delaware.gov/wp-content/uploads/2023/12/23-22933_1_Delaware_Full_Report-FMT-ed103023-Version-2.pdf

CARES Act, Pub. L. No. 116-136. (2020). https://www.congress.gov/bill/116th-congress/senate-bill/3548/text

Cheng, S., & Long, J. S. (2007). Testing for IIA in the multinomial logit model. *Sociological Methods & Research*, 35(4), 583-600.

Jacobson, A.; Willis, J.; Diaz, J.; Lewis, R.; McClellan, P.; Durodoye, R. (2021). *Utah Education Funding Study: Phase 2 Report.* WestEd.

ODEW. (2022). *Guidance for Completion of the Fiscal Year 2022 DPIA and SWSF Data Collection Tool.* ODEW.

ODEW. (2023). *Student Wellness and Success Funds and Disadvantaged Pupil Impact Aid Report.* ODEW. https://education.ohio.gov/getattachment/About/Annual-Reports/2023-Student-Wellness-and-Success-Funds-and-Disadvantaged-Pupil-Impact-Aid-Report.pdf.aspx?lang=en-US

ODEW. (2024a). *State Support Teams*. ODEW. https://education.ohio.gov/Topics/School-and-District-Improvement/State-Support-Teams

ODEW. (2024b). Student Wellness and Success Funds and Disadvantaged Pupil Impact Aid. ODEW. https://education.ohio.gov/Topics/Student-Supports/School-Wellness/Supporting-Student-Wellness

Ohio Auditor of State. (2013). *Uniform School Accounting System: User Manual.* Ohio Auditor of State. https://ohioauditor.gov/publications/docs/uniform_school_accounting_system_user_manual.pdf

Ohio Revised Code. Title 33. Section § 3317.25 (2023a). https://codes.ohio.gov/ohio-revised-code/section-3317.25

Ohio Revised Code. Title 33. Section § 3317.26 (2023b). https://codes.ohio.gov/ohio-revised-code/section-3317.26

Papke, L. E., & Wooldridge, J. M. (2008). Panel data methods for fractional response variables with an application to test pass rates. *Journal of econometrics*, *145*(1-2), 121-133. https://www.researchgate.net/profile/Dorgyles-Kouakou/post/Is_it_advisable_to_use_Censerod_Tobit_Model_if_technical_efficincy_ranges_between_044_and_1/attachment/5fbfb1e75a4aa800016c95fc/AS%3A962115909206018%401606397716175/download/Papke-Wooldridge-2008.pdf

Papke, L.E. and Wooldridge, J.M. (1996), Econometric methods for fractional response variables with an application to 401(k) plan participation rates. J. Appl. Econ., 11: 619-632. https://doi.org/10.1002/(SICI)1099-1255(199611)11:6<619::AID-JAE418>3.0.CO;2-1

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (1998). *Teachers, schools, and academic achievement*. Working Paper 6691. National Bureau of Economic Research. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=122569

Tushman, M., & O'Reilly, C. A. (2002). *Winning through innovation: A practical guide to leading organizational change and renewal*. Harvard Business Press.

U.S. Department of Education. (2016). *Supporting School Reform by Leveraging Federal Funds in a Schoolwide Program.* U.S. Department of Education. https://www.ed.gov/sites/ed/files/policy/elsec/leg/essa/essaswpguidance9192016.pdf

Chapter 6. Estimating the Cost of Serving Students who are Economically Disadvantaged Using a Professional Judgment Panel Approach

Introduction

This chapter presents the results of the PJP approach used to estimate the cost of providing an adequate education to students in Ohio public schools who are economically disadvantaged. The approach leverages the expert educators (panelists) to generate evidence on the practices, programming, and resources necessary to provide an adequate education to students who are economically disadvantaged, which is then used to answer the following research questions:

- What are the costs associated with providing effective educational programming to students who experience economic disadvantage, and how do these differ from the costs of adequately serving students with no additional needs?
- To what extent do key federal and state funding sources pay for educational programming provided to students who experience economic disadvantage, including Title I, DPIA, and SWSFs?

Overview of the PJP Approach

The PJP approach was originally developed by AIR as an effective method to estimate educational adequacy by identifying the key resources necessary to ensure students receive an adequate education and costing these out (Chambers and Parrish, 1994a; 1994b). However, it has since served as one of the main methods used for estimating the cost of educational adequacy, not only by AIR but also by other leading education finance experts (Augenblick, Palaich and Associates, 2014).[46]

[46] For example, see the PJP cost studies performed by AIR in California (Chambers et al., 2006 and Levin et al., 2018), Delaware (Atchison, 2023), New Mexico (Chambers et al., 2008), and New York (Chambers et al., 2004).

The PJP approach involves the following four general steps:

1. **Develop Goals Statement**–Draft a document describing the student outcomes a state's public education system should produce that represents an adequate education.

11. **PJP Deliberations**–PJPs convene in a series of meetings to specify the programs and resources necessary to meet the outcomes listed in the Goals Statement (Step 1) at a minimum cost for a set of hypothetical school models that vary with respect to the percentage of students who are economically disadvantaged, schooling level (elementary, middle, and high), and locale.

12. **Adequate Cost Calculation**–The study team develops a statistical school-level cost model that is derived from the PJP deliberations to project adequate costs for actual schools statewide, which are then aggregated within district and added to spending on centralized district functions.

13. **Analyzing Cost Variation**–The study team develops a statistical district-level cost model that shows how the district-level adequate costs developed in Step 3 vary according to the percentage of students who are economically disadvantaged, which represent cost-based funding weights that can be compared to the responsiveness of current district spending to percentage economic disadvantage.

For this study, we leveraged the knowledge and expertise of expert educators from across Ohio, who were organized into seven panels each with an average of eight participants representing the following educational roles: a superintendent, a principal and teacher at each schooling level (elementary, middle and high), a specialist on serving economically disadvantaged students (e.g., Title I coordinator, social worker, etc.). Each panel was made up exclusively of educators working in districts located in one of the four ODEW major typology groupings: rural, small town, suburban, and urban.[47] All panels worked independently from one another. Within each, panelists worked collaboratively to develop models of efficient educational programs capable of delivering an adequate education for hypothetical public elementary, middle, and high schools serving varying percentages of students who experience economic disadvantage.

The process began with the panelists drafting a program design document that included a detailed description of the programming and services deemed necessary to provide an adequate education at a school with a typical (medium) percentage of students who are

[47] While there was only one panel representing suburban districts, there were two panels for each of rural, small town, and urban groupings.

economically disadvantaged.[48] Following this, the PJPs specified the types and quantities of personnel and nonpersonnel resources required to support this adequate educational program most efficiently (i.e., at a minimum cost). The costs corresponding to the resources specified by the panels were calculated in real time using a spreadsheet tool (described below). The panels were then required to complete this program design development/resource specification exercise for a series of hypothetical school models that varied by both the percentage of students with economic disadvantage (high and low) and schooling level (elementary, middle, and high). The cost data generated by this process provided information used by the study team to develop estimates of the cost of providing economically disadvantaged students an adequate education.

During the PJP deliberations, the study team recorded the personnel and nonpersonnel resources specified by the panels in a spreadsheet tool called an RCM. The RCM serves two purposes. First, it organizes the information gathered from the PJPs on personnel and nonpersonnel resources. Second, it calculates the costs of the specified resources corresponding with each of the hypothetical school models developed by the PJPs using statewide average prices. These deliberations generated a dataset that was used to estimate a statistical model describing how adequate school-level cost per-pupil varies according to percentage of economic disadvantage. This estimated model was then used to project adequate cost per pupil for actual schools across the state from which total costs were aggregated within districts. District-level spending per pupil to cover centralized functions (overhead, maintenance and operations, etc.) was then added to the aggregated school-level adequate cost projections to yield the per-pupil costs to districts of providing an adequate public education to the K–12 students they served. These district-level adequate per-pupil cost estimates were then analyzed to determine the cost of adequately serving students with economic disadvantage.

The remainder of the chapter first summarizes the PJP process, including the hypothetical school-level exercises (tasks) completed by the panels. It then presents key programmatic themes that emerged from the panel program designs that detail the types of programs and services deemed important to adequately serve students. This is followed by corresponding cost calculations of the school-level designs developed by the PJPs and an analysis that uses this information to model projected adequate costs for all districts statewide. Patterns of the estimated district-level adequate costs are then compared to actual spending and used to derive a set of funding adjustment weights for students who are economically disadvantaged.

[48] An adequate education is defined as one that will allow all students an opportunity to achieve a desired set of outcomes that is provided to panelists in a *goals statement*. The goals statement provided to panelists for this study is described below.

Professional Judgment Process

As mentioned above, the PJP involves two important initial steps. First, a goals statement must be developed, which includes the student outcomes that guide the work of the panels. Second, the PJPs convene in a series of meetings in which they develop program designs and specify the necessary resources to support the designs for hypothetical elementary, middle, and high schools serving different levels of student need. These steps are described in further detail below.

Goals Statement

The PJP process requires a formal document that lays out the educational goals that constitute an adequate education called a goals statement. This statement is provided to the PJPs in developing the hypothetical school programs that will meet the goals listed at a minimum cost. The goals included in a goals statement include a set of academic competencies that every student should have an opportunity to achieve, as well as content standards that describe the subject matter that should be made available to all students. These goals are most often drawn from materials developed by state departments of education.

For this study, we used the detailed goals, learning domains, core principles, and priority strategies outlined in Ohio's Strategic Plan, *Each Child, Our Future*. We also referred to the state's performance goals, content standards, and instructional program requirements to define the educational goals for each school type (see Appendix E). These goals aim to improve academic achievement in ELA and mathematics for all students, as well as for each student subgroup. They also include measures of academic attainment and a state-developed measure of chronic absenteeism, as well as a four-year cohort graduation rate. In addition, the goals statement also included the ODEW's learning standards that explain the knowledge and skills Ohio students should know and be able to do in prekindergarten through Grade 12. Ohio measures the performance of its schools based on how well students are progressing in gaining knowledge and skills within the learning standards.

Convening PJPs

Premeeting Materials

Prior to convening the PJP meetings, each panelist was provided a full set of PJP instructions, which included the following: the goals statement; five research briefs on effective educational practices for rural, at-risk, English learner, and special education student populations; and a practitioner brief on effective school leadership. The research briefs were authored by nationally known experts in their respective fields, with an additional brief drafted by one of the members of the AIR study team. They are intended to provide a national overview of what

effective schools do to improve student outcomes for their respective populations.[49] Panelists were also provided with school resource profiles—showing recent staffing patterns for Ohio's elementary, middle, and high schools of similar size and demographics for their respective panel's typology major grouping base task—to serve as reference points in their deliberations. The instructions and materials other than the research briefs that were provided to the panelists are included in Appendix E.[50]

The panels were also given a set of assumptions to work with during their deliberations. These assumptions were intended to make the exercise as realistic as possible, within the constraints of available participant time and expertise. These include the following:

1. **Student demographics and needs.** Assume that the student population in each hypothetical school reflects the demographic and needs characteristics provided in the tasks.

14. **Personnel qualifications.** Assume that all instructors are state-certified in the subject areas that they are teaching, other personnel requiring certifications or licenses have these, and that salaries are adequate to attract and retain certified faculty and staff.

15. **School facilities.** Facilities are in place, and funding for facilities improvements is not part of the tasks.

16. **Maintenance and operations**. Ongoing facilities maintenance and operations are considered a district expense and do not need to be accounted for in the programs being designed by the panelists.

17. **Instructional supplies, equipment (including educational technology), and textbooks.** Assume that the program being designed by the panelists is for an existing school that has basic supplies, equipment, and textbooks that are typical of Ohio schools.

18. **Student activities, athletics, and enrichment.** Assume that the school that the program is being designed for has access to sufficient resources to devote nonpersonnel spending to student activities that are typical of Ohio schools.

19. **Special education services.** Assume the statewide average distribution of all special education students with respect to disability and severity across the district unless otherwise instructed.

20. **Central district administration.** There is no need for the panels to address central district administration expenditure, as the research team will separately estimate these costs.

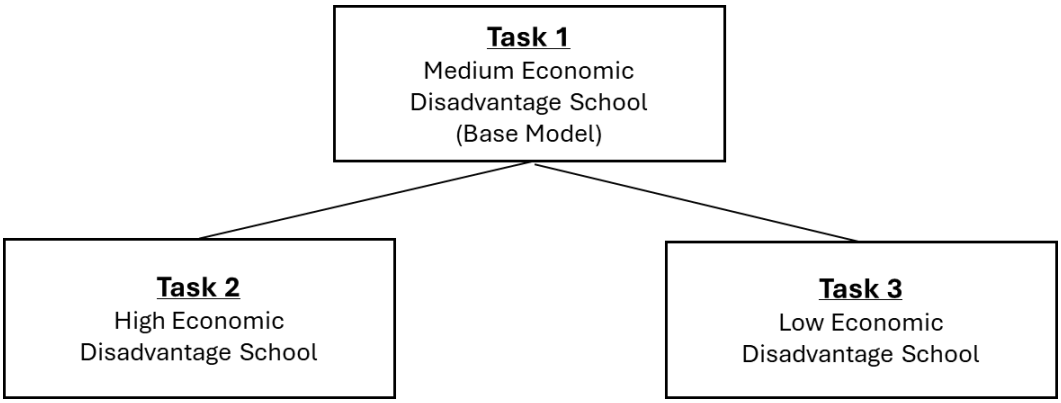
[49] The research briefs were drafted by Professors Henry Levin (Columbia University), Kenji Hakuta (Stanford University), Anthony Cavanna (Fordham University), Margaret McLaughlin (University of Maryland), and Dr. Christopher D. Brooks (AIR).
[50] The research briefs are available upon request.

21. **Home-to-school transportation services.** There is also no need for the panels to address home-to-school transportation services, as they are beyond the scope of the present study.

Program Designs for Schools Serving Different Levels of Economic Disadvantage

Exhibit 6.1 provides an overview of the organization of the series of school models (tasks) that each panel was asked to complete. The tasks required each panel to develop adequate educational programs and the resources necessary to support them for hypothetical elementary, middle, and high schools serving "medium," "high," and "low" percentages of students experiencing economic disadvantage, where the percentages were set to reflect the ranges of student need found in each typology major grouping.

Exhibit 6.1. Professional Judgment Panel Tasks



Note: "Medium" economic disadvantage schools refer to schools with the percentage of students with economic disadvantage set at the 50th percentile of the statewide distributions of schools located in rural, small-town, suburban, and urban districts, respectively. "High" economic disadvantage schools are schools with the percentage of students with economic disadvantage at the 90th percentile of each of the typology-grouping specific statewide economic disadvantage distributions, and "low" economic disadvantage schools have percentages of students with economic disadvantage at the 10th percentile of the distribution.

Specifically, school-model tasks with "medium" economic disadvantage (Task 1) had the percentage of students with economic disadvantage set at the 50th percentile of the statewide distributions of schools located in rural, small-town, suburban, and urban districts, respectively. School-model tasks with a "high" economic disadvantage were at the 90th percentile of each of the typology-grouping specific statewide economic disadvantage distributions, and school-model tasks with a "low" percentage were set at the 10th percentile of the distributions. The other demographic characteristics (enrollment and percentages of ELs and SWD) were set at average values within each of the school bins defined above. Exhibits 6.2a–6.2d presents the specific demographics defining each hypothetical school-model task for which rural, small-town, suburban, and urban panels were tasked with designing a program.

Exhibit 6.2a. School-Level Enrollment and Demographics for Rural PJP Tasks by Schooling Level

Schooling Level	School Characteristics	Task 1–Medium Economic Disadvantage (Base Model)		Task 2–High Economic Disadvantage		Task 3–Low Economic Disadvantage	
		Count	Percentage	Count	Percentage	Count	Percentage
Elementary	Enrollment	412		412		412	
	Economic disad.	*138*	*39%*	*375*	*91%*	*54*	*13%*
	English learner	0	0%	0	0%	0	0%
	Special education	78	19%	78	19%	78	19%
Middle	Enrollment	391		391		391	
	Economic disad.	*149*	*38%*	*387*	*99%*	*59*	*15%*
	English learner	0	0%	0	0%	0	0%
	Special education	66	17%	66	17%	66	17%
High	Enrollment	462		462		462	
	Economic disad.	*143*	*31%*	*370*	*80%*	*65*	*14%*
	English learner	0	0%	0	0%	0	0%
	Special education	55	12%	55	12%	55	12%

Note. Economic disadvantage student counts and percentages in shaded italics denote the only demographics that vary across PJP tasks.

Source. Research team analysis of ODEW School Report Card Data, 2022–23.

Exhibit 6.2b. School-Level Enrollment and Demographics for Small-Town PJP Tasks by Schooling Level

Schooling Level	School Characteristics	Task 1–Medium Economic Disadvantage (Base Model)		Task 2–High Economic Disadvantage		Task 3–Low Economic Disadvantage	
		Count	Percentage	Count	Percentage	Count	Percentage
Elementary	Enrollment	397		397		397	
	Economic disad.	*138*	*50%*	*393*	*99%*	*107*	*27%*
	English learner	12	0%	12	3%	12	3%
	Special education	71	18%	71	18%	71	18%
Middle	Enrollment	370		370		370	
	Economic disad.	*181*	*49%*	*366*	*99%*	*155*	*42%*
	English learner	7	2%	7	2%	7	2%
	Special education	56	15%	56	15%	56	15%
High	Enrollment	457		457		457	
	Economic disad.	*187*	*41%*	*452*	*99%*	*91*	*20%*
	English learner	0	0%	0	0%	0	0%
	Special education	64	14%	64	14%	64	14%

Note. Economic disadvantage student counts and percentages in shaded italics denote the only demographics that vary across PJP tasks.

Source. Research team analysis of ODEW School Report Card Data, 2022–23.

Exhibit 6.2c. School-Level Enrollment and Demographics for Suburban PJP Tasks by Schooling Level

Schooling Level	School Characteristics	Task 1–Medium Economic Disadvantage (Base Model)		Task 2–High Economic Disadvantage		Task 3–Low Economic Disadvantage	
		Count	Percentage	Count	Percentage	Count	Percentage
Elementary	Enrollment	474		474		474	
	Economic disad.	*175*	*37%*	*465*	*98%*	*43*	*9%*
	English learner	28	6%	28	6%	28	6%
	Special education	81	17%	81	17%	81	17%
Middle	Enrollment	583		583		583	
	Economic disad.	*210*	*36%*	*571*	*98%*	*58*	*10%*
	English learner	12	2%	12	2%	12	2%
	Special education	87	15%	87	15%	87	15%
High	Enrollment	1,114		1,114		1,114	
	Economic disad.	*357*	*32%*	*1,058*	*95%*	*100*	*9%*
	English learner	22	2%	22	2%	22	2%
	Special education	145	13%	145	13%	145	13%

Note. Economic disadvantage student counts and percentages in shaded italics denote the only demographics that vary across PJP tasks.

Source. Research team analysis of ODEW School Report Card Data, 2022–23.

Exhibit 6.2d. School-Level Enrollment and Demographics for Urban Town PJP Tasks by Schooling Level

Schooling Level	School Characteristics	Task 1–Medium Economic Disadvantage (Base Model)		Task 2–High Economic Disadvantage		Task 3–Low Economic Disadvantage	
		Count	Percentage	Count	Percentage	Count	Percentage
Elementary	Enrollment	414		414		414	
	Economic disad.	*335*	*81*	*414*	*100*	*128*	*31*
	English learner	41	10	41	10	41	10
	Special education	70	17	70	17	70	17
Middle	Enrollment	712		712		712	
	Economic disad.	*641*	*90*	*712*	*100*	*285*	*40*
	English learner	21	3	21	3	21	3
	Special education	121	17	121	17	121	17
High	Enrollment	917		917		917	
	Economic disad.	*844*	*92*	*917*	*100*	*504*	*55*
	English learner	28	3	28	3	28	3
	Special education	165	16	165	18	165	18

Note. Economic disadvantage student counts and percentages in shaded italics denote the only demographics that vary across PJP tasks.

Source. Research team analysis of ODEW School Report Card Data, 2022–23.

As a first step, each panel developed base-model program designs for elementary, middle, and high schools that reflect typical schools that serve a medium level of students experiencing economic disadvantage. After completing the program design for the base model for each school level, the panels were asked to modify the design alternative schools with low and high percentages of students who experience economic disadvantage. Specifically, panelists were asked to consider how lower or higher percentages of students experiencing economic disadvantage in a school would affect the initial program design developed for a school with a "medium" percentage of students experiencing economic disadvantage. After the program designs were completed, the panels were then required to specify the personnel and nonpersonnel resources needed to support the programs they developed.

PJP Activities

AIR convened a series of virtual PJP meetings with seven panels from April through July 2024. Each panel was made up of expert practitioners from districts belonging to one of the major groupings of the Ohio district typology (rural, small town, suburban, or urban).[51]. In total, 51 expert educators from Ohio participated in these panels. Appendix F provides details about the process for recruiting and selecting panelists, as well as biographical descriptions of each participating panelist.

The panels were convened separately and completed their work independently from the other panels. Each panel met at least five times, with each meeting lasting about 2 hours. Panelists were instructed not to communicate about this work with individuals outside their panels until the PJP process was complete.

The panels were asked to develop program designs (i.e., comprehensive descriptions of the services and supports associated with instruction, pupil support, and administration; see Appendix E for more details) that would achieve the student outcomes described in the goals statement at a minimum cost. This was done for a set of hypothetical school models that differed with respect to grade level and percentage of students experiencing economic disadvantage. In developing school program designs, the panelists were asked to consider the following questions:

- **Goals**: Will your program design achieve the outcomes listed in the goals statement?
- **Evidence**: Is there any evidence supporting your program designs and resource specifications?
- **Efficient**: Are your program designs and resource specifications efficient (i.e., will they achieve the intended outcomes at a minimum cost)?

[51] A detailed description of the Ohio district typology can be found at https://education.ohio.gov/Topics/Data/Frequently-Requested-Data/Typology-of-Ohio-School-Districts.

- **Realistic**: Could your program designs and resource specifications realistically be implemented by competent staff if sufficient funding were made available?

When considering these questions, panelists were asked to draw on both their professional judgment and research evidence on effective practices. Panelists were required to develop their program designs for each school-model task in an organized fashion by "building out" the following program components: a) core general education instruction, b) instruction for students who are ELs, c) special education services for SWD, d) additional academic and pupil support, e) staff professional development, f) extended-day and extended-year programming, and g) school administration.

Specifying Resources for School-Model Tasks

After completing the program designs for all school-model tasks, AIR asked the panels to specify the personnel and nonpersonnel resources necessary to implement each design at a minimum cost. For example, a panel's program design for a given school-model task might prioritize providing core subject teachers with a daily planning period or time for collaboration with colleagues. To accommodate this, the panel would include additional staff to ensure core teachers had the necessary time to engage in these activities.

The types and quantities of each resource were entered into an RCM spreadsheet tool and valued using statewide average prices. This costing-out exercise was done in real time during panel meetings so that panelists could see how the resources translated into school-level costs. Panelists could then explore different resource allocation strategies to identify the least costly approach to implementing the program design from a given school-model task.

Using the finalized program designs, the study team estimated the costs for different school models. That is, the individual resource costs were summed to calculate an overall cost for each school model and put into per-student terms by dividing by enrollment. The resulting cost estimates reflect the per-pupil spending required to provide an adequate education at hypothetical elementary, middle, and high schools in different locales and with varying proportions of students experiencing economic disadvantage. The cost information was then used in a statistical analysis to show how school-level per-pupil adequate cost varies by schooling level, typology major grouping, and percentage of economically disadvantaged students.

Key Themes from the PJP School Program Designs

The following section examines key themes from the program designs, describing how the panels felt resources should be optimally used to provide an adequate education across the different school model tasks. From the deliberations of the seven PJPs, several common themes

emerged with respect to classroom conditions, teacher characteristics, professional learning and development, and school-level resources necessary to support student well-being and academic success.

Classroom Conditions

Across all panels, panelists agreed that class sizes should be lower for younger students. Specifically, they felt that student-to-teacher ratios should be smallest in Grades K-2 and largest by the time students were in the high school grades.[52] On average, panelists recommended the following class sizes by school type for core instructional courses:[53]

- Elementary
  - Grades K–2 = 15:1
  - Grades 3–5 = 18:1
- Middle (Grades 6–8) = 20:1
- High (Grades 9–12) = 22:1

Elementary Classrooms

Regardless of school location or the percentage of students experiencing economic disadvantage in a school, panelists noted the importance of smaller class sizes and the need for instructional aides for elementary-aged students. For example, two panels highlighted that younger children are more impressionable and still developing foundational learning skills (e.g., reading and writing) and that the development of these literacy skills is crucial and tends to impact future academic achievement. Having more teachers and aides could help reinforce these fundamental skills and foster a pervasive positive attitude toward school and learning in students.

Having more staff can also help students with the transition into a full-day school setting. Multiple panels noted the difficulty of transitioning to elementary school for younger children and stated their experience that children come to school at various stages of school readiness. Having more teachers and aides could help young students socially and behaviorally transition into a school setting.

The panelists' recommendations for student-to-staff ratios were particularly relevant for considering the resources needed to serve students experiencing economic disadvantage. Multiple panelists extrapolated that kindergarten is often their students' first time in an

[52] Student-to-teacher ratios for this study are based on the number of students per full-time equivalent teacher. Education assistants are not factored into this calculation.
[53] Elementary school students were not separated into core and elective classes like the higher grades were; therefore, the class size refers to their general homeroom class.

education setting and, consequently, these students tend not to have had any formal learning experiences prior to kindergarten. Young students who experience economic disadvantage frequently need direct attention from staff to help them acclimate behaviorally and academically. Having multiple teachers and educational assistants in each classroom during this foundational educational period allows for more individualized attention and fosters a safe and supportive classroom environment for students, especially those from economically disadvantaged backgrounds.

Middle and High School Classrooms

The program designs developed for middle and high schools also included recommendations for student-to-staff ratios. Overall, the recommended ratios were smaller than those for elementary schools and gradually increased with grade level. The panelists noted that it is important for schools to strike a balance between keeping classes small enough to foster positive classroom relationships and help educators better monitor and respond to the academic needs of individual students in their classes while still considering staffing costs.

In terms of course content, starting in middle school, core classes become more specific and are taught by different instructors who are subject area experts. As a result, core coursework becomes more rigorous and necessitates proficiency in fundamental academic abilities, like writing/grammar and basic math. As such, it is critically important to keep core instruction class sizes small enough that students who need extra interventions are able to be identified and supported, especially in schools with students in areas of higher poverty. In addition, one panel suggested having one paraprofessional per core subject in each middle school building as a cost-effective way to provide extra support for students struggling with their coursework.

In the middle and high school program models, panelists noted the importance for students to take noncore academic courses (e.g., art, foreign languages, and career technology exploration, career and technical education, etc.). At the middle school level, there are typically fewer elective options and those offered are more introductory and exploratory. In high school, elective courses become critical curricular components, especially in schools with larger percentages of students experiencing economic disadvantage. Panelists noted that courses such as foreign languages and fine arts and athletic courses (e.g., drama/theater, dance, physical education, and sports) are particularly important in schools that serve larger percentages of students experiencing economic disadvantage since this may be the only opportunity students have for exposure to these subjects.

Similarly, CTE courses are essential. In these schools, these courses can be invaluable for students, providing them with the opportunity to learn trades and develop skills suitable for

employment after graduation. As college is often not a feasible or practical option for economically disadvantaged students, being able to take CTE courses in a variety of relevant fields (e.g., agriculture for rural students or manufacturing for urban students) with the opportunity to earn professional certification(s) is invaluable for those students who need or want to pursue a career directly after high school.

Teacher Characteristics

Schools are charged with securing a stable workforce while navigating budgetary constraints, teacher turnover, and candidate shortages. Regardless of typology major grouping, panelists identified challenges recruiting and retaining qualified staff as impacting their recommendations about the ideal balance of early career versus experienced teachers. These discussions highlighted the unique qualities both groups bring to the table, especially in schools with more students experiencing economic disadvantage.

Panels emphasized that "experienced" teachers (those with 5 or more years of experience) can fulfill a variety of important roles. They not only support student learning but also mentor new teachers, helping to foster a positive school culture. Furthermore, experienced teachers who have worked for longer periods in communities with more households experiencing economic disadvantage may be better equipped to address the specific challenges of these students, having gained a deeper understanding of their needs over time.

However, panelists also acknowledged the valuable role of early-career teachers (those with less than 5 years of experience). Teachers who are closer in age to their students may be better equipped to build personal relationships with their students, offering connections that are crucial for these students' emotional and academic development. Additionally, early-career teachers are typically less expensive, which reduces staffing costs in schools where funding may be limited.

While both experienced and early-career teachers bring distinct advantages, the panels agreed that a teaching staff composed of slightly more experienced teachers than early-career teachers may best serve the needs of students experiencing economic disadvantage. This configuration allows schools to balance the strengths of both groups while addressing the unique challenges of their student populations.

Professional Learning and Development

To improve educator knowledge and skills to support increasingly diverse student populations, school program designs included sustained professional learning for educators (e.g., teachers, specialists, administrators, etc.) during the regular school day. Professional learning opportunities identified by panelists included a) instructional coaching for new teachers, b)

trauma-informed instruction training, c) implicit bias training, and d) development of culturally responsive teaching practices. Panelists also recommended training on understanding and managing student behavior and mental health.

While these types of professional development are important in all schools, they are especially critical where there are more students experiencing economic disadvantage. This student population tends to have greater needs and less access to services outside of the school setting. In turn, greater understanding of trauma-informed and culturally responsive practices, implicit bias, and student mental health are important for teachers and staff in these communities to support their students.

Multiple panels were also dedicated to professional development, specifically focusing on effective teaching pedagogy. These discussions were critical for educators, particularly those working in higher education, as they explored innovative strategies and approaches that can enhance teaching effectiveness in high economic disadvantage settings. As one panel explained, knowledge absorption and access to resources outside of school needed to reinforce learning may be lower for students in schools with more students experiencing economic disadvantage. For instance, students experiencing economic disadvantage may be more likely to have familial and/or occupational responsibilities outside of school and a more difficult time focusing both while they are in and out of school. Additionally, students experiencing economic disadvantage may not be as likely to have access to additional resources such as internet access or a calculator to supplement their learning outside of school. Because students experiencing economic disadvantage are more likely to struggle academically, panelists felt that it is critical for teachers serving students who experience economic disadvantage to be trained on effective teaching practices to better serve these students.

In summary, all panels noted the need for a significant increase in compensated professional learning time during the school day compared to what is currently offered. To incorporate time for increased professional learning, multiple panels recommended building professional development days into the school calendar rather than early dismissal, citing parental aversion to early release days. As an example, one panel recommended having one full day per month dedicated to professional learning to allow for more consistent learning and better retention of material.

Staff to Support Students and Families

The panels emphasized the need for similar levels of school staff and resources to provide adequate programs for students, regardless of location, percentage of economically disadvantaged students at school, or grade. For example, students from communities that experience economic disadvantage may lack routine medical care, which can lead to acute

illnesses and contribute to chronic absenteeism. The panelists recommended at least one full-time nurse in every school building and increasing the number of nursing staff in schools with higher percentages of students experiencing economic disadvantage. Panelists also recommended adding part- or full-time nurses to provide screening services (e.g., dental, vision, and mental health) for students who may not have routine access to healthcare.

The panels also noted the importance of mental health support, especially since access to mental health care services outside of school may be more limited in communities with larger numbers of children and youth experiencing economic disadvantage. In response, panelists recommended increasing the number of guidance counselors, social workers, family and community liaisons, and coordinators to provide in-school mental health support in schools that serve more students experiencing economic disadvantage. In particular, they recommended that the schools employ or contract with additional guidance counselors or social workers to provide services such as individual and group therapy and mental health evaluations.

In addition to student support, the panels acknowledged the importance of involving families in the support process. They recommended increasing the number of family and community liaisons at all schools to foster trust and communication between students, their families, and the school. Specifically, home-school liaisons could also have an expanded role in schools with a higher percentage of students experiencing economic disadvantage, such as monitoring and advising families on their children's behavior or attendance issues.

Given the increased need for student and family support services schools located in communities with more children and youth experiencing economic disadvantage, the panels proposed creating additional coordinator positions. These roles could either help coordinate service delivery or focus on specific needs, such as tracking service usage or educating families on important life skills, including consumer science, hygiene, and parenting.

The panels also suggested adding various coordinators, such as a transition coordinator, a dedicated homeless student liaison, an attendance advisor, and a school resource officer (SRO). The transition coordinator would focus on helping high school students navigate post-secondary options, including workforce opportunities, especially as many economically disadvantaged students may not pursue college immediately after high school. The homeless student liaison would be a full-time staff member dedicated to supporting students experiencing homelessness or in the foster care system. The attendance advisor would monitor and address student attendance concerns, while the SRO would be tasked with enhancing school safety for both students and staff.

Technology, Supplies and Food

Panels stressed that now more than ever, technology plays a central role in student learning and instruction. As a result, it is most recommended to place at least one technical consultant in each school building, rather than relying on one from the district office, to assist with device maintenance for both teachers and students. Panelists agreed that having a dedicated technology staff member in each building was invaluable for efficiently responding to technology support requests and ensuring that classroom instruction and student learning were not interrupted by malfunctioning or inoperable equipment. It was argued that this setup also makes it easier for teachers and students to receive one-on-one assistance with incorporating technology into their instruction and learning.

Panelists also identified internet access as an additional important technological consideration for schools in communities with more children and youth experiencing economic disadvantage and in rural communities. In these places, students may be less likely to have internet access at home. In response, most panels included funding for mobile hotspots and broadband access for students to mitigate this barrier to learning.

In schools that serve more students experiencing economic disadvantage, multiple panels emphasized the need to provide support in the form of food and general supplies for both students and their families. Several panels advocated implementing a school food program, such as offering free breakfast and lunch. They also suggested providing free meals to students in afterschool and/or summer school programs to incentivize participation. For example, one panel recommended offering snacks to students participating in athletics and providing meals before athletic events. Another panel raised concerns about food scarcity, pointing out that providing breakfast and lunch at school may not be sufficient, and proposed a program that sends students home with food to ensure that students and their families have access to meals outside of school. A different panel shared the same concern, recalling a school that had a food and supplement closet where students could take the resources they needed, proposing this intervention as a way to combat food insecurity.

Students and families experiencing economic disadvantage also may not have discretionary income to purchase general school supplies and essential items, like clothing and hygiene products. Panels mentioned that these needs often go unnoticed, as students are often reticent to admit that they or their families cannot afford these types of supplies. Therefore, most panels recommended providing these materials for students and families in their program designs.

Cost Estimates for School Models

School-Level Adequate Program Costs

Cost estimates were developed for each school model using the resource specifications generated by the seven PJPs. Exhibits 6.3 presents the cost estimates for each school model.[54]

Patterns of School-Level Adequate Cost

Exhibit 6.3 below shows the projected adequate per-pupil costs for different program designs across the three schooling levels for each panel. This allows us to compare how the costs generated for low, medium (base model), and high levels of economic disadvantage vary across panels and school types. Unsurprisingly, the panels universally specified additional resources beyond those outlined in the medium economic disadvantage (Task 1) base models when designing programs for schools with higher numbers of economically disadvantaged students (Task 2). Common modifications to these program designs included reduced class sizes and adding more pupil support staff.

As seen in the exhibit, the cost of providing adequate educational opportunities increased in schools with a greater percentage of economically disadvantaged students. At the elementary, middle, and high school levels, the models with higher percentages of economically disadvantaged students (Task 2) had the highest adequate costs per pupil, which were, on average, $3,136 (20%), $3,093 (21%), and $2,452 (18%) above those of the corresponding base models (Task 1), respectively.

To provide a richer description of the patterns of resource allocation resulting from the PJP specifications, we grouped the costs associated with each hypothetical school task into the following categories:

- Core instruction: Costs of teacher and educational assistants for core instructional classes.
- EL instruction: Costs associated with EL instructional staff.
- SWD instruction: Costs associated with special education instruction and services.
- Other student support services: Costs of instructional and pupil support services (such as guidance counselors, school psychologists, social workers, and other support staff).

[54] The cost estimates do not account for the costs associated with central or district administration, maintenance and operations of buildings, food services, and student transportation; these are added in a later analysis presented below. Cost estimates were derived using compensation rates (prices for staff) based on annual salary information for the 84 positions warehoused in the Ohio Education Management Information System (EMIS). These were used to calculate a statewide average salary for each job type to which a standard benefit rate of 39% derived from federal statistics reported from the NCES Public Education Financial Survey was applied to generate a total compensation rate for each position. The compensation rates used are reported in Appendix E.

Exhibit 6.3. Projected Adequate School-Level Costs by Model, Schooling Level, Typology and Panel

Schooling Level	Typology Major Grouping	Panel	Task 3–Low Economic Disadvantage	Task 1–Medium Economic Disadvantage (Base Model)	Task 2–High Economic Disadvantage
Elementary	Rural	1	$12,060	$13,645	$17,880
		2	$13,262	$13,504	$15,890
	Small town	3	$15,002	$15,795	$19,753
		4	$13,962	$16,309	$19,047
	Suburban	5	$16,762	$17,393	$22,043
	Urban	6	$15,701	$16,898	$19,032
		7	$13,473	$14,888	$16,739
Average			$14,368	$15,525	$18,690
Middle	Rural	1	$11,204	$12,269	$15,096
		2	$13,292	$13,927	$16,728
	Small town	3	$15,304	$17,004	$18,870
		4	$15,098	$16,412	$21,534
	Suburban	5	$14,752	$14,632	$21,835
	Urban	6	$11,492	$13,685	$14,368
		7	$13,635	$14,170	$15,317
Average			$13,408	$14,443	$17,359
High	Rural	1	$12,086	$13,083	$16,071
		2	$13,009	$13,207	$14,885
	Small town	3	$14,738	$16,179	$19,159
		4	$15,146	$15,820	$21,083
	Suburban	5	$11,047	$11,909	$14,081
	Urban	6	$13,812	$14,961	$16,006
		7	$11,466	$12,580	$13,620
Average			$12,691	$13,642	$15,785

Note. Figures represent 2023 dollars. Averages are pupil-weighted across the school-level models completed by the PJPs.

Source. Research team analysis of PJP resource specification data, ODEW Report Card 2022–23, ODEW EMIS 2022–23, NCES CCD Public Elementary/Secondary School Universe Data, CCD Geographic Data 2022–23.

- Nonpersonnel: Costs of books and curriculum; supplies/materials; equipment/technology; contracted services; communications services; and any rentals, leases, or repairs.
- Professional development: Costs other than personnel time that are associated with staff participation in professional development (e.g., tuition and fees, travel, lodging, etc.).
- Extended learning: Costs of school athletic programs, extended-day programs, extracurricular activities, and extended-year (summer) programs.
- School administration: Costs of principals, vice principals, clerical and office staff, and any other school administrative staff.

The following sections examine costs across these categories corresponding to the elementary, middle, and high school program designs developed for the base model (Task 1), as well as the modified models that account for changes in in the percentage of economically disadvantaged students (Tasks 2 and 3). We stress that although the panels specified combinations of resources (e.g., core instruction classroom teachers, instructional assistants, pupil support personnel, etc.), none of these specifications are intended to be prescriptive. Districts and schools make different choices in how they use their resources given their specific context and defined by the needs of the students and families served, geographic location, and feedback received from staff, parents, and other community members. The resource specifications serve as a method to estimate the cost of providing adequate education to students under different circumstances and are not meant to replace local decision making concerning resource allocation.

Elementary School Program Designs

Elementary School Base Model

While the panels independently designed instructional programs of similar scope and nature, they differed in the intensity of the resources and specific needs identified. The panelists unanimously agreed that, compared to existing practices, smaller student-to-teacher ratios (e.g., 15:1 in Grades K–2 and 18:1 in Grades 3–5) were essential and recommended sufficient numbers of full-time equivalent teachers to maintain them.

Panels also advocated for the inclusion of at least one related services teacher to support special education instruction. Additionally, the panels emphasized the need for a diverse range of school-level support staff, including a guidance counselor, a school psychologist, a social worker, a nurse, a technical consultant, and a family/community liaison in every school. They also allocated sufficient dollars for books, instructional technology, general supplies, contracted services, and professional development. Panels acknowledged that students at this age would likely participate in extended learning opportunities and therefore allocated additional

resources for food, transportation, and staff to support increased participation. Administratively, each program design included a principal, an assistant principal, and clerical staff to ensure smooth operations.

The elementary base model specifications resulted in an average per-pupil cost across the PJPs of about $15,525 (Exhibit 6.4). The core instruction component accounted for approximately half of the average per-pupil cost, while the other half was split almost evenly between special education and pupil support services and the remaining program design elements, including EL instruction, nonpersonnel services, extended learning time, and administrative staff.

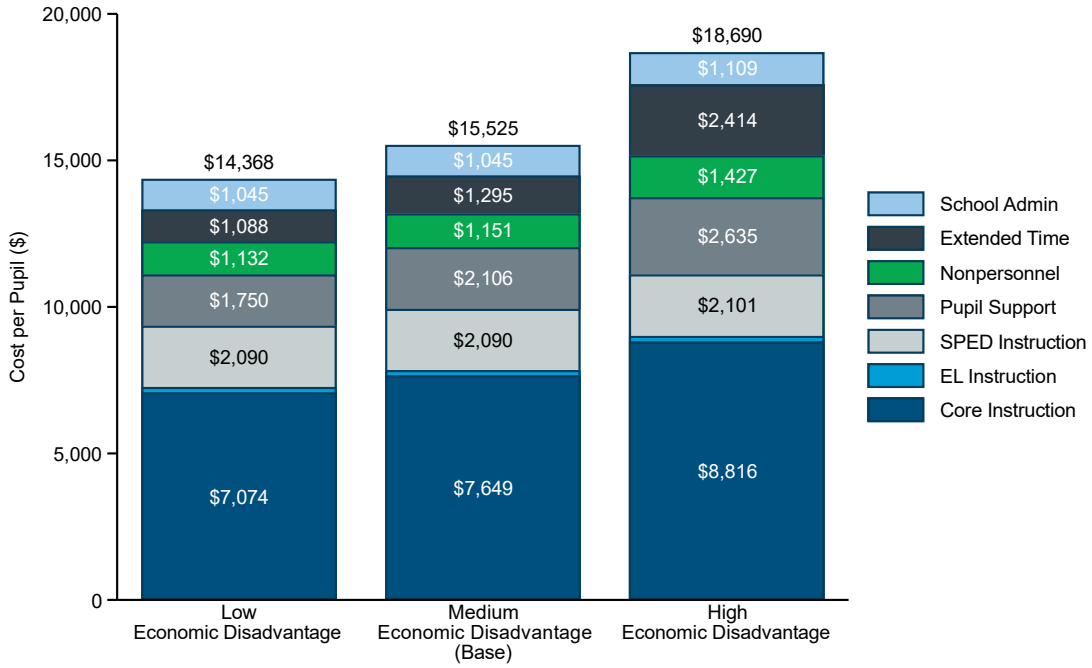
Elementary School High-Economic Disadvantage Design Modifications

The panels determined that educational support must be more focused on schools with higher percentages of economically disadvantaged students. They recommended that schools provide access to essential resources that students may lack at home—such as internet, food, books, and medical care—to ensure students can prepare for and engage effectively in their education. This emphasis contributed to the increase in costs for core instruction, other student support services, nonpersonnel services, and extended learning time. To tackle the challenges specific to schools operating in communities with more children and youth experiencing economic disadvantage, panelists recommended adding more core instruction teachers, remedial specialists, pupil support professionals, and administrators to their program designs, while also anticipating increased student participation in extended learning programs. As a result of these additions, the average overall adequate program cost per pupil for the high-economic disadvantage (high-Economic Disadvantage) elementary model (Task 2) increased by $3,165 from the baseline model to $18,690 per pupil.

Elementary School Low-Economic Disadvantage Design Modifications

In contrast to the high-Economic Disadvantage school program designs, the schools with a lower percentage of economically disadvantaged students saw notable reductions in core instruction, pupil support, and extended learning costs. Panelists agreed that students from areas with lower economic disadvantage are better able to access academic assistance, routine and acute physical and mental health care, and afterschool and summer programs that are unaffiliated with their school. Therefore, the average overall adequate per-pupil program cost for the low-economic disadvantage (low-Economic Disadvantage) elementary model (Task 3) decreased by $1,157 from the baseline medium-economic disadvantage elementary model (Task 1) to $14,368.

Exhibit 6.4. Average Elementary School Projected Adequate Costs by Cost Component and School Task



Note. Figures represent 2023 dollars. Averages are pupil weighted across the school level models completed by the PJPs. Labels for per-pupil values less than $200 are not shown.
Source. Research team analysis of PJP resource specification data, ODEW Report Card 2022–23, ODEW EMIS 2022–23.

Middle School Program Designs

Middle School Base Model

The average overall adequate per-pupil cost of the baseline middle school program design was $14,443—slightly lower than that of the baseline elementary school program design (Exhibit 6.5). The core instruction program accounts for almost half of the overall per pupil cost, the special education and pupil support programs 28% of the total per-pupil cost, and the remaining programmatic components—EL instruction, nonpersonnel expenditures, extended learning time, and administrative staff—comprised the remaining overall per-pupil cost.

For the middle school base model, core instruction costs accounted for nearly half of the total cost per child, reflecting the introduction of more specialized core instruction courses, electives, and CTE classes, as well as an increase in remedial specialists to support the heightened academic rigor.

Also, like the elementary program designs, the specifications for special education teachers and assistants were based on national standards and consistent across panels. Additionally, the panels emphasized the need for a diverse range of school-level support staff, including a guidance counselor, a school psychologist, a social worker, a nurse, a technical consultant, library/media specialist, and a family/community liaison in every school. Notably, for the middle school program designs, many panels introduced a coordinator position in each building to address specific needs, though the roles varied among the panels. One panel proposed a coordinator to track and manage the services utilized by students, while another envisioned a practitioner specializing in mental health care. A third panel suggested adding an SRO to address disciplinary concerns. Non-personnel costs for books, instructional technology, extracurricular activities, contracted services, and professional development all increased compared to the elementary school program design, driven by greater course specialization, enhanced technological integration, developmental needs of students, and the addition of afterschool clubs and sports. Furthermore, most panels recommended adding an extra clerical staff member or administrator to manage attendance and disciplinary issues that become more pronounced in middle school.

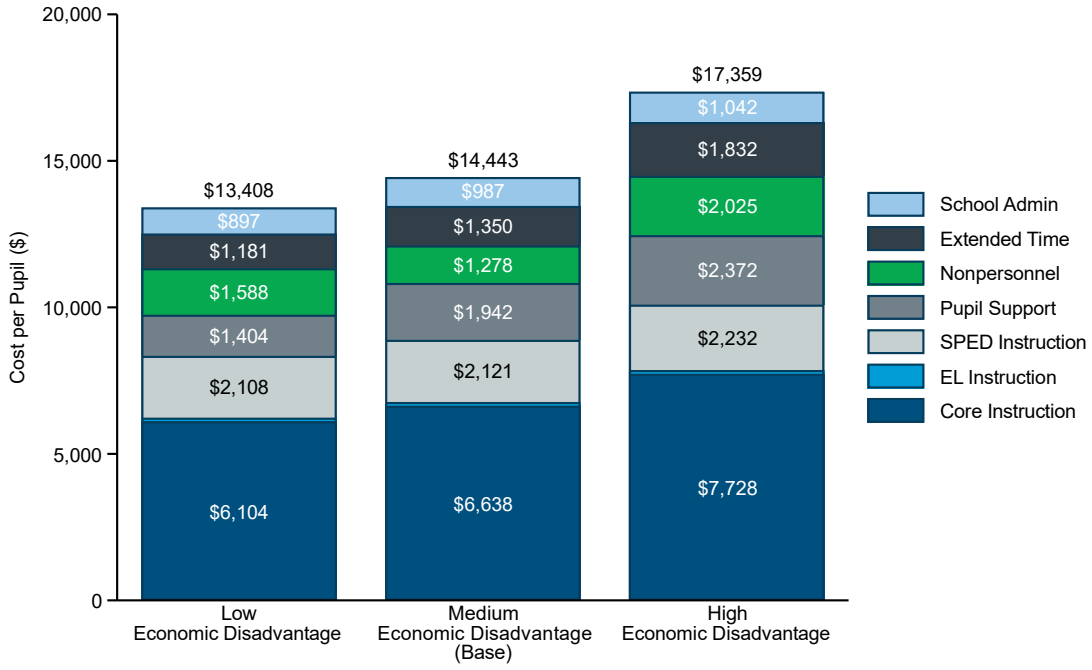
Middle School High-Economic Disadvantage Design Modifications

Building on the elementary school high-economic disadvantage program designs, the panelists reaffirmed their commitment to providing students with economic disadvantage access to vital supports that may be unavailable at home, such as internet access, food assistance, and physical and mental health care. Expanding these services to a greater number of students accounted for the increases in nonpersonnel and pupil support costs. Additionally, having more fine arts teachers (e.g., theater, dance) and CTE instructors was emphasized to ensure that interested students can participate in these courses and extracurricular activities, further contributing to the rise in instructional and extended learning costs. Three panels highlighted the necessity of adding at least one full-time administrator to address truancy, attendance, and school discipline as well as to facilitate communication with families beyond the scope of the pupil support roles. They noted that attendance and discipline issues are particularly pronounced in schools with higher economic disadvantage, making the addition of administrative staff support crucial. Across most program components, the panels tended to specify enhanced levels of resources resulting in cost increases in core instruction, pupil support, nonpersonnel, extended learning, and administration. The result of the modifications made to the baseline middle school program design in order to accommodate the additional needs of a high-economic disadvantage middle school was an increase in the average overall adequate program cost per pupil to $17,359 (a difference of $2,916).

Middle School Low-Economic Disadvantage Design Modifications

Overall, the low-economic disadvantage design modifications made by panelists at the middle school level were like those made at the elementary school level. That is, core instruction, pupil support, and nonpersonnel costs all decreased. Class sizes were increased for core instructional courses, resulting in the need for fewer teachers. Across panels, the numbers of full-time staff for most pupil support service positions (e.g., guidance counselors, social workers, etc.) were reduced due to the lower need for these services in lower-economic disadvantage schools. The resulting average overall adequate program cost per pupil for low-economic disadvantage middle school decreased to $13,408.

Exhibit 6.5. Average Middle School Projected Adequate Costs by Cost Component and School Task



Note. Figures represent 2023 dollars. Averages are pupil weighted across the school-level models completed by the PJPs. Labels for per-pupil values less than $200 are not shown.
Source. Research team analysis of PJP resource specification data, ODEW Report Card 2022–23, ODEW EMIS 2022–23.

High School Program Designs

High School Base Model

The average overall adequate per-pupil cost for the baseline high school model was $13,642 (Exhibit 6.6). Core instruction program costs represented the highest average share of student

spending (44%), but the percentage of overall cost attributed to this program component was slightly lower than that of the other schooling levels. Moreover, nonpersonnel costs accounted for larger shares (12%) of the baseline medium economic disadvantage model overall projected adequate costs at the high school level compared to the elementary (7%) and middle schooling levels (9%).

The average adequate per-pupil cost at the baseline high school was lower than those of the middle and elementary school models, despite similar cost shares across the program components. The high school programs emphasized postsecondary planning more intensely, reflected in an expanded array of specialized course options—such as honors, AP, and College Credit Plus—as well as diverse elective opportunities tailored for students aiming for higher education. Concurrently, many panels enhanced the CTE program offerings to be more immersive and career-focused, enabling students to explore vocational paths postgraduation.

However, core instruction costs remained the lowest at the high school level, primarily due to larger class sizes that offset expenses related to a more specialized curriculum. The focus on future pathways also underscored the critical role of guidance counselors, with all panels recommending at least one full-time additional counselor to facilitate college and career readiness. While other pupil support roles largely mirrored those in middle school designs, the expanded responsibilities for instructional and student support staff resulted in higher professional development costs in the high school models. The broader range of courses, each with varying levels of academic rigor, necessitated specialized training for both core instruction and CTE teachers, further elevating professional development expenses. Additionally, the increase in sports teams and divisions (e.g., varsity, junior varsity, freshman) introduced costs not seen at other schooling levels, prompting multiple panels to recommend additional clerical staff to support athletics and assist administrators and pupil support personnel.

High School High-Economic Disadvantage Program Design Modifications

The additional resources specified for the high-Economic Disadvantage high school program designs raised the average adequate cost per pupil by $2,143 above the base model specifications, resulting in an adequate per-pupil cost of $15,785. The most significant increases were observed in core instruction, pupil support, and nonpersonnel spending. To reduce class sizes, multiple panels recommended adding an additional full-time teacher for each core subject, alongside an extra full-time resource teacher to support students facing greater academic and behavioral challenges.

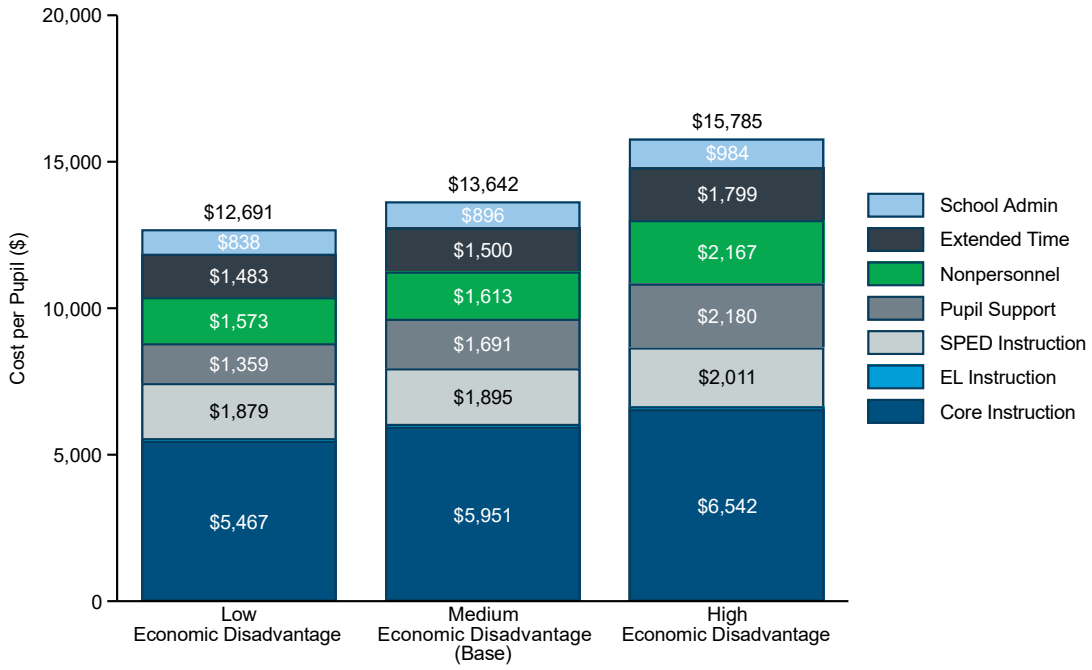
Panels also identified the need for additional pupil support professionals, including nurses, SROs, family and community liaisons, and transition coordinators, to address the unique

challenges of students from high-Economic Disadvantage communities. Additionally, the costs of nonpersonnel resources, particularly for technology and contracted services, saw substantial increases to meet these students' specific needs, such as providing Wi-Fi hotspots and support for participation in work programs.

High School Low-Economic Disadvantage Design Modifications

Overall, the low-economic disadvantage design modifications made by panelists at the high school level were like those made for the middle school models. Specifically, core instruction and pupil support staff were reduced, lowering their respective costs. Class sizes were again increased for core instructional courses, resulting in the need for fewer teachers. Additionally, most panels decreased the number of pupil support service staff, especially social workers and family-community liaisons, because there tends to be less need for these services and resources for students and families in low-economic disadvantage schools. The resulting average overall adequate program cost per pupil for low-economic disadvantage high school decreased to $12,691.

Exhibit 6.6. Average High School Projected Adequate Costs by Cost Component and School Task



Note. Figures represent 2023 dollars. Averages are pupil-weighted across the school-level models completed by the PJPs. Labels for per-pupil values less than $200 are not shown.

Source. Research team analysis of PJP resource specification data, ODEW Report Card 2022–23, ODEW EMIS 2022–23.

Using Regression to Model Variation in School Program Costs

Estimating the Cost of Adequacy from the PJP Specifications

Using the costs calculated from the program designs, we conducted a regression analysis to estimate an equation describing how the overall per-pupil cost of providing an adequate school program varies across the various school models. The estimated model was used to initially generate projected school-level costs of providing adequate education, with particular emphasis on how cost varies with respect to students who are economically disadvantaged.

Due to the small number of data points, we pooled the data from across panels and generated a single equation. The regression included overall adequate per-pupil cost (dependent variable) as a function of percentages of economic disadvantage, typology major grouping, schooling level, and interactions between typology major grouping and schooling level as follows:

Adequate Cost Per Pupil = f(Percentage Economic Disadvantage, Typology Major Grouping, Schooling Level, Typology Major Grouping x Schooling Level)

The regression results are presented in Exhibit 6.7. The constant can be interpreted as a base per-pupil cost of school-level programming for an average-sized elementary school in a rural district with no students experiencing economic disadvantage and otherwise typical student needs.

The results indicate that an average-size rural elementary school with no students who are economically disadvantaged has an adequate base per pupil cost of $11,850. The percentage economic disadvantage coefficient indicates that a school with 100 percent of its students being economically disadvantaged would cost $5,294 more compared to a school with no students who are economically disadvantaged. The remaining coefficients can be interpreted as additives to the base cost. In other words, a positive (negative) coefficient indicates that the cost per pupil increases (decreases) with respect to each respective factor being considered.

Projected Adequate School-Level Programmatic Expenditures

We used the regression-based cost adjustments presented in Exhibit 6.7 above to develop projected spending amounts for each school in Ohio. The cost estimates can be interpreted as an adequate spending level in each school.

We used administrative data on Ohio's public schools for the 2022–23 school year for our projections. These data included enrollment of each school in total and by grade, as well as the percentages of students who are economically disadvantaged, typology major grouping (with rural schools representing the omitted reference category), and schooling level (with elementary schools representing the omitted reference category). Using these data on

characteristics of schools, we generated a predicted adequate cost for each public school in the state using the regression results presented in Exhibit 6.7 above.

These projected costs per student are inclusive of the following school-level program components covered by the PJPs: a) core instructional program costs; b) student support costs; c) school administrative costs; d) costs for extended day and year programs; and e) costs for special populations of students, such as students who are low-income, classified as ELs, or enrolled in special education.

After projecting the cost of school-level programming for each school in the state, we used the CWIFT to adjust the school-level projected costs to reflect differences in the costs required to hire and retain staff across geographic areas.[55] Because the CWIFT is specific to wages, we implemented geographic cost adjustments by multiplying the portion of projected costs representing salaries by the state-centered CWIFT. Next, we aggregated these school-level predictions at the district level before accounting for overhead and district-level functions.

Accounting for Overhead and District-Level Functions

The projected adequate costs described above do not include the costs of overhead or other districtwide services including district or central administration, operation and maintenance of school buildings, food services, and student transportation. To provide a comprehensive account of adequate district-level per-pupil cost, it was necessary to generate these additional costs and combine them with the school-level adequacy projections aggregated to the district-level. Because of the special complexities involved in determining costs associated with district and central administration, maintenance and operations of facilities, food service, and student transportation, we did not attempt to determine adequate cost levels for these district-level functions through the PJP process. Instead, we used extant fiscal data provided by ODEW to determine actual per-pupil amounts for these four functions across districts. We then added this district -level spending to the adequate costs of school programming generated using the PJP data and aggregated to the district level. After adding the spending on overhead and district-level functions, our final district-level per-pupil adequate cost estimates are comprehensive of all services accounted for in measures of current expenditure for Grades K–12.

[55] The CWIFT is a publicly available data product of NCES that can be found at https://nces.ed.gov/programs/edge/economic/teacherwage.

Exhibit 6.7. Regression Results Predicting Adequate Cost Per-Pupil at the School Level (2022–23)

Variable	School-Level Adequate Cost Per Pupil
Percentage of economic disadvantage	5,294.1*** (506.3)
Small town (Typology major grouping 2)	1,688.9*** (436.9)
Suburban (Typology major grouping 3)	4,341.3*** (500.6)
Urban (Typology major grouping 4)	530.7 (669)
Middle school	-779.4 (549.1)
High school	-332.4 (397.1)
Small town x Middle school	1452 (761.7)
Suburban x Middle school	-880.2 (1,244.6)
Urban x Middle school	-1882.0 (882.9)
Small town x High school	991.0 (594.7)
Suburban x High school	-5913.1 (689.9)
Urban x High school	-2,666.3** (893.8)
Constant (Base amount)	11,850.0*** (386.1)
Number of observations	63
Pseudo R^2	0.86

Note. Regression is pupil-weighted using enrollments from school models as weights. Robust standard errors in parentheses. Reference group is a school in a rural district that serves only elementary students, none of whom are economically disadvantaged. ** $p < .01$, *** $p < .001$.

Source. Research team analysis of PJP resource specification data, ODEW Report Card 2022–23, ODEW EMIS 2022–23, NCES CCD Public Elementary/Secondary School Universe Data, CCD Geographic Data 2022–23.

Comparative Analysis of Projected Adequate Cost and Actual Spending

The next section presents key findings of an analysis that compares the adequate district-level per-pupil cost projections to actual spending per pupil to better understand the extent to which existing levels of state and local funding cover the costs of providing an adequate education for students experiencing economic disadvantage.[56]

Using district-level per-pupil adequate cost and per-pupil actual spending as dependent variables, respectively, we ran two regressions. (Exhibit 6.8) The first regression models per-pupil adequate cost as a function of percentage of students who experience economic disadvantage, district typology major group (rural serves as the omitted reference category), district percentages of enrollment in Grades 6–8 and 9-12 (the percent enrolled in Grades K–5 serves as the omitted reference category), interactions between district typology major group and grade-range specific enrollments, and the CWIFT as follows:

Adequate Cost Per Pupil = f(Percent Economic Disadvantage, Typology Major Grouping, Enrollment Shares by Schooling Level, Typology Major Grouping x Enrollment Shares by Schooling Level, Comparable Wage Index)

The model of actual average district-level spending per pupil includes additional controls for student needs (percentages of ELs and SWDs) and district enrollment (as a natural logarithm) to capture additional variation in spending associated with these factors:[57]

Actual Spending Per Pupil = f(Percent Economic Disadvantage, Typology Major Grouping, Enrollment Shares by Schooling Level, Typology Major Grouping x Enrollment Shares by Schooling Level, Comparable Wage Index, Percent English Learner, Percent Students with Disabilities, ln[District Enrollment])

The base amounts for adequate per-pupil cost and actual per-pupil spending were quite similar with estimates equal to $12,164 and $12,543, respectively, so that the estimated base from the adequate cost model is $379 lower than that of the actual per-pupil spending model. These base amounts reflect the predicted adequate cost and actual per-pupil spending for all students (i.e., irrespective of any needs they might have).

[56] To tailor this analysis to consider only the funding over which the state controls (state and local), expenditures on K–12 education supported by federal funding programs, such as Title I, Title III and IDEA, have been removed. Therefore, the base and additional costs for students experiencing economic disadvantage represented in the following analysis can be used to determine adequate target funding levels for this student group that should guaranteed by the state funding mechanism.

[57] Note that the set of PJP school models from which the adequate cost projections were derived was not designed to account for variations in ELs, SWD, or enrollment, which is why these covariates have been omitted from the adequate cost regression.

Exhibit 6.8. Regressions of District-Level Adequate Per-Pupil Cost and Actual Per-Pupil Spending (2022–23)

Variable	Model 1–District-Level Adequate Cost Per Pupil	Model 2–District-Level Actual Spending Per Pupil
Percentage of economic disadvantage	6,193.4*** (130.5)	2,619.0*** (519.5)
Small town (Typology major grouping 2)	2,534.1*** (244.2)	-2,820.9* (1,195.9)
Suburban (Typology major grouping 3)	5,753.1*** (258.1)	-1,901.4 (1,224.2)
Urban (Typology major grouping 4)	1,353.3*** (276.1)	-2,847.4* (1,239.3)
Percentage enrollment 6–8	661.5 (1,665.8)	-2,040.1 (5,922)
Percentage enrollment 9–12	1,251.2 (1,566.7)	20.52 (6,576.7)
Small town x Percentage enrollment 6–8	448 (1,673.8)	3,366.3 (5,971.6)
Suburban x Percentage enrollment 6–8	-2,117.5 (1,738.8)	3,043.3 (6,177.2)
Urban x percentage enrollment 6-8	-1,754.8 (2,328.8)	-6,056.7 (-1785)
Small town x Percentage enrollment 9–12	33.13 (1,570.7)	1,795.5 (6,552.4)
Suburban x Enrollment 9–12	-7,672.8*** (1,655.7)	1,539.2 (6,590.6)
Urban x Enrollment 9–12	-3,913.2* (1,644)	2,947.4 (6,609.9)
Comparable Wage Index for Teachers (CWIFT)	12,573.4*** (664.9)	14,651.1*** (2,156.9)
Percentage English learner		-1,840.6 (2,589)
Percentage special education		13,080.2*** (3,462.2)
In (Enrollment)		-2,409.6*** (245.7)
Constant (Base amount)	12,163.7*** (275.7)	12,543.1*** (1376.8)
Number of observations	737	731
Adjusted R^2	0.893	0.302

Note. Regression is pupil-weighted using school enrollments as weights. Robust standard errors are in parentheses. Reference group is a school in a rural district that serves only elementary students, none of whom are economically disadvantaged (Model 1) or are economically disadvantaged, English learners, or students with disabilities (Model 2). * $p < .05$, *** $p < .001$.

Source. Research team analysis of PJP resource specification data, district-level expenditure provided by ODEW 2022–23, district-level revenue by source provided by ODEW 2022–23, ODEW Report Card 2022–23, NCES CCD Public Elementary/Secondary School Universe Data, CCD Geographic Data 2022–23, NCES CWIFT 2022–23.

When comparing the individual model estimates of additional adequate cost versus additional actual spending for educating students experiencing economic disadvantage, we observe a substantive difference. While both regression models indicate a positive relationship between student economic disadvantage and both adequate cost and actual spending, the economic disadvantage estimate associated with the adequate cost (Model 1) is notably larger. According to this model, a district where 100% of students experience economic disadvantage would need, on average, $6,193 more in per-pupil funding to provide an adequate education than would a district where no students experience economic disadvantage. This can be interpreted as the additional cost per student experiencing economic disadvantage compared to a student with otherwise similar needs who is not economically disadvantaged. We can further translate this absolute dollar value into a relative funding weight for economically disadvantaged students by simply dividing it by the estimated adequate base per-pupil cost, which would equal 0.51 (equal to $6,193 divided by $12,163). This finding suggests that on average, it costs about 51% more than the base per-pupil amount to provide an adequate education to students who experience economic disadvantage compared to students who do not experience economic disadvantage.[58]

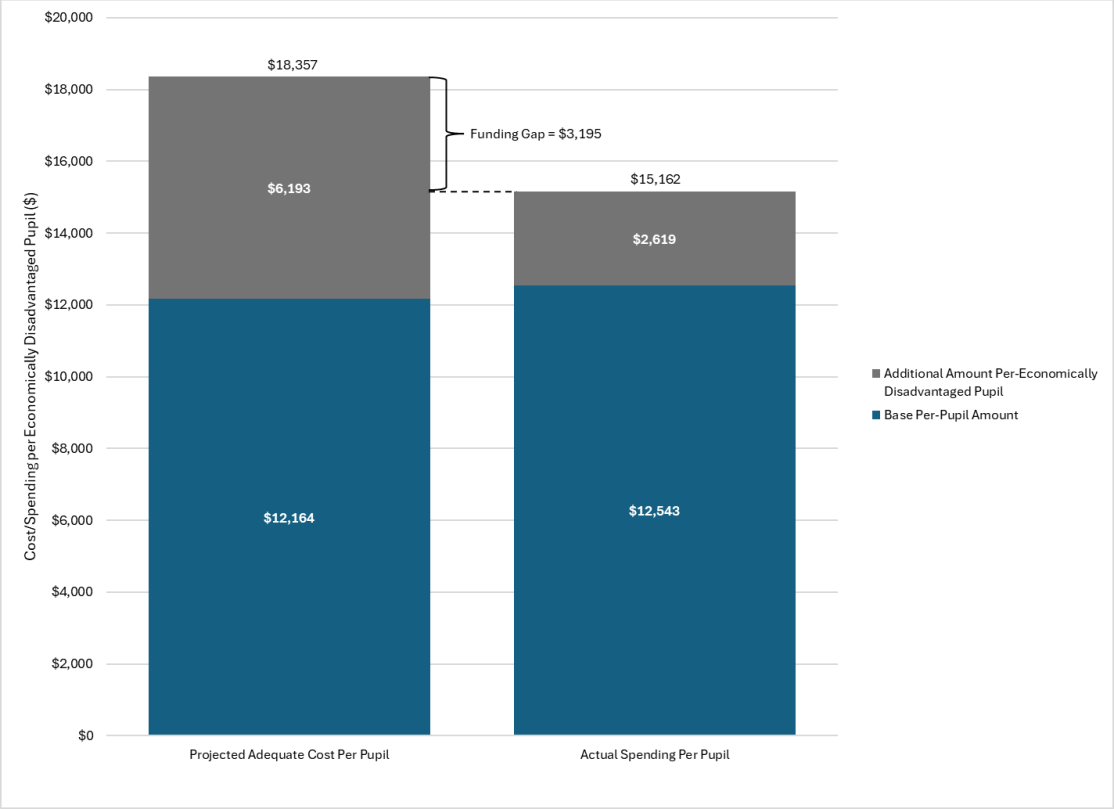
This estimated additional cost for a student who is economically disadvantaged contrasts the expected actual spending on this type of student, where the results show that a district with 100% of students who experience economic disadvantage is expected to spend $2,619 more per enrolled pupil compared to a district with no students who experience economic disadvantage. We can calculate a spending weight by dividing this figure by the estimated base per-pupil spending to yield a weight of 0.21 (equal to $2,619 divided by $12,543), which suggests that under the current state system, 21% more in state and local funding is spent on pupils who experience economic disadvantage. The comparison of the relative weights based on the cost and spending regressions provides another way to gauge the gap in funding for students who experience economic disadvantage.

We calculate the gap in adequate funding as the difference between the sums of the base and additional dollars associated with pupils who are economically disadvantaged, estimated using the adequate cost model and actual spending model. That is, we sum the base and additional dollar measures generated by the adequate cost model ($12,164 + $6,193 = $18,357) and do the same using the measures generated by the actual spending model ($12,543 + $2,619 = $15,162). Exhibit 6.9 shows the difference between these two sums to be $3,195 ($18,357 – $15,162 = $3,195), which serves as a measure of the funding gap for students experiencing economic

[58] Calculating relative funding weights is useful in developing funding policy, and in Chapter 7 we leverage our results to offer recommendations on how the state's funding mechanism could be improved to adequately fund students who are economically disadvantaged.

disadvantage (i.e., the additional spending per-pupil above and beyond what is currently provided that is necessary to provide an adequate education for students experiencing economic disadvantage). In relative terms, the finding suggests that spending directed to supporting students who are economically disadvantaged must increase by 21% in order to provide this group with an adequate educational opportunity ($3,195 / $15,162 = 0.21).

Exhibit 6.9. Projected Adequate Cost and Actual Spending Per Pupil to Support Students Who Are Economically Disadvantaged (2022–23)



Source. Research team analysis of PJP resource specification data, district-level expenditure provided by ODEW 2022–23.

Comparing Adequate Cost to Revenues Targeted to Students Experiencing Economic Disadvantage

The following analysis compares the projected adequate cost of serving students experiencing economic disadvantage to the funding currently allocated for serving this student population. This includes the four key funding sources analyzed in Chapter 5: the state's DPIA and SWSF, Title I, and the Elementary and Secondary School Emergency Relief Fund (ESSER). Exhibit 6.10 shows results of this analysis, comparing the projected per-pupil cost for providing effective

services to students who experience economic disadvantage with the actual funding that is targeted for these students through the four federal and state programs.

ESSER funds account for the largest share (60%) of the funding across the sources, while SWSF makes up the smallest share (7%). Crucially important is the fact that ESSER funding represents one-time funding that expired in September 2024. Going forward, the distribution of funding across these programs targeted towards students who are economically disadvantaged will be like what it was prior to COVID (i.e., the ESSER funding that made up the majority of these combined funding sources will no longer be available).

The analysis findings suggest there is a $14,444 per-pupil funding gap between the projected adequate cost for students experiencing economic disadvantage ($18,357) and funding under these four key programs ($3,913). In relative terms, the funding provided by these four programs covers just 21% of the projected adequate cost for economically disadvantaged students, leaving a 79% gap. This gap underscores the amount of funding necessary from revenue streams other than the four key funding programs to provide adequate support and resources for students who are economically disadvantaged.

Importantly, the funding gap will increase now that the federal ESSER funding (the largest of the four targeted revenue streams) is no longer available. With the loss of ESSER funding, the funding gap in the example would have widened to $16,797 (92%), exacerbating the financial challenges faced by schools and educational institutions, potentially undermining the continuity and quality of services to their students and, specifically, economically disadvantaged students.[59] ESSER funding has played a critical role in bridging funding deficits, and its loss will place additional strain on already stretched budgets and could lead to cuts in essential programs and resources for students who need them the most.

[59] Indeed, this example is extreme in assuming that all ESSER dollars were targeted to students who are economically disadvantaged. While this may be an exaggeration, it is not unrealistic to assume that a significant portion of ESSER funding was spent on supports for students who are economically disadvantaged.

Exhibit 6.10. Statewide Adequate Cost and Targeted Revenues Per Economically Disadvantaged Pupil (2022–23)

Adequate Per-Pupil Cost for Economically Disadvantaged Students	Per-Pupil Funding from Key Funding Programs (Relative Shares in Parentheses)				Overall Per-Pupil Funding from Key Revenue Sources	Gap Between Adequate and Key Program Per-Pupil Funding	Gap Between Adequate and Key Program Per-Pupil Funding Excluding ESSER
	DPIA	SWSF	Title I	ESSER*			
$18,357	$621 (16%)	$275 (7%)	$664 (17%)	$2,353 (60%)	$3,913	$14,444	$16,797

*ESSER funding expired in September 2024. Detailed findings for each district are available upon request.
Source. ODEW Detailed Revenue Data for 2022–23
Source. Research team analysis of PJP resource specification data, district-level expenditure provided by ODEW 2022–23, district-level revenue by source provided by ODEW 2022–23.

Chapter Summary

As a main method for assessing the cost of providing an adequate education to economically disadvantaged students within Ohio's school funding system, we used the PJP approach. This involved bringing panels of expert educators from across Ohio together, who detailed the essential school programming and resources required to ensure that all students have the opportunity to meet the state's educational goals. Through a structured process, these experts identified the necessary resources for schools with varying levels of economically disadvantaged students. Using the information generated by the panels enabled the research team to estimate the cost of providing an adequate education to students who are economically disadvantaged.

Common themes found across the PJP school program designs that speak to adequately serving students who are economically disadvantaged include the following:

Class Size and Classroom Support

- Provide smaller class sizes and instructional aides are crucial for elementary schools, especially for students who are economically disadvantaged.
- Deploy additional staff to assist with social and behavioral transitions, particularly for younger economically disadvantaged students.

Teacher Characteristics

- Employ a mix of teachers that is slightly weighted towards those with more experience (over 5 years) to better support students experiencing economic disadvantage.

- Experienced teachers provide guidance to newer teachers, particularly in diverse classrooms that include economically disadvantaged students.

Professional Learning and Development

- Schools serving large numbers of students who are economically disadvantaged should include sustained professional learning for all educators.
- Key areas of professional development to better serve economically disadvantaged students: instructional coaching, trauma-informed training, implicit bias, culturally responsive teaching, student behavior, and mental health.
- CTE teacher training is crucial due to the increasing value of vocational education to students served in communities with high levels of economic disadvantage.

School Staffing and Resources

- More school-based mental health support is needed in schools with high economic disadvantage, including guidance counselors, social workers, and therapists.
- The state should explore policies to expand mental health services for economically disadvantaged students.

Coordination and Community Support

- Family involvement should be promoted by increasing family and community liaison staff.
- Additional staff, including transition coordinators, attendance advisor, and homeless student liaisons, should be put in place to better serve economically disadvantaged students and their families.

Our analysis suggests that the per-pupil cost to adequately serve economically disadvantaged students in 2022–23 was $18,357, which is $3,195 or 21% more than the estimate of what was actually spent per enrolled pupil in supporting economically disadvantaged students in that year ($15,162). This finding indicates that there is a significant gap in funding needed to address the unique challenges faced by economically disadvantaged students.

We further find that the four key funding sources used to support students who are economically disadvantaged (state DPIA and SWSF, and federal Title I and ESSER) provided only about 21% of the cost of providing an adequate education to student. Because ESSER funding (the largest of these four funding sources) has been discontinued, the gap between the projected adequate cost of serving economically disadvantaged students and targeted funding for this population is expected to grow. These findings underscore a significant funding shortfall

that may limit provision of necessary support and resources for students who are economically disadvantaged across the state.

References

Augenblick, Palaich and Associates. (2014). *A comprehensive review of state adequacy studies since 2003*. Denver, CO: Augenblick, Palaich and Associates.

Atchison, D., Levin, J., Fatima, S., Trauth, A., Srikanth, A., Heberle, C., Gannon-Slater, N., Junk, K., Wallace, L., & Baker, B. (2023). *Assessment of Delaware public school funding*. Washington, DC: American Institutes for Research.

Chambers, J., Levin, J., DeLancey, D., & Manship, K. (2008). *An independent comprehensive study of the New Mexico public school funding formula: Volume 1—Final report*. Palo Alto, CA: American Institutes for Research.

Chambers, J., Levin, J., & DeLancey, D. (2006). *Efficiency and adequacy in California school finance: A professional judgment approach.* Palo Alto, CA: American Institutes for Research.

Chambers, J., & Parrish, T. (1994a). Developing a resource cost database. In W. S. Barnett (Ed.), Cost analysis for education decisions: Methods and examples (Vol. 4, pp. 23–44). JAI Press.

Chambers, J., & Parrish, T. (1994b). Modeling resource costs. In W. S. Barnett (Ed.), Cost analysis for education decisions: Methods and examples (Vol. 4, pp. 7–21). JAI Press.

Chambers, J., Parrish, T., Levin, J., Smith, J., Guthrie, J., Seder, R., & Taylor, L. (2004). The New York adequacy study: Determining the cost of providing all children in New York an adequate education. Palo Alto, CA: American Institutes for Research.

Levin, J., Brodziak de los Reyes, I., Atchison, D., Manship, K., Arellanes, M., & Hu, L. (2018). *What does it cost to educate California's students? A professional judgment approach*. Stanford, CA: Policy Analysis for California Education.

Chapter 7. Recommendations

Overview

The purpose of this study is to estimate the cost of providing adequate educational programs to students who are economically disadvantaged in Ohio and generate insights surrounding how the state's public school funding might be improved in terms of how it supports this student population. The previous study chapters have presented analyses intended to provide a better understanding of the needs of students who are economically disadvantaged, how various sources of funding are currently being used to provide services for these students, and the types of school programming and corresponding funding necessary to adequately serve them. Together, this information can be used to inform policymaking around school funding to ensure appropriate and equitable funding for students who are economically disadvantaged statewide. The following chapter draws upon this research to provide specific actionable recommendations for improving how the current state school funding mechanism supports the state's economically disadvantaged student population.

Options for Modifying the Current Funding Mechanism to Better Support Students Who Are Economically Disadvantaged

The study team thoroughly evaluated the weights used in Ohio's current funding formula to support students who are economically disadvantaged and the subsequent spending on this student group. This involved comparing estimates of the cost of providing adequate programming to students who are economically disadvantaged generated through a PJP approach to actual spending (see Chapter 6). The findings revealed that the existing weights do not adequately reflect the actual cost of implementing best practices in serving economically disadvantaged students, as recommended by the educational experts serving on the PJPs, extant research literature, and policy guidelines. These best practices include offering additional pupil support services, enrichment programs, social-emotional learning, and other critical services designed to close achievement gaps between economically disadvantaged students and other groups. The analysis suggests that the mechanism used to calculate the allocation of funds for students experiencing economic disadvantage falls short of accounting for the cost of the resources required to adequately meet the needs of these students. Specifically, the current weight for economically disadvantaged students is not aligned with the estimated cost of implementing the educational strategies, programs, and services deemed by the PJPs to be most effective for this group.

The study findings illustrate opportunities to revise existing policies to ensure that the state allocates supplemental funding to local school districts in a manner that will support an adequate education for economically disadvantaged students. We offer two options for how funding weights could be used to better reflect the cost of providing an adequate educational to students who are economically disadvantaged: (a) adding supplementary funding to the existing formula for DPIA or (b) replacing DPIA with a simpler formula that is similar to how the state currently allocates funding to support both ELs and SWD.

Option 1–Supplementing DPIA

A key part of the Ohio funding mechanism includes DPIA, which is a critical source of funding targeted specifically to support economically disadvantaged students. The current DPIA formula is structured as follows:[60]

$$DPIA\ Funding = \$422 \times Econ.Disad.ADM \times Econ.Disad.Index$$

where:

- \$422 is the base amount allocated per economically disadvantaged student;
- Econ. Disad. ADM is the average daily membership of students who are economically disadvantaged; and,
- Econ. Disad. Index is the additional support needed based on the concentration of economically disadvantaged students in a district and defined as follows:

$$Econ.\ Disad.\ Index = \left(\frac{District\ Econ.\ Disad.ADM / Disrict\ Enrolled\ ADM}{Statewide\ Econ.\ Disad\ ADM / Statewide\ Enrolled\ ADM} \right)^2$$

There are two important aspects of the DPIA formula to keep in mind. First, the final component of the DPIA formula (the Econ. Disad. Index) accounts for concentration of student economic disadvantage that increases funding per economically disadvantaged pupil in a nonlinear (exponential) fashion as the district percentage of pupils who are disadvantaged becomes larger. Second, funding allocated by the DPIA formula is moderated by the statewide economic disadvantage percentage such that the higher the percentage of economically disadvantaged students, the lower is the funding per economically disadvantaged pupil across all levels of economic disadvantage. This second aspect is quite relevant given the recent rise in

[60] This detailed explanation of how DPIA funding is allocated to districts is based on the section *D. Disadvantaged Pupil Impact Aid [Revised Code Section 3317.022 (A)(4)]* on page 17 of Ohio Department of Education and Workforce (2024).

statewide economic disadvantage percentage that is at least partially attributable to the increased uptake of the CEP in Ohio (Strawser, 2024).[61]

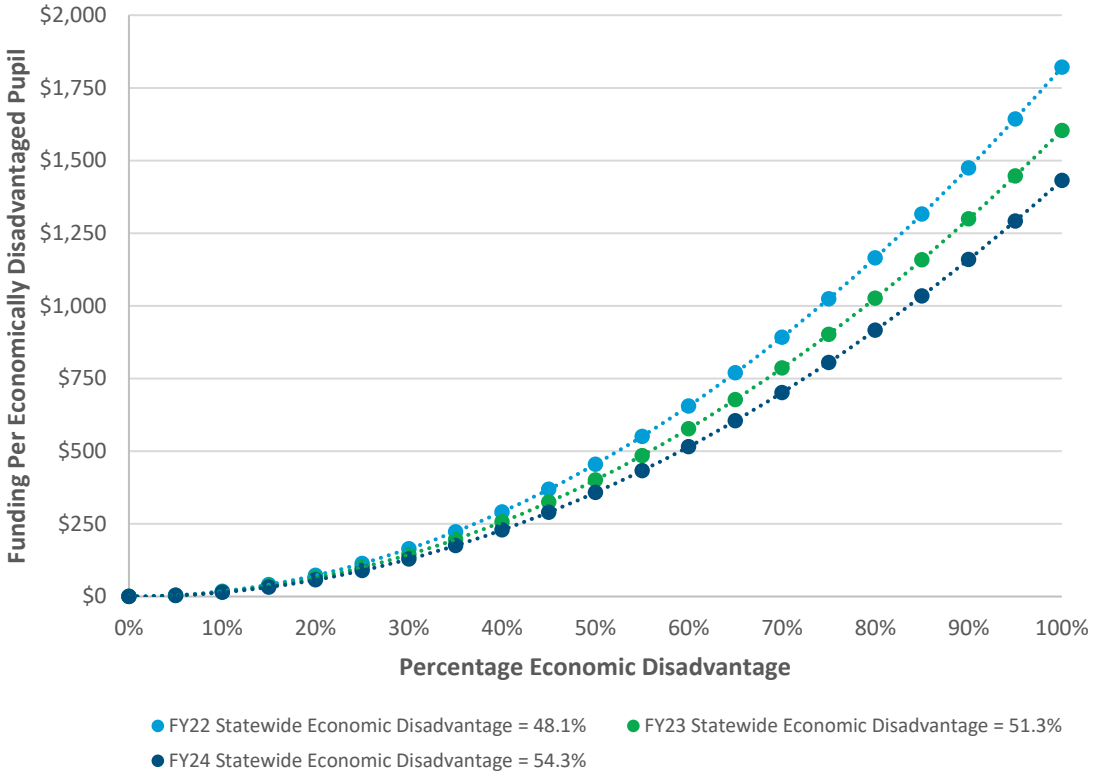
Exhibit 7.1 illustrates both of these aspects of the formula by displaying the funding allocations per economically disadvantaged pupil by percentage economic disadvantage for the 2021–22, 2022–23, and 2023–24 school years (FY22, FY23, and FY24). For example, in FY22, a district with 100% economic disadvantage was allocated $1,821 per economically disadvantaged pupil in supplemental DPIA funding. In contrast, a district with 50% economic disadvantage received $455 per economically disadvantaged pupil (equal to only one quarter of the amount allocated to the 100 percent economic disadvantage district), and those with 10% economic disadvantage received only $18 for each economically disadvantaged pupil served (equal to just one percent of the amount allocated to the 100% economic disadvantage district). While DPIA funding increases substantially as the percentage of economically disadvantaged pupils goes up, those districts with low levels of economic disadvantage receive relatively low levels of DPIA dollars for each economically disadvantaged pupil served.

The chart also shows that over the past three years as the statewide percentage of economic disadvantage has increased, the DPIA funding profiles have become flatter such that the amount of funding per economically disadvantaged pupil has decreased across all levels of economic disadvantage. For example, while districts with the highest level of economic disadvantage were allocated $1,821 per economically disadvantaged pupil in FY22, in the most recent year (FY24) this figure has dropped to $1,431 (equal to a 21% decrease).

The analysis in Chapter 6 compared the projected adequate cost of serving pupils who are economically disadvantaged and actual additional spending on these pupils to determine that there is a per-pupil funding gap of $3,195 in 2022-23 (FY23). This figure represents the additional investment required to provide a pupil who is economically disadvantaged with an adequate education. Given that the DPIA is the primary funding source dedicated to meeting the specific needs of economically disadvantaged pupils, adjusting the allocation generated through this formula is a straightforward way to close the gap. One possible option is to adjust the FY24 DPIA allocation by supplementing it with $3,294 per economically disadvantaged

[61] The CEP is an option available to high-poverty public schools and districts in which they are allowed to serve breakfast and lunch at no cost to all enrolled students without collecting applications from families to determine student eligibility for the National School Lunch Program as described on the United States Department of Agriculture website. (https://www.fns.usda.gov/cn/cep). Upon exercising the CEP option, school- and district-level measures of student eligibility for free- or reduced-price lunch are then recoded to 100%, which can greatly influence the outcomes of policies that use this as a measure of economic disadvantage, such as DPIA.

Exhibit 7.1. Schedule for DPIA Funding Allocations Per Economically Disadvantaged Pupil (FY22 Through FY24)



Note. DPIA funding formula (ODEW, 2024), statewide average economic disadvantage percentage for FY22 and FY23 from Ohio School Report Card data, statewide average economic disadvantage percentage for FY24 from Strawser (2024).

student (equal to the estimated FY23 funding gap inflated to FY24 dollars) as follows:[62]

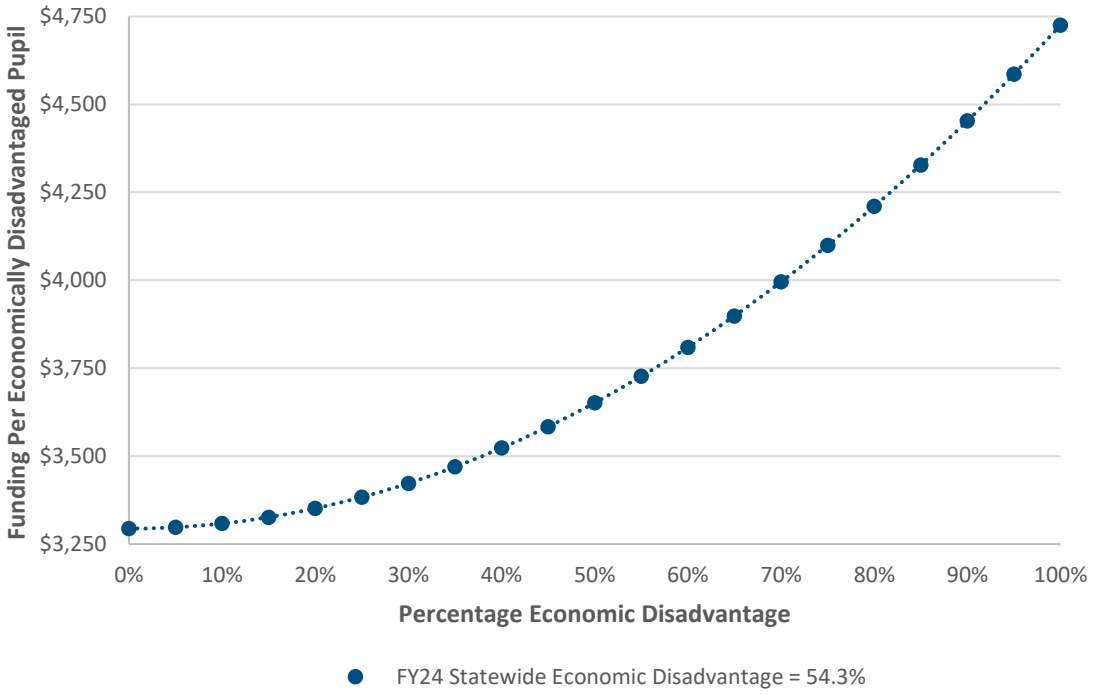
$$FY24\ DPIA\ Funding = \$422 \times Econ.Disad.\ ADM \times Econ.Disad.Index + \$3{,}294 \times Econ.Disad.ADM$$

where *Econ. Disad. ADM* is student economic disadvantage average daily membership and *Econ. Disad. Index* is the economic disadvantage index used for the current DPIA funding formula (see explanation above and ODEW, 2024).

[62] The suggested supplement of $3,294 is the value of gap measured in FY23 ($3,195) inflated to FY24 dollars using a 3.1 percent rate (the 12-month change from October 2023 to October 2024 in the Consumer Price Index for All Urban Consumers less Food and Energy-Midwest Region published by the U.S. Bureau of Labor Statistics; see Midwest Consumer Price Index Card here: https://www.bls.gov/regions/midwest/cpi-summary/ro5xg01a.htm). Exhibit G.1 in Appendix G shows the step-by-step calculations used to generate the $3,294 supplemental funding allocation per economically disadvantaged student recommended under this option.

Exhibit 7.2 below illustrates the impact of this supplementary funding adjustment on the current DPIA funding formula. The adjustment would effectively "shift up" the current funding profile providing a minimum amount of funding per economically disadvantaged pupil equal to $3,294 while preserving the positive effect on funding due to district concentration of economic disadvantage. The intention of this formula adjustment is to more effectively address the educational challenges faced by students who are economically disadvantaged. Specifically, the adjustment would ensure that adequate resources are allocated to support the educational needs of students with economic disadvantage, regardless of whether they attend districts with high or low concentrations of economic disadvantage.

Exhibit 7.2. Impact of Supplementing DPIA on Funding Allocations Per Economically Disadvantaged Pupil (FY24)



Source. Research team analysis of adequate cost and actual spending for students who are economically disadvantaged (Chapter 6), DPIA funding formula (ODEW, 2024), statewide average economic disadvantage percentage for FY24 comes from Strawser (2024)

Option 2–Replacing the DPIA Funding Formula

As mentioned above, the Chapter 6 analysis generated an estimate of the difference between projected adequate per-pupil cost of serving students who are economically disadvantaged and actual spending on this type of student (i.e., the funding gap). Option 2 leverages this finding to

develop a simple funding adjustment that generates the funding to cover both this gap and the existing funding currently provided by DPIA. Further, its application would be analogous to the manner in which the current state mechanism allocates funding to support students who are ELs and SWD. Specifically, funding to support the additional educational needs of both of these categories of students is allocated using relative weights that are applied to the statewide average base per-pupil funding (ODEW, 2024).[63]

Option 2 would replace the current DPIA formula with the application of a simple funding weight for students who are economically disadvantaged. As shown in Chapter 6, it was determined that funding under the current state mechanism already covers a portion of the projected adequate cost of serving students who are economically disadvantaged. Specifically, the results showed that in 2022–23, there was a per-pupil funding gap of $3,195, equal to the difference in the projected adequate cost ($18,357) and actual spending on students who are economically disadvantaged ($15,162). Under this option, DPIA funding would be replaced with a simpler formula that is more similar in structure to those formulas currently used to provide additional funding to support ELs and SWD. Specifically, we develop an economic disadvantage funding weight that covers both the 2022–23 per-pupil adequacy funding gap ($3,195) and the portion of actual per-pupil spending accounted for by DPIA funding in the same year (measured to be $621, as reported in Exhibit 6.10 in Chapter 6). We next adjust the summed adequacy gap and DPIA funding to reflect 2024 dollars using the same 3.1% inflation rate described under Option 1. The resulting amount of $3,934 per pupil reflects the 2023–24 value of funding gap and DPIA funding, which is divided by the existing FY24 statewide average base per-pupil funding of $8,242 (ODEW, 2024) to arrive at the appropriate economic disadvantage weight:

$$Economic\ Disadvantage\ Funding\ Weight = \frac{(Gap\ in\ Adequate\ Per\text{-}Pupil\ Cost\ for\ Economic\ Disadvantage + DPIA\ Funding)}{Statewide\ Average\ Base\ Per\text{-}Pupil\ Funding}$$

which yields a recommended funding weight of 0.4773 (equal to $3,934 / $8,242).[64] The resulting recommended weight suggests that providing an adequate education to a student who is economically disadvantaged will require 48% more funding than the typical student who is not economically disadvantaged, an EL, or with a disability.[65] To better align the current funding mechanism with the needs of students experiencing economic disadvantage, we

[63] The weighting schemes used by the current state mechanism to allocate funding for ELs and SWD are detailed in sections C. Special Education Funding [Revised Code Section 3317.022 (A)(3)] and E. English Learner [Revised Code Section 3317.022 (A)(5)], respectively (pages 16 and 18 of ODEW, 2024).

[64] Exhibit G.2 in Appendix G shows the step-by-step calculations used to generate the recommended 0.4773 economic disadvantage funding weight.

[65] An additional policy consideration would be whether to subject the funding generated through the new economic disadvantage weight to the District State Share Percentage adjustment currently used to determine the state funding provided to districts to support the needs of ELs and SWD (ODEW, 2024).

recommend that the state consider implementing the funding weight under Option 2. Districts and schools could then use the additional funds to ensure that students who are economically disadvantaged have access to the resources and support they require to succeed.

Option Strengths and Weaknesses

When considering the two proposed options, there are strengths and weaknesses associated with each that should be recognized. Option 1 provides the funding needed to support an adequate education for students who are economically disadvantaged while preserving the effect of economic disadvantage concentration on DPIA funding. However, under this option the nonlinear relationship between economic disadvantage and funding becomes significantly muted as the statewide percentage of economically disadvantaged pupils becomes larger (due to the formula being anchored to the statewide average). In turn, should the state want to retain this approach, it should consider alternative proxies for economic disadvantage that are not sensitive to policies, such as the CEP, which cause the current measure used (eligibility for free- or reduced-price lunch) to be upwardly biased. One possibility is the use of a measure based on direct certification of eligibility for other programs such as Medicaid, SNAP, or TANF.

Option 2 is a simpler and more transparent allocation scheme that aligns well with the way the current state funding mechanism provides funding to support the needs of both ELs and SWD. Further, funding allocations under this option are not sensitive to the statewide incidence of students who are economically disadvantaged. However, this simpler alternative would not differentially allocate funding for economically disadvantaged pupils according to district concentration of students who are economically disadvantaged.

Discretion on the Use of Additional Supplementary Funds

Regardless of how the amount of supplemental funding for supporting the needs of economically disadvantaged pupils is determined, it is also essential to consider how districts should be allowed to use these dollars. Here, the state should consider whether they would want to allocate the funding to districts as a block grant with maximum flexibility versus providing guidance and/or restrictions as to how dollars should be spent to best meet the needs of students who are economically disadvantaged, similar to a categorical program.

Block Grant with Broad Flexibility

This approach would give districts maximum discretion in determining how to best use the funds based on local needs. Districts could direct the additional funds toward a variety of priorities, such as instructional materials, school staffing, afterschool programs, or parent engagement initiatives, depending on what they determine will have the most impact on their students who are economically disadvantaged. However, without specific guidelines, there is a

risk that the funds may not be used in a way that directly addresses the most pressing needs of economically disadvantaged students, such as addressing achievement gaps or enhancing support services.

Targeted Allocation with Guidance

This option would include specific guidance as to how the additional funds should be used. For example, the funds could be earmarked for tutoring services, mental health support, summer programs, or reducing class sizes. Guidance or restrictions on how funding is used would ensure that the money is spent directly on interventions thought to benefit students experiencing economic disadvantage and close achievement gaps. However, this approach would limit the flexibility of districts in addressing local priorities and delivering programming they feel would meet the unique needs of the economically disadvantaged students they serve.

We, therefore, recommend that the state consider adopting **a hybrid approach**, allowing districts a degree of flexibility in using the additional funds while also implementing some guardrails to ensure that the money is spent effectively on initiatives that directly benefit students who are economically disadvantaged. These guardrails could include:

- prioritizing evidence-based interventions that address the specific challenges faced by students who are economically disadvantaged, such as additional tutoring, academic support, and social-emotional learning programs, and
- requiring periodic reporting from districts on how the funds are being used and demonstrating the outcomes they are achieving for economically disadvantaged students.

This balanced approach will allow districts the flexibility to address local needs while ensuring that additional funding is directed towards programs and services that will have a measurable, positive impact on those students who are economically disadvantaged.

Effective Programming for Students Who Are Economically Disadvantaged

The study findings highlight key programming practices necessary to support the academic success and well-being of students who are economically disadvantaged. These results can provide guidance on how funding can best be used to improve the outcomes of economically disadvantaged students. We offer recommendations that focus on several areas, including classroom conditions, teacher characteristics, professional development, and school staffing.

Class Size and Classroom Support

The study findings emphasize the importance of smaller class sizes and instructional aides in elementary schools, particularly for students who are economically disadvantaged. Program designs developed by the PJPs suggest that these aides help reinforce foundational skills like

reading and writing and provide critical support during transitions into a formal school setting, which is especially important for economically disadvantaged students who may have limited prior learning experiences. The programs also suggest that additional staff also play a key role in assisting with social and behavioral transitions, particularly for younger students with economic disadvantage. Moreover, panels indicated that smaller class sizes and extra aides enable smoother transitions and foster a more positive attitude toward learning for these students. The needs assessment analysis also showed that pupil-teacher ratios do not meaningfully vary by percentage of students who are economically disadvantaged, suggesting there is an opportunity for schools to implement this recommendation.

Teacher Characteristics

Findings from the needs assessment showed that across the state those schools with higher percentages of students experiencing economic disadvantage tend to have larger shares of inexperienced teachers. The PJP program designs recommend that schools serving economically disadvantaged students prioritize a mix of teachers that is slightly more heavily weighted towards those who are more highly experienced (i.e., those with more than 5 years of experience). The PJPs felt that these teachers are better equipped to address the specific needs of economically disadvantaged students, especially in high-poverty communities where these students face unique challenges. Furthermore, because experienced teachers can provide valuable guidance and support to help younger teachers navigate challenges in diverse classrooms, the designs called for establishing mentorship programs for early-career teachers, especially in middle and high schools.

Professional Learning and Development

To support increasingly diverse student populations, especially those who serve large numbers of students who are economically disadvantaged, the study designs developed by the PJPs recommend school programs to include sustained professional learning for all educators. Key areas for professional development identified by panels include instructional coaching, trauma-informed training, implicit bias education, as well as training on culturally responsive teaching practices, student behavioral issues, and mental health. These areas are suggested as particularly vital in economically disadvantaged communities, where students often have greater needs and fewer resources outside of the school setting. Additionally, training for CTE teachers is critical, as vocational education is increasingly valuable in areas with high levels of economic disadvantage. The PJPs also emphasize the need for more frequent compensated professional learning to better equip educators and enhance student support, and that this learning should be provided through full staff development days rather than early dismissals. The analysis of effective services shows that the use of DPIA and SWSF funding to provide professional development is relatively uncommon. Further, the analysis suggests that the

professional development currently provided is not tailored to improving services for students who are economically disadvantaged, indicating that this is an area in which further investment should be made.

School Staffing and Resources

Findings from the PJP analysis highlight the need for consistent staffing and resources across schools to ensure adequate support for all students, regardless of location or percentage of students who are economically disadvantaged. This includes having at least one full-time nurse in every school, with additional nursing staff in schools with higher percentages of economically disadvantaged students to address medical and health screening needs. The PJP program designs also stress the importance of increasing school-based mental health support in communities that exhibit high levels of economic disadvantage by expanding the numbers of guidance counselors, social workers, and other support staff for in-school therapy and evaluations, as students experiencing economic disadvantage often lack access to external care. This recommendation is also supported by both the needs assessment analysis that identifies mental health supports as one of the most urgent needs for students who are economically disadvantaged and by the effective services analysis, which finds that districts with higher percentages of economically disadvantaged students are more likely to invest in academic supports rather than mental health services. In turn, we recommend that the state explore policies that would expand the provision of mental health services for students who are economically disadvantaged.

The needs assessment findings highlight the importance of a coordinated system of support and collaboration with community partners, as well as the major challenge that chronic absenteeism poses. The PJP analysis results speak to both of these findings. First, the program designs place particular emphasis on promoting family involvement by increasing the numbers of family and community liaisons to foster communication and support. Furthermore, the designs recommend additional staff to serve in coordinator roles, such as transition coordinators, attendance advisors, and homeless student liaisons, to better address the specific needs of students who are economically disadvantaged. These recommendations aim to strengthen student and family support services, particularly in schools with higher percentages of economic disadvantage.

References

Ohio Department of Education and Workforce. (2024). *FY 2024 school finance payment report: Line by line explanation*. https://education.ohio.gov/getattachment/Topics/Finance-and-Funding/School-Payment-Reports/State-Funding-For-Schools/Traditional-School-Districts/FY24-SFPR-Funding-Line-by-Line-Explanation-11-2-2023.pdf.aspx?lang=en-US

Strawser, E. (2024). *Shifting poverty indicators and K12 poverty funding in Ohio*. Collaborate blog post. Ohio Association of School Business Officials. https://collaborate.oasbo-ohio.org/blogs/ernie-strawser1/2024/06/05/shifting-poverty-indicators-and-k12-poverty-fundin#:~:text=The%20average%20indicates%20that%20statewide%2054.3%%20of,the%20signi%EF%AC%81cant%20shift%20in%20this%20statewide%20average

Chapter 8. Conclusion

In this report, we offer policy recommendations regarding programming and funding for adequately educating economically disadvantaged pupils in Ohio. These recommendations offer alternative funding adjustment mechanisms for delivering funding to districts that will adequately support students who are economically disadvantaged. In addition, the recommendations identify specific types of effective programming supported by our analysis that can guide district and school spending priorities intended to meet the unique learning needs of economically disadvantaged students.

To generate these recommendations, we conducted exhaustive analyses that accomplished the following:

- Compared Ohio's method for adjusting funding for economically disadvantaged students to those of other states.
- Leveraged administrative data, surveys, and interviews with district leaders to detail the unique educational needs of economically disadvantaged students across various school and district contexts and documented the differences in educational resources and outcomes experienced by these students.
- Summarized the state and federal sources of funding for economically disadvantaged students in Ohio, how these resources are utilized, and how resource utilization varies across districts with different levels of economic disadvantage.
- Estimated the adequate cost of educating economically disadvantaged students by leveraging information collected from expert educators through PJPs.

Adequately funding schools and districts to meet the unique needs of students who are economically disadvantaged is essential for ensuring that this group is provided with an equal educational opportunity to their peers who are not economically disadvantaged. A high-quality education offers transformational opportunities for children's life trajectories, and socioeconomic background should not determine a student's access to an adequate education. Our policy recommendations aim to provide leaders and policymakers in Ohio with methods to develop and implement a more equitable and adequate education funding system for serving students who are economically disadvantaged, ensuring that this group of students has the opportunity to learn, succeed, and thrive.

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