

Improving the Equity and Adequacy of Public Education Funding in Maryland

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Maryland's current funding formula for public education was constructed with the express intent of ensuring equitable and adequate funding for each student in the state, regardless of county of residence, wealth, or other individual circumstances. However, the state's funding for education falls short on both counts.

The funding formula used in Maryland consists of a foundation amount per student, with additional weights for students receiving free and reduced-price meals, students with limited English proficiency, and students receiving special education services. The per-student amount is increased by a certain percentage for the 13 counties in which the provision of education is more expensive. This funding scheme was created based upon a series of adequacy studies carried out in the early 2000s, and was intended to ensure that each county received sufficient funding to enable all students to perform adequately on state-level performance measures.

This policy brief uses empirical measures to evaluate the equity and adequacy of funding for public education in Maryland, identifies opportunities for improvement in both areas, and recommends policy adjustments intended to increase equity and improve performance. The equity of Maryland's public education funding has shown limited improvement but still falls short on three relative measures of equity. Adequacy, as measured by passing rates on standardized tests, was achieved by only half of Maryland counties in 2012. The General Assembly must take immediate action to re-evaluate the definition and cost of the provision of an adequate education, and revise the state's funding formula to ensure equitable and adequate funding.

Introduction

Maryland's public schools have been lauded for their high rankings in early childhood education standards, graduation standards and tests, alignment of graduation requirements with college entrance requirements, and improvement on Advanced Placement scores (Carter, 2010). The Maryland State Education Association (MSEA) boasts that Maryland's public school systems are "the envy of the rest of the country," with achievements including high rankings by *Education Week*, improvements in fourth- and eighth-grade reading, increasing graduation rates, and high kindergarten readiness ("School funding", 2015). Maryland's schools were ranked first in the country by *Education Week* every year from

2009 to 2014, based on, among other things, K-12 achievement, standards and accountability, and school finance equity and expenditures per student (Education Week, 2014). These seeming successes, however, belie a persistently low level of equity in education funding between counties of varying wealth, and inadequate passing rates

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of high school students on Maryland's own standardized tests.

The stated intent of Maryland's current funding formula, adopted in 2003, was to ensure equity and adequacy in education for every student in the state. Over a decade later, it is clear that those goals have not been achieved, and that Maryland is not providing each of its students the resources required for success. The state must take steps to reevaluate its education funding formula, comparing it with other, more successful states to determine where improvements can be made.

Overview of funding formulas

Methods of allocating state-level funding for education vary between states, but funding formulas can be sorted into five categories (Verstegen & Knoepfel, 2012). Thirty-six states use the *foundation program* approach, which guarantees a set amount of funding per pupil or per teacher, a portion of which is the responsibility of the local district. Some states employ weights to account for higher costs of educating students in, for example, very rural districts. Three states use *district power equalizing systems*, which are intended to support taxpayer equity rather than pupil equity: these states have different levels of education funding per district based on locally-chosen tax rates. Hawaii provides *full funding* from the state for each of its schools and distributes funds according to a weighted formula to adjust for economic disadvantage, limited English proficiency, transience, and gifted and talented students. North Carolina uses a *flat grant* approach, which also allows for local supplements that are not matched by the state. The remaining nine states use a *combination system* employing two or more of the other four methods.

Many states have recalibrated their funding formulas in recent decades in an attempt to ensure that all pupils receive an "adequate" education, including Arkansas, Maine, Maryland, Mississippi, Missouri, New Hampshire, Ohio, and South Carolina (Verstegen & Knoepfel, 2012). Analytical methods for determining an "adequate" level of funding generally fall under two types. The *successful schools* approach determines an acceptable level of pupil performance or proficiency, then identifies districts or individual schools which achieve the desired level. The resources expended by such schools are deemed "adequate," and funding for other districts is adjusted to match. The underlying assumption in this approach is that "any district should be able to accomplish what some districts do accomplish" (Guthrie & Rothstein, 1999, p. 224). However, this method risks overfunding, because it may include schools which produce adequate outcomes in an inefficient manner. It also ignores the additional costs faced by school districts serving a large proportion of economically disadvantaged students. The *professional judgment* approach uses bottom-up cost analysis to calculate the resources required to provide "adequate" education. This method uses no statistical inference from actual outcomes, but depends upon the opinion of committees of teachers, administrators, public officials, and education consultants to determine the level of resources which will allow students to perform at an adequate level.

A third, emerging method of constructing the cost of an adequate education is the *evidence based* method, which uses research evidence to make programmatic recommendations on the components of an adequate education. This method uses parameters such as class size, availability of tutoring, professional development time for faculty and staff, size of support staff, and half- or full-day kindergarten, to determine an appropriate structure to support the delivery of an "adequate" education. The cost of the components is then estimated similarly to the professional judgment approach (Odden, Picus, & Goetz, 2010).

Maryland's funding formula

Article VIII of Maryland's constitution, ratified in 1867, reads as follows:

The General Assembly, at its First Session after the adoption of this Constitution, shall by Law establish throughout the State a thorough and efficient System of Free Public Schools; and shall provide by taxation, or otherwise, for their maintenance.

There has been vigorous debate about the meaning of the phrase *thorough and efficient*. According to common usage of the two words before, during, and after the constitutional convention, Leviton and Joseph (1993) note that both *thorough* and *efficient* imply the modern concepts of adequacy and effectiveness. In its 1983 decision in *Hornbeck v. Somerset County Board of Education*, Maryland's Court of Appeals concluded that the constitutional education clause ensures the right to "an adequate education measured by contemporary educational standards," but did not indicate what was meant by "adequate" nor make any reference to which standards should be used.

Hornbeck was the first in a series of legal challenges to the state's education funding system, leading to the eventual establishment of a commission to study Maryland's education funding system. The bipartisan Commission on Education Finance, Equity, and Excellence (also called "The Thornton Commission" after its chairman) convened in 1999 with the stated goals of making recommendations to ensure, inter alia, adequacy of funding, equity of funding, and excellence in student performance.

The Thornton Commission contracted Augenblick & Myers, Inc. to perform adequacy studies using both the professional judgment and the successful schools approaches. The results of the studies showed that school districts furthest from adequate funding targets were also the ones with low wealth and/or a higher proportion of special needs students, and that school districts with the largest gap between adequate funding and fiscal year 2002 funding had the lowest scores on the Maryland State Performance Assessment Program tests (Thornton, 2002).

The Thornton Commission's recommendations to remedy these deficiencies became the Bridge to Excellence in Public Schools Act, passed by the General Assembly in 2002. Maryland has 24 public school districts, one in each county and the independent city of Baltimore. Maryland's current funding formula is a combination system which consists of the following components, described in more detail in Appendix A:

1. Foundation Program: a basic per-pupil funding amount, adjusted for inflation annually. In 2012, the per-pupil amount was \$6,694.
2. At-Risk Programs:
 - a. Compensatory Program: additional 97 percent of the foundation amount for each student qualifying for free and reduced price meals.
 - b. Limited English Proficiency (LEP): additional 99 percent of the foundation amount for each student learning English as a second language.
 - c. Special Education: additional 74 percent of the foundation amount for each student receiving special education services.
3. Additional Programs:
 - a. Geographic Cost of Education Index (GCEI): additional funding for 13 counties in which delivering education is more expensive.
 - b. Net Taxable Income (NTI) Grants: to compensate counties whose proportion of foundation funding has increased due to a 2013 adjustment in the method of calculating wealth.
 - c. Transportation: to assist local systems with the cost of transporting students to school.

The Bridge to Excellence Act provided an additional \$1.3 billion in state aid to all school districts as compared to the previous funding system (Chung, 2015). Appendix B shows a comparison of pre- and post-reform funding schemes. It is worth noting that Maryland's weights for at-risk programs are significantly higher than all other states which use similar funding formulas. The national average weight for free and reduced price meal recipients is 29 percent, and the average weight for LEP students is 39 percent (Verstegen & Knoepfel, 2012).

The GCEI component of Maryland's funding formula is intended to be more than a simple cost-of-living adjustment for school districts with higher incomes and higher property values. The bulk of the GCEI adjustment is a personnel cost index, which reflects the higher wages needed to attract personnel to districts deemed less desirable (Kelley, 2015). The level of wealth in a county does not necessarily correlate with the perception of "good" schools. Kent County, for example, is the third wealthiest district due to an abundance of waterfront property, but personal income in the county is below average for the state, the percentage of persons living in poverty is above average, and in 2012, the county high schools did not meet performance benchmarks on the state's standardized tests. Though GCEI was included in the 2002 Bridge to Excellence Act, it was designated as a discretionary portion of the state funding formula, and remained unfunded until 2009. It was funded at 30 percent in 2009, and was funded fully each year from 2010 to 2015. In 2016, the governor withheld 50 percent of the funding designated for GCEI, and so the General Assembly passed legislation mandating full funding of the GCEI in 2017 and forward.

Equity

Equity in education funding means "distributing and expending available revenues with fairness to schools and students, regardless of their location within a state" (Brimley & Garfield, 2005, p. 61). This definition is broad enough to include equity of inputs or outcomes, depending on the purpose and context of any particular equity study. Baker, Green, and Richards (2008) further divide equity into *horizontal*, the equal treatment of students in terms of educational inputs (funding), and *vertical*, the differential treatment of students with measurably different educational needs, including students who are economically disadvantaged, non-native English speakers, or those who require special education services.

The education finance literature includes three types of equity standards: absolute equity, of which the foundation formula is an example; relative equity, in which differences between school districts are kept within a defined bound; and wealth neutrality, which aims to equalize resources or outcomes across districts regardless of wealth (Johnston & Duncombe, 1998).

In analyzing Maryland's education funding, this study uses relative standards to measure horizontal equity. Three commonly used measures, which capture different parts of the funding distribution, are the McLoone index, the Verstegen index, and the Federal Range Ratio (Johnston & Duncombe, 1998; Berne & Stiefel, 1984; Odden & Picus, 2000). Since Maryland's funding formula is intended to equalize spending for special needs populations, this study incorporates vertical equity into the horizontal equity measures by normalizing each county's spending according to its special needs populations. To normalize spending per student, total enrollment is adjusted upward by the proportion of students receiving additional funding, weighted by the state funding formula weights for each special needs category (Baker et al., 2008). For example, a Maryland county with 100 students with limited English proficiency would have its enrollment ("pupil cost units") adjusted upward by $100 \times .99 = 99$ students. Adjusted spending per student is then calculated by dividing the total spending by the adjusted number of pupil cost units. This weighting counts students with special needs as greater than one student; this essentially removes the impact of funding weights, and shows what spending would be like without the weights. Appendix C presents descriptive statistics and equity measures for both unweighted and weighted spending data.

The McLoone index measures the equity of per-student spending by first ranking all students in the state by their respective per-student spending. It then calculates the mean per-student spending among the bottom 50 percent of students, and divides this mean by the median per-student spending among all students. The closer this index is to 1.00, the more equitably funding is distributed among the bottom half of students, with an index of 0.95 considered acceptable (Consortium for Policy Research in Education (CPRE), 2012). In 2003, which was the first year of Maryland's Bridge to Excellence program, the McLoone index was 0.949. By 2012, which is the most recent year for which all relevant data are available, the index had decreased to 0.906, below the acceptable range.

The Versteegen index is a relatively new measure to analyze funding distribution in the top 50 percent of students, and is calculated similarly to the McLoone index. Using the same rationale as the McLoone index, an acceptable standard for the Versteegen index would be 1.05, with values closer to 1.00 indicating greater equity (Peterson, 2010). In 2003, the Versteegen index for Maryland schools was 1.218, and by 2012, it had decreased to 1.155. Though the top half of the funding distribution showed improvement between 2003 and 2012, the index remains well above the 1.05 benchmark, which indicates an unacceptable level of inequity among the top 50 percent of students.

The Federal Range Ratio (FRR) is a modified range that measures dispersion without the influence of the tails of the distribution. FRR is calculated as the range in per-student spending between students in the 5th and 95th percentiles, divided by per-student spending for students in the 5th percentile. In 2003, the FRR was 0.5330, and in 2012 the FRR had decreased to 0.3269. A review of the literature, including several studies performed by the National Center for Educational Statistics (a major user of the measure), did not yield a normative value, but the FRR is used as a comparison criterion between districts or between points in time. From 2003 to 2012, the FRR decreased, indicating that disparities between students decreased.

The improvement in the Federal Range Ratio indicates that, excepting outliers, the dispersion of per-student spending levels between counties has diminished. The decrease in the Versteegen index shows that funding equity has increased among the wealthier counties, but the decrease in the McLoone index indicates a widening of the range of funding between counties falling below the median spending level.

Regarding equity, the Thornton Commission (2002) declared that "educational opportunities should not depend on a jurisdiction's relative ability to raise revenue from local sources", and that "to the extent practicable, funding for education should be wealth-equalized" (page xiii). Comparing the above measures of equity to this standard, Maryland's current funding formula is not equitable.

Adequacy

The concept of adequacy in education funding is challenging to define, and very likely to vary between states. Guthrie and Rothstein (1999) note that in setting adequate levels of funding, a twofold judgment must be made about the performance levels to be attained, and the resource levels required to permit schools and students to accomplish such levels. As to the question of the performance levels to be attained, Brimley and Garfield (2005) suggest basic proficiency in literacy, numeracy, and problem solving. Most often, states use scores or pass rates on standardized tests to determine whether schools and students are performing adequately. A major issue with test-based performance standards is the risk of "teaching to the test," or otherwise shifting resources to meet the test standard at the expense of other educational objectives (Duncombe & Yinger, 1999). To determine the level of resources required to achieve performance targets, states use the successful schools, professional judgment, or evidence based approaches as described above.

In Maryland, the Bridge to Excellence Act references the achievement of state and local performance standards, and requires each school system to implement a master plan to improve

student achievement on such standards. The Thornton Commission (2002) reported that “a proper model for funding school systems should be based on the projected costs associated with meeting State performance standards, including the additional costs associated with providing services to students with special needs” (page xiii). Maryland’s current state-level standardized test is the High School Assessment (HSA) program, a series of exams intended to measure student- and school-level achievement of “core learning goals” in Algebra, Biology, English, and Government.

To comply with federal No Child Left Behind¹ requirements, the state measures “adequate yearly progress” at the high school level using aggregate county-level scores on the English and Algebra HSA tests. The objective achievement level for each test was to be phased in from 2007 to 2014, beginning with a 52.2 percent English pass rate and a 38.6 percent Algebra pass rate in 2007, increasing gradually to a 100 percent pass rate on both tests in 2014. The 2012 objectives were an 86.3 percent pass rate for English and an 82.4 percent pass rate for Algebra (“What are Maryland’s AYP targets”, 2015). Detailed county-level results are provided in Appendix D. Overall, 50 percent of Maryland counties met the standard on the English test and 71 percent of counties met the standard on the Algebra test in 2012. Of the counties spending above the median level per student, 83 percent achieved passing rates for English and 100 percent achieved passing rates for Algebra. But alarmingly, only 17 percent of the counties below the median spending level achieved passing rates for English, and just 42 percent of those counties achieved passing rates for Algebra. There is a moderately strong positive Pearson’s correlation coefficient between county spending per student and scores on both tests: 0.646 for English, and 0.549 for Algebra.

The final report of the Thornton Commission (2002) articulated the belief that adequacy in education funding means that “there should be a direct link between what is expected of school systems and the level of funding that school systems receive” (page xiii). Analysis of Maryland’s HSA scores in 2012 reveals that there is a correlation between performance and funding, such that schools in counties which spend more tend to perform better on the tests. But performance by schools in the lower 50 percent of counties is woefully inadequate. If Maryland expects all schools to achieve proficient performance, then its current funding formula does not provide adequate resources.

Maryland’s opportunities for improvement

Maryland’s funding formula for education falls short on measures of both equity and adequacy. The McLoone and Verstegen indices reveal an unacceptable level of variation from the median spending per student, with significantly higher spending in counties that have a higher level of wealth as illustrated in Figure 1. Only 46 percent of counties achieved passing rates on both of the 2012 HSA tests, indicating that funding levels were not appropriate to ensure the adequate education of all students. It is difficult to establish a causal relationship between wealth and student achievement, but there is a correlation between higher spending and better pass rates.

¹ No Child Left Behind refers to the 2001 iteration of the Elementary and Secondary Education Act of 1965, which is the major source of federal funding for K-12 education. It requires, inter alia, that states periodically test students in reading, mathematics, and science.

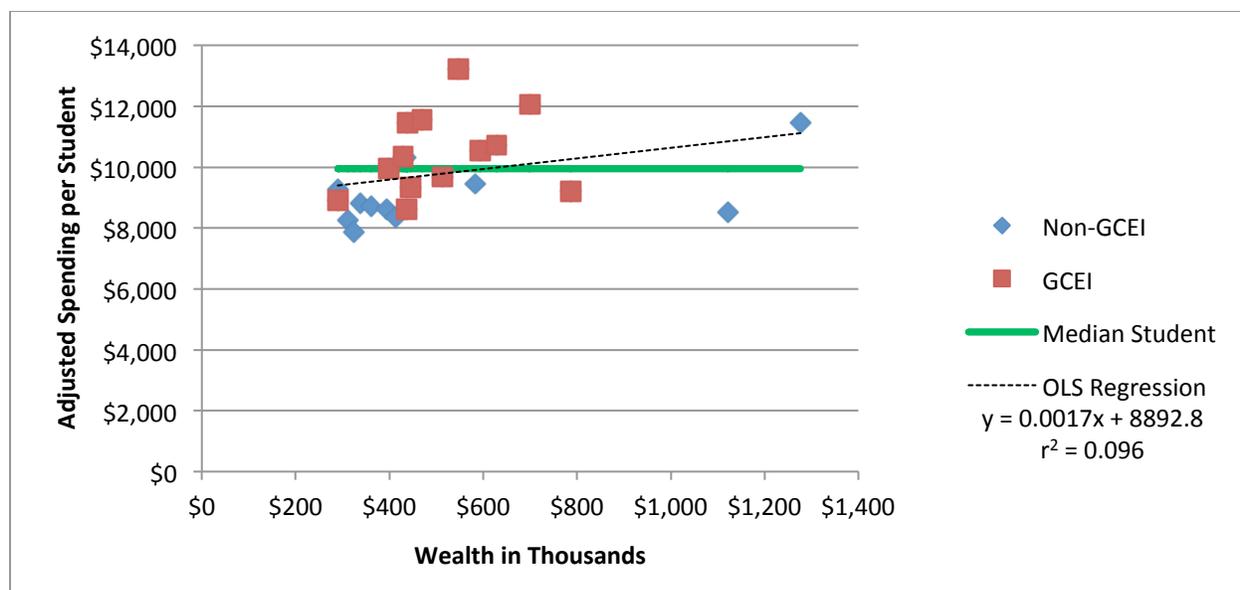


Figure 1. Wealth and Adjusted Spending per Student by County in Maryland, 2012

Source: Author's calculations using data from "Data downloads" (2012)

Similar to the "successful schools" adequacy approach, it is useful to look at other states that provide more equitable and adequate funding in order to make policy recommendations to improve Maryland's formula. The differences between state funding formulas discussed earlier make it difficult to make empirical statements about which states are achieving equity and adequacy, and why, but there have been a few attempts.

To evaluate funding equity, the Education Law Center (ELC) at Rutgers University (2015) uses a "fairness ratio", which provides a way to compare equity between states. The ELC model focuses on how revenues per pupil vary according to poverty levels within states (Baker & Farrie, 2010). The ELC fairness index, while complicated, offers a fair level of precision by correcting for geography, size, and density of districts. It aligns with the equity framework used in this paper because it takes into account the entire distribution of funding. Its focus on poverty level is a near converse to this paper's focus on wealth. The fairness ratio is the difference in funding between high-poverty and low-poverty districts within a state, with the relationship between funding and student poverty estimated using a regression model tailored to each individual state's characteristics. A ratio of 1.0 represents fair funding, a ratio less than 1.0 represents regressive funding, and a ratio greater than 1.0 represents progressive funding. Maryland had a ratio of 0.92 in 2012, and received a "D" grade for funding distribution from the ELC. Neighboring states in the Mid-Atlantic region received the following ratios and grades: Delaware, 1.35 and "A"; Virginia, 0.89 and "F"; Pennsylvania, 0.91 and "D"; and New Jersey, 1.30 and "A" (ELC, 2015).

To evaluate funding adequacy, Odden et al. (2010) attempted to estimate the costs of adequate education across all fifty states by applying evidence-based recommendations (teacher-student ratios, student support services, materials costs, professional development, etc.) to student characteristics of each state. They used teacher salaries to estimate the cost of such support for each state, then compared that estimate to each state's actual per-student spending. This study estimated that, in terms of providing the required funding for an adequate education, Maryland was underspending by \$628 per student, Delaware was overspending by \$1,063, Virginia was underspending by \$49, Pennsylvania was overspending by \$306, and New Jersey was overspending by \$1,063.

From the results of these two studies, New Jersey seems to represent a good aspirational example for Maryland, because it appears to fund education both equitably and adequately. New Jersey reformulated its education funding formula in 2008, not long after Maryland did, and even used the same consulting firm to perform the adequacy study. The two states' formulas are similar in many ways, as detailed in Appendix E. They each use a foundation amount with compensatory and LEP adjustments, though Maryland's weights are much higher than New Jersey's. A notable difference is that New Jersey weights the foundation amount more heavily for middle and high school students, whereas Maryland does not.

Recommendations

In the short-to-medium term, the General Assembly must consider convening another commission ("Thornton II") to re-evaluate adequacy and equity in education funding. There would likely be considerable political support to undertake a new study. The original Thornton report (2002) recommended that the state continually evaluate the impact of the new funding scheme, and conduct new adequacy studies in the future, noting that "the development of good public policy relies on continuous evaluation of existing and newly adopted policies" (page xvii). The Bridge to Excellence Act required a follow-up adequacy study to be completed no later than June 30, 2012, but such a study has not been completed to date. The MSEA also supports legislation to create this recommended Thornton II Commission ("School funding", 2015).

Thornton II should carefully consider the funding formula structures of other states that outperform Maryland on equity and adequacy measures. According to the ELC (2015) and Odden et al. (2010), New Jersey seems superior to Maryland on both counts, even though the two states' funding formulas are very similar. One possible reason is New Jersey's use of grade-level weights, providing more funding for middle and high school students, which likely adjusts the foundation amount to be closer to the actual costs of education. Another reason is simply the fact that Maryland's adequacy study was performed nearly 15 years ago, and the cost and definition of providing adequate education have likely changed since then. Maryland will soon begin using the Partnership for Assessment of Readiness for College and Careers (PARCC) system for its state-level standardized tests. Since the state performance standard has changed twice since the original adequacy study, a new study to align costs with desired outcomes is necessary.

In re-assessing equity and adequacy in Maryland, Thornton II should also consider using the evidence based method of constructing the cost of an adequate education. This is the method used by Odden et al. (2010) to estimate adequacy in each state. Ohio and Wyoming have actually used this approach to develop their funding formulas, and have seen some success in improving performance (Odden et al., 2010; Verstegen & Knoepfel, 2012). Wyoming seems particularly committed to ensuring adequate funding, determining the cost for each individual school to provide a predetermined "basket of goods," and recalibrating its cost model every five years ("School finance information", 2016).

In order to fulfill its constitutional mandate to provide thorough and efficient education to each student in the state, regardless of wealth, county of residence, and special education needs, Maryland must take immediate action to increase the equity and adequacy of its education funding formula. This can be achieved through the careful re-evaluation of what it means to provide an adequate education in the state of Maryland, and the costs associated with that standard. The existing funding formula must be adjusted to ensure that all students have equal opportunities to receive a high quality education, which will better prepare them to succeed as productive members of society.

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Appendix A - Maryland's Funding Formula

As implemented under the Bridge to Excellence in Public Schools Act, Maryland's funding for education consists of the following components.

1. Foundation Program: a basic per-pupil funding amount, adjusted for inflation annually. In 2012, the per-pupil amount was \$6,694. Each jurisdiction is expected to contribute a proportion of this amount, depending on local wealth, as described further below.
2. At-Risk Programs: supplemental aid for each child needing additional resources to receive a high-quality education.
 - a. Compensatory Program: for each student qualifying for free and reduced price meals, school systems receive an amount equal to 0.97 of the per pupil foundation amount.
 - b. Limited English Proficiency: for each student learning English as a second language, school systems receive an amount equal to 0.99 of the per pupil foundation amount.
 - c. Special Education: for each student receiving special education services, school systems receive an amount equal to 0.74 of the per pupil foundation amount.
3. Additional Programs: intended to account for additional expenses.
 - a. Geographic Cost of Education Index (GCEI): additional funding for 13 counties in which delivering education is more expensive. An index values each county's cost of education. The GCEI multiplies the per pupil foundation amount by each county's predetermined adjustment factor, varying from 0.002 to 0.048.
 - b. Net Taxable Income (NTI) Grants: a phased grant to compensate counties whose proportion of foundation funding has increased due to a 2013 adjustment in the timing of calculating NTI.
 - c. Transportation: to assist local systems with the cost of transporting students to school. This grant includes a separate component of \$1,000 per student with disabilities that require special transportation.

Local wealth is calculated as the sum of net taxable income, 100 percent of assessed value of the operating real property of public utilities, 40 percent of assessed valuation of all other real property, and 50 percent of assessed value of personal property.

Source: General Assembly of Maryland (2002).

Appendix B - Pre- and Post-Reform Funding Formulas in Maryland

	Pre-Reform	Post-Reform
Foundation Program		
Foundation amount	\$4,291 in 2003 dollars ^a	\$5,634 in 2003 dollars ^b
GCEI	No	Yes
Minimum state aid	No	15% of foundation amount
Special Needs Students		
Special education	Ad hoc ^c	Weight of 0.74 per pupil foundation amount
Compensatory	25% of per pupil foundation amount ^d	Weight of 0.97 per pupil foundation amount ^e
LEP	\$1,350 per pupil ^f	Weight of 0.99 per pupil foundation amount
Guaranteed tax base program	No	Only if less than 80% average wealth per pupil and only for the local tax effort above that required in Foundation Program; no more than 20% of per pupil foundation amount

Source: Chung (2015).

Notes: GCEI = Geographic Cost of Education Index; LEP = Limited English Proficiency

- a. Foundation amount is calculated on basis of actual spending
- b. Foundation amount is calculated on basis of successful school study.
- c. Special education formulas provided on ad hoc basis; politically determined total aid was distributed to each school district on basis of enrollments and wealth measure.
- d. Number of Title I eligible students.
- e. Number of students eligible for free and reduced meals.
- f. Per pupil state aid fixed at \$1,350 by School Accountability Funding for Excellence legislation, 1998.

Appendix C - Descriptive Statistics and Equity Measures for Spending and Adjusted (Weighted) Spending per Pupil by District

	Spending per Pupil		Adjusted Spending per Pupil	
	2003	2012	2003	2012
<i>Descriptive Statistics</i>				
Mean	\$9,694.17	\$14,579.92	\$7,742.02	\$9,801.81
Median	\$9,298.00	\$14,434.50	\$7,377.40	\$9,386.42
Standard Deviation	\$975.27	\$1,572.62	\$1,176.67	\$1,381.38
Coefficient of Variation	0.10	0.11	0.15	0.14
Minimum	\$8,363.00	\$12,341.00	\$6,053.39	\$7,866.86
Maximum	\$11,840.00	\$18,073.00	\$10,288.19	\$13,202.05
Range	\$3,477.00	\$5,732.00	\$4,234.80	\$5,335.18
Federal Range	\$3,350.00	\$5,368.00	\$3,577.25	\$3,252.73
<i>Equity Measures</i>				
McLoone Index	0.9620	0.9510	0.9490	0.9060
Verstegen Index	1.1519	1.1252	1.2181	1.1545
Federal Range Ratio	0.3946	0.4225	0.5330	0.3269
<i>Pearson Correlation</i>				
Wealth	0.4917	0.2220	0.5258	0.3094

Source: Author's calculations using data from Maryland Department of Legislative Services (2012) and National Center for Education Statistics (2012)

Appendix D - 2012 Maryland High School Assessment Performance by County

District	GCEI	Top 50%ile Spending	Wealth per Pupil (\$)	Adjusted Spending per Pupil (\$)	HSA English Pass Rate (%)	HSA Algebra Pass Rate (%)	Met English Standard	Met Algebra Standard
Allegany			289,935	9,280	71.6	79.1	No	No
Anne Arundel	Yes	Yes	627,838	10,727	87.5	91.0	Yes	Yes
Baltimore City	Yes		291,018	8,912	59.8	57.9	No	No
Baltimore	Yes	Yes	512,923	9,675	85.4	86.1	No	Yes
Calvert	Yes	Yes	469,728	11,558	95.9	96.3	Yes	Yes
Caroline			324,109	7,867	77.6	83.9	No	Yes
Carroll	Yes	Yes	439,029	11,462	92.5	94.7	Yes	Yes
Cecil			393,895	8,613	86.5	93.5	Yes	Yes
Charles	Yes	Yes	397,256	9,949	88.7	90.3	Yes	Yes
Dorchester			412,238	8,361	69.3	78.8	No	No
Frederick	Yes	Yes	428,321	10,353	90.1	92.8	Yes	Yes
Garrett		Yes	583,132	9,439	90.4	91.1	Yes	Yes
Harford		Yes	434,535	10,327	83.9	89.4	No	Yes
Howard	Yes	Yes	546,509	13,202	91.9	94.7	Yes	Yes
Kent	Yes		786,125	9,195	77.2	79.5	No	No
Montgomery	Yes	Yes	698,439	12,056	89.0	90.0	Yes	Yes
Prince George's	Yes		437,339	8,610	73.8	67.7	No	No
Queen Anne's	Yes	Yes	593,312	10,564	91.4	94.8	Yes	Yes
Saint Mary's	Yes		445,122	9,334	85.2	91.6	No	Yes
Somerset			337,402	8,826	79.2	77.4	No	No

Talbot			1,121,952	8,509	79.5	84.8	No	Yes
Washington			361,191	8,720	88.7	94.5	Yes	Yes
Wicomico			312,264	8,253	79.6	81.3	No	No
Worcester		Yes	1,276,025	11,452	88.6	94.1	Yes	Yes

Source: "Data downloads" (2012)

	% of Counties Meeting Standard	
	English	Algebra
Overall	50%	71%
Top 50%	83%	100%
Bottom 50%	17%	42%

	Correlation Matrix			
	Wealth	Spending	HSA English	HSA Algebra
Wealth	1			
Spending	0.309	1		
HSA English	0.239	0.646	1	
HSA Algebra	0.261	0.549	0.929	1

Appendix E - Selected Characteristics of Maryland and New Jersey Funding Formulas

	Maryland	New Jersey
Constitutional Language	“Thorough and Efficient”	“Thorough and Efficient”
Adequacy Consulting Firm	Augenblick & Myers, Inc.	Augenblick, Palaich and Associates, Inc.
Year of Adequacy Study	2000	2002
Method of Adequacy Study	Professional Judgment and Successful Schools	Professional Judgment (3 panels)
Foundation Program		
Foundation amount	\$6,694 in 2012	\$9,649 in 2012, weighted progressively heavier for middle school (1.04) and high school (1.17) students
GCEI	Yes	Yes
Special Needs Students		
Special education	0.74 of foundation amount	“Census model”: total district enrollment × 14.69% × statewide average special education excess cost
Compensatory	0.97 of foundation amount	Sliding scale 0.47 to 0.57 of foundation amount depending on district-level poverty
LEP	0.99 of foundation amount	0.50 of foundation amount
Combined LEP/Compensatory	No	0.125 of foundation amount

Sources for New Jersey data: Davy (2008) and State of New Jersey Legislature (2008).