

EXHIBIT B

Report of Matthew G. Springer, Ph.D.

March 13, 2020

In Re Delaware Public Schools Litigation, C.A. 2018-0029-VCL

1. Introduction and Overview

This report analyzes the Delaware school funding system and addresses certain allegations regarding the system as set forth in the Plaintiffs' lawsuit, *In Re Delaware Public Schools Litigation*. In general, the Plaintiffs assert that the state's funding system does not meet the state constitutional requirement of a "general and efficient system of free public schools" (Sec. Am. Compl., ¶ 1). Plaintiffs claim that the system "fails to provide all low-income children, children with disabilities, and children whose first language is not English (collectively, "Disadvantaged Students") with a meaningful opportunity to obtain an adequate education" (Sec. Am. Compl., ¶ 5).

Based on my experience in education finance, analysis of local, state, and national school finance data, and review of relevant literature and reports, I have formed the following opinions:

- Delaware's funding system has appropriate funding structures and flexibility that are commonly found in state funding systems;
- Delaware's funding system is highly progressive, meaning that districts and schools with a larger share of disadvantaged students, on average, spend more per pupil than districts and schools with a smaller share of such students; and
- Delaware's funding system generates substantial funding and is appropriately equalizing across school districts.

2. Qualifications

I am the Robena and Walter E. Hussman, Jr. Distinguished Professor of Education Reform at the University of North Carolina at Chapel Hill, an associate professor of education, evaluation, and policy in the School of Education, and chair of the Educational Policy and Organizational Leadership area. I earned a Ph.D. in education finance and policy from Vanderbilt University in 2007. After earning my Ph.D., I joined the faculty in the department of Leadership, Policy, and

Organizations at Vanderbilt University's Peabody College of Education and Human Development for more than a decade. During my time in academia, I have taught a variety of education, policy, and research methods courses, including Introduction to Public Policy; Politics and Policymaking in America's Schools; Incentives and Accountability; American Professoriate; Causal Inference in Public Policy Research; School Finance; and Executive Leadership.

I have extensive experience running large-scale research, evaluation, and technical assistance projects, and served as principal or co-principal investigator on more than \$43 million in extramural funding. This work has been funded by the United States Department of Education's Institute of Education Sciences; National Institute of Child Health and Development; Center for Medicare & Medicaid Services; Highland Vineyard Foundation; John M. Belk Endowment; Smith Richardson Foundation; Tennessee Department of Education; Fund for New York City Schools; Michael and Susan Dell Foundation; and Texas Education Agency. This work typically relies on large longitudinal databases from school districts, state education agencies, national assessment firms, and federal repositories then supplemented with novel survey instruments or qualitative data collection activities to better understand mechanisms for program and policy impacts.

My work has been published in top education and policy journals, including *American Educational Research Journal*; *Economics of Education Review*; *Education Economics*; *Educational Evaluation and Policy Analysis*; *Education Finance and Policy*; *Educational Researcher*; *Journal of Research on Educational Effectiveness*; and *Journal of Policy Analysis and Management*. I have also authored or edited seven books, including *Modern Education Finance and Policy* (Pearson), *Performance Incentives: Their Growing Impact on American K-12 Education* (Brookings), and the *Handbook of Research on School Choice* (Taylor and Francis). I have consulted broadly with government agencies and international organizations, including the U.S. Department of Education, U.S. Government Accountability

Office, and the Organization for Economic Cooperation and Development, as well as testified at the local, state and federal levels. My curriculum vita is attached to this report as Appendix A.

3. Compensation and Prior Testimony

I am being compensated at the rate of \$350 per hour for the present case and my research assistants are compensated at the rate of \$50 and \$75 per hour. I have not testified or submitted an expert report in an administrative hearing or a litigation in the past five years.

4. Materials Considered and Relied Upon

I reviewed various data and documents that pertain to the case. This includes data sources that contain student performance, expenditure, demographic and other data from Delaware's Report Card website. I was also provided a pdf file that listed all databases and tables included in the download (Databases and Tables, N.D.) as well as information on school codes and names (School Codes, 2019).

I also reviewed various publicly available data sources. These data sources include Delaware Open Data (data.delaware.gov) and Delaware's Report Card website (reportcard.doe.k12.de.us). In addition, I obtained data from the School Funding Fairness Data System (Baker, Srikanth, and Weber, 2016) and the National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data (2016) to examine national and state-level school finance trends. To facilitate comparison of educational expenditures across states, I merged these data with the National Center for Education Statistics' American Community Survey Comparable Wage Index for Teachers (CWI-FIT) (Cornman, Nixon, Spence, Taylor, and Geverdt, 2019).

I reviewed various case materials including the Plaintiffs' amended complaint and second amended complaint and the State's answers. I also reviewed and considered background and

descriptive documents concerning the Delaware school finance system including recent legislative appropriations for public education.

The specific documents and data upon which my various opinions are made are referenced throughout my report.

5. Background on School Finance

Public elementary and secondary education in the United States is a massive enterprise and foundationally critical policy matter. The purposes of public schooling range widely from developing individual intellect to serving society's social and economic needs. During the 2015-16 school year, total expenditures for public elementary and secondary education in the United States reached \$706 billion (National Center for Education Statistics, 2018). Of each dollar of this funding, 44.79 cents came from local revenue generation, 46.96 cents from state revenue generation, and 8.25 cents from federal sources (National Center for Education Statistics, 2018). Though by far the smallest share of revenue generation, as displayed in Table 1, federal dollars are focused on supplementing local and state funds primarily in support of disadvantaged student groups, including economically disadvantaged students, students with disabilities, early childhood education programs for low-income families (Head Start), and English learners (EL).

In fiscal year 2018, Delaware generated more than \$2.419 billion for the state's approximately 223 public schools and 135,000 students (Sec. Am. Compl., ¶ 27). Of each dollar of school funding in Delaware, 33.1 cents came from local revenue generation, 58.9 cents from state revenue generation, and 8.0 cents from federal sources (Sec. Am. Compl., ¶ 27). Given the magnitude of these federal, state, and local resources and the critical importance of public education writ large, there is persistent debate regarding what exactly constitutes a fair, equitable, sufficient, and productive state education funding system. Below I posit a framework for understanding

school finance systems, describe common types of state funding systems, and provide an overview of Delaware’s funding system.

Table 1. Types of Federal Education Funding

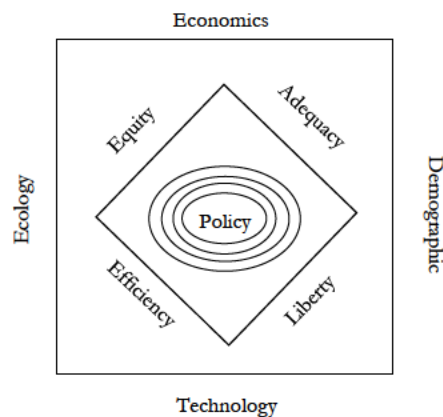
| Source | Description |
|---|--|
| Title I, Part A | Support for economically disadvantaged students |
| Title II, Part A | Support for teacher and principal training |
| Title III | Support for English learners |
| Title IV, Part B | Support before- and after-school programming (21 st Century Community Learning Centers) |
| Title V, Part D | Support for distressed neighborhoods (Promise Neighborhoods) and counseling programs |
| Title VI, Part B | Support for rural school districts |
| Title VII, Part A | Support for school districts that serve Native students |
| Title VII, Subtitle B | Support for homeless children and youth (McKinney-Vento Act) |
| Head Start | Support for early education programs for low-income families (B-5) |
| Individuals with Disabilities Education Act | Support for special education services |

Source: Every Student Succeeds Act (2015) and Center for Education Policy (2014).

5.a. A paradigm for considering goals and purposes of school finance systems

Figure 1 below offers a useful paradigm for considering the goals and purposes of a state’s school finance system which builds on prior work by Guthrie, Springer, Rolle, and Houck (2007). Four public values – liberty, equity, adequacy, and efficiency – are embedded within a given state’s technical, cultural, political, and economic circumstances. In this paradigm, there is a fulcrum on which all four interests are balanced. Favoring one dimension inherently weakens the others. Accordingly, no school finance system can maximize all four goals simultaneously. Any effort to create, reform, or evaluate a given school finance system must take into account this complex dynamic and focus instead on the balance of goals that produces the optimal outcome for all stakeholders.

Figure 1. Policy Paradigm for Understanding Modern Education Finance



Within the context of school finance systems, *Liberty* refers to the principle of subsidiarity; that is, the notion that the government closest to the people should be making important choices with respect to public schooling (Guthrie, Springer, Rolle, and Houck, 2007). Local control over education is a long-standing principle in American public education, both nationally and in Delaware. Local boards of education make key decisions regarding public school funding, school leadership and staffing, and the offering of curricular and extracurricular opportunities.

Equity addresses two distinct concepts – horizontal equity and vertical equity (Guthrie, Springer, Rolle, and Houck, 2007). Horizontal equity refers to the equal treatment of equals, or simple fairness. Vertical equity posits that differently situated students should be treated differently. Students with special needs, by way of example, should receive additional resources given their respective and relative needs. Horizontal equity is obviously the simpler approach, in that everyone should receive the same treatment. Vertical equity acknowledges that individuals in different situations should be treated differently. To obtain equitable results, higher need students may require more resources. Unlike horizontal equity, though, there is no uniform scale for determining the appropriate and incremental amount of resources that may be required by special populations. Determining that incremental amount of additive resources is both difficult to quantify and prone to

inefficiency. Vertical equity requires political consensus, professional and policy judgment, and careful consideration of liberty, adequacy, and efficiency.

Adequacy, like vertical equity, is a rather abstract notion. Adequacy defines how much is “enough” to provide any given student the opportunity for success (Guthrie, Springer, Rolle, and Houck, 2007). Adequacy should be thought of as a societally acceptable equilibrium. That is, if the amount and distribution of resources for schools were not adequate, then the people would demand and effect change through elected representatives. In the field of school finance there is no consensus about the level of funding that is “adequate” in any particular circumstance and disagreement about approaches that attempt to estimate such a level. Prior calculations and remediation figures have been derived from multiple methods, including the professional judgment, successful schools, state-of-the-art (or evidence-based), and econometric (or cost-function) approaches. These approaches, in their underlying methods, are not only different, but their outcomes inevitably vary both within and across states. For example, competing cost-function studies entered into evidence in the Texas school finance case, *Neeley vs. West Orange-Cove Consolidated Independent School District*, reached drastically different conclusions of how much it would cost for 55 percent of students to reach proficiency. Estimates ranged from \$563 to \$731 million in additional funding in one study to \$1.7 to \$6.2 billion in another. Similarly, in the New York adequacy case, *Campaign for Fiscal Equity, Inc. vs. State*, the estimated spending gaps for New York City ranged from \$1.9 billion according to a successful schools cost study and \$5.63 billion based on another cost study. The validity and usefulness of these types of studies have been the subject of considerable and ongoing academic debate (Hanushek, 2007; Springer and Guthrie, 2007; Guthrie and Springer, 2007; Aportela, Picus, Odden, and Fermanich, 2014).

Efficiency, conceptually, is the pursuit of maximal output while striving to minimize inputs (Guthrie, Springer, Rolle, and Houck, 2007). People have a whole host of expectations for their

government. In a system of limited resources and competing demands for government services, delivery must therefore be efficient. In the context of school finance systems, there are two types of efficiency: allocative and technical. Allocative efficiency is the range of outputs produced by a given input. These outputs include not only student performance, but also school climate and the health and safety of its students. Technical efficiency refers to output, or the level of performance a given student gains from a specific investment of resources.

Of late, evaluations of state finance systems have focused on measuring the amount of resources allocated to districts and schools by the type of students they enroll. This recent approach attempts to capture the *progressivity* of the school finance system by evaluating its concomitant equity, adequacy, and efficiency. A state's school finance system is said to be progressive if it were to direct more resources to higher-need students, yet regressive if it were to spend more on schools and districts with fewer higher-need students relative to the rest of the state (Baker, Di Carlo, and Weber, 2019).

5.b. Types of state school funding systems and other sources of public education funding

There are multiple ways that state funding systems are defined and categorized. The most common approach is the foundation formula, or Strayer-Haig plan (Guthrie, Springer, Rolle, and Houck, 2007). A state specifies a base dollar amount per student (i.e., the foundation) to which each school district is entitled. The state requires each district to levy a property tax at a fixed rate (i.e., the required local effort), and then provides the difference between the local revenue and guaranteed expenditure levels. Approximately 35 states employ a foundation program as their primary approach to funding K-12 schools (Education Commission of the States, 2019).

The most common alternative approach is the resource (or position) allocation model, which is the approach used in Delaware. In the resource-allocation system, state money is given to school

districts based on the cost of providing education resources (Guthrie, Springer, Rolle, and Houck, 2007). Resources are provided for a prescribed number of staff positions based on student counts. By way of example, one teacher and one instructional aide are allocated for every 40 students. In addition to Delaware, seven states use a resource-allocation system (e.g., AL, ID, NC, SD, TN, WA, and WV), with another three states using a hybrid model that combines elements of foundation and resource-allocation strategies (e.g., GA, ME, and VA) (Education Commission of the States, 2019).

A third type of funding formula is district power equalization (DPE). DPE refers to a state aid program that “equalizes” the revenue-raising ability of each school district to generate resources for education (Guthrie, Springer, Rolle, and Houck, 2007). In a pure DPE program, a state guarantees to both property-poor and property-rich school districts the exact same dollar yield for the same property tax rate. This type of funding system shifts taxation and spending decision-making from the state to local school districts. By 1984, 18 states had adopted some form of power equalization as a component of their school finance systems (Verstegan, 2011). However, by 2011, only three states (CT, VT, and WI) still employed this approach (Verstegan, 2011).

That said, the vast majority of state finance systems employ some variation of these three general funding approaches. A common feature of some finance systems is *system weighting* whereby the state funding mechanism assigns different weights to student counts based on the estimated costs of a particular type of student’s education (Guthrie, Springer, Rolle, and Houck, 2007). A foundation plan, for example, may guarantee more funding for students classified as EL by weighting them more (e.g., 1.5 times) than that of a “traditional” student. In this situation, the funding system takes the sum of all weighted students and this weighted count is used as the basis for calculating state aid. As discussed later in this report, in states that include student weightings there is wide variation in the levels of such weightings (see Table 5).

A more recent development in school finance is the use of *weighted student formulas* whereby funds are allocated from districts to schools based on individual student needs (Roza, 2019). These formulas weight funding for a range of student characteristics, including grade-level, student ability, poverty-status, EL status, special education status, and the like. Several large urban school districts, including New York City, Boston, Denver, San Francisco, and Nashville, employ a student-based funding formula. Even when districts have experimented with weighted student formulas, there is tremendous variation in the weights districts employ. For example, as noted by Roza (2019), in a sample of districts, EL weights in the highest tier weighted districts are 36 times greater than the weights used in the lowest tier weighted districts (EL weights ranged from 0.02 to 0.72).

In addition to school funding that flows through a formula, most states also provide *outside-the-formula* funding, which includes block grants, categorical funds, and grant-in-aid programs (Guthrie, Springer, Rolle, and Houck, 2007). These funding streams comprise grants, entitlements, and other forms of financial assistance received by a school district from the state government (Guthrie, Springer, Rolle, and Houck, 2007). They are typically designed to fund specific activities, operational functions, and specialized educational programs. Common examples include transportation aid, special education aid, technology grants, and aid for career and technical education offerings.

Most school finance models include local participation in revenue generation for schools that constitutes a substantial portion of total funding. Local tax revenue accounts for between 7.06 (Vermont) and 72.65 percent (Nebraska) of total revenue (National Center for Education Statistics, 2018).¹ Local revenue for schools plays an important role. As noted earlier, in fiscal year 2018, of

¹ Hawaii is excluded from this ranking because it is a single state system (no school districts) and state and federal sources account for nearly all education dollars.

each dollar of school funding in Delaware, 33.1 cents came from local revenue generation, 58.9 cents from state revenue generation, and 8.0 cents from federal sources (Sec. Am. Compl., ¶ 27).

5.c. Delaware’s school funding system

Delaware allocates funds to school districts using a resource-allocation model. Delaware designates funds through a three-part Division system (Delaware, 2020a). This system is designed to allocate funds to districts based on the number of students in a given district and the cost of providing teachers and other resources to the schools.

Division I funds are designated for employees of school districts according to the state salary schedule (Delaware, 2020a). Funding units for a teacher are assigned based on the number of students in specific grades and who have specific needs as displayed in Table 2.

Table 2. Number of Pupils Needed for a District to Qualify for a Funding ‘Unit’

| | |
|--|-------------|
| Preschool | 12.8 |
| K-3 | 16.2 |
| 4-12 Regular Education | 20 |
| 4-12 Basic Special Education (Basic) | 8.4 |
| Pre K-12 Intensive Special Education (Intensive) | 6 |
| Pre K-12 Complex Special Education (Complex) | 2.6 |

Source: Information adapted from Delaware (2020a).

The amount appropriated to a district is calculated based on the number of students served in a given district, which is then used in accordance with the state salary schedule to determine the amount of funding needed for Division I. The state’s allocation is typically designed to provide approximately 70 percent of all teacher salaries (Delaware Department of Education, 2015). Other positions (e.g., principals, secretaries, nurses, and driver education specialists) are also determined by the number of pupils or units, with requirements varying by position (see Table 3). Ninety-eight percent of Division I funding for staff must be used in the school that “earned” it, although this requirement can be waived through the local school board. Division I funding was 1.065 billion

dollars in FY 2020, approximately 89 percent of the money allocated on the three divisions (Delaware, 2020b).

Table 3. Select Examples of Number of Funding Units Needed for a District to Qualify for Building Administrators

| | |
|-----------------------|--|
| Principal | 1 for first 15 or more Div 1 units |
| Assistant Principal 1 | 1 for first 30 or more Div 1 units; 0.65 for 25 to less than 30 Div 1 units |
| Assistant Principal 2 | 1 for first 55 or more Div 1 units; 0.65 for 50 to less than 55 Div 1 units |
| Assistant Principal 3 | 1 for first each 20 Div 1 units beyond the first 55 Div 1 units |

Source: Information adapted from Delaware (2020a).

Division II funds are designated for school and energy costs excluding student transportation and debt service (Delaware, 2020a). Districts receive one unit of Division II funding for every one unit of Division I funding. In fiscal year 2020, Division II funding was \$32.38 million, approximately 2.7 percent of total division funding (Delaware, 2020b).

Division III pertains to equalization, with the anticipated amount recommended by the state Department of Education in its yearly budget requests. Division III funds can be used at the district’s discretion for education purposes. In fiscal year 2020, Division III funding was \$98 million, or approximately 8.2 percent of total division funding (Delaware, 2020b). Districts receive money, as outlined in Title 14, Section 1707 of the Delaware Code, based on their local tax revenue contributions towards education. The baseline expected contribution is known as the “authorized amount”, but this value is adjusted depending on the “ability” of a district, based on a variety of factors like poverty rates and wealth, to ensure poorer districts can still receive funds. If a district meets its expected contribution, it receives a full portion of the Division III funds allocated for it. (I am aware that there is a separate track in this litigation concerning property tax reassessment issues. This report does not address those issues but does provide an analysis of how well the existing funding system equalizes funding across the state.)

Delaware's funding system also contains a number of significant non-division, or outside-the-funding formula initiatives which are labeled "Other Items", "Education Block Grants", and "Public School Transportation". Non-division funds serve a variety of purposes, including efforts to support disadvantaged students as displayed in Table 4. The \$270.29 million allocated in these funds is a substantial addition to Divisions I-III spending (Delaware, 2020b). For example, in collaboration with the General Assembly, Governor Carney approved \$75 million in Opportunity Funds over three years to support students and teachers in Delaware's highest-needs schools (Delaware, N.D.a).

Table 4. Select Non-Division / Outside-the-Formula School Funding in Fiscal Year 2020 (original and supplemental budget)

| Fund | Fiscal Year 2020 Amount | Description |
|--|----------------------------|---|
| Transportation | \$112.97M | Distributes money to go towards the transportation of students |
| Academic Excellence | \$42.89M | 1 unit for every 250 students. Can be used for a broad range of educational services |
| Educational Sustainment Fund | \$28.15M | Allocated based on enrollment and can be used for any local purpose |
| Opportunity Fund ^a | \$25.00M | Weighted funding for low-income and English learner students and mental health and reading supports |
| Student Success Block Grant | \$8.80M | Funding for students in grades K-3 Basic Special Education; funding for reading interventionists in certain grade configurations meeting an EL or low-income enrollment threshold; funding for school-based health clinics |
| Unique Alternatives | \$8.37M | Distributed via the Interagency Collaborative Team for children requiring additional assistance in the classroom and the educational component related to residential treatment services and/or day treatment services |
| Skills, Knowledge and Responsibility Pay Supplement | \$6.74M | Supplemental salary for teachers with a recognized national certification, demonstrate a set level of knowledge or skill (none currently approved or specified), or are assigned one of the enumerated additional responsibilities for school improvement |
| Professional Accountability and Instructional Advancement Fund | \$6.00M | Funds professional development, the Delaware center for teacher education, alternative certification routes etc. |
| Student Discipline Program | \$5.34M | Statewide for severe discipline |
| Related Services for Students with Disabilities | \$4.13M | Distributes funds for additional support for students with disabilities |
| Technology Block Grant | \$3.77M | Allocated based on Division I units. Used for technology maintenance and support |
| School Improvement Funds | \$2.5M | Discretionary grant award money for efforts to improve achievement and/or narrow gaps |
| World Language Expansion | \$1.65M | For districts implementing world language expansion in elementary schools |

Source: Information adapted from Delaware (2020b; 2020c).

a. \$12.5M from House Bill No. 225 and \$12.5M from House Bill No. 226

6. Analysis and Opinions

A primary argument made by Plaintiffs is that the Delaware funding system “often provides more support for children who are well off than it provides for children living in poverty” (Sec. Am. Compl., ¶ 4). Plaintiffs specifically complain that because the funding system does not include explicit weights for low-income, EL students, or funding K-3 special education, the Delaware system does not provide additional needed resources for the education of disadvantaged students (Sec. Am. Compl., ¶ 5).

As I detail below, these arguments lack support when one considers the funding system’s current design, its empirical funding outcomes, and how these funding outcomes compare with other states. Accordingly, I am of the opinion that Delaware’s education finance system possesses appropriate funding structures and flexibility, entails highly progressive outcomes whereby districts and schools with a larger share of disadvantaged students spend more than schools serving smaller shares, and produces substantial funding for public schools that is appropriately equitable across school districts.

6.a. Delaware’s funding system has appropriate funding structures and flexibility that are commonly found in state funding systems

The general structure of Delaware’s resource-allocation model is found in seven other states (AL, ID, NC, SD, TN, WV, and WA) while three states use a hybrid model that combines elements of foundation and resource-allocation strategies (GA, ME, and VA) (Education Commission of the States, 2019). Delaware’s funding model contains an equalization component called Division III funds which can be allocated to schools and programs as determined by the school district. Under the model, the state contributes 58.9 percent of all education funding which includes outside-the-formula block grants, categorical funds, and grant-in-aid programs to specifically address the needs

of disadvantaged student subgroups. Local districts provide 33.1 percent of all public school revenue which can largely be spent according to local school board priorities.

Plaintiffs are critical of outside-the-formula funding (*See, e.g.*, Sec. Am. Compl., ¶¶ 109, 123). However, it offers needed flexibility, enabling the state and districts to be responsive to specific areas or populations of need and allows policymakers to experiment with and evaluate new, targeted priorities. Outside-the-formula appropriations are reviewed and funded annually just as appropriations are for the rest of the funding system.

By way of example, Delaware’s Opportunity Fund and Student Success Block Grant are both funded outside of the formula. The Opportunity Fund allocates \$75 million over a three-year period in support of the state’s low-income students and ELs and provides mental health and reading supports to students (Delaware, N.D.a). The Student Success Block Grant program provides \$8.8 million in fiscal year 2020 to support K-3 basic special education, allocates 45 reading interventionists to elementary schools with high percentages of students in poverty and for EL students, and establishes wellness centers in elementary schools (Delaware, N.D.a). The Department of Education is working “with district and school leaders, community representatives, families and educators to evaluate how districts and charters are using the Opportunity Funding and mental health/reading support, and to measure student progress” (Delaware, N.D.b). The system’s stakeholders should reasonably expect this funding to persist if proven effective, or be replaced with new appropriations that take into account the findings from the state’s evaluations.

The Plaintiffs are also critical of the state’s resource-allocation mechanism, arguing that alternative funding systems are more progressive and fair (*See, e.g.*, Sec. Am. Compl., ¶¶ 4, 34-36). I can test this argument by arraying states according to widely-cited and relied upon measures of progressivity, such as those published using the Education Law Center’s School Finance Indicators

Database (Baker, Di Carlo, and Weber, 2019), and then categorizing states by their respective funding systems (e.g., foundation, resource allocation, district power equalization, etc.).

To evaluate progressivity across states, Baker and colleagues (2019) examine the relationship between funding and student poverty. Specifically, they estimate per-pupil expenditures using a regression-based approach and then calculate a funding ratio based on the predicted difference in local and state revenue between a high poverty district (30 percent of its students in poverty) and a low poverty district (no students in poverty) (Baker, Di Carlo, and Weber, 2019). A state's funding system is considered progressive if the high poverty district receives more funding than a wealthy district. The funding system is labeled regressive if poor districts receive less funding than wealthy districts.

To identify states' respective funding systems I relied on two sources: the Education Commission of the States (2019)² 50-state comparison of K-12 funding; and Verstegan's (2011) review of public education finance systems in the United States.³ ECS categorizes state funding systems into five groups: Foundation Formula; Resource-Allocation Model; Hybrid Systems, either Foundation + Resource Allocation or Foundation + Hold Harmless; and Other. For ease of exposition, I collapse these groups into three categories: Foundation Formula; Resource-Allocation Model; and Other. Verstegan (2011) categorizes state funding systems into four groups: Foundation Formula; District Power Equalization; Flat Grant; and Combination System. I again collapse these

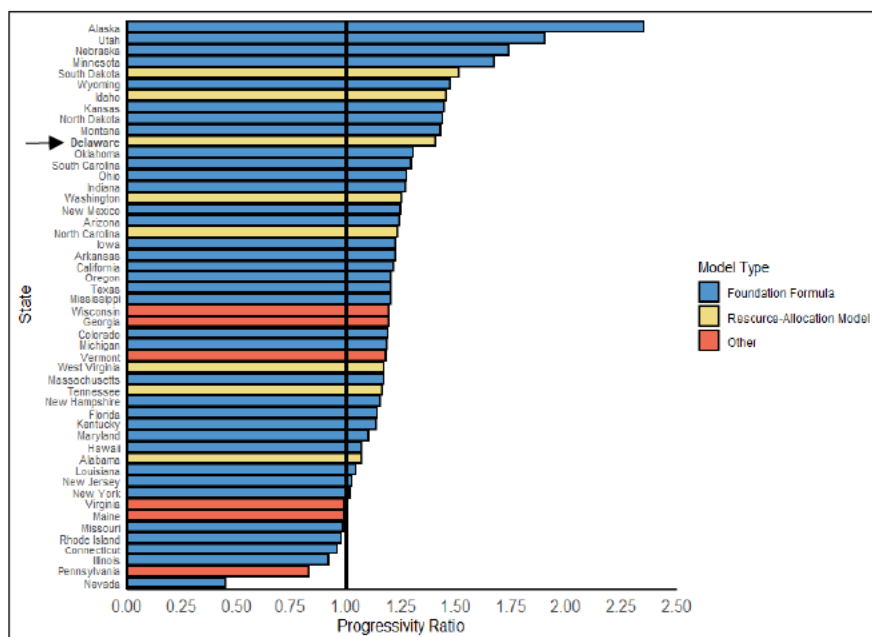
² The Education Commission of the States is a 501(c)(3) nonprofit organization that was founded as a result of the creation of the Compact for Education, an interstate compact approved by Congress that works with all 50 U.S. states, three territories, and the District of Columbia. Each member jurisdiction (state, territory, and District of Columbia) has seven seats on the Commission, including the governor and six appointed members, usually including members of the state legislature and education officials, such as the state education commissioner or head of the state education agency. ECS tracks policy, translates research, and provides advice on pressing education issues, largely functioning as an education policy think tank. (<https://www.ecs.org/>).

³ Deborah A. Verstegan is a professor in the Department of Educational Leadership in the College of Education at the University of Nevada, Reno. She is widely known for her work in school finance and received the National Education Finance Association's Lifetime Achievement Award in 2016.

groupings, creating the following three categories: Foundation Formula; District Power Equalization; and Flat Grant or Combination.

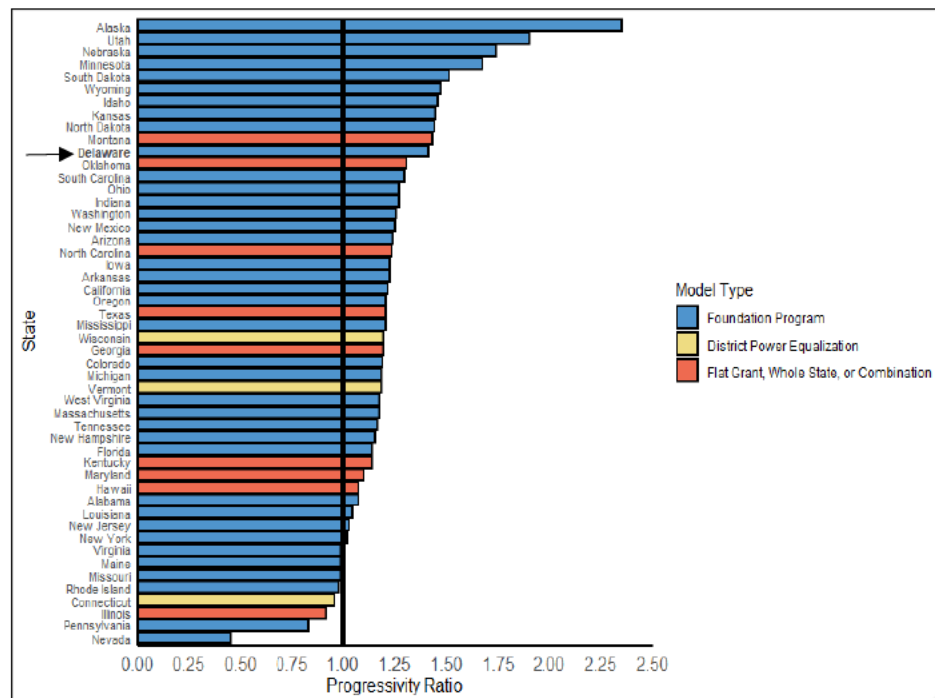
Figures 2a and 2b array states from the most progressive (e.g., Alaska, Utah, and Nebraska) to the least progressive (e.g., Nevada, Pennsylvania, and Illinois). State funding systems with a progressivity ratio above one (such as Delaware) allocate more funding to districts with high levels of student poverty, while systems with a progressivity ratio below one allocate less funding to high poverty districts. It is clear from this analysis that a given state's type of funding system does not insure progressivity as all three model types have a wide range of progressivity ratios.

Figure 2a. State Funding Mechanism Progressivity Ratios in 2015-16 School Year by Type of Funding Model as Coded by Education Commission of the States (2019)



Source: Author's compilation based on Baker, Di Carlo, and Weber (2019) and ECS (2019).

Figure 2b. State Funding Mechanism Progressivity Ratios in 2015-16 School Year by Type of Funding Model as Coded by Verstegen (2011)



Source: Author's compilation based on Baker, Di Carlo, and Weber (2019) and Verstegen (2011).

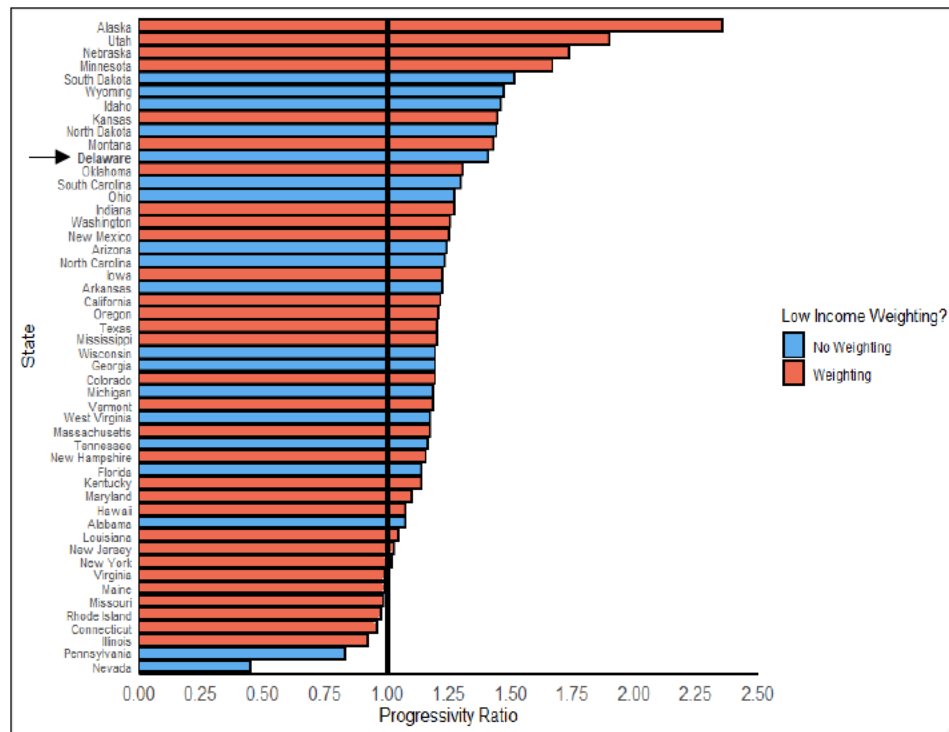
I conducted a similar analysis to examine whether state funding systems with explicit weights for low-income students resulted in a more progressive funding system. To identify states' respective funding systems, I again relied on Baker, Di Carlo, and Weber's (2019) measure of state funding progressivity. To classify state systems by their use of funding weights for student subgroups, I turned to Hanover Research's 2015 report to the Delaware Department of Education.⁴ The report identifies whether a given state's funding system employs explicit weights for low-income students. As shown in Figure 3, it is clear that weighting does not insure funding progressivity. Of the 15 most progressive states, 8 state's funding formulas do not employ weights for low-income

⁴ Hanover Research is a consulting firm designed to provide strategic insight into new markets, products, or programs to daily operations that increase customer satisfaction and engagement, retain employees, and optimize revenue. Hanover works with established global organizations, to emerging companies, to educational institutions (<https://www.hanoverresearch.com/about/>).

students. And, of the 10 least progressive (most regressive) states, 80 percent employ weights for low-income students. Systems with and without weights are found to be progressive and regressive.

Figure 3. State Funding Mechanism Progressivity Ratios in 2015 by Low-Income Weighting as

Coded by Hanover Research (2015)



Source: Author's compilation based on Baker, Di Carlo, and Weber (2019) and Hanover Research (2015).

The argument for student subgroup weighting is further complicated by the weights themselves. There is no professional or research-based consensus on their values, nor agreement on how to classify the various student subgroups to which the state may desire to assign a weight. Take, for example, the variation in at-risk funding weights for low-income students in state funding systems shown in Table 5, with values ranging from a low of 0.05 in Mississippi to a high of 0.97 in Maryland. Moreover, states such as Arkansas, California, Illinois, and Virginia employ a multiplicity of weights, meaning more than one weight (or dollar amount) is assigned based on severity of disadvantage for a given student subgroup. In contrast, states such as Maryland, Mississippi,

Oklahoma, and Texas employ flat weighting, meaning that a single weight is assigned irrespective of the degree or severity of disadvantage.

Table 5. State Funding System Weights for At-Risk, Low-Income Students⁵

| State | Type of System | Weights |
|-------------|----------------|---|
| Arkansas | Multiple | Level 1 = 0.079, Level 2 = 0.158, Level 3 = 0.237 |
| California | Multiple | 0.2 pupil weight with additional weight of 0.05 if targeted concentration of FRPL, EL, foster youth above 55% |
| Illinois | Multiple | Per-pupil grant of \$355 if concentration < 15%; if concentration >15% formula increasing with concentration $([294.25 + (2,700(DCR)2)] \times \text{low-income pupils})$ |
| Maryland | Flat / Single | 0.97 (FRPL) |
| Mississippi | Flat / Single | 0.05 (FRPL) |
| Oklahoma | Flat / Single | 0.25 (FRPL) |
| Texas | Flat / Single | 0.20 (FRPL) |
| Virginia | Multiple | 1 to 13 percent more for every low-income student in their school based on the concentration of poverty |

Source. Author's compilation based on Education Commission of the States (2019), Hanover Research (2015), and Imazeki (2018).

There is similar variability in district designed weighted student formulas as displayed in Table 6. In short, the existence of weightings in a school finance system, by themselves, is not meaningful in evaluating the efficacy of a school finance system. The more critical question is whether the funding system truly delivers more funding to disadvantaged students, not whether the system uses weights.

⁵ Different states use different measures and indicators for low-income. FRPL denotes free or reduced-price lunch status as part of the National School Lunch Program. Children from families with incomes at or below 130 percent of the poverty level are eligible for free school meals (USDOE, 2020). Children from families with incomes between 130 and 185 percent of the poverty level are eligible for reduced price meals (USDOE, 2020).

Table 6. Funding formula weights in relation to base per-pupil funding by characteristic

| Location/ District | School year of weights gathered | Base per- pupil (weight 1.0) | Grade level | Low- Income | EL | Special Education | Other |
|---------------------------------|---------------------------------------|------------------------------------|------------------|------------------|------------------|-------------------------|---|
| Baltimore | 2018 - 19 | \$5,521 | 0.0 - 0.10 | 0.04 - 0.11 | - | 0.11 - 0.12 | low and high student performance |
| Boston | 2018 - 19 | \$4,119 | 0.2 - 0.8 | 0.10 | 0.02-0.94 | 1.0 - 6.7 | high-risk students; vocational programs; inclusive settings |
| Cincinnati | 2012-13 | \$4,873 | 0.20 | 0.05 | 0.48 | 1.0 - 3.69 | low student performance |
| Denver | 2018-19 | \$4,283 | ... | 0.01 - 0.13 | 0.10 | 0.19 | low and high student performance; individualized SWD programs |
| Hartford | 2012-13 | \$6,395 | 0.10-0.30 | ... | 0.11-0.43 | 0.71 - 3.6 | low and high student performance |
| Houston | 2012-13 | \$3,330-\$3,366 | ... | 0.15 | 0.10 | 0.15 | high student performance |
| Metro Nashville | 2018-19 | \$4,600 | 0.0 - 0.10 | ... | 0.10 | 0.5 - 7.25 | low student performance |
| New York City | 2012-13 | \$4,123 | 0.03-0.08 | 0.12 | 0.4-0.5 | 0.56-2.09 | low student performance |
| Prince George's County | 2018-19 | \$3,060 | 0.0 - 0.11 | ... | 0.40-0.60 | - | low and high student performance |
| San Francisco | 2018-19 | \$3,904 | 0.0 - 0.26 | 0.09 | 0.07-0.18 | 0.0128 - 0.0256 | ... |
| Min-Max Weight Range | | \$3,060- \$6,395 | 0.00-0.80 | 0.01-0.15 | 0.02-0.94 | 0.0128- 7.25 | |

Source: Information adapted from Levin et al. (2019).

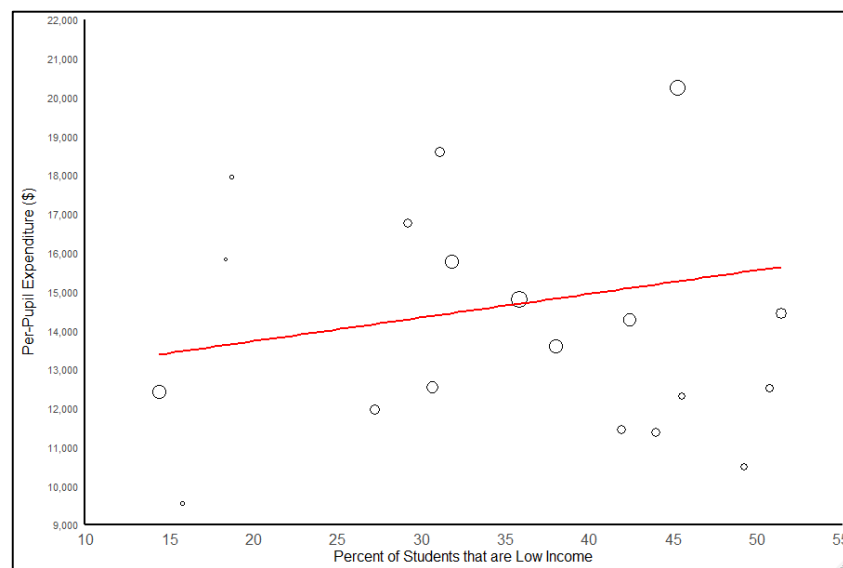
6.b. Delaware’s funding system is highly progressive, meaning that districts and schools with a larger share of disadvantaged students, on average, spend more per pupil than districts and schools with a smaller share of such students.

As previously noted, the Plaintiffs claim that the Delaware funding system “often provides more support for children who are well off than it provides for children living in poverty” (Sec. Am. Compl., ¶ 4). As a starting point for investigating this claim, as well as similar points made by Plaintiffs about funding and “disadvantaged students”, I use Report Card data provided by the Delaware Department of Education for the 2017-18 school year, to examine district- and school-level per-pupil expenditures by percentage of students that are classified as low-income students or “GAP” students. Low-income is defined as the percentage of students who receive Temporary Assistance for Needy Families (TANF) and/or Supplemental Nutrition Assistance Program (SNAP) (direct certification) benefits. GAP is a unique measure to Delaware and is defined as “an aggregate, unduplicated count of students that are in groups that have historically had achievement gaps (i.e., African American, Hispanic, Native American, English Language Learners, Economically Disadvantaged, and Students with Disabilities)” (Delaware Department of Education, N.D., p. 9).

For each relationship examined, I report two sets of district- and school-level per-pupil expenditure estimates. The first calculates per-pupil expenditure based on local and state dollars. The second calculates per-pupil expenditure based on local, state, and federal dollars. There are two primary reasons why I evaluate these relationships both with and without federal dollars. First, federal funding is typically targeted to disadvantaged students and ostensibly will produce a greater degree of progressivity. Second, federal funding is a critical and persistent component of school finance; therefore it is appropriate to consider the contribution of federal dollars when evaluating a given finance system. In all scenarios, district- and school-level per-pupil expenditures increase as the percentage of disadvantaged students in a district or school increases.

Figure 4 displays the relationship between a district's percentage of low-income students (horizontal axis) and that district's level of per-pupil expenditure (vertical axis). Each circle represents a district and the size of each circle reflects the size of enrollment. Across the state, the district-level percentage of low-income students ranges between 14.36 percent (Appoquinimink) and 51.43 percent (Capital). The red line is the line of best fit which expresses the relationship between the concentration of low-income students and per-pupil expenditures in districts across the state. The line's upward slope means that per-pupil spending, on average, increases in tandem with the percentage of low-income students in a district. Districts in the top tertile of students identified as low-income spend \$2,719.70 more per-pupil than districts in the first tertile. This difference is equivalent to 18.51 percent of the weighted average per-pupil expenditure in the state in the 2017-18 school year.

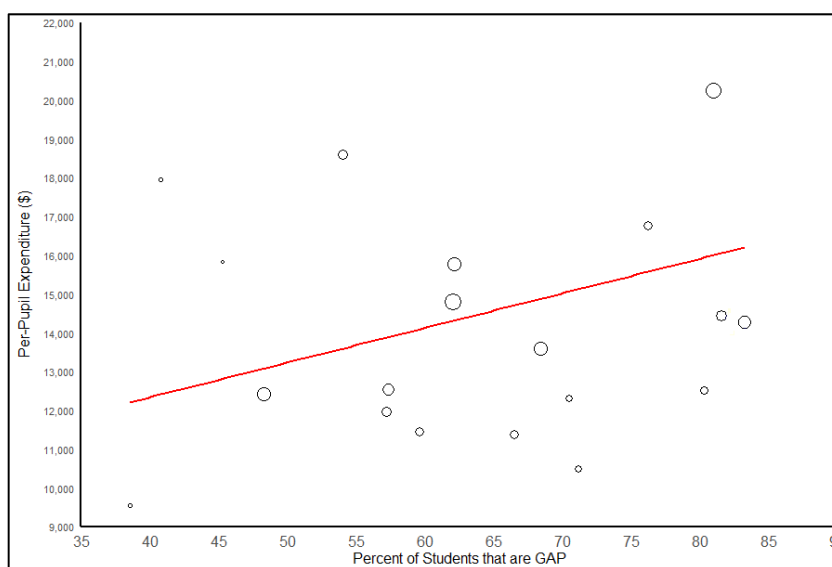
Figure 4. District-Level Per-Pupil Expenditures by Percent of Students that are Low-Income, Weighted by District Enrollment, School Year 2017-18 (Without Federal Dollars)



Source: Author's own calculations, Delaware's Report Card (2018).

Figure 5 displays the relationship between a district's percentage of students identified as GAP students (horizontal axis) and that district's per-pupil expenditure (vertical axis). Across the state, the district-level percentage of GAP students ranges between 38.5 percent (Delmar) and 83.28 percent (Colonial). The red line's upward slope means that per-pupil spending, on average, increases in tandem with the percentage of GAP students in the district. Districts in the top tertile of students identified as GAP students spend \$2,714.88 more per-pupil than schools in the first tertile, which is equivalent to 18.48 percent of the weighted average per-pupil expenditure in the state.

Figure 5. District-Level Per-Pupil Expenditures by Percent of GAP Students, Weighted by District Enrollment, School Year 2017-18 (Without Federal Dollars)

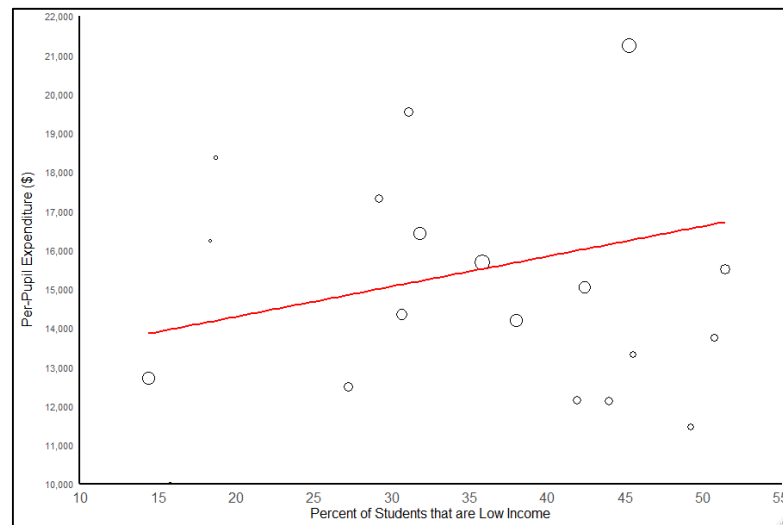


Source: Author's own calculations, Delaware's Report Card (2018).

Figures 6 and 7 replicate the relationships presented in Figures 5 and 6, respectively, but this time including federal dollars in the per-pupil expenditure calculation. Once again, there is a positive relationship between the disadvantaged student subgroup and the level of per-pupil spending in the district. Districts in the top tertile of students identified as low-income spend \$2,982.28 more per-pupil than districts in the first tertile, which is equivalent to 19.22 percent of the weighted average

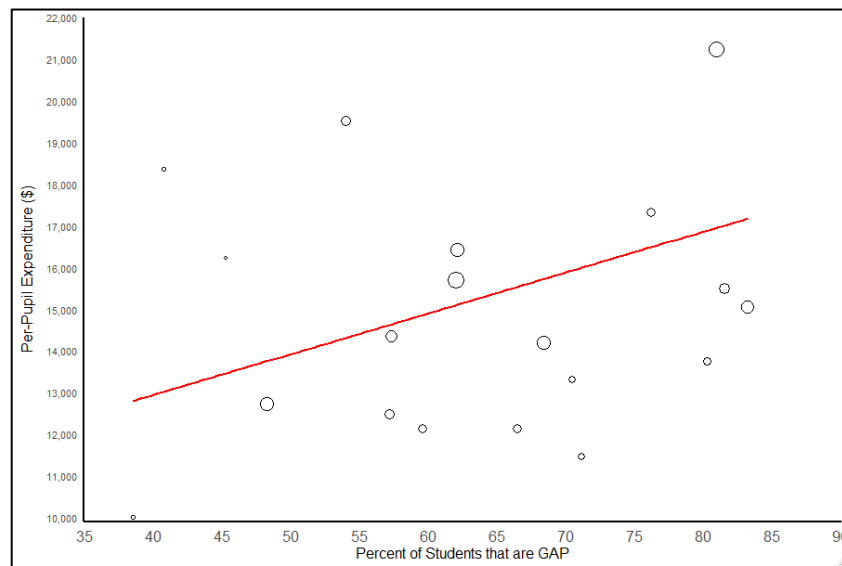
per-pupil expenditure in the state (Figure 6). Districts in the top tertile of students identified as GAP students spend \$2,839.06 more per-pupil than schools in the first tertile. This difference is equivalent to 18.29 percent of the weighted average per-pupil expenditure in the state (Figure 7).

Figure 6. District-Level Per-Pupil Expenditures by Percent of Students that are Low-Income, Weighted by District Enrollment, School Year 2017-18 (With Federal Dollars)



Source: Author's own calculations, Delaware's Report Card (2018).

Figure 7. District-Level Per-Pupil Expenditures by Percent of GAP Students, Weighted by District Enrollment, School Year 2017-18 (With Federal Dollars)



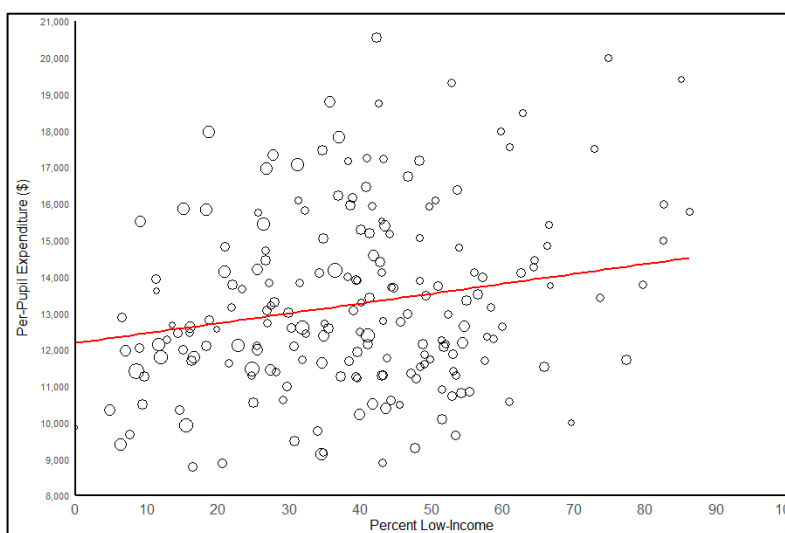
Source: Author's own calculations, Delaware's Report Card (2018).

While school finance analyses of the distribution and use of educational resources have traditionally focused on district-level data given that districts are the unit responsible for determining how dollars are allocated to schools, there has been growing access to and interest in school-level finance data. School-level finance data provides a better look at the distribution of funds among schools and students considering that spending patterns within districts or across schools may be quite different from the distribution of funds across districts in a state. To investigate the progressivity of funding at the school-level in Delaware, I analyzed school-level Report Card data provided by the Delaware Department of Education for the 2017-18 school year. I focus initially on the relationship between local and state funding for low-income and GAP student subgroups and then re-examine the same relationships using local, state, and federal funding.⁶

⁶ I remove outlier schools from my school-level analyses. Outlier schools are primarily specialized schools and programs with per-pupil expenditures significantly different from other schools in the state. Schools were deemed outliers if their per-pupil expenditures were more than 1.5 interquartile ranges (i.e., the

Figure 8 displays the relationship between a school's percentage of low-income students (horizontal axis) and that school's level of per-pupil expenditure (vertical axis). Each circle represents a school and the size of each circle reflects enrollment. Across the state, the school-level percentage of low-income students ranges between 0 and 86.22 percent. The red line is the line of best fit. The line of best fit expresses the relationship between the concentration of low-income students and per-pupil expenditures in schools across the state. The line's upward slope means that per-pupil spending, on average, increases in tandem with the percentage of low-income students in a school. Schools in the top quintile of students identified as low-income spend \$1,098.30 more per-pupil than schools in the first quintile, which is equivalent to 8.36 percent of the weighted average per-pupil expenditure in the state.

Figure 8. School Level Per-Pupil Expenditures by Percentage of Students Identified as Low-Income, Weighted by School Enrollment, 2017-18 School Year (Without Federal Dollars)

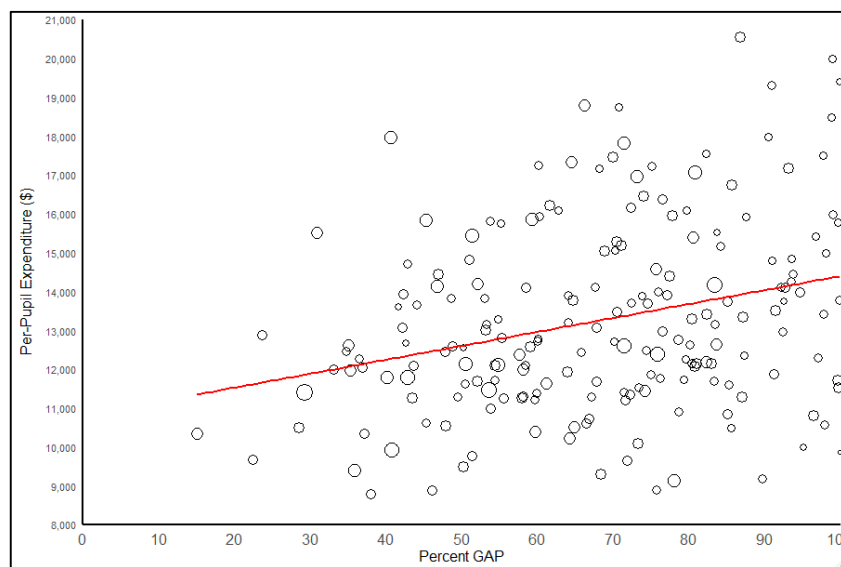


Source: Author's own calculations, Delaware's Report Card (2018).

difference between the 75th and 25th percentiles) below the first quartile or above the third quartile, which is a commonly used approach to identify outliers in administrative data. Whether or not outliers are removed the direction of the slopes (lines of best fit) presented in Figures 8-11 do not change. Appendix B contains a list of outlier schools.

Figure 9 displays the relationship between a school's percentage of students identified as GAP students (horizontal axis) and that school's per-pupil expenditure (vertical axis). The percentage of GAP students in a school ranges between 15.04 and 100 percent of the student body. The positive sloping line of best fit indicates that, on average, per-pupil spending in Delaware increases as the school-level percentage of GAP students increases. Schools in the top quintile of students identified as GAP students spend \$2,098.25 more per-pupil than schools in the first quintile, which is equivalent to 15.97 percent of the weighted average per-pupil expenditure in the state.

Figure 9. School Level Per-Pupil Expenditures by Percentage of Students that are Identified as GAP, Weighted by School Enrollment, 2017-18 School Year (Without Federal Dollars)

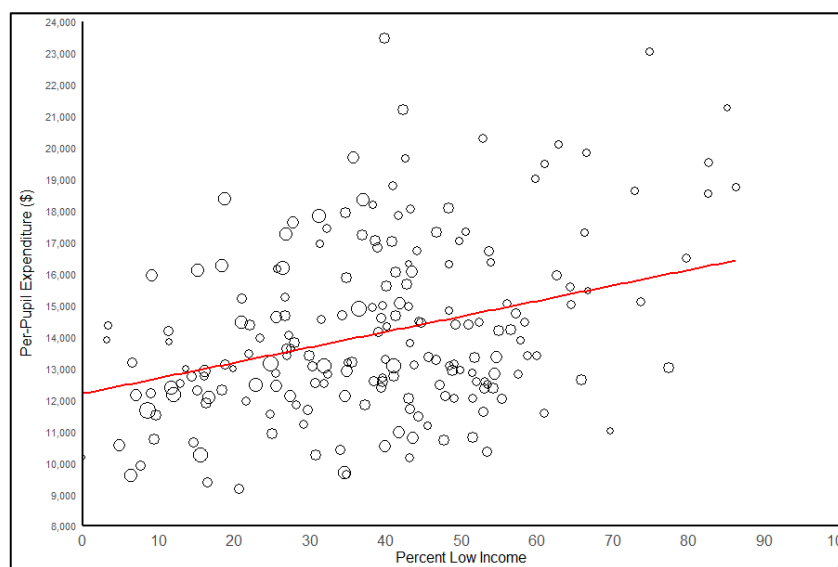


Source: Author's own calculations, Delaware's Report Card (2018).

Figures 10 and 11 repeat the same series of analysis as Figures 8 and 9 with federal funding included in the calculation of per-pupil spending. The patterns are qualitatively similar, although the

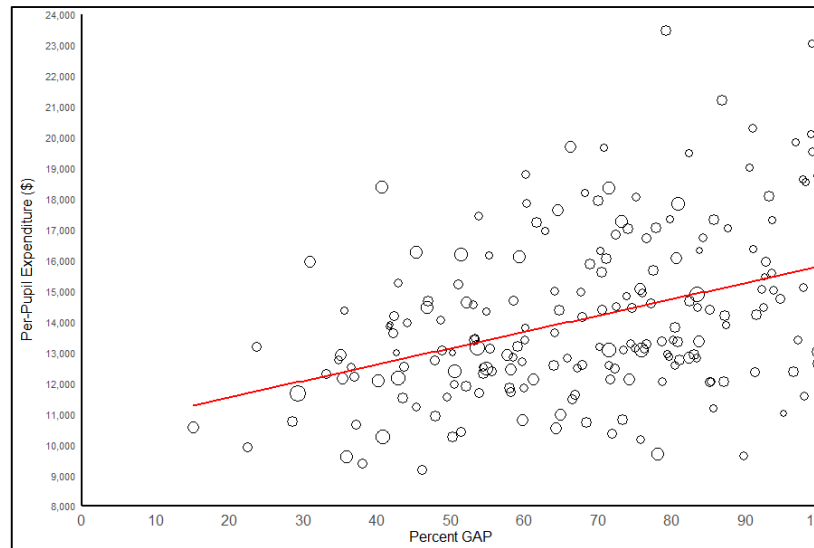
best fit line tends to be more positive (steeper), meaning that per-pupil spending increases at a greater rate as the percentage of low-income or GAP students in a school increases. Schools in the top quintile of students identified as low-income spend \$2,125.73 more per-pupil than schools in the first quintile, which is equivalent to 15.27 percent of the weighted average per-pupil expenditure in the state (Figure 10). Schools in the top quintile of students identified as GAP students spend \$3,019.95 more per-pupil than schools in the first quintile, which is equivalent to 21.69 percent of the weighted average per-pupil expenditure in the state (Figure 11).

Figure 10. School Level Per-Pupil Expenditures by Percentage of Students Identified as Low-Income, Weighted by School Enrollment, 2017-18 School Year (With Federal Dollars).



Source: Author's own calculations, Delaware's Report Card (2018).

Figure 11. School Level Per-Pupil Expenditures by Percentage of GAP Students, Weighted by School Enrollment, 2017-18 School Year (With Federal Dollars)



Source: Author's own calculations, Delaware's Report Card (2018).

6.c. Delaware's funding system generates substantial funding and is appropriately equalizing across districts

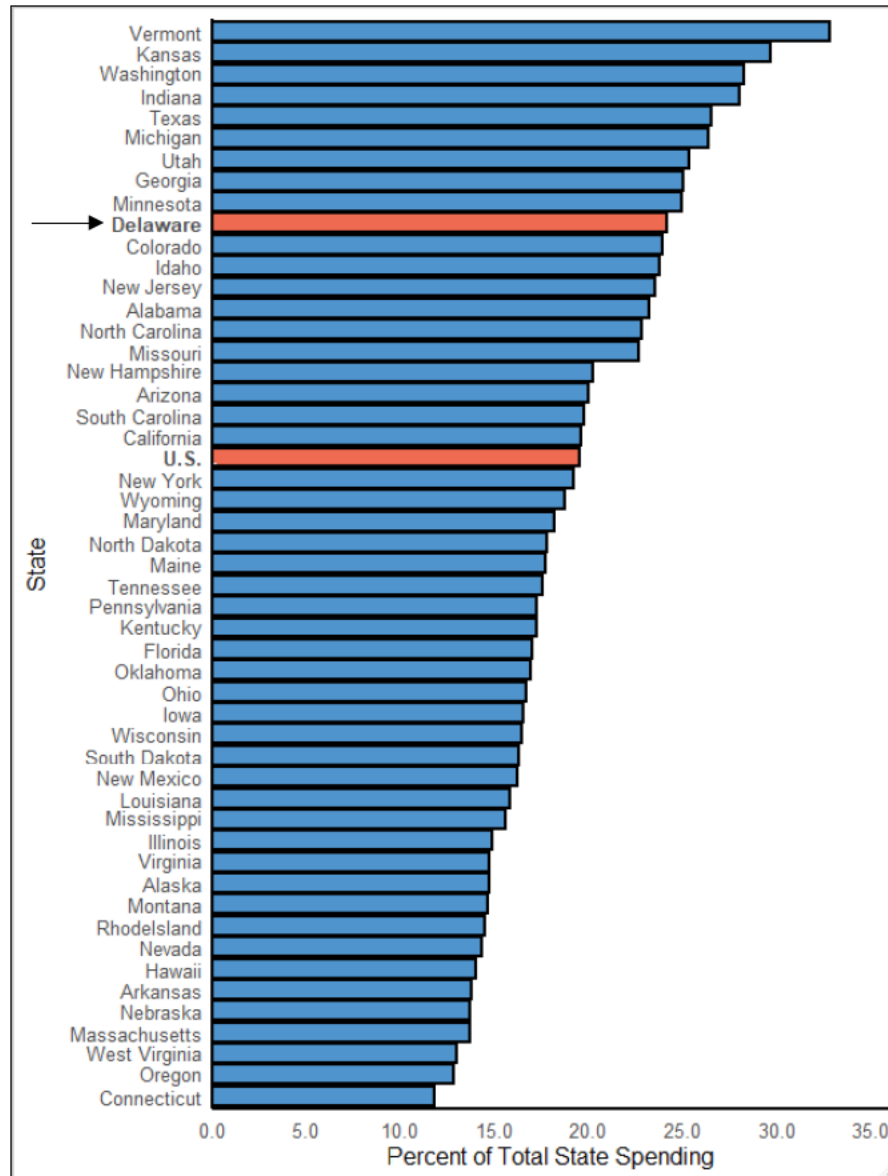
As noted above, Delaware generates and invests a substantial amount of resources into its public elementary and secondary schools and has increased this high level of investment over time. In fiscal year 2019, for example, spending on public elementary and secondary education in Delaware accounted annually for 24.1 percent of the state's total expenditures (National Association of State Budget Officers, 2019).⁷ This investment not only makes public elementary and secondary education the largest spending function in the state but also means that Delaware invests more state dollars on education as a percentage of total state expenditures than 40 states (see Figure 12). The

⁷ In fiscal year 2020, the state allocated over 35 percent of *general fund revenue* on elementary and secondary public education (Delaware, N.D.c).

relatively high percentage of school funding that is provided by the state is further shown in Figure 13, which delineates the percentage of school funding in a state by local, state, and federal sources.

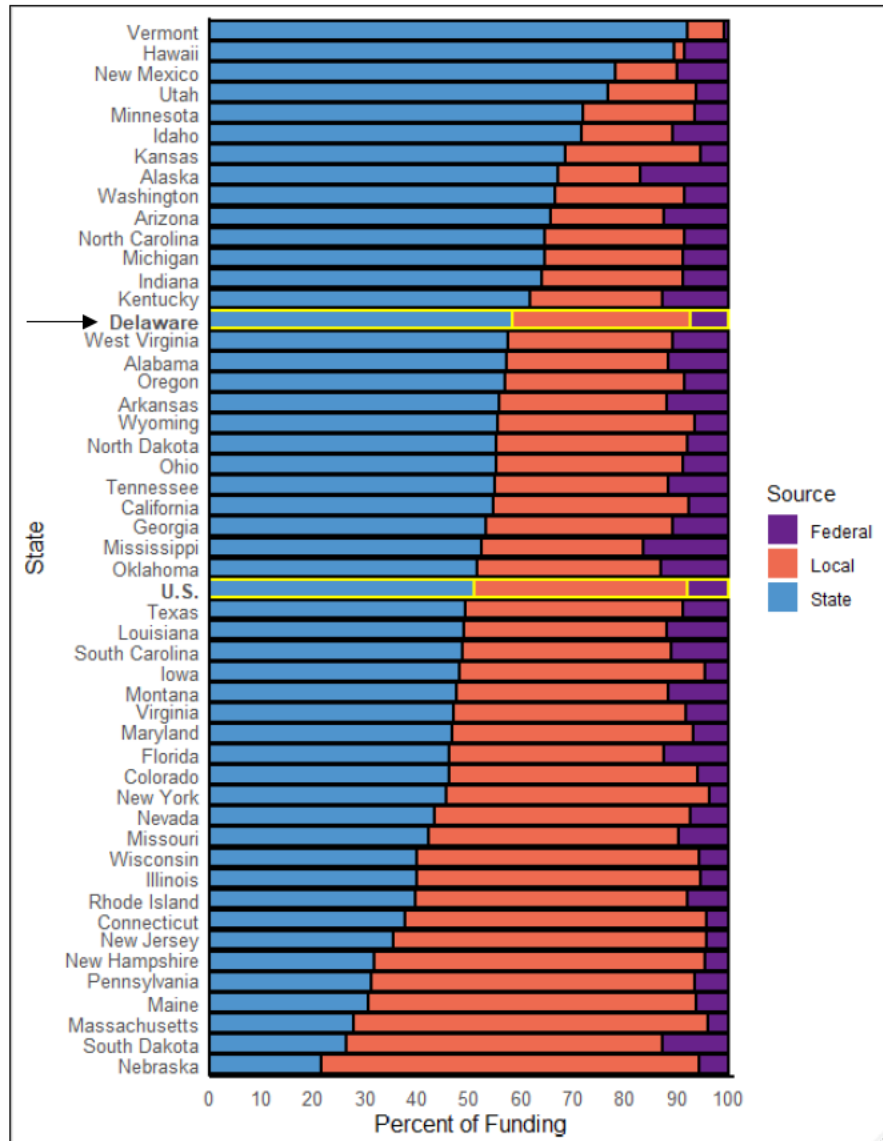
Figure 12. State Spending on Elementary and Secondary Education as a Percent of Total State

Expenditures, Fiscal Year 2019



Source: Author's figure based on National Association of State Budget Officers (2019).

Figure 13. Percent of School Funding by Source, School Year 2015-16.

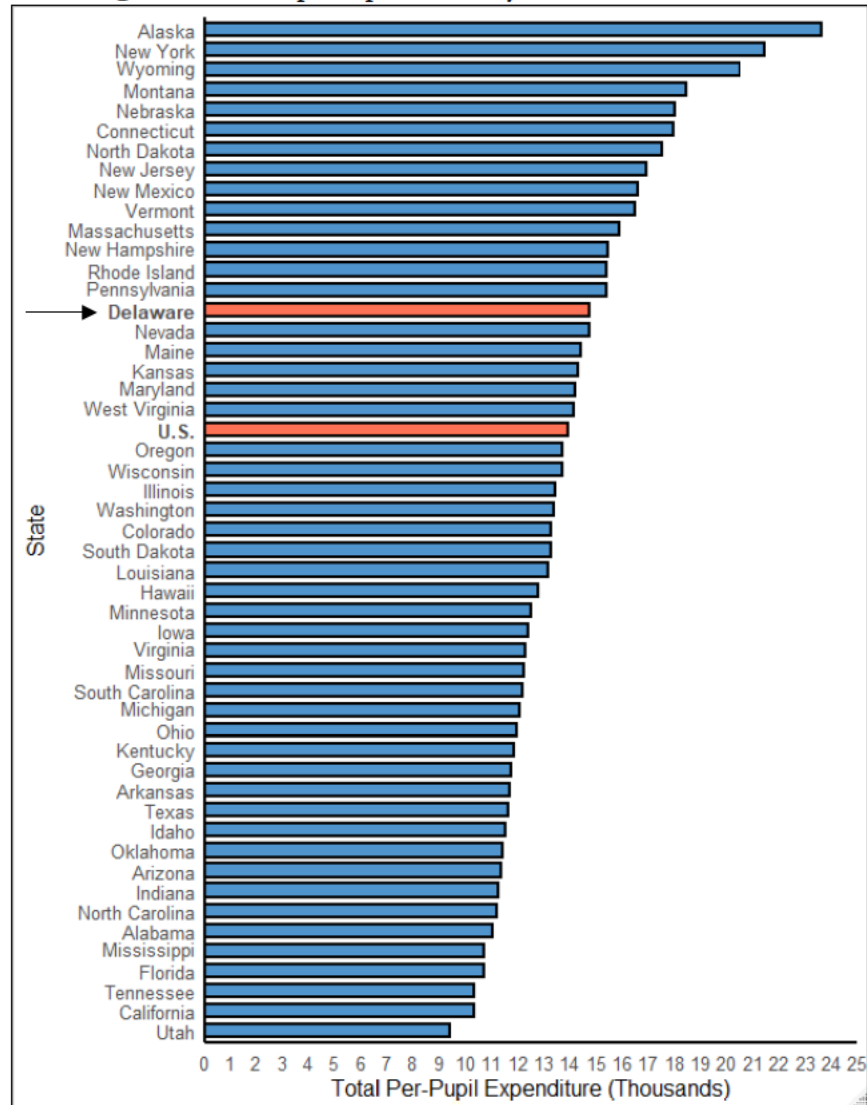


Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Delaware invests a great deal of money in public elementary and secondary schools on a per-pupil basis. As displayed in Figure 14, Delaware spent \$14,739.81 per pupil, or \$829.39 more than

the national average, in the 2014-15 school year. These estimates are adjusted using the National Center for Education Statistics' Comparable Wage Index for Teachers (CWI-FT), which facilitates more accurate comparison of educational expenditures across geographic areas (Cornman, Nixon, Spence, Taylor, and Geverdt, 2019).

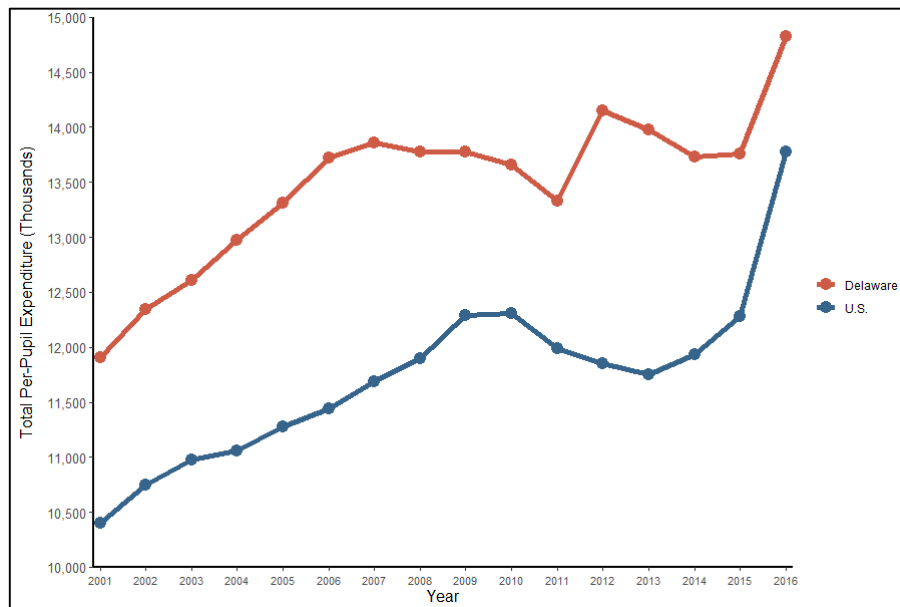
Figure 14. Per-Pupil Expenditures by State, School Year 2014-15



Source. Author's own calculations, School Funding Fairness Data System and the National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Delaware's commitment to public education on a per-pupil spending basis has remained strong over time. As displayed in Figure 15, Delaware spent \$14,825.66 in the 2015-16 school year, which was \$1,045.41 more than the national average. These estimates are adjusted for the cost of inflation opposed to geographic variation as in Figure 14 given that the CWI-FT does not provide adjustments for more historical data or for the more recently released 2015-16 school year data.

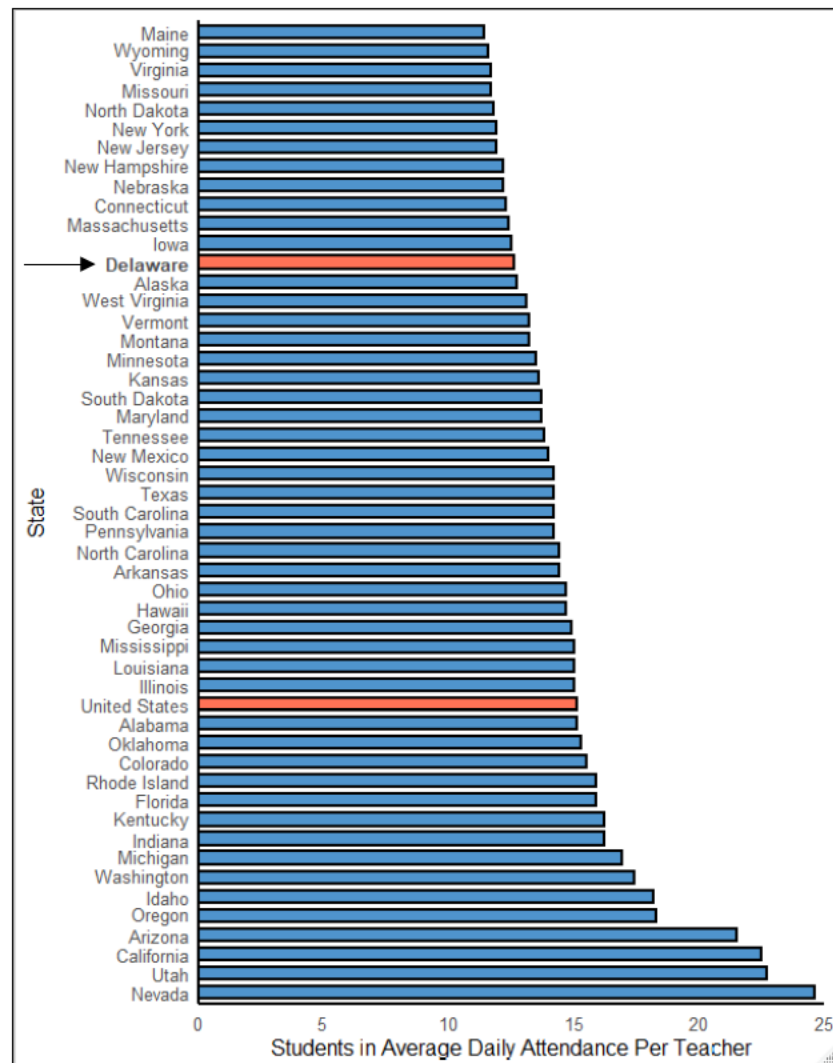
Figure 15. Per-Pupil Spending in Delaware vs. U.S. Average, School Years 2000-01 – 2015-16



Source: Author's own calculations, School Funding Fairness Data System and National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Delaware's investment in public education has also helped to keep student-teacher ratios below the national average (Figure 16). In the United States, students in average daily attendance per teacher ranged between 11.4 (Maine) and 24.6 (Nevada) in the 2015-16 school year. The national average was approximately 15 students per teacher. With a pupil-to-teacher ratio of 12.6, Delaware ranked 13th, making it more favorable than the national average.

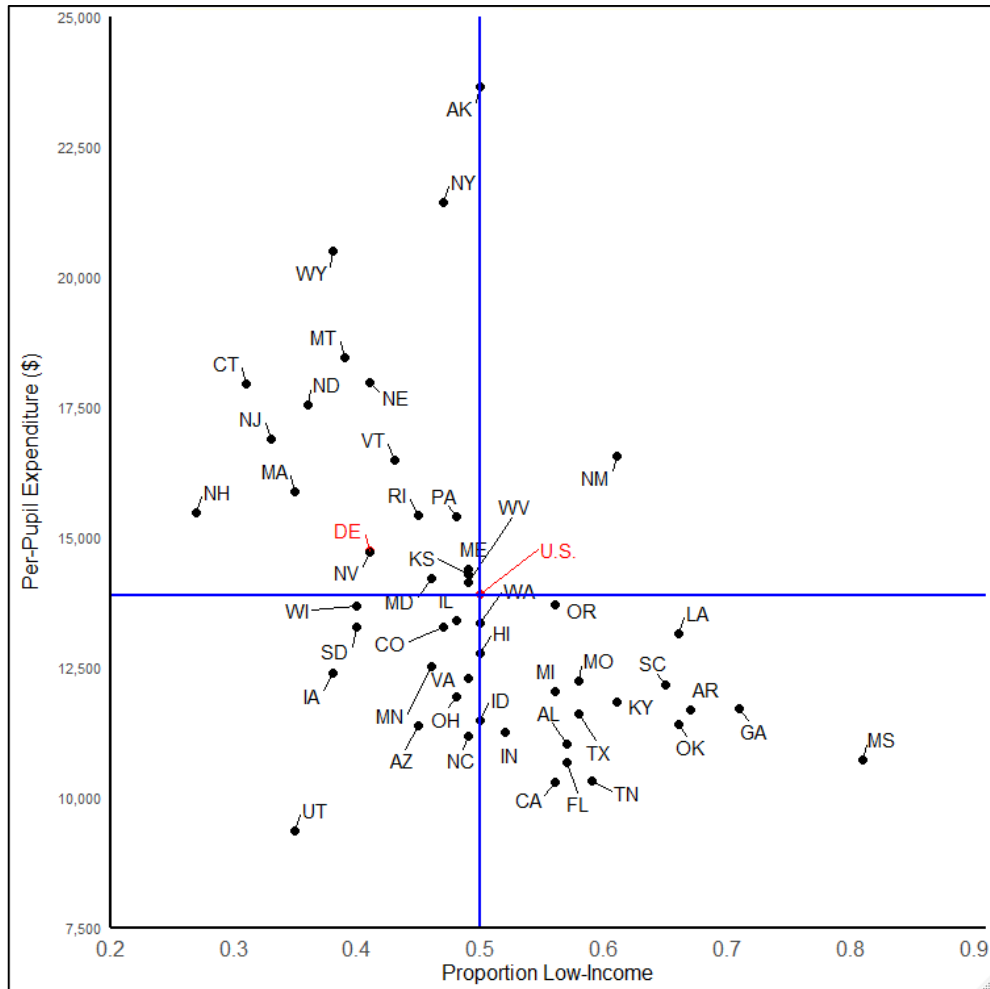
Figure 16. Student-to-Teacher Ratios, 2015-16 School Year



Source: National Education Association's Rankings and Estimates (2017).

Another way to evaluate Delaware's investment in public elementary and secondary schools is to examine the relationship between the proportion of low-income students in a state and a state's per-pupil expenditure relative to the national average. As shown in Figure 17, Delaware is located in the upper left-hand quadrant, indicating that it spends above the national average on a regionally cost adjusted per-pupil basis while having a student body that is less economically disadvantaged than most states.

Figure 17. Relating Proportion of Low-Income Students and Per Pupil Spending, 2014-15 School Year

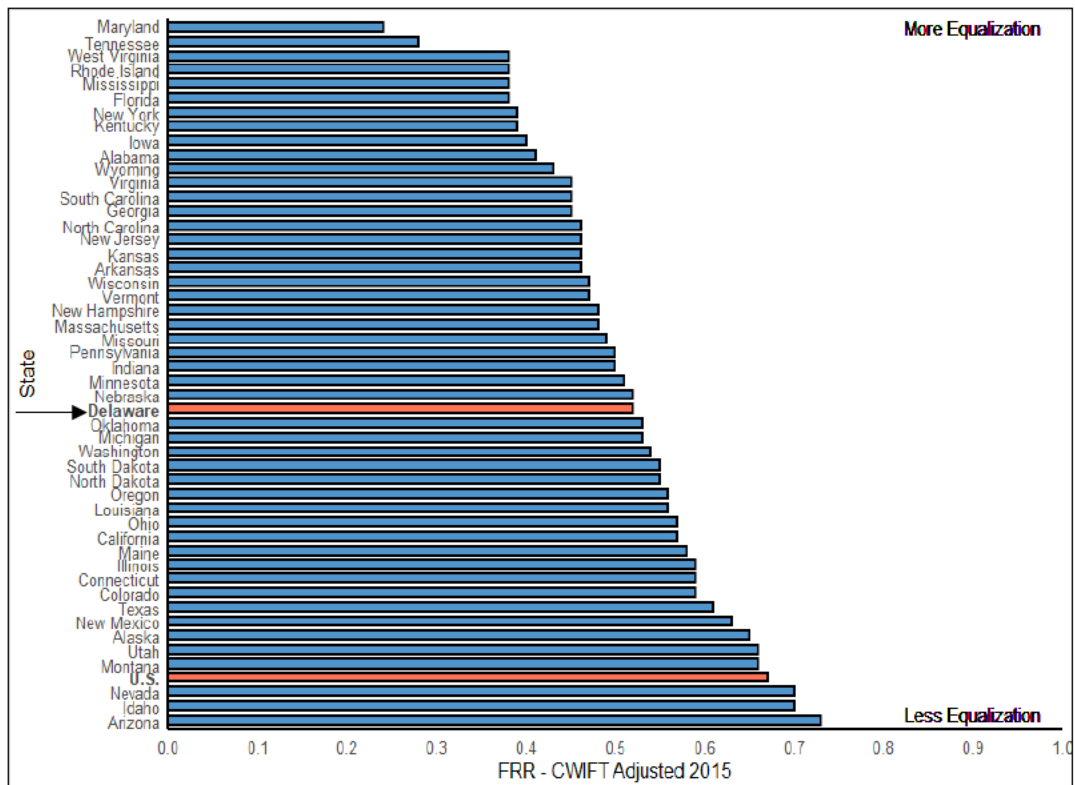


Source: Author's own calculations, School Funding Fairness Data System and National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

To address Plaintiffs' claims that Delaware's funding system is inequitable (*See, e.g.*, Sec. Am. Compl., ¶¶ 28, 36, 43), I calculate a series of commonly-used approaches for measuring inequality, including the Federal Range Ratio; the Gini Coefficient; the McLoone Index; and the Coefficient of Variation (Guthrie, Springer, Rolle, and Houck, 2007; Education Week, 2019). The Federal Range Ratio is defined as the difference between the per-pupil expenditure of the districts at the 95th and 5th

percentiles, divided by the per-pupil expenditure for the district at the 5th percentile. A value of 0 means perfect equity, with increasing values denoting greater levels of disparity. As shown in Figure 18, Delaware's Federal Range Ratio for per-pupil expenditures is in the middle of the national distribution and more favorable than the national average.

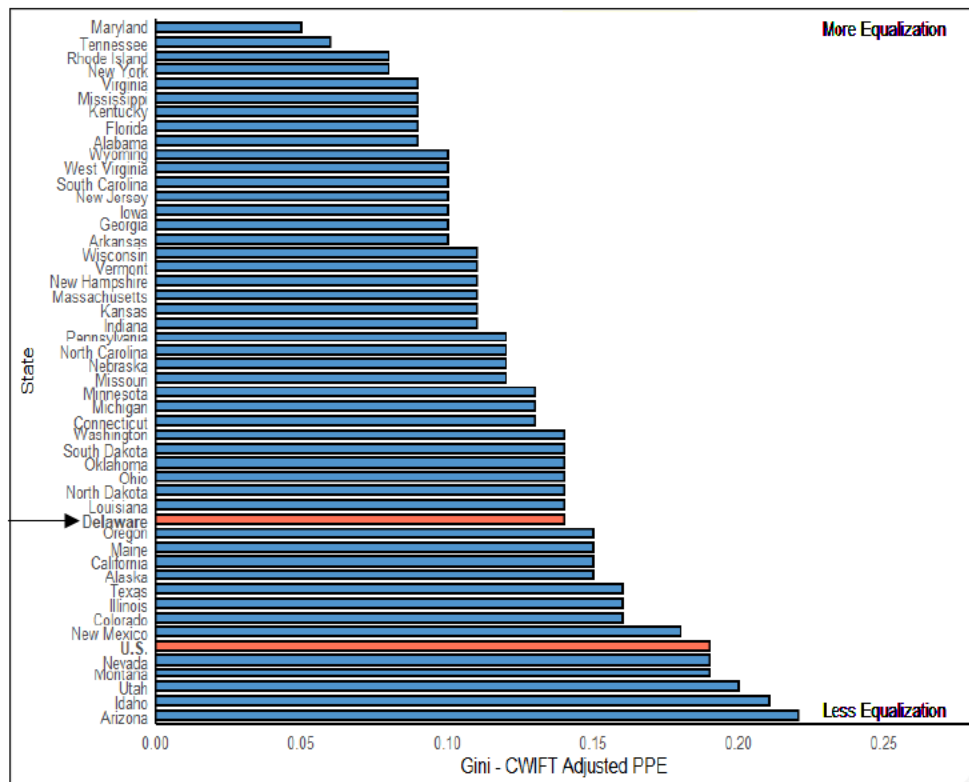
Figure 18. Federal Range Ratio by State, School Year 2015-16



Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

An alternative measure of school funding inequality is the Gini coefficient. A value of 0 means that every school district in a given state has exactly the same per-pupil expenditure. In contrast, a Gini coefficient of 1 represents maximal inequality, meaning that a single school district in that state would receive all of the state's revenue. As shown in Figure 19, Delaware has a Gini coefficient in the middle of the national distribution and more favorable than the national average.

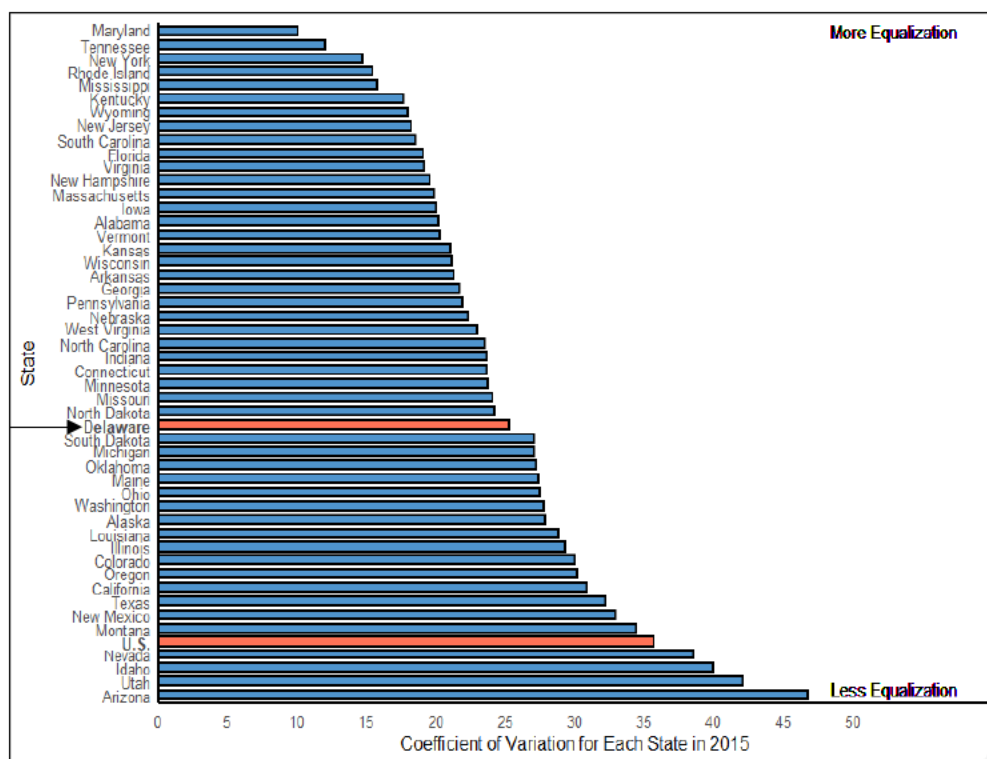
Figure 19. Gini Coefficients by State, School Year 2015-16



Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Figure 20 displays state-level values for the coefficient of variation, which is a measure of statistical dispersion of observations around the mean. It is expressed as the ratio of the standard deviation to the mean for those observations. If the coefficient of variation for a given state's per-pupil expenditures were to be 30 percent, then the average variation from the mean for these expenditures would equal 30 percent of their average value. As the coefficient of variation increases, the overall dispersion of school districts' per-pupil expenditures around the state mean becomes greater, signaling greater disparity in these districts' expenditures in the state. As shown in Figure 20, there is less disparity in Delaware relative to the rest of the nation.

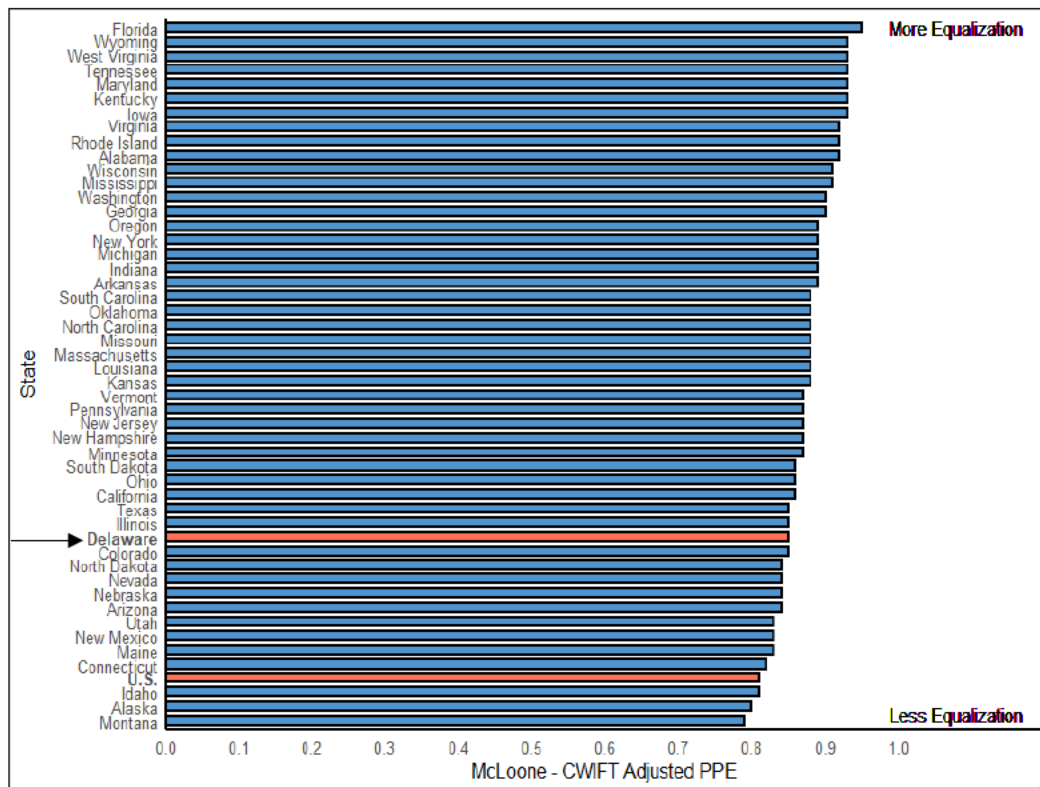
Figure 20. Coefficient of Variation by State, School Year 2015-16



Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Figure 21 displays values for the McLoone Index. The McLoone Index is another useful measure of equity that focuses on the lower half of the per-pupil expenditure distribution; that is, the school districts that spend less than the state median (Guthrie, Springer, Rolle, and Houck, 2007). The McLoone Index is expressed as the ratio of the total amount of spending below the state's median per-pupil expenditure to the amount that would be needed to raise all students to the state median. A McLoone Index of 1 reflects perfect equity, while a value of 0 would denote absolute inequity. As shown in Figure 21, Delaware's McLoone Index of 86 percent is in the middle of the distribution of all states, and estimates that Delaware spends approximately 86 percent of what would be required to raise all students to the median per-pupil expenditure across school districts in the state.

Figure 21. McLoone Index by State, School Year 2015-16



Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

While equity statistics can offer important insight into the distribution of per-pupil expenditures across districts in a state, school finance is increasingly focused on where (and on whom) these dollars are spent. The equity statistics reported in Figures 18 – 21 show that Delaware is generally in the middle of the national distribution and that school funding equalization is more favorable than the national average. However, a more central point is that Delaware's school finance system is highly progressive. Some of the inequity found in Delaware's funding system is a result of more dollars going to disadvantaged schools and students. As such, I am of the opinion that Delaware's finance system is appropriately equalizing and highly progressive.

7. Conclusion

This report analyzes the Delaware school funding system and addresses certain allegations regarding the system as set forth in the Plaintiffs' lawsuit, *In Re Delaware Public Schools Litigation*. In general, the Plaintiffs assert that the state's funding system does not meet the state constitutional requirement of a "general and efficient system of free public schools" (Sec. Am. Compl., ¶ 1). Plaintiffs claim that the system "fails to provide all low-income children, children with disabilities, and children whose first language is not English (collectively, "Disadvantaged Students") with a meaningful opportunity to obtain an adequate education" (Sec. Am. Compl., ¶ 5).

Based on my experience in education finance, analysis of local, state, and national school finance data, and review of relevant literature and reports, I have formed the following opinions to a reasonable professional certainty:

- Delaware's funding system has appropriate funding structures and flexibility that are commonly found in state funding systems;
- Delaware's funding system is highly progressive, meaning that districts and schools with a larger share of disadvantaged students, on average, spend more per pupil than districts and schools with a smaller share of such students; and
- Delaware's funding system generates substantial funding and is highly equalizing across school districts.



Matthew G. Springer

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- Hanover Research (2015). *Benchmarking State K-12 Funding Models: Prepared for the Delaware Department of Education*. Arlington, VA: Author.
- Imazeki, J. (2018). *Adequacy and State Funding Formulas: What Can California Learn from the Research and National Context?* Palo Alto, CA: PACE.
- Levin, J., Manship, K., Hurlburt, S., Atchison, D., Yamagushi, R., Hall, A., Stullich, S. (2019). *Districts’ Use of Weighted Student Funding Systems to Increase School Autonomy and Equity: Findings from a National Study*. Washington, DC: U.S. Department of Education.
- National Association of State Budget Officers (2019). *2019 State Expenditure Report: Fiscal Year 2017 – 2019*. Washington, DC: Author.
- National Center for Education Statistics (2018). *Local Education Agency (School District) Finance Survey (F-33) Data*. Washington, DC: Author. [data file]
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- Roza, M. (2019). *Weighted Student Funding is on the Rise. Here’s What We Are Learning*. Inside IES Research Blog. Washington, DC: U.S. Department of Education.
- Springer, M.G. and Guthrie, J.W. (2007). The Politicization of the School Finance Legal Process. In M.R. West and P.E. Peterson (Eds.). *School Money Trials: The Legal Pursuit of Educational Adequacy*. Washington, DC: Brookings Institution Press.

- United States Department of Education (2020). The Condition of Education: Glossary. Washington, DC: Author. <https://nces.ed.gov/programs/coe/glossary.asp#nationalschoollunch>
- Verstegan, D.A. (2011). Public Education Finance Systems in the United States and Funding Policies for Populations with Special Educational Needs. *Education Policy Analysis Archives*, 19(21).

Appendix A

CURRICULUM VITAE

MATTHEW G. SPRINGER

University of North Carolina – Chapel Hill
CB 3500 Peabody Hall
Chapel Hill, NC 27599-3500
(615) 970-0190 cell
Email: mgspringer@unc.edu

Specialization: Education Policy; Accountability; Incentives; Compensation; Causal Inference

Rankings: h-index: 29; i10-index: 38

EDUCATION

- 2006 Vanderbilt University, Peabody College, Nashville, Tennessee. Ph.D. Major Field: Education Finance and Policy. Dissertation: “No Child Left Behind and Achievement Tradeoffs.”
- 1998 Denison University, Granville, Ohio. Major Fields: Education and Psychology. Degree Awarded: B.A. with honors. State certified psychology and sociology teacher.

PROFESSIONAL EXPERIENCE

- 2018 – present Robena and Walter E. Hussman, Jr. Distinguished Professor of School Reform; Associate Professor of Education, Evaluation, and Public Policy; Chair, Department of Education Policy and Organizational Leadership. University of North Carolina – Chapel Hill
- 2017 – 2018 Associate Professor of Public Policy and Education. Department of Leadership, Policy, and Organizations. Peabody College, Vanderbilt University.
- 2010 – 2016 Assistant Professor of Public Policy and Education. Department of Leadership, Policy, and Organizations. Peabody College, Vanderbilt University.
- 2010 – 2014 Director. Tennessee Consortium for Research, Evaluation, and Development [Tennessee Education Research Alliance].
- 2006 – 2012 Director. National Center on Performance Incentives.
- 2006 – 2010 Research Assistant Professor of Public Policy and Education. Department of Leadership, Policy, and Organizations. Peabody College, Vanderbilt University.
- 2005 – 2006 Assistant Director for Policy Research. Peabody Center for Education Policy.
- 2005 – 2006 Project Director. National Center on School Choice.
- 2001 – 2002 Associate Dean of Students, Service-Learning Director, and teacher. Darrow School. New Lebanon, New York.

1998 – 2001 Assistant Dean of Students, Service-Learning Director, and teacher. Darrow School. New Lebanon, New York.

HONORS AND AFFILIATIONS

2019 Johnston Teaching Excellence Award. University of North Carolina – Chapel Hill

2019 Chancellor’s Entrepreneurship Scholar, University of North Carolina – Chapel Hill

2017 Faculty Excellence Award for Research and Service to the Field. Peabody College of Vanderbilt University

2017 Outstanding Article of the Year Award. National Education Finance Academy.

2007 – 2017 Faculty Fellow. Vanderbilt University’s Experimental Education Research Training Program.

2012 Outstanding Policy Report. American Education Research Association

2006 – 2012 Research Fellow. National Center on School Choice.

2010 – 2012 Education Policy Fellow. The George W. Bush Institute.

2008 Benefactor of the Commons Award. Vanderbilt University.

2007 Award for Excellence in Research. Vanderbilt University’s Learning Sciences Institute.

2005 Outstanding Educator Honoree. Peabody College, Vanderbilt University.

2002 – 2005 Research Fellowship. Peabody College, Vanderbilt University.

1998 – 2002 Founding Director. Program for Service-Learning and the Environment. Awarded CSEE’s Outstanding Service-Learning Program Award.

1998 Inducted into National Education Honor Society.

PUBLICATIONS:

*alphabetical ordering of authorship; #graduate student

Journal Articles

#Pearman, A., **Springer, M.G.**, Lipsey, M., Lachowicz, M., Swain, W.A., Farran, D. (forthcoming). Exploring the Persistence of Pre-K Effects. *Journal for Research on Educational Effectiveness*.

Rodriguez, L.A., Swain, W.A. and **Springer, M.G.** (forthcoming). Sorting through Performance Evaluations: The Effect of Performance Ratings on Teacher Labor Market. *American Educational Research Journal*.

#Pham, L., #Nguyen, T., and **Springer, M.G.** (forthcoming). Teacher Merit Pay: A Meta-Analysis. *American Educational Research Journal*.

Springer, M.G. (forthcoming). You Get What You Pay For? The Need for Strategic Compensation Reform. *Peabody Journal of Education*.

- #Swain, W.A., #Rodriguez, L.A., **Springer, M.G.** (2019). Selective Teacher Retention Bonuses: Evidence from the Governor's Retention Bonus Program. *Economics of Education Review*, 68, 148-160.
- *Koedel, C., #Li, J., and **Springer, M.G.**, #Tan, L. (2019). Teacher Performance Ratings and Professional Improvement. *Journal of Research on Educational Effectiveness*, 12(1), 90-115.
- #Joshi, E., #Doan, S., and **Springer, M.G.** (2018). Student-Teacher Race Match: New Evidence and Insight from Tennessee. *AERA Open*, 4(4), 1-25.
- *Koedel, C., #Li, J., **Springer, M.G.**, #Tan, L. (2017). The Impact of Performance Ratings on Job Satisfaction for Public School Teachers. *American Educational Research Journal*, 54(2), 241-278.
- *Ballou, D. and **Springer, M.G.** (2017). Has NCLB Encouraged Educational Triage? Accountability and the Distribution of Achievement Gains. *Education Finance and Policy*, 12(1), 77-106.
- Springer, M.G.**, #Swain, W., and #Rodriguez, L. (2016). Effective Teacher Retention Bonuses: Evidence from Tennessee. *Educational Evaluation and Policy Analysis*, 38(2), 199-221.
- ***Springer, M.G.** and Taylor, L.L. (2016). Designing Incentives for Public School Teachers: Evidence from a Texas Incentive Pay Program. *Journal of Education Finance*, 41(3), 344-381. [awarded Outstanding Article of the Year, National Education Finance Academy]
- #Swain, W., **Springer, M.G.**, Hofer, K.G. (2015). The Persistence of Pre-K Effects and Early Grade Teacher Quality: Evidence from the Tennessee-Voluntary Pre-K Experiment. *AERA Open*, 1(4), 1-17. [top 10 AERA Open article of 2015].
- Springer, M.G.**, #Rosenquist, B., and #Swain, W. (2015). Monetary vs. Non-Monetary Incentives. Experimental Evidence from After-School Tutoring Student Attendance Interventions. *Journal of Research on Educational Effectiveness*, 8(4), 453-474.
- Steele, J., Pepper, M.J., **Springer, M.G.**, and Lockwood, J.R. (2015). The Distribution and Mobility of Effective Teachers. *Economics of Education Review*, 48, 86-101.
- *Ballou, D. and **Springer, M.G.** (2015). Using Student Test Scores to Measure Teacher Performance: Some Problems in the Design and Implementation of Evaluation Systems. *Educational Researcher*, 44(2), 77-86. [top 10 ER article of 2015].
- *#Balch, R. and **Springer, M.G.** (2015). Performance Pay, Test Scores, and Student Learning Objectives. *Economics of Education Review*, 44, 114-125.
- Springer, M.G.**, Pepper, M., and Ghosh-Dastidar, B. (2014). Supplemental Educational Services and Student Test Scores: Evidence from a Large, Urban School District. *Journal of Education Finance*, 39(4), 370-403.
- Springer, M.G.**, Ballou, D., and #Peng, A. (2014). Impact of the Teacher Advancement Program on Student Test Scores Gains. *Education Finance and Policy*, 9(2), 193-230.
- Yuan, K., Le, V., McCaffrey, D.F., Marsh, J.A., Hamilton, L., Stecher, B., and **Springer, M.G.** (2013). Incentive Pay Programs Do Not Affect Teacher Motivation or Reported Practices: Results from Three Randomized Studies. *Educational Evaluation and Policy Analysis*, 35(1), 3-22. [top EEPA article of 2013; top 10 AERA article of 2013].
- Springer, M.G.**, Pane, J., Le, V., McCaffrey, D., Burns, S.F., Hamilton, L., and Stecher, B. (2012). Team Pay for Performance: Experimental Evidence from the Round Rock Pilot Project on Team Incentives. *Educational Evaluation and Policy Analysis*, 34(4), 367-390.

- Han, B., McCaffrey, D., **Springer, M.G.**, and Gottfried, M. (2012). Teacher Effect Estimates and Decision Rules for Establishing Student-Teacher Linkages: What are the Implications for High-Stakes Personnel Policies in an Urban School District. *Statistics, Politics, and Policy*, 3(2), 1-22.
- Ballou, D., **Springer, M.G.**, McCaffrey, D.F., Lockwood, J.R., Stecher, B., and Hamilton, L. (2012). POINT/CounterPOINT: The View from the Trenches of Education Policy Research. *Education Finance and Policy*, 7(2), 170-202.
- *Podgursky, M. and **Springer, M.G.** (2011). Teacher Compensation Systems in the United States K-12 Public School System. *National Tax Journal*. 64(1), 165-192.
- Springer, M.G.**, #Liu, K. and Guthrie, J.W. (2009). The Impact of School Finance Litigation on Resource Distribution: A Comparison of Court-Mandated Equity and Adequacy Reform. *Education Economics*, 17(4), 421 – 444.
- *Podgursky, M., Smith, J.R., and **Springer, M.G.** (2008). A New Defendant at the Table: An Overview of Missouri School Finance and Recent Litigation. *Peabody Journal of Education*, 83(2), 174-197.
- Springer, M.G.** (2008). Accountability Tales: Do Schools Practice Educational Triage? *Education Next*, 8(1), 74-79.
- Springer, M.G.** (2008). The Influence of an NCLB Accountability Plan on the Distribution of Student Test Score Gains. *Economics of Education Review*, 27(5), 556-563.
- *Podgursky, M. and **Springer, M.G.** (2007). Teacher Performance Pay: A Review. *Journal of Policy Analysis and Management*, 26(4), 909-950.
- *Guthrie, J.W. and **Springer, M.G.** (2007). Courtroom Alchemy: Adequacy Advocates Turn Guesstimates into Gold. *Education Next*, 7(1), 20-27.
- Springer, M.G.**, Houck, E. Ceperley, P., and Hange, J. (2007). Revenue Generation and Resource Allocation and Deployment Practices in Smaller Learning Communities: Lessons Learned from Three High Schools. *Journal of Education Finance*, 32(4), 443-469.
- Podgursky, M. and **Springer, M.G.** (2006). K-12 Public School Finance in Missouri: An Overview. *Federal Reserve Bank of St. Louis Regional Economic Development*, 2(1), 31-50.
- *Podgursky, M. and **Springer, M.G.** (2007). Credentials versus Performance: Review of the Teacher Performance Pay Research. *Peabody Journal of Education*, 82(4), 551-573.
- Guthrie, J.W. and **Springer, M.G.** (2004). Returning to Square One: From *Plessy* to *Brown* and Back to *Plessy*. *Peabody Journal of Education*, 79(2), 5-32.
- *Guthrie, J.W. and **Springer, M.G.** (2004). A Nation at Risk Revisited: “Wrong” Reasoning Sometimes Result in “Right” Rules? At What Cost? *Peabody Journal of Education*, 79(1), 7-35.

Books

- *Berends, M., Primus, A., and **Springer, M.G.** (eds., 2019). *Handbook of Research on School Choice*. New York, NY: Taylor and Francis Group.
- Springer, M.G.** (ed., 2010). *Performance Incentives: Their Growing Impact on American K-12 Education*. Washington, DC: Brookings Institution Press.
- Berends, M., **Springer, M.G.**, Ballou, D., and Walberg, H.J. (eds., 2009). *Handbook of Research on School Choice*. New York, NY: Taylor and Francis Group.

Guthrie, J.W., **Springer, M.G.**, Rolle, A.R., and Houck, E.A (2007). *Modern Education Finance and Policy*. Englewood Cliffs, NJ: Allyn & Bacon.

*Berends, M., **Springer, M.G.**, and Walberg, H. (eds., 2007). *Charter School Outcomes*. New York, NY: Taylor and Francis Group.

*Berends, M., Langevin, W., and **Springer, M.G.** (eds., 2007). *Policy, Politics, and Organization of School Choice*. Mahwah, NJ: Lawrence Erlbaum Associates.

*Guthrie, J.W. and **Springer, M.G.** (eds., 2005). *Rendering School Resources More Effective: Unconventional Responses to Long-Standing Issues*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Book Chapters

Gegenheimer, K. and **Springer, M.G.** (2019). Voucher Outcomes. In Berends, M., Primus, A., and Springer, M.G. *Handbook of Research on School Choice*. New York, NY: Taylor and Francis Group.

Springer, M.G., Houck, E.A., and Guthrie, J.W. (2015). History and Scholarship of United States Education Finance and Policy. In H. Ladd and P. Goertz (eds.), *Handbook of Research on Education Finance and Policy*. Mahwah, NJ: Lawrence Erlbaum Associates, 3-23.

Springer, M.G. (2011). *Establishing a Framework for Evaluation and Teacher Incentives: Considerations for Mexico*. Paris: Organisation for Economic Co-Operation and Development.

Springer, M.G. and #Balch, R. (2010). Design Components of Incentive Pay Programs in the Education Sector. In S. Sclafani (ed.), *Teacher Incentives and Stimuli*. Paris: Organisation for Economic Co-Operation and Development.

Taylor, L.L., **Springer, M.G.**, and Ehlert, M. (2010). Characteristics and Determinants of Teacher-Designed Incentive Pay Programs: Evidence from Texas' Governor Educator Excellence Grant Program. In M.G. Springer (ed.), *Performance Incentives: Their Growing Impact on American K-12 Education*. Washington, DC: Brookings Institution Press.

Springer, M.G., Pepper, M., #Gardner, C. and #Bower, C. (2009). Supplemental Education Services and No Child Left Behind. In M. Berends, M.G. Springer, D. Ballou, and H.J. Walberg (eds.), *Handbook of Research on School Choice*. Mahwah, NJ: Lawrence Erlbaum Associates.

Springer, M.G., Houck, E.A., and Guthrie, J.W. (2007). History and Scholarship of United States Education Finance and Policy. In H. Ladd and T. Fiske (eds.), *Handbook of Research on Education Finance and Policy*. Mahwah, NJ: Lawrence Erlbaum Associates, 3-23.

Springer, M.G. and Guthrie, J.W. (2007). Adequacy's Politicization of the School Finance Legal Process. In M. West and P. Peterson (eds.), *School Money Trials: The Legal Pursuit of Educational Adequacy*. Washington, DC: Brookings Institution Press, 102 – 130. [cited in US Supreme Court decision on school finance].

Springer, M.G. and Guthrie, J.W. Finance Inequality (2006). In K. Borman, S. Cahill, and B. Cotner. *An American High School: An Encyclopedia*. Westport, CT: Greenwood Publishing.

Guthrie, J.W. and **Springer, M.G.** Administration (2006). In K. Borman, S. Cahill, and B. Cotner. *An American High School: An Encyclopedia*. Westport, CT: Greenwood Publishing.

Policy Reports

Ballou, D., Canon, K., Ehlert, M., Wu, W.W., Doan, S., Taylor, L., Springer, M.G. (2016). Final Evaluation Report: Tennessee's Strategic Compensation Programs Findings from

- Implementation and Impact: 2010-2016. Nashville, TN: Tennessee Education Research Alliance.
- Ehlert, M., Pepper, M.J., Parsons, E., Burns, S.F., and **Springer, M.G.** (2014). Educator Evaluation in Tennessee: Initial Findings from the 2013 First to the Top Survey. Nashville, TN: Tennessee Consortium on Research, Evaluation, and Development.
- Pepper, M.J., Burns, S.F., and **Springer, M.G.** (2013). Educator Evaluation in Tennessee: Preliminary Findings from the 2012 First to the Top Survey. Nashville, TN: Tennessee Consortium on Research, Evaluation, and Development.
- Springer, M.G.**, Ballou, D., Hamilton, L., Le, V., Lockwood, J.R., McCaffrey, D., Pepper, M.J., and Stecher, B. (2013). *Teacher Pay for Performance: Experimental Evidence from the Project on Incentives in Teaching*. Nashville, TN: National Center on Performance Incentives.
- Lewis, J., Greenslate, C.M., and **Springer, M.G.** (2013). A Review of the Tennessee Assessment Landscape: Current Practices, Perceptions, and Future Directions. Nashville, TN: Tennessee Consortium on Research, Evaluation, and Development.
- Marsh, J.A., **Springer, M.G.**, McCaffrey, D.F., Yuan, K., Epstein, S., Koppich, J., Kalra, N. DiMartino, C. and *Peng, A. (2012). A Big Apple for Educators: New York City's Experiment with Schoolwide Performance Bonuses. Santa Monica, CA: RAND. [AERA Outstanding Policy Report Award].
- Pepper, M.J., Burns, S.F., and **Springer, M.G.** (2012). A Review of Tennessee's Educational Data Systems. Nashville, TN: Tennessee Consortium on Research, Evaluation, and Development.
- Canon, K., Greenslate, C., Lewis, J., Merchant, K., and **Springer, M.G.** (2012) Evaluation of Tennessee's Strategic Compensation Programs: Interim Findings on Development, Design, and Implementation. Nashville, TN: Tennessee Consortium on Research, Evaluation, and Development.
- Springer, M.G.**, Ballou, D., Hamilton, L., Le, V., Lockwood, J.R., McCaffrey, D., Pepper, M.J., and Stecher, B. (2010). *Teacher Pay for Performance: Experimental Evidence from the Project on Incentives in Teaching*. Nashville, TN: National Center on Performance Incentives.
- Springer, M.G.**, Stuit, D.A., and Peng, A. (2010). Volatility in School Performance Measures: A Primer. Washington, DC: United States Department of Education's Institute of Education Sciences.
- Springer, M.G.**, Lewis, J.L., Ehlert, M., Podgursky, M., Crader, G., Taylor, L., Gronberg, T., Jansen, D., Lopez, O., and Stuit, D. (2010). *District Awards for Teacher Excellence (D.A.T.E.) Program: Final Evaluation Report*. Austin, TX: Texas Education Agency.
- Springer, M.G.**, Lewis, J.L., Podgursky, M., Ehlert, M., Gronberg, T., Hamilton, L., Jansen, D., Stecher, B., Taylor, L.L., Lopez, O., Peng, A. (2009). *Texas Educator Excellence Grant (TEEG) Program: Year Three Evaluation Report*. Austin, TX: Texas Education Agency.
- Lewis, J. and **Springer, M.G.** (2009). *Effective Technical Assistance Principles: Lessons from Three Performance Pay Programs*. Washington, DC: Center for American Progress.
- Springer, M.G.**, Lewis, J.L., Podgursky, M., Ehlert, M., Taylor, L.L., Lopez, O., and Peng, A. (2009). *Governor's Educator Excellence Grant (GEEG) Program: Year Three Evaluation Report*. Austin, TX: Texas Education Agency.

Lewis, J.L. and **Springer, M.G.** (2008). *Performance Incentives in Texas: Why Schools Chose Not to Participate*. Nashville, TN: National Center on Performance Incentives.

Jacob, B. and **Springer, M.G.** (2007). *Teacher Attitudes on Pay for Performance: A Pilot Study*. Tallahassee, Florida: Florida Education Association.

Springer, M.G. (2005). *Administrator Merit Pay Programs: Performance Indicators and Characteristics Associated with Successful Program Planning, Design, Adoption, and Implementation*. Austin, TX: Austin Independent School District, 1 – 29.

Other Articles

Nguyen, T. and **Springer, M.G.** (forthcoming). Teacher Attrition and Retention: What We Know, What We Can Do, and What More Do We Need. Brookings Institution Chalkboard.

Springer, M.G., Rodriguez, L., Swain, W., and Taylor, L. (2019). What We've Learned about Teacher Compensation Reform in Tennessee. Nashville, TN: Tennessee Education Research Alliance, 1-10.

Rodriguez, L.A. and **Springer, M.G.** (2019). Transforming the Pool of Tenured Teachers in Tennessee. Nashville, TN: Tennessee Education Research Alliance, 1-9.

Springer, M.G. (2019). You Get What You Pay For? The Need for Strategic Compensation Reform. Santa Monica, CA: National Institute for Excellence in Teaching, 1-43.

Springer, M.G. and #Gardner, C.D. (2010). Teacher Pay for Performance: Context, Status, and Direction. *Phi Delta Kappan*, 91(8), 8-15.

Podgursky, M., **Springer, M.G.** and #Hutton, R. (2009). Teacher Training and Preparation in the United States. In P. Peterson, E. Baker, and B. McGaw (eds.), *International Encyclopedia of Education*. New York, NY: Elsevier.

Manuscripts in Preparation

*Hunter, S., and **Springer, M.G.** Does Feedback Matter? *Re&R at Educational Evaluation and Policy Analysis*.

Springer, M.G. and Doan, S. Value-Added and Teacher Accountability: Evidence from a Twin Study Design. *Under-review, Statistics and Public Policy*.

Nguyen, T., Pham, L., Crouch, M. and **Springer, M.G.** The Factors of Teacher Attrition and Retention: An Updated and Expanded Meta-Analysis of the Literature. *Under-review at Education Research Review*.

Rodriguez, L.A., Gegenheimer, K., and **Springer, M.G.** The Effect of Tenure Reform on Teacher Attitudes and Behavior. *Under-review at Educational Policy*.

***Springer, M.G.** and Taylor, L.L. The Effect of Incentive Pay on Teacher Mobility: Evidence from Tennessee.

Sartain, L., Springer, M.G., Brooks, C. Measuring Teacher Effectiveness. *In-progress for Handbook on Economics of Education*.

#Rodriguez, L.A. and **Springer, M.G.** The Impact of Tenure Reform on Student and Teacher Outcomes.

Rodriguez, L. and **Springer, M.G.** Distribution and Mobility of Highly Effective Teachers: An Access Perspective.

Woo, D., Nguyen, T., Weiss, A., Nader, J., and **Springer, M.G.** Charter Satisfaction, Conditions, and Turnover.

PROFESSIONAL PRESENTATIONS

| | |
|----------------|---|
| 2019 | Experimental Design and Student and Teacher Incentives. Presented at Boston University's Wheelock College of Education and Human Development (invited); Students First Coalition (invited); National Institute for Excellence in Teaching; Prodigy – Canada. |
| 2018 – present | Does Feedback Matter? Performance Management and Improvement in Public Education (with S. Hunter). Presented at the Association for Public Policy Analysis and Management; Association of Education Finance and Policy. |
| 2018 – present | The Impact of Tenure Reform on Student and Teacher Outcomes (with L. Rodriguez). Presented at the Association for Education Finance and Policy. |
| 2017 – present | A Meta-Analysis of Teacher Merit Pay (with L. Pham, T. Nguyen). Presented at the Association for Public Policy Analysis and Management; Vanderbilt University; University of North Carolina – Chapel Hill; NC Governor's Commission on Student Success. |
| 2016 – 2017 | Teachers, Schools, and Geographic Contexts: Understanding Pre-K Effect Persistence (with A. Pearman, M. Lachowicz). Presented at the Association for Public Policy Analysis and Management; Society for Research on Educational Effectiveness; University of North Carolina – Chapel Hill (invited). |
| 2015 – 2017 | The Effect of Incentive Pay on Teacher Mobility: Evidence from Tennessee (with L.L. Taylor). Presented at the Association for Public Policy Analysis and Management; Association for Education Finance and Policy, North Carolina BEST (invited); National Education Finance Academy (invited). |
| 2014 – 2017 | The Persistence of Pre-K Effects and Early Grade Teacher Quality (with W. Swain and K. Hofer): Evidence from the Tennessee-Voluntary Pre-K Experiment. Association for Education Finance and Policy; Association for Public Policy Analysis and Management; National Head Start Association (invited); Society for Research on Educational Effectiveness (invited). |
| 2014 – 2015 | Impact of Tennessee's Retention Bonus Program (with W. Swain and L. Rodriguez): Presented at the Albert Shanker Institute (invited); Association for Education Finance and Policy; Association for Public Policy Analysis and Management; Education Writer's Association National Conference (invited); Vanderbilt University. |
| 2014 | Children's Health Insurance and Student Achievement: The Effect of SCHIP on Test Scores (with W. Swain): Presented at the Association for Education Finance and Policy. |
| 2011 – 2013 | Student Incentives and Supplemental Educational Services: Experimental Evidence (with B. Rosenquist and W. Swain). Presented at the American Educational Research Association; Association for Education Finance and Policy; University of Colorado – Colorado Springs (invited); U.S. Department of Education (invited); Vanderbilt University. |

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| 2011 – 2012 | Team Pay for Performance: Experimental Evidence from the Round Rock Pilot Project on Team Incentives (with J. Pane, J.R. Lockwood, D. McCaffrey, et al). Presented at the American Educational Research Association; Association for Public Policy Analysis and Management; Association for Education Finance and Policy; and Vanderbilt University. |
| 2010 – 2012 | Teacher Pay for Performance: Experimental Evidence from the Project on Incentives in Teaching (with D. Ballou, J.R. Lockwood, D. McCaffrey, et al.). Presented at the American Educational Research Association; Association for Public Policy Analysis and Management; Association for Education Finance and Policy, University of Michigan’s Ford School of Public Policy (invited); U.S. Department of Education (invited); Vanderbilt University’s Peabody College. |
| 2008 – 2012 | Teacher Compensation Systems in the United States K-12 Public School System (with M. Podgursky). Presented at the Education Finance Association; Association for Public Policy Analysis and Management; Harvard University’s John F. Kennedy School of Government (invited); Oklahoma House of Representatives; REL MidWest/Learning Point Associations (invited); Trevecca Nazarene University (invited); University of Georgia (invited); University of Texas (invited); Vanderbilt University’s Peabody College. |
| 2008 – 2010 | The Estimated Effects of Supplemental Educational Services on Student Test Scores: Evidence from a Large, Urban School District (with B. Ghosh-Dastidar, M. Pepper). Presented at the American Education Finance Association; Urban Institute (invited); National Center for Education Statistics (invited). |
| 2009 – 2010 | Designing Incentives for Public School Teachers: Evidence from a Texas Incentive Pay Program (with L.L. Taylor). Presented at the U.S. Department of Education’s Institute of Education Sciences (invited); National Governors Association (invited); United States Government Accountability Office (invited). |
| 2008 – 2009 | Achievement Tradeoffs and No Child Left Behind (with D. Ballou). Presented at the American Education Finance Association; American Educational Research Association; Association for Public Policy Analysis and Management; Urban Institute; Vanderbilt University. |
| 2009 | Volatility in School Growth Measures and Implications for School Accountability (with D.F. McCaffrey, D.A. Stuit). Presented at the U.S. Department of Education’s Institute of Education Sciences; Vanderbilt University. |
| 2009 | The Estimated Effect of Texas’ Teacher Pay for Performance Program on Student Test Score Gains (with T. Gronberg, D. Jansen, J. Lewis, et al.). Association for Public Policy Analysis and Management; American Education Finance Association; University of Arkansas (invited); U.S. Department of Education’s Institute of Education Sciences; Vanderbilt University. |
| 2008 | The Political Economy of Teacher Certification and Compensation (with W.E. Langevin). [nominated for MPSA outstanding paper award]. Presented at the Midwest Political Science Association. |

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| 2007 – 2009 | The Impact of the Teacher Advancement Program on Student Test Score Gains: Findings from an Independent Appraisal (with D. Ballou, A. Peng). Presented at the American Education Finance Association; Association for Public Policy Analysis and Management; Harvard University / CESifo (invited); Vanderbilt University. |
| 2006 – 2007 | Teacher Performance Pay: A Review (with M. Podgursky). Presented at the Education Commission of the States (invited); Kauffman Foundation (invited); National Comprehensive Center on Teacher Quality (invited); National Council for Exceptional Children (invited); National Governor's Association (invited); University of Missouri (invited). |
| 2005 – 2007 | The Impact of Education Finance Litigation Reform on Resource Distribution: Is There Anything Special About Adequacy? (with K. Liu, J.W. Guthrie). Presented at the American Education Finance Association; American Educational Research Association; Association for Public Policy Analysis and Management. |

EXTRAMURAL FUNDING

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| Under-review | Principal Investigator. <i>MatchSolution: A Project on Evidence-Based Teacher-Student Assignment</i> . \$1.4 million over 3 years. |
| Under-review | Principal Investigator. <i>Pay for Progress: Improving Teaching and Learning through Incentives</i> . \$3.4 million over 5 years. |
| 2020 - 2027 | Co-Principal Investigator. <i>North Carolina Integrated Care for Kids</i> . Center for Medicaid and Medicare. \$16 million over 7 years. (C. Wong, PI; M. Steiner, Co-PI). [prime contractor Duke Medical Center] |
| 2020 | Principal Investigator. <i>North Carolina Education Futures Initiative Planning Grant</i> . John M. Belk Endowment. \$250,000 over 1 year. (with A. Kelly). |
| 2020 – 2021 | Principal Investigator. Higher Education Project. Highland Vineyard Foundation. \$100,000 (with B. Goldstein). |
| 2014 – 2018 | Co-Principal Investigator. <i>Follow-up through Middle School of a Randomized Study of Public Prekindergarten</i> . National Institute of Child Health and Development. \$3,906,152 over 5 years. |
| 2011 – 2016 | Principal Investigator / Founding-Director. <i>Tennessee Consortium for Research, Evaluation, and Development [Tennessee Education Research Alliance]</i> . U.S. Department of Education's Race to the Top Grant Program and the Tennessee Department of Education. \$3,500,000. |
| 2010 – 2015 | Principal Investigator. <i>Evaluation of Tennessee's TIF Grant – Round III</i> . U.S. Department of Education's Teacher Incentive Fund Program / Tennessee Department of Education. \$2,300,000 over 4 years. |
| 2009 – 2011 | Co-Principal Investigator. <i>Evaluation of New York City's School-Wide Performance Bonus Program</i> . Fund for New York City Schools. \$600,000 (D. McCaffrey, PI; J. Marsh, Co-PI). [prime contractor RAND Corporation] |

| | |
|-------------|---|
| 2007 – 2011 | Principal Investigator. <i>Evaluation of the Texas Governor's Educator Excellence Award: Texas Educator Excellence Grant Program</i> . Texas Education Agency. \$1,850,000 (M. Podgursky, Co-PI). |
| 2006 – 2011 | Principal Investigator / Founding-Director. <i>National Center on Performance Incentives</i> . U.S. Department of Education's Institute of Education Sciences. \$10,000,000 (J. Guthrie, D. Ballou, M. Podgursky, Co-PIs). |
| 2010 | Principal Investigator. <i>The Impact of Teacher Pay for Student Performance on Student Outcomes</i> . Nashville Alliance for Public Education. \$1,000,000. |
| 2008 – 2010 | Principal Investigator. <i>Evaluation of the District Awards for Teaching Excellence Program</i> . Texas Education Agency. \$725,000 (J. Lewis, Co-PI). |
| 2004 – 2010 | Co-Principal Investigator. <i>National Center on School Choice</i> . U.S. Department of Education. Institute of Education Sciences. \$10,000,000 (M. Berends, PI; D. Ballou, E. Goldring, Co-PI). |
| 2008 – 2009 | Principal Investigator. <i>Evaluation of a Team-Level Pay for Performance Program</i> . Michael and Susan Dell Foundation. \$380,000. |
| 2007 – 2009 | Principal Investigator. <i>Performance Incentives: Their Growing Impact on American K-12 Schools</i> . Smith Richardson Foundation. \$180,000. |
| 2006 – 2009 | Principal Investigator. <i>Evaluation of the Texas Governor's Educator Excellence Award Program: Governor's Educator Excellence Grant Program</i> . Texas Education Agency. \$530,000 (M. Podgursky, Co-PI). |
| 2006 – 2009 | Co-Principal Investigator. <i>No Child Left Behind and Achievement Tradeoffs</i> . Smith-Richardson Foundation. \$284,000 (D. Ballou, PI). |
| 2005 | Principal Investigator. <i>Revenue Generation and Resource Allocation and Deployment Practices in Smaller Learning Communities: Lessons from Three High Schools</i> . U.S. Department of Education through subcontract with Appalachian Educational Laboratory. approx. \$25,000 (E. Houck, Co-PI). |

TEACHING

Politics and Policymaking in America's Schools (EDUC – 506; undergraduate)

Incentives and Accountability (EDUC – 840; graduate)

American Professoriate (IDST – 890; graduate with B. Goldstein and K. Guskiewicz)

Introduction to Public Policy (HOD – 1800; undergraduate)

Causal Inference in Public Policy Research [Research Design and Data Analysis II] (LPO – 3800; graduate)

Ph.D. Proseminar (LPO – 3600; graduate)

Resource Allocation and Deployment / School Finance (LPO – 3600; graduate, co-taught as student).

Executive Leadership (HOD – 3900; undergraduate, co-taught as student).

SERVICE:

Public / Professional

| | |
|----------------------|--|
| 2019 | Division L Lifetime Achievement Award Committee, American Educational Research Association |
| 2018 – present | Mentor, APPAM Mentor Matching Program |
| 2011 – 2015, present | SREE proposal review committee |
| 2018 | Program Committee, Association of Public Policy Analysis and Management |
| 2018 | Expert Witness. Florida Best and Brightest Litigation. |
| 2015 – present | Policy Advisory Board, Texas Institute for Education Reform |
| 2015 – 2018 | Board of Directors, Cal Turner Family Foundation. Nashville, TN. |
| 2011 – 2016 | SCORE Prize Selection Committee. Nashville, TN. |
| 2011 – 2012, 2014 | AERA proposal review committee |
| 2013 | Expert testimony on teacher incentive pay systems. New York City Board of Education and United Federation of Teachers. |
| 2013 | Expert testimony on teacher evaluation system. State of New York. |
| 2012 – 2013 | Technical Advisory Committee, RANDA Inc. |
| 2011 | Value-Added Technical Advisory Committee. Florida Department of Education. |
| 2010 – 2012 | Governor’s Commission on the First to the Top Act. State of Tennessee. |
| 2009 – 2013 | Technical Working Group, National Impact Evaluation of the Teacher Incentive Fund. U.S. Department of Education. |
| 2008 – 2012 | Advisory Board. National Governors Association’s Teacher Effectiveness Initiative. |
| 2008 – 2012 | Board of Directors. Chalkboard Project for Education. |
| 2010 – 2012 | Advisory Board. National Education Association’s Institute for Local Innovation and Policy Leadership. |
| 2009 – 2011 | Task Force on Teacher Effectiveness. Nashville Mayor and Director of Schools ASSET Reform Initiative. |
| 2009 – 2010 | Program Committee, Division L - Policy and Politics (chair). American Education Research Association. |
| 2008 – 2009 | Technical Expert, <i>Committee for Educational Equality, et al. v. State of Missouri, et al.</i> |
| 2007 – 2010 | ERIC Content Expert on Policy and Management. U.S. Department of Education. |
| 2006 – 2009 | Board of Directors. American Board for Certification of Teacher Excellence. |
| 2009 | Technical Working Group on Growth Curve Models. U.S. Department of Education’s Institute of Education Sciences. |
| 2007 – 2008 | Financial Analyst, <i>Moore v. State of Alaska.</i> |
| 2006 – 2008 | Financial Analyst, <i>Abbeville County School District, et al. v. State of South Carolina.</i> |

| | |
|-------------|---|
| 2008 | Policy Working Group on Educator Incentives. U.S. Department of Education. |
| 2007 | Program Committee. Association for Public Policy Analysis & Management. |
| 2007 | Financial Analyst, <i>Tyler Young, et. al. v. Daniel L. Williams, et. al. and Related Action.</i> |
| 2006 | Technical Advisor. Governor's Educator Excellence Award Programs. State of Texas. |
| 2005 | Advisory Committee. Principal Pay for Performance Program. Austin Independent School District. |
| 2005 | Program Committee. American Education Finance Association. |
| 2001 – 2003 | Board of Directors. Berkshire Habitat for Humanity. |

Departmental / University

| | |
|----------------|---|
| 2019 – present | Area Chair, Education Policy and Organizational Leadership, School of Education |
| 2019 – present | Curriculum committee, School of Education |
| 2019 | Tanner and Friday Teaching Award Committee, University |
| 2018 | Member, Faculty Search Committee. Educational Leadership and Policy, School of Education |
| 2017 | Chair, Faculty Search Committee. K-12 Leadership and Policy, School of Education |
| 2015 – 2018 | Coordinator, Education Policy track (undergraduate) |
| 2007 – 2018 | Masters of Public Policy Admissions Committee |
| 2016 – 2018 | Ph.D. Steering Committee |
| 2015 – 2017 | Coordinator, LPO Research Colloquium Series |
| 2015 | Faculty Search Committee. K-12 Leadership and Policy |
| 2008 – 2010 | Research Advisory Board. Vanderbilt's Learning Sciences Institute |
| 2007 – 2009 | Advisory Board. Vanderbilt Institute for Clinical and Translational Research |
| 2004 | Program Planning Committee (co-chair). National Conference on Revisiting <i>Brown v. Board of Education</i> hosted by Peabody College |
| 2004 | Program Committee. National Conference of Education Writers Association hosted by Peabody College |
| 2003 – 2006 | Associate Editor. <i>Peabody Journal of Education</i> |

Dissertation Committees

| | |
|-------|---|
| Ph.D. | Sy Doan (2019); Emily Kern (2019); Luis Rodriguez (2018, chair); Tuan Nguyen (2018, co-chair); Michael Little (2018); Seth Hunter (2018); Brooks Rosenquist (2018); Richard Blissett (2017); Chris Redding (2017); Walker Swain (2017, chair); Nayan Bose (2015, Econ Dept.); Art Peng (2014); Ryan |
|-------|---|

Balch (2012); Peter Goff (2012); Alex Kurz (2011, Special Education); Meisha Fang (2010); Keke Liu (2010); Karen Herbert (2010, UT-Austin); Coby Meyers (2009; co-chair); David Stuit (2009).

Ed.D. Susan Burns (2009); Cate Gardner (2009); Joyce Meeuwssen (2009).

Referee

AERA Open; American Economic Journal: Policy; American Educational Research Journal; Developmental Psychology; Economics of Education Review; Economic Letters; Educational Researcher; Educational Administration Quarterly; Educational Evaluation and Policy Analysis; Education Finance & Policy; Education Next; Education Policy Analysis Archives; Educational Testing Service; Industrial & Labor Relations Review; Institute of Education Sciences; Journal of Education Finance; Journal of Educational and Behavioral Statistics; Journal of Human Capital; Journal of Human Resources; Journal of Policy Analysis & Management; Journal of Public Economics; Journal of Public Policy Administration & Review; Journal of School Choice; National Comprehensive Center on Teacher Quality; National Tax Journal; Peabody Journal of Education; Policy Studies Journal; Public Administration Review; Psychological Bulletin; Public Policy Institute of California; Psychological Sciences; Smith-Richardson Foundation; Social Sciences and Humanities Research Council – Canada; Social Science Quarterly; Society for the Advancement of Excellence in Education; Urban Education Review.

Media Coverage

ABC World News Tonight; Australian Teacher Magazine; Business Wire; CNN's Lou Dobbs Tonight; CNN Top of the Hour; Christian Science Monitor; Dallas Morning News; Denver Post; Education Week; Futurity; Hechinger Report, Houston Chronicle; Idaho Statesman; National Public Radio; Newsweek; New York Times; ScienceDaily; Stateline.org; Teacher Magazine; Tennessean; Time Magazine; The 74; US News and World Report, USA Today; Wall Street Journal.

March 2020

Appendix B - Outlier Schools

| <i>School Name</i> | <i>District Number</i> |
|---|------------------------|
| Appoquinimink Preschool Center | 29 |
| Bancroft Elementary Middle School | 33 |
| Brandywine SITE | 31 |
| Brennan School | 33 |
| Bush School | 31 |
| Charlton School | 10 |
| Christiana High School | 33 |
| Christina Early Education Center | 33 |
| Colonial Early Education | 34 |
| Delaware School for Deaf | 33 |
| Dover Air Base Middle School (Military Base School) | 10 |
| First State School | 32 |
| Gateway Lab School | 92 |
| GW Carver School | 36 |
| Howard T Ennis | 36 |
| Kent County Community School | 13 |
| Kent County Secondary ILC | 13 |
| Kent Elem School ILC | 10 |
| Leach School | 34 |
| Meadowood | 32 |
| Positive Outcomes Charter School | 71 |
| Richardson Park Learning Center | 32 |
| Sussex Consortium | 17 |
| Wallin School | 34 |
| Welch Elementary School (Military Base School) | 10 |

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Appendix C

Table 1. Types of Federal Education Funding

| Source | Description |
|---|--|
| Title I, Part A | Support for economically disadvantaged students |
| Title II, Part A | Support for teacher and principal training |
| Title III | Support for English learners |
| Title IV, Part B | Support before- and after-school programming (21 st Century Community Learning Centers) |
| Title V, Part D | Support for distressed neighborhoods (Promise Neighborhoods) and counseling programs |
| Title VI, Part B | Support for rural school districts |
| Title VII, Part A | Support for school districts that serve Native students |
| Title VII, Subtitle B | Support for homeless children and youth (McKinney-Vento Act) |
| Head Start | Support for early education programs for low-income families (B-5) |
| Individuals with Disabilities Education Act | Support for special education services |

Source: Every Student Succeeds Act (2015) and Center for Education Policy (2014).

Figure 1. Policy Paradigm for Understanding Modern Education Finance

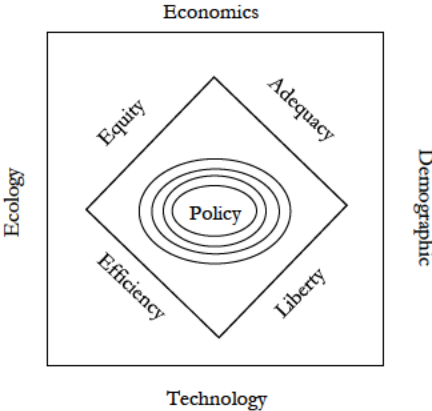


Table 2. Number of Pupils Needed for a District to Qualify for a Funding ‘Unit’

| | |
|--|-------------|
| Preschool | 12.8 |
| K-3 | 16.2 |
| 4-12 Regular Education | 20 |
| 4-12 Basic Special Education (Basic) | 8.4 |
| Pre K-12 Intensive Special Education (Intensive) | 6 |
| Pre K-12 Complex Special Education (Complex) | 2.6 |

Source: Information adapted from Delaware (2020a).

Table 3. Select Examples of Number of Funding Units Needed for a District to Qualify for Building Administrators

| | |
|-----------------------|--|
| Principal | 1 for first 15 or more Div 1 units |
| Assistant Principal 1 | 1 for first 30 or more Div 1 units; 0.65 for 25 to less than 30 Div 1 units |
| Assistant Principal 2 | 1 for first 55 or more Div 1 units; 0.65 for 50 to less than 55 Div 1 units |
| Assistant Principal 3 | 1 for first each 20 Div 1 units beyond the first 55 Div 1 units |

Source: Information adapted from Delaware (2020a).

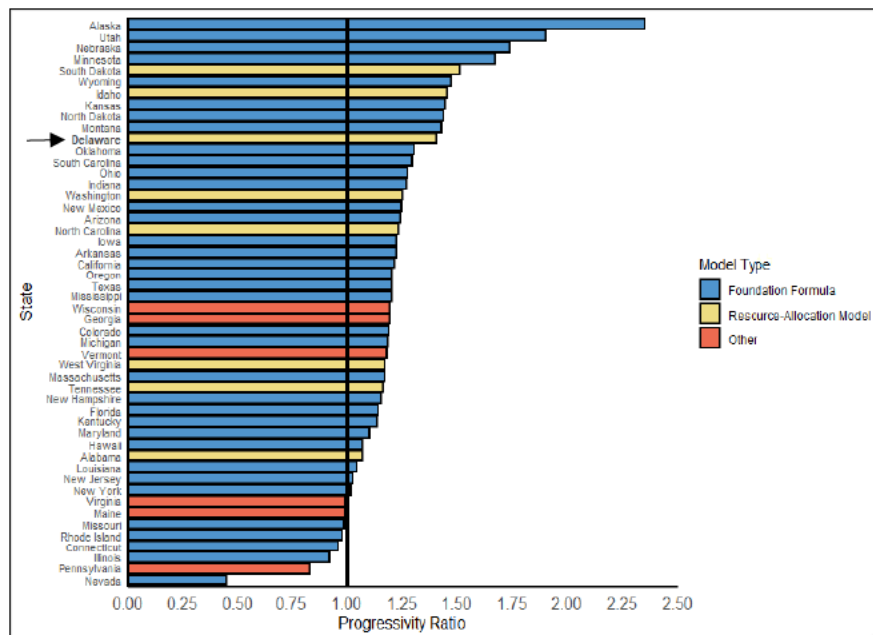
Table 4. Select Non-Division / Outside-the-Formula School Funding in Fiscal Year 2020 (original and supplemental budget)

| Fund | Fiscal Year 2020 Amount | Description |
|--|----------------------------|---|
| Transportation | \$112.97M | Distributes money to go towards the transportation of students |
| Academic Excellence | \$42.89M | 1 unit for every 250 students. Can be used for a broad range of educational services |
| Educational Sustainment Fund | \$28.15M | Allocated based on enrollment and can be used for any local purpose |
| Opportunity Fund ^a | \$25.00M | Weighted funding for low-income and English learner students and mental health and reading supports |
| Student Success Block Grant | \$8.80M | Funding for students in grades K-3 Basic Special Education; funding for reading interventionists in certain grade configurations meeting an EL or low-income enrollment threshold; funding for school-based health clinics |
| Unique Alternatives | \$8.37M | Distributed via the Interagency Collaborative Team for children requiring additional assistance in the classroom and the educational component related to residential treatment services and/or day treatment services |
| Skills, Knowledge and Responsibility Pay Supplement | \$6.74M | Supplemental salary for teachers with a recognized national certification, demonstrate a set level of knowledge or skill (none currently approved or specified), or are assigned one of the enumerated additional responsibilities for school improvement |
| Professional Accountability and Instructional Advancement Fund | \$6.00M | Funds professional development, the Delaware center for teacher education, alternative certification routes etc. |
| Student Discipline Program | \$5.34M | Statewide for severe discipline |
| Related Services for Students with Disabilities | \$4.13M | Distributes funds for additional support for students with disabilities |
| Technology Block Grant | \$3.77M | Allocated based on Division I units. Used for technology maintenance and support |
| School Improvement Funds | \$2.5M | Discretionary grant award money for efforts to improve achievement and/or narrow gaps |
| World Language Expansion | \$1.65M | For districts implementing world language expansion in elementary schools |

Source: Information adapted from Delaware (2020b; 2020c).

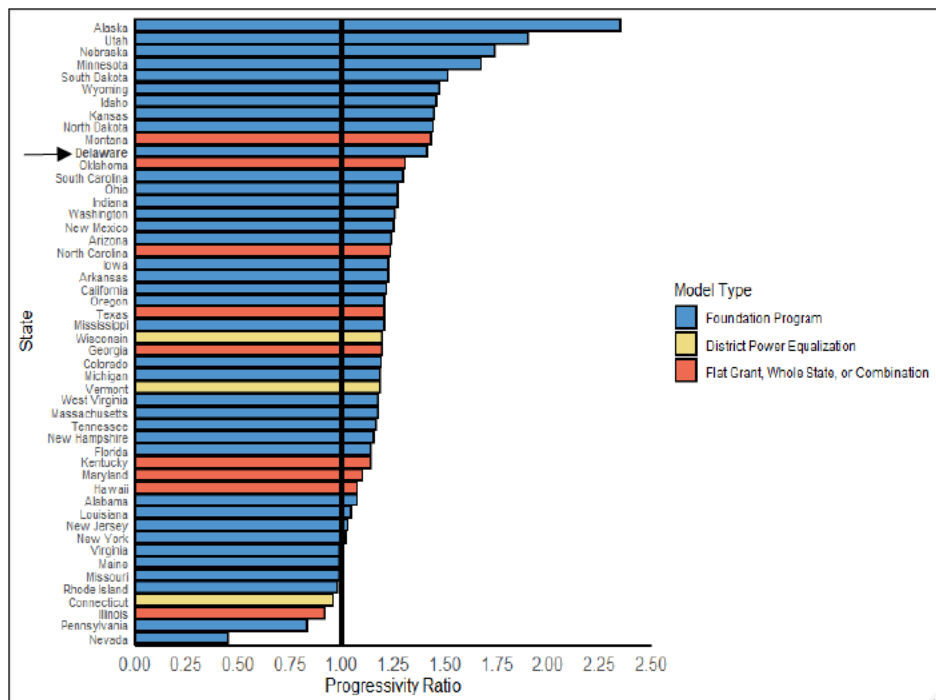
a. \$12.5M from House Bill No. 225 and \$12.5M from House Bill No. 226

Figure 2a. State Funding Mechanism Progressivity Ratios in 2015-16 School Year by Type of Funding Model as Coded by Education Commission of the States (2019)



Source: Author's compilation based on Baker, Di Carlo, and Weber (2019) and ECS (2019).

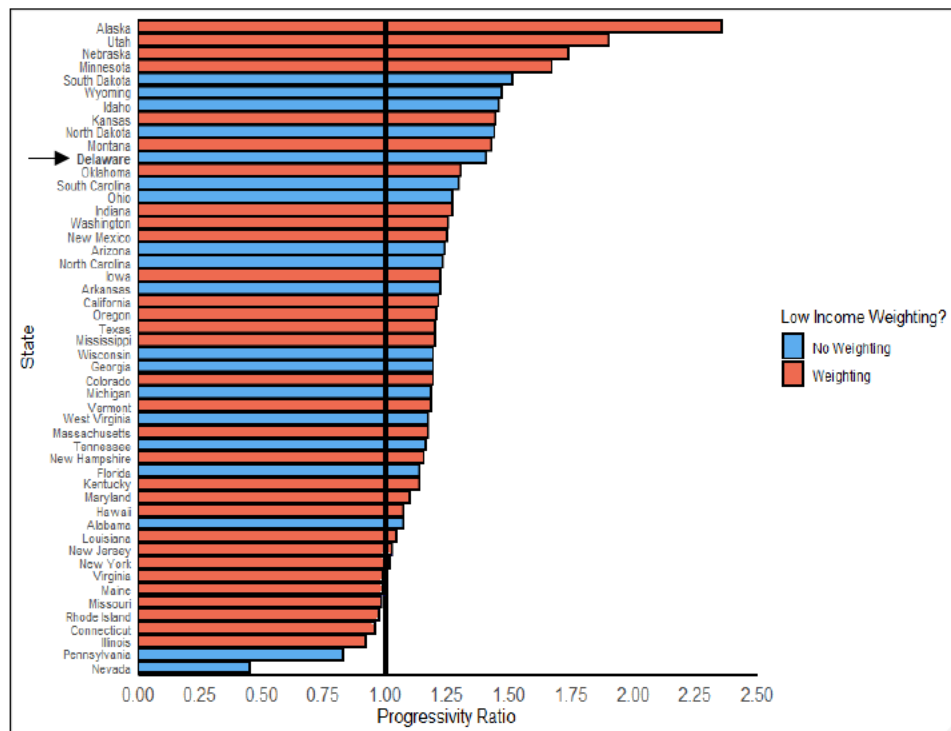
Figure 2b. State Funding Mechanism Progressivity Ratios in 2015-16 School Year by Type of Funding Model as Coded by Verstegen (2011)



Source: Author's compilation based on Baker, Di Carlo, and Weber (2019) and Verstegen (2011).

Figure 3. State Funding Mechanism Progressivity Ratios in 2015 by Low-Income Weighting as

Coded by Hanover Research (2015)



Source: Author's compilation based on Baker, Di Carlo, and Weber (2019) and Hanover Research (2015).

Table 5. State Funding System Weights for At-Risk, Low-Income Students¹

| State | Type of System | Weights |
|-------------|----------------|---|
| Arkansas | Multiple | Level 1 = 0.079, Level 2 = 0.158, Level 3 = 0.237 |
| California | Multiple | 0.2 pupil weight with additional weight of 0.05 if targeted concentration of FRPL, EL, foster youth above 55% |
| Illinois | Multiple | Per-pupil grant of \$355 if concentration < 15%; if concentration >15% formula increasing with concentration $([294.25 + (2,700(DCR)2)] \times \text{low-income pupils})$ |
| Maryland | Flat / Single | 0.97 (FRPL) |
| Mississippi | Flat / Single | 0.05 (FRPL) |
| Oklahoma | Flat / Single | 0.25 (FRPL) |
| Texas | Flat / Single | 0.20 (FRPL) |
| Virginia | Multiple | 1 to 13 percent more for every low-income student in their school based on the concentration of poverty |

Source: Author's compilation based on Education Commission of the States (2019), Hanover Research (2015), and Imazeki (2018).

¹ Different states use different measures and indicators for low-income. FRPL denotes free or reduced-price lunch status as part of the National School Lunch Program. Children from families with incomes at or below 130 percent of the poverty level are eligible for free school meals (USDOE, 2020). Children from families with incomes between 130 and 185 percent of the poverty level are eligible for reduced price meals (USDOE, 2020).

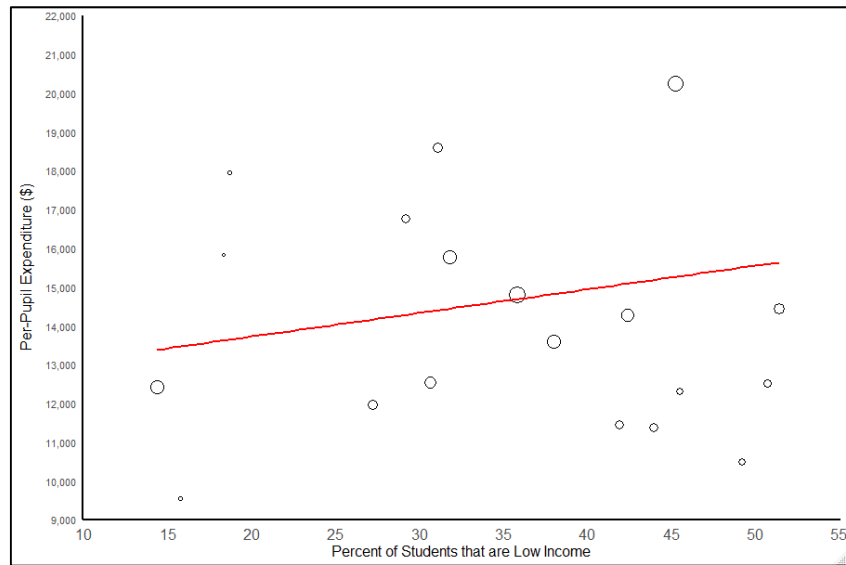
Table 6. Funding formula weights in relation to base per-pupil funding by characteristic

| Location/ District | School year of weights gathered | Base per- pupil (weight 1.0) | Grade level | Low- Income | EL | Special Education | Other |
|-----------------------------|---------------------------------------|------------------------------------|------------------|------------------|------------------|----------------------|---|
| Baltimore | 2018 - 19 | \$5,521 | 0.0 - 0.10 | 0.04 - 0.11 | - | 0.11 - 0.12 | low and high student performance |
| Boston | 2018 - 19 | \$4,119 | 0.2 - 0.8 | 0.10 | 0.02-0.94 | 1.0 - 6.7 | high-risk students; vocational programs; inclusive settings |
| Cincinnati | 2012-13 | \$4,873 | 0.20 | 0.05 | 0.48 | 1.0 - 3.69 | low student performance |
| Denver | 2018-19 | \$4,283 | ... | 0.01 - 0.13 | 0.10 | 0.19 | low and high student performance; individualized SWD programs |
| Hartford | 2012-13 | \$6,395 | 0.10-0.30 | ... | 0.11-0.43 | 0.71 - 3.6 | low and high student performance |
| Houston | 2012-13 | \$3,330-\$3,366 | ... | 0.15 | 0.10 | 0.15 | high student performance |
| Metro Nashville | 2018-19 | \$4,600 | 0.0 - 0.10 | ... | 0.10 | 0.5 - 7.25 | low student performance |
| New York City | 2012-13 | \$4,123 | 0.03-0.08 | 0.12 | 0.4-0.5 | 0.56-2.09 | low student performance |
| Prince George's County | 2018-19 | \$3,060 | 0.0 - 0.11 | ... | 0.40-0.60 | - | low and high student performance |
| San Francisco | 2018-19 | \$3,904 | 0.0 - 0.26 | 0.09 | 0.07-0.18 | 0.0128 - 0.0256 | ... |
| Min-Max Weight Range | | \$3,060-\$6,395 | 0.00-0.80 | 0.01-0.15 | 0.02-0.94 | 0.0128-7.25 | |

Source: Information adapted from Levin et al. (2019).

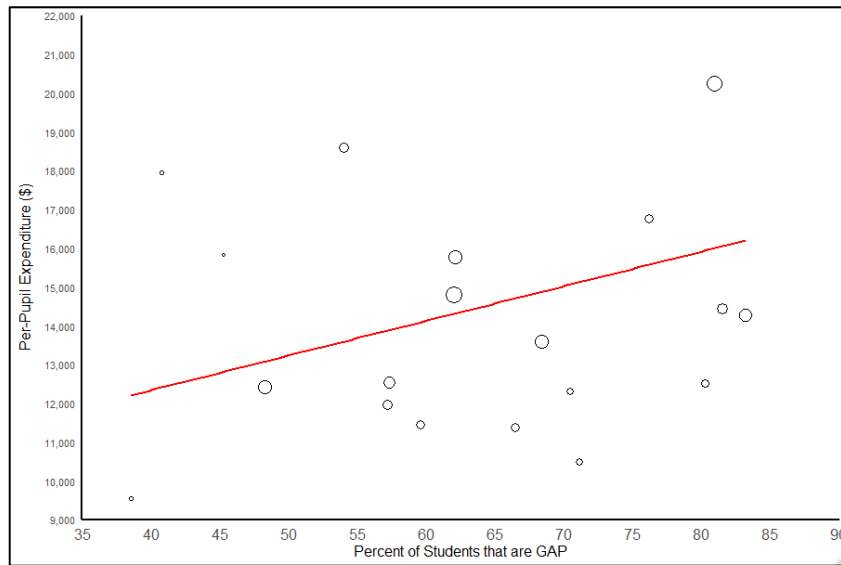
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Figure 4. District-Level Per-Pupil Expenditures by Percent of Students that are Low-Income, Weighted by District Enrollment, School Year 2017-18 (Without Federal Dollars)



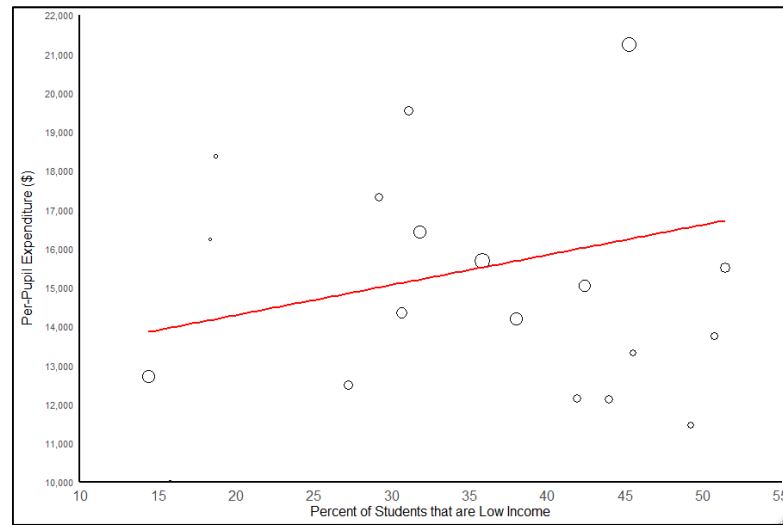
Source: Author's own calculations, Delaware's Report Card (2018).

Figure 5. District-Level Per-Pupil Expenditures by Percent of GAP Students, Weighted by District Enrollment, School Year 2017-18 (Without Federal Dollars)



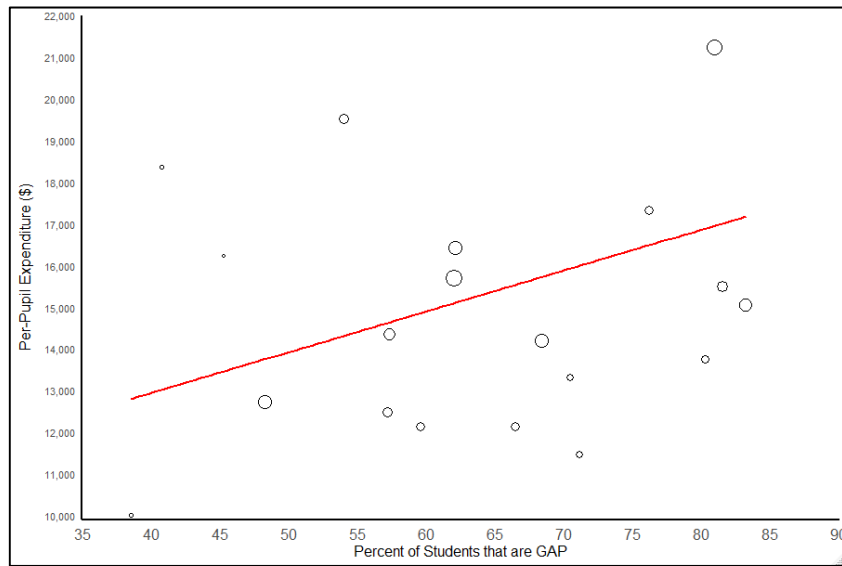
Source: Author's own calculations, Delaware's Report Card (2018).

Figure 6. District-Level Per-Pupil Expenditures by Percent of Students that are Low-Income, Weighted by District Enrollment, School Year 2017-18 (With Federal Dollars)



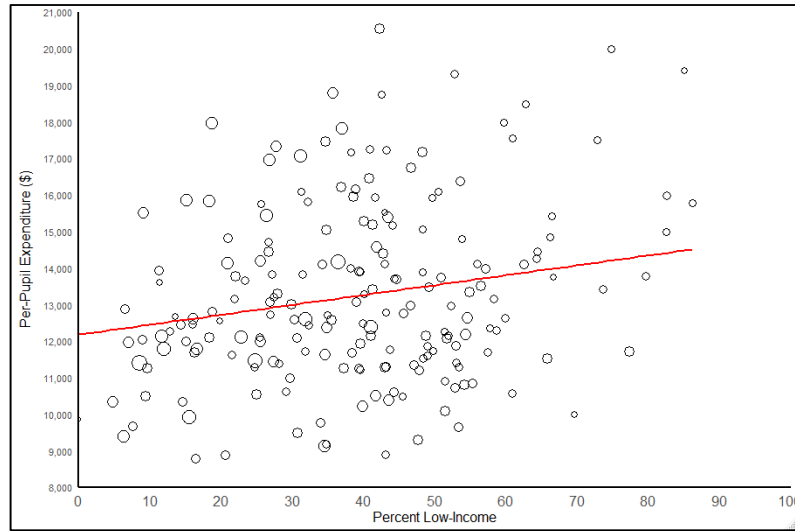
Source: Author's own calculations, Delaware's Report Card (2018).

Figure 7. District-Level Per-Pupil Expenditures by Percent of GAP Students, Weighted by District Enrollment, School Year 2017-18 (With Federal Dollars)



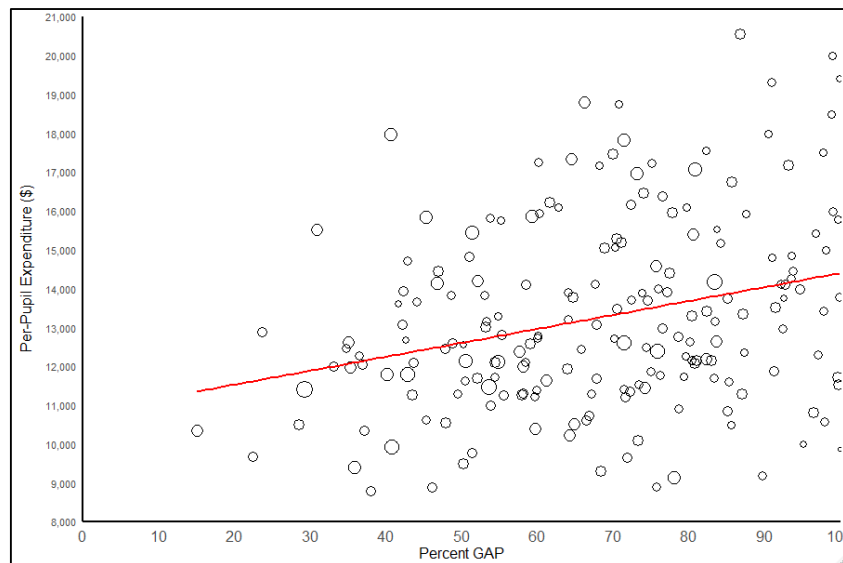
Source: Author's own calculations, Delaware's Report Card (2018).

Figure 8. School Level Per-Pupil Expenditures by Percentage of Students Identified as Low-Income, Weighted by School Enrollment, 2017-18 School Year (Without Federal Dollars)



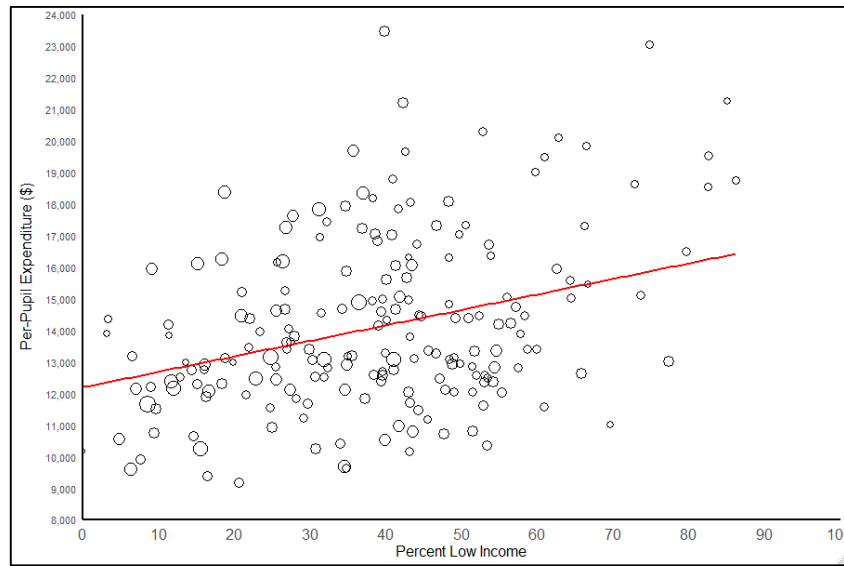
Source: Author's own calculations, Delaware's Report Card (2018).

Figure 9. School Level Per-Pupil Expenditures by Percentage of Students that are Identified as GAP, Weighted by School Enrollment, 2017-18 School Year (Without Federal Dollars)



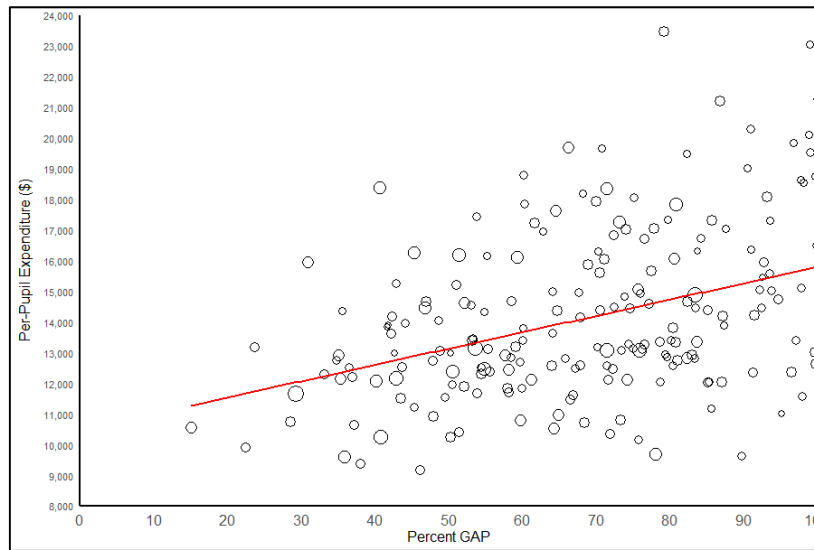
Source: Author's own calculations, Delaware's Report Card (2018).

Figure 10. School Level Per-Pupil Expenditures by Percentage of Students Identified as Low-Income, Weighted by School Enrollment, 2017-18 School Year (With Federal Dollars).



Source: Author's own calculations, Delaware's Report Card (2018).

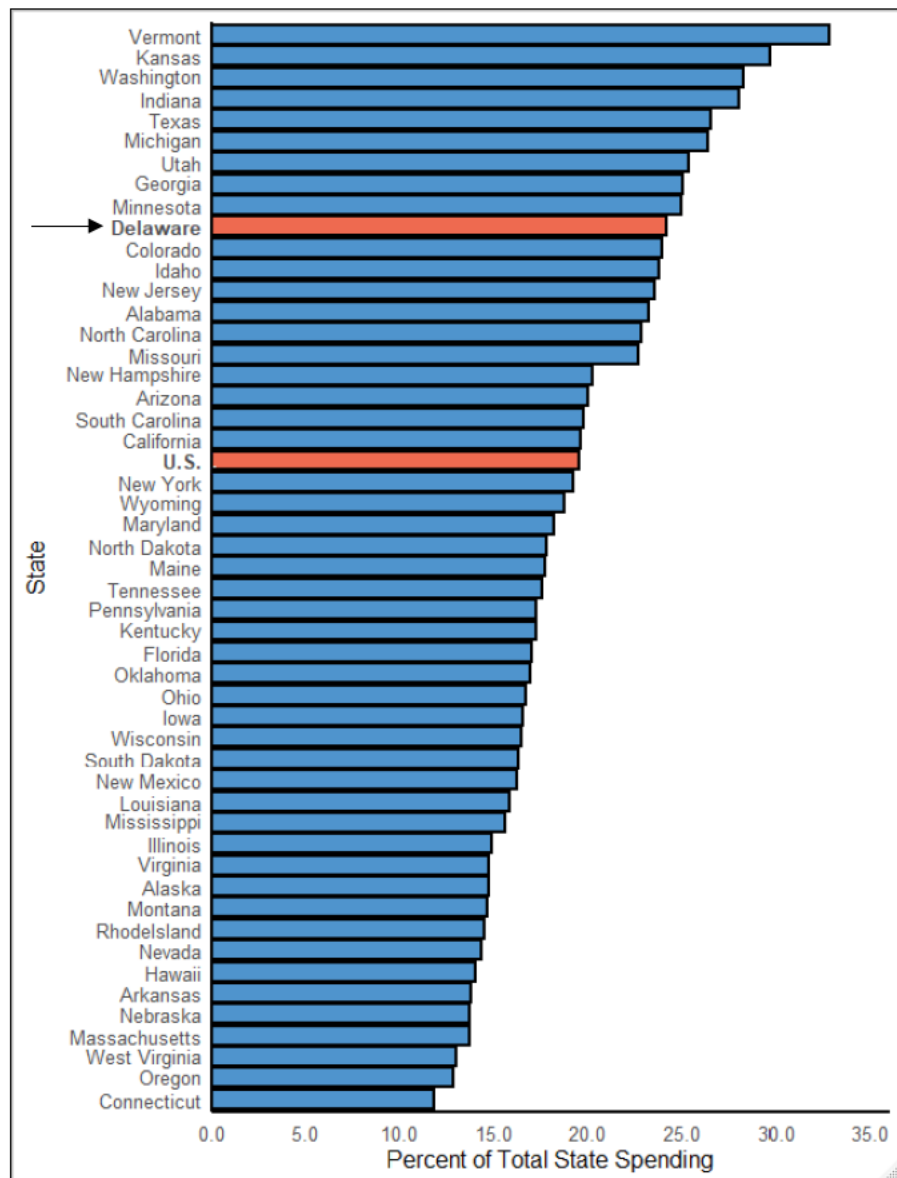
Figure 11. School Level Per-Pupil Expenditures by Percentage of GAP Students, Weighted by School Enrollment, 2017-18 School Year (With Federal Dollars)



Source: Author's own calculations, Delaware's Report Card (2018).

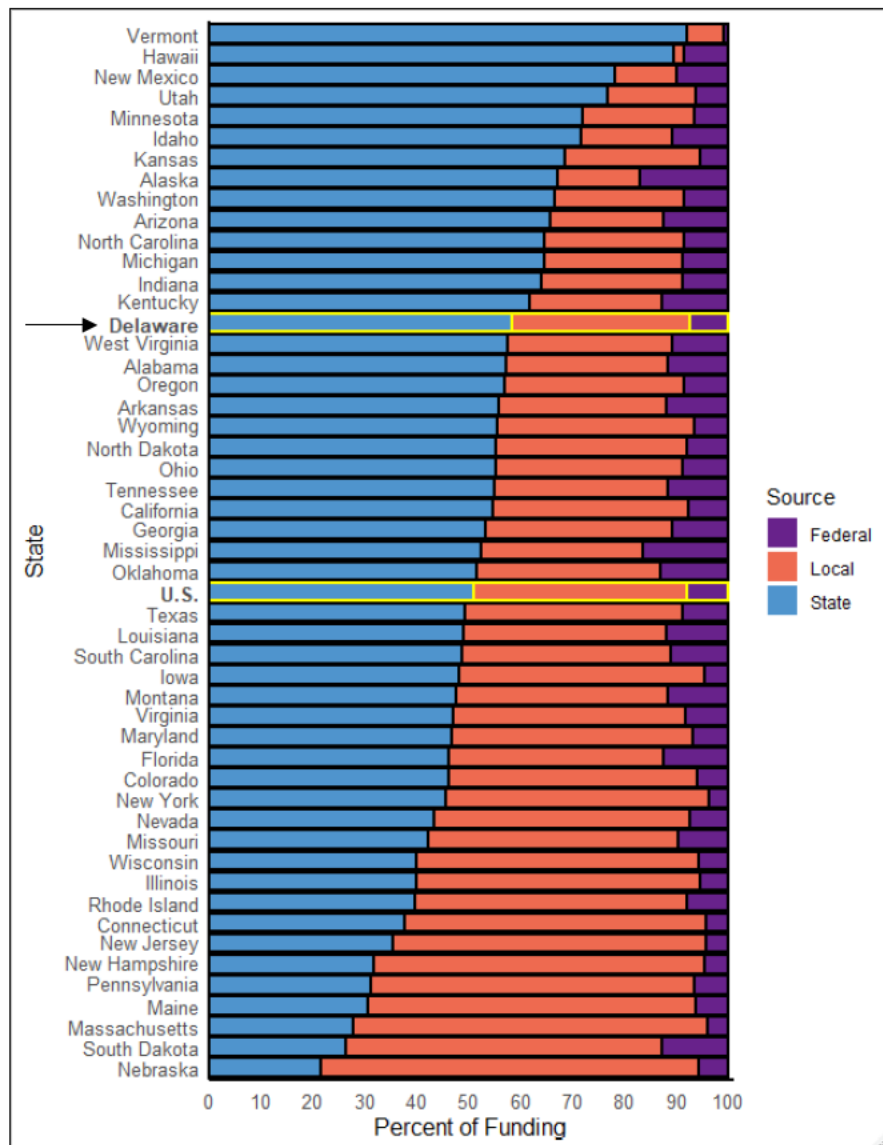
Figure 12. State Spending on Elementary and Secondary Education as a Percent of Total State

Expenditures, Fiscal Year 2019



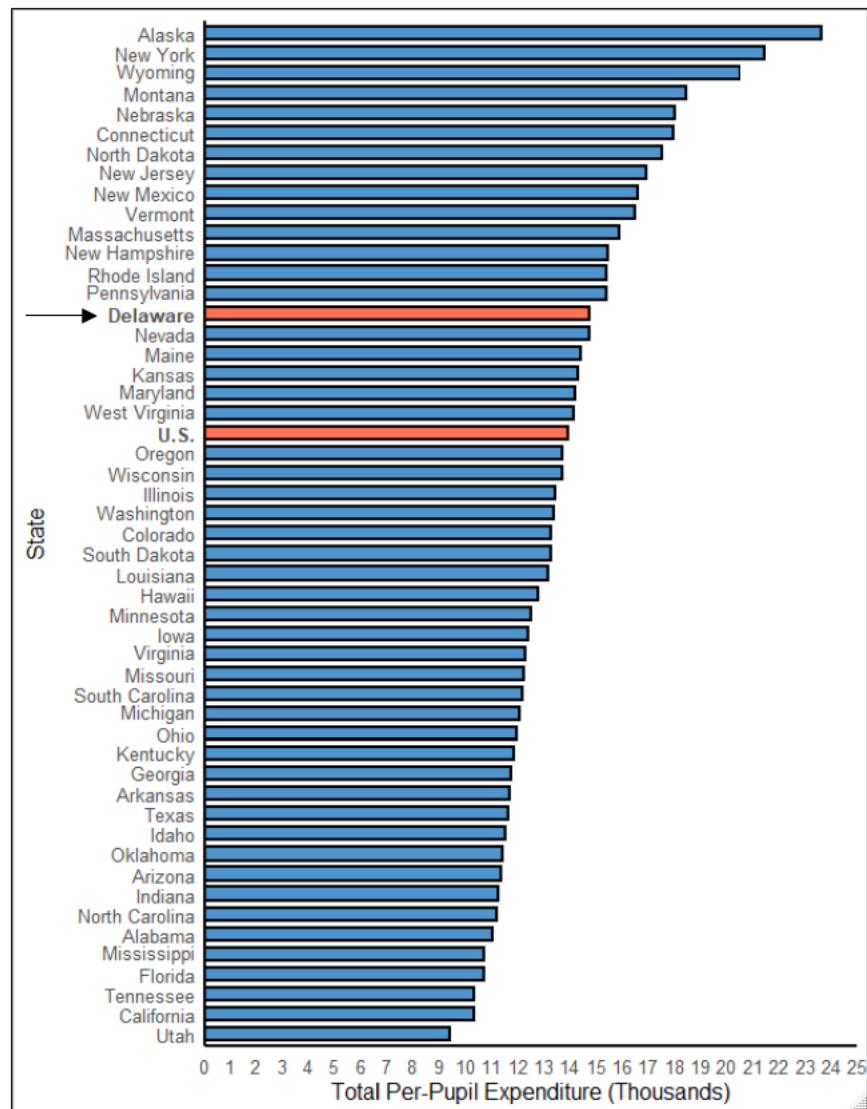
Source: Author's figure based on National Association of State Budget Officers (2019).

Figure 13. Percent of School Funding by Source, School Year 2015-16.



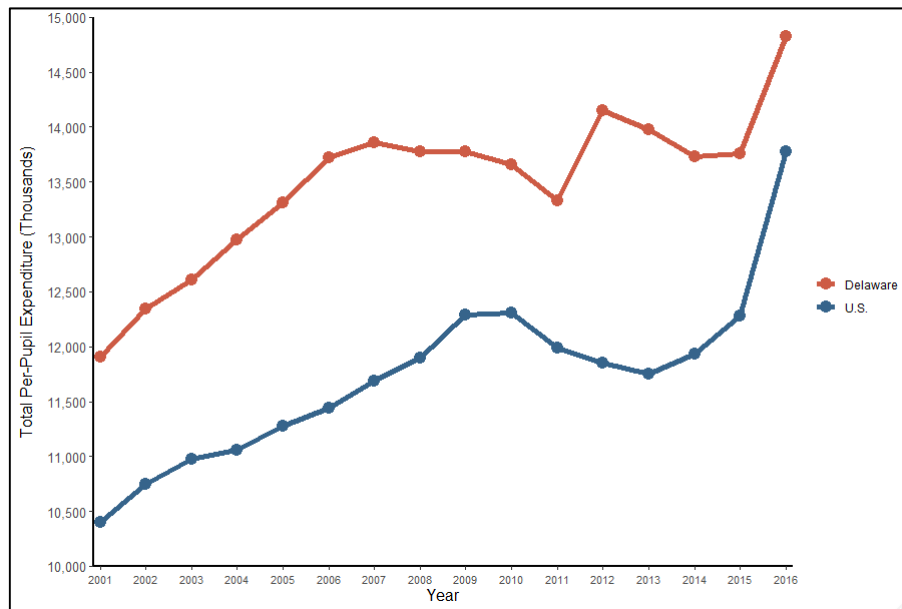
Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Figure 14. Per-Pupil Expenditures by State, School Year 2014-15



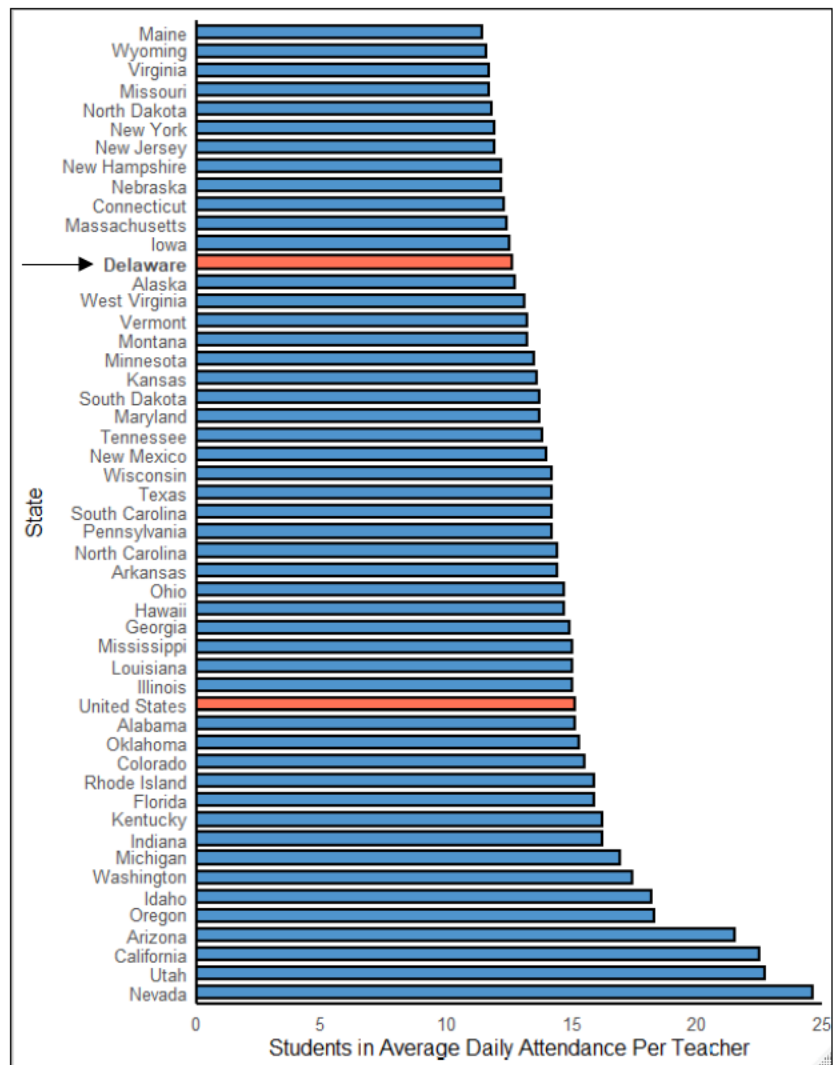
Source. Author's own calculations, School Funding Fairness Data System and the National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Figure 15. Per-Pupil Spending in Delaware vs. U.S. Average, School Years 2000-01 – 2015-16



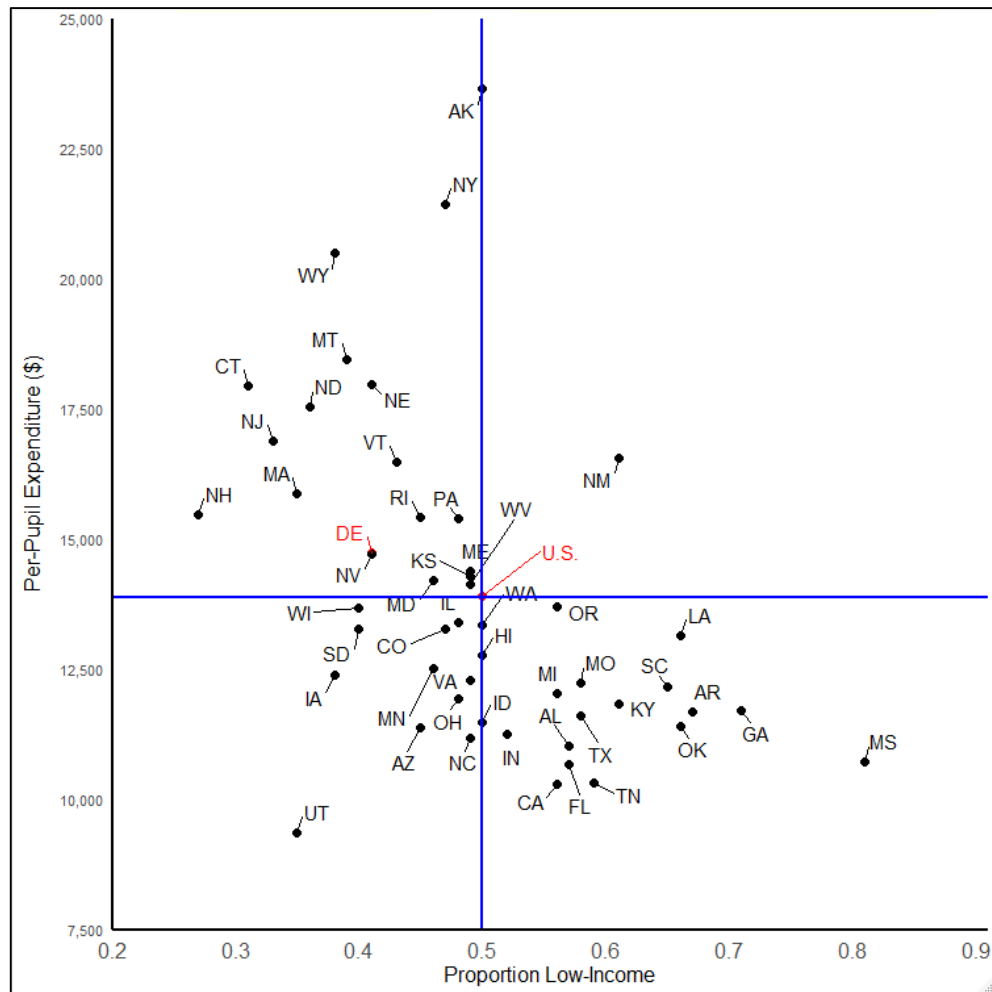
Source: Author's own calculations, School Funding Fairness Data System and National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Figure 16. Student-to-Teacher Ratios, 2015-16 School Year



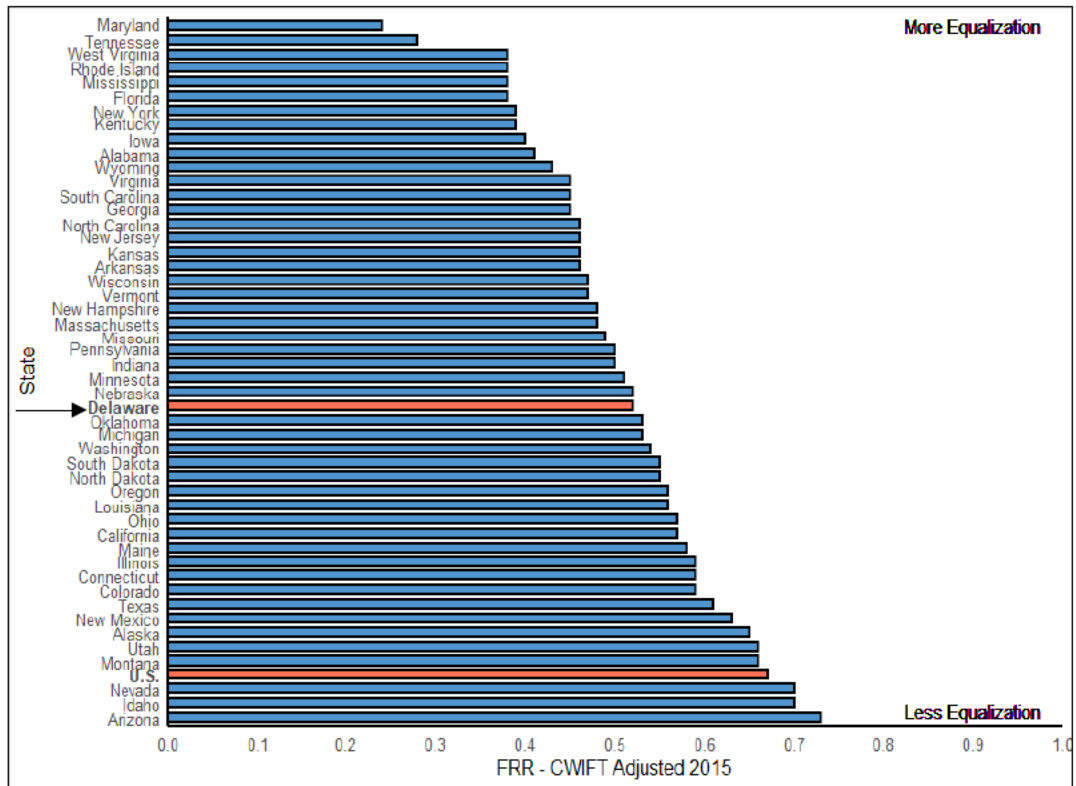
Source: National Education Association's Rankings and Estimates (2017).

Figure 17. Relating Proportion of Low-Income Students and Per Pupil Spending, 2014-15 School Year



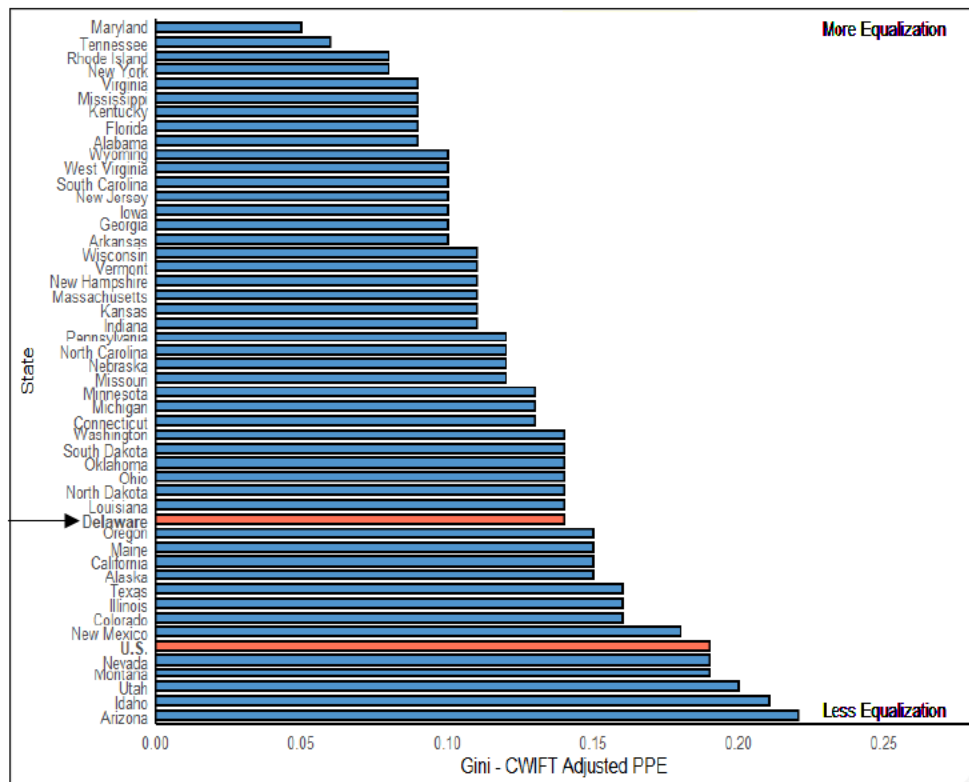
Source: Author's own calculations, School Funding Fairness Data System and National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Figure 18. Federal Range Ratio by State, School Year 2015-16



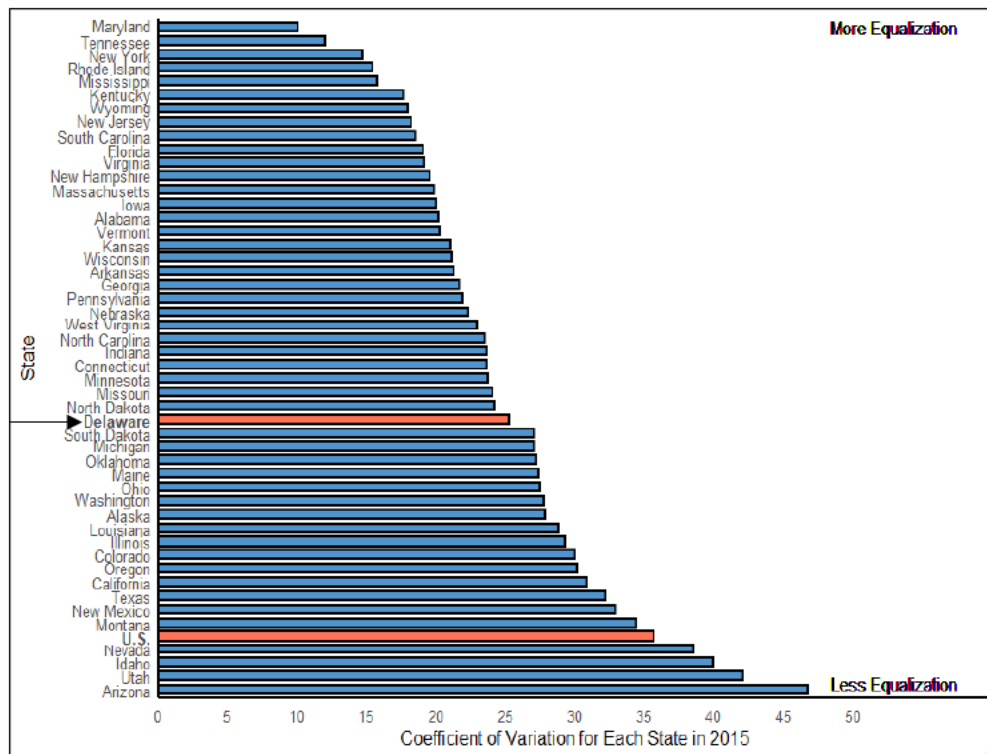
Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Figure 19. Gini Coefficients by State, School Year 2015-16



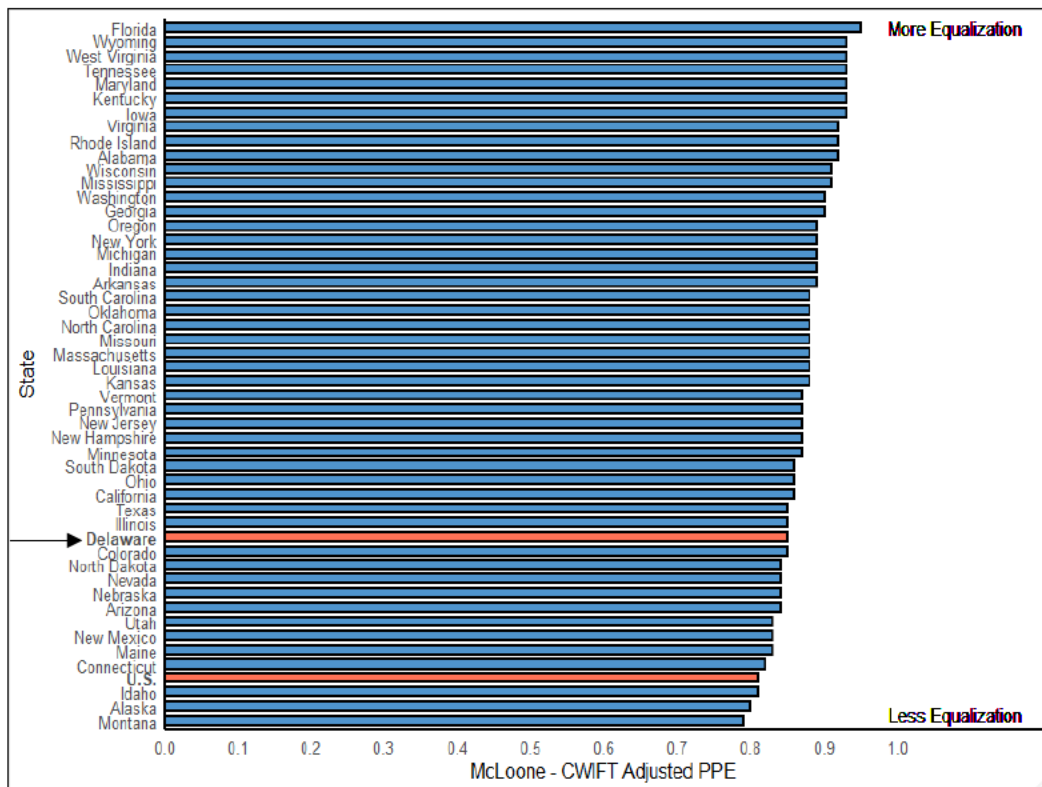
Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Figure 20. Coefficient of Variation by State, School Year 2015-16



Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.

Figure 21. McLoone Index by State, School Year 2015-16



Source: Author's own calculations, National Center for Education Statistics' Local Education Agency (School District) Finance Survey (F-33) Data.