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2016 Review of Selected Components of the Essential Programs and
Services Funding Formula: Specialized Student Populations
Economically Disadvantaged Student Component

Report to

Maine Department of Education

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Specialized Student Populations

Economically Disadvantaged Student Component

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Executive Summary

As part of the cyclical review of components of Maine’s Essential Programs and Services (EPS) funding model, the Maine Education Policy Research Institute (MEPRI) at the University of Southern Maine analyzed several elements in 2016. This report details the analysis and review of the Economically Disadvantaged Students weighted component in the formula, which is included in review of Specialized Student Populations formula adjustments. The analysis was based on expenditure data from FY15 and staffing data from fall 2015 (FY16).

In our analytic approach, Maine school districts were categorized as either small, medium, or large depending on attending student enrollment, and further grouped as low, average, or high poverty based on the percent of students eligible to receive free or reduced price lunch. These nine categories of districts were compared in several areas to contrast their spending patterns in an effort to discern spending on economically disadvantaged students.

First, for overall context, we analyzed total operating expenditure and found that high poverty SAUs spent less per student compared to low and average poverty SAUs across all size groups. A separate analysis of school funding suggests that the optional local funding that lower poverty districts chose to budget above the minimum EPS amount was a contributing factor. While high poverty districts spent more per pupil from federal and other funds, the additional funds were not enough to close the gaps between high poverty and other districts in general fund or total spending.

Next, researchers analyzed specific types of spending to determine whether high-poverty districts were spending more on certain programs that may benefit economically

disadvantaged students: summer school, student support, and special education. When focusing only on General fund expenditures from state and local sources, high poverty districts spent less on summer school, student support, and special education than low poverty districts. When federal and other funding was included (i.e. total overall spending on these programs), high poverty districts generally spent more than low poverty districts on summer school, but spent less per pupil on student support and special education.

Lastly, staff ratios were compared across the nine categories of districts to determine whether high-poverty districts had lower student to staff ratios than low or average poverty districts. As with overall expenditures, low poverty districts generally had the lowest (i.e. most favorable) student to staff ratios for teachers, level III educational technicians, and guidance/counseling staff.

In summary, it appears that the additional funds allocated through the additional 0.15 student weight for economically disadvantaged students is having an impact, by helping the highest poverty districts come closer in spending to average poverty districts. However, high poverty districts still spent less per pupil than low and average poverty districts, even after accounting for the federal funds and other funds that flow in greater proportion to high poverty units.

2016 Review of Selected Components of the Essential Programs and Services Funding
Formula: Specialized Student Populations
Economically Disadvantaged Student Component

Overview and Introduction

There is an extensive body of research showing that students in poverty have lower academic achievement than their more affluent peers (Children’s Defense Fund, 2007; Jacob and Ludwig, 2009). In response, the federal government and most states have adopted education funding policies that provide additional money to school districts based on poverty rates in an effort to improve the academic outcomes of disadvantaged students.

The Federal government has targeted funds to students in lower income households since 1965 through Title I of the Elementary and Secondary Education Act, which provides block grants for states to distribute to local school districts with large numbers or percentages of economically disadvantaged students. In Maine, \$50.1M in federal Title I funds were awarded to school districts in FY2015. Title I funds are required to be provided in addition to state funding (in keeping with federal “supplement, not supplant” policy). The federal government also sets criteria for how funds are to be used to target students in need. The federal allocation formulas use the number and percentage of students eligible for free and reduced price lunch (FRPL) to identify whether districts should receive supplemental funding, and how much funding should be provided.

Many states, including Maine, also provide additional funds to districts based on the number or proportion of low-income students. In FY2015 \$85.5M was allocated to districts through the Economically Disadvantaged component of the school funding formula. As with federal funds, the additional funding weight for economically disadvantaged students is based on the percentage of students eligible for free and reduced price lunch (FRPL). As laid out in the Essential Programs and Services (EPS) Funding Act of 2004, Maine provides an additional weight of 0.15 for FRPL-eligible students in each district (i.e. each FRPL-eligible student is counted as 1.15 students). The basis for the weight is calculated by applying the FRPL rate for grades K-8 times the resident student enrollment in all grades. The weighted counts adjust upward the number of students to be funded and thus the

district's EPS allocation (Picus et. al., 2013; Silvernail, 2011). Unlike Title I funds, the state of Maine gives local school districts broad discretion over how the state and local funds provided by the EPS economically disadvantaged component allocation are used.

The additional funds are intended to enable schools to provide additional academic support and implement specific learning opportunities shown to improve academic achievement especially among low-income students (Carey, 2002, Center for Budget and Policy Priorities; Jacob and Ludwig, 2009). There is, for example, some evidence that students in poverty benefit from smaller class sizes (Whitehurst and Chingos, 2011, Brown Center on Education, Brookings Institute; Krueger and Whitemore, 2001) and that additional guidance counseling support can also help (Bryan, 2005). Research also shows that summer learning loss is greater for students from low-income families (Alexander, Entwisle, and Olson, 2007) and that summer school targeted to low income students can help close the poverty achievement gap (McCombs et. al., RAND, 2011). Early childhood education has also been shown to help students in general, and low-income students in particular (Karoly et. al., RAND, 1998; Currie, 2001). And while the research is mixed, there is research suggesting that low-income students may be more likely to be identified as having special educational needs (Children's Defense Fund, 2003; Lee, Sills, and Oh, 2002; National Center for Learning Disabilities, 2014).

In this report we examine district level expenditures to assess whether the additional funds translate into higher per pupil spending or lower student-staff ratios in general and in selected instructional and student support programs. Specifically, we address the following questions:

1. How does total spending in high poverty districts compare to spending in low poverty districts?
2. To what extent are federal funds and the EPS 15% student weight adjustment closing the spending gap between low and high poverty districts?
3. Are high poverty districts spending more than low poverty districts on targeted programs (summer school, student support, and special education)?
4. Are high poverty districts hiring proportionally more staff than low poverty districts, resulting in reduced student-to-staff ratios?

Methods for Review of the EPS Disadvantaged Youth Cost Component

Each component of Maine's Essential Programs and Services funding model is scheduled for regular review. The most recent review of the economically disadvantaged youth cost component was conducted in 2011 (Silvernail and Sloan, 2011), using school level data to examine per pupil spending on economically disadvantaged versus non-FRPL eligible students. The results of that analysis indicated that selected higher performing, high poverty schools—i.e. those that were achieving the same average level of proficiency on statewide exams as lower poverty schools—were actually spending less per pupil. On the surface, this finding may seem at odds with the adequacy-based EPS formula and its practical implication that it costs 15% more to educate economically disadvantaged students. The report identified a number of possible reasons for this finding. The analysis suggested a more complex relationship between poverty and school funding, and found a strong correlation between per pupil expenditures and local property values. Low poverty schools may be spending more in part because they can, i.e., higher local optional revenues were offsetting the lower state and federal revenues distributed to districts with lower percentages of FRPL eligible students. The report also suggested the possibility that the expenditure data used in the analysis captured spending on things not directly linked to achieving proficiency as measured by MEA performance. For example, low poverty districts may be spending more per pupil because they are providing more student support services or extra-curricular activities which may in turn have impacts not captured by standardized tests. They may also spend more on areas such as AP classes and non-core subjects that lead to learning beyond the proficiencies tested on state exams, or on items not as directly linked to achieving outcomes such as debt service.

In this report we take a closer look at expenditures by low, average, and high poverty districts, additionally accounting for district size. Both overall spending and spending on selected programs were analyzed. We also examine spending by fund type (Federal, General Fund, and Other) to assess the extent to which federal Title I funds and the EPS 15% student weight adjustment may close the spending gap between low and high poverty districts.

Sample

The sample used in the analysis includes the population of Maine public school districts and administrative units with attending students, excluding only those in unorganized territories and on tribal reservations as well as charter schools and small island districts. We categorized districts according to three levels of poverty: lower poverty districts (percent eligible for FRPL is less than one half standard deviation below the mean percent eligible of 49%), average poverty districts (within one half standard deviation from the mean), and higher poverty districts (percent eligible for FRPL is greater than one half standard deviation above the mean). These categories were selected to ensure that the higher and lower poverty groups are significantly different from each other without creating categories with too few districts. Of the 177 districts used in the analysis (shown in Table 1), 29% are lower poverty districts, 38% are average poverty districts, and 33% are higher poverty districts. See Appendix A (Technical Notes) for additional discussion of alternate methods of establishing poverty group definitions.

Because larger districts can benefit from economies of scale in the delivery of educational services, their per pupil spending is typically lower than that of smaller districts. Thus, in addition to categorizing districts by poverty level, we further categorized districts by size, with smaller districts defined as those with fewer than 300 attending students, medium sized districts as those with 300 to 1,200 attending students, and larger districts as those with 1,200 or more, to better illustrate poverty trends.

Among lower poverty districts, the average rate of poverty is 27%, compared to 68% among higher poverty districts. From Table 1 below we see that higher poverty districts as defined in this study educate about 28% of Maine's students and are, on average, significantly smaller than lower and average poverty districts.

Table 1: Overall Sample of Districts

		Poverty Categories			
		Lower poverty (5%-39% FRPL)	Average poverty (39%-58% FRPL)	Higher poverty (59%-99% FRPL)	Total
Number of Districts	Small (1 to 300)	19	25	26	70 (40%)
	Medium (301-1,200)	12	18	19	49 (28%)
	Large (1,201+)	20	25	13	58 (33%)
	Total	51 (29%)	68 (38%)	58 (33%)	177 (100%)
Number of Students Enrolled	Small (1 to 300)	2,344	3,227	2,888	8,459 (5%)
	Medium (301-1,200)	8,137	10,643	13,689	32,469 (18%)
	Large (1,201+)	43,238	59,041	32,793	135,072 (77%)
	Total	53,719 (31%)	72,911 (41%)	49,370 (28%)	176,000 (100%)
Average district enrollment		1,053	1,072	851	994

Methods of Analysis and Data Sources

Part I of the analysis uses detailed expenditure data for fiscal year 2014-2015, the most recent data available at the time of analysis, to examine differences in per pupil spending from various fund types across lower, average, and higher poverty districts. General Fund expenditures were calculated by combining two sources: 1) publicly-available district operating expenditure data obtained from 2015-2016 Public Elementary and Secondary Tuition Rates report on the Maine Department of Education website, and 2) allowable Special Education expenditures data used by the Maine Department of Education (MDOE) in calculating special education allocations. These two sources are optimal as they are cleaned and prepared by MDOE financial staff to be appropriate for analyses involving attending students (rather than resident students). Operating costs do not include spending on community services, major capital outlay, career and technical education, debt retirement, tuition, or transportation. The tuition rate report also excludes special education, which resulted in the need to combine that data from an alternate MDOE source to obtain a more comprehensive analysis of spending on the education of students.

Expenditure data for funds other than the General Fund, including federal funds, were extracted from a raw file of all 2014-2015 expenditures provided by the Maine DOE in

spring 2016 based on data reported by public school districts. Federal fund expenditures were identified using Fund Codes 2300-2999 aggregated to the district level. Expenditures from Capital, Permanent, Enterprise, Internal, Trust, and Agency funds were extracted from the same file using Fund Codes 3000 or greater and summed under “Other”. Per pupil spending amounts were calculated using attending student counts from October 2014.

Because per pupil district level data can vary widely and can be heavily skewed by a few small, high spending districts, we compared overall per pupil spending for the nine district categories (lower, average, and higher poverty for smaller, medium, and larger size districts) by combining spending for all districts and students in each group. This method reduces the influence of outliers with small numbers of students by pooling their data with that of similar districts. We also examined per pupil spending at the district level using statistical techniques to provide additional confidence that the observed differences in overall per pupil spending across district poverty level are not being driven by outliers and distributions within sub-groups. These additional analyses were conducted as a check on reported results to ensure they were not being overly influenced by the relatively wide variability in per pupil spending. Additional detail on statistical treatment of data is included in Appendix A. These analyses are included only when relevant to interpreting findings across poverty groups.

In Part II of the analysis we examine per student spending on specific programs and services that may benefit economically disadvantaged students, including summer school, special education, and student support. These analyses use the raw 2014-15 expenditure data file from the MDOE rather than operating expense data from the tuition rate reports, as additional detail is needed to isolate costs in those areas. District expenditures were again combined with October 2014 attending student count data to compute per pupil spending amounts, which were then compared across low, average, and high poverty districts in each size group.

Part III used the most recently available staffing data from the school year 2015-2016, obtained from the researcher portal of the Maine Data Warehouse, to compute the number of full-time equivalent (FTE) teachers, Educational Technicians, and counseling and guidance staff in each district. Student-to-staff ratios were then calculated for each district using attending student counts from October 2015.

Analysis Part I. Spending by Funding Source

We begin by examining per pupil expenditures from the various funding categories used by districts to pay for education in order to address question 1, “*How does spending in high poverty districts compare to spending in low poverty districts?*” We are specifically interested in determining whether additional Title I funds or the state’s 15% adjustment translate into higher per pupil spending in high poverty districts. But before we examine expenditures by fund type, a brief explanation of Maine’s EPS funding model and the types of funding sources may be helpful for some readers.

EPS and Funding Source Basics

The Essential Programs and Services cost model determines the expected cost of providing an adequate education in a district based on its size and student characteristics. This cost is shared between the state (via state subsidy) and local taxpayers. Local districts may choose to authorize actual budgets that are more than the amount dictated by EPS. However, the state does not subsidize spending above the EPS amount (thus budget amounts above EPS are paid 100% by local taxpayers). These funds raised through local taxes and state subsidy are considered *General Fund*, and constitute the large majority of public education funding.

The amount of subsidy that a district receives from the state in any given year is dictated by its ability to pay, as determined by property valuation. The state establishes a statewide mill rate expectation that all districts must raise towards their EPS allocation. That mill rate (which was 8.10 in FY2015) multiplied by the property valuation within the district constitutes the total amount that the district must pay towards the EPS amount. The state provides a subsidy to fill the gap between the local required share and the EPS total allocation amount. If a district’s voter-approved budget is higher than the minimum EPS amount, local taxpayers must pay the additional amount above EPS.

Community property valuation and the percent of students who are eligible for FRPL in a district (which is based on family income) are both related to community wealth. Areas with high rates of families in poverty tend to have less residential and commercial property value than areas with low poverty. Overall, the subsidy distribution model provides more state funding to districts with less income wealth, as it is intended to do.

However, areas with lower income may be less likely to choose to approve school budgets that are higher than the minimum EPS amount, even if they have a large property valuation base. This is reported to occur in rural or coastal districts with a large area of property or high-value vacation property and comparatively few students; while they may look wealthy by valuation measures, the communities may still struggle to raise funds for education due to lower resident household incomes.

After General Fund, *Federal Funds* contribute the second largest portion of total education funding. The two largest federal formula grant programs are Title IA (for students in poverty) and special education funds (federal IDEA act, part B). Federal formula grant assistance is apportioned to districts based on criteria established by the federal government as relevant to the funding purpose. For example, Title IA funds are allocated based on the proportion of students in poverty (as measured by FRPL eligibility). Thus, while virtually all Maine districts receive some type of federal formula funds, the distribution of federal funds depends on a variety of factors and is not uniform across all districts. In addition to formula grants, a smaller amount of federal funds are received by districts that successfully apply for discretionary grants from the US Department of Education. Discretionary and formula grant funds are combined in this analysis as in some cases they cannot be distinguished, but formula block grants are the largest source of federal funds.

Some districts raise additional funds for education through state or local grants. Many districts also raise money through local fund-raising events and donation requests. Some units also undertake *Enterprise* activities, which are self-sustaining programs that must cover their own expenses, but whose revenue can be used to support a wide variety of educational expenses. Examples of enterprise programs include school bookstores and food service programs.

In the section that follows, information is also provided on spending from *Capital Projects funds*, which are separate sources of income specifically for projects to acquire or construct new buildings or additions, upgrade learning spaces and existing schools, or minor capital outlays for renovations and repairs or loans to lease minor capital items. The final *Other* category displayed below in Table 2 includes Trust, Agency, Internal Services, and Permanent funds.

Analysis of Total Spending

Provided with the above background for context, we may now explain findings related to the question “*How does spending in high poverty districts compare to spending in low poverty districts?*” To investigate this question, researchers analyzed all expenditures reported by school districts to the Maine Department of Education in annual financial data collection. These expenditures were aggregated by the source of funds, and further analyzed by district poverty level. Table 2 displays the amounts of each of the funds for the 177 included Maine districts according to district poverty level.

Table 2: FY15 Expenditure by Source of Funds and District Poverty Level*

	Poverty Categories			All (n=177)
	Lower (n=51)	Average (n=68)	Higher (n=58)	
General Fund	\$607,027,063 (88.0%)	\$728,613,028 (86.7%)	\$467,137,469 (82.3%)	\$1,802,777,560 (86.0%)
Federal	\$34,612,684 (5.0%)	\$73,330,547 (8.7%)	\$60,819,783 (10.7%)	\$168,763,015 (8.0%)
Other State & Local Grants	\$2,434,927 (0.3%)	\$6,370,565 (0.8%)	\$7,123,104 (1.3%)	\$15,928,596 (0.8%)
Capital Projects	\$30,014,178 (4.4%)	\$15,322,211 (2.3%)	\$12,999,970 (2.3%)	\$58,336,360 (2.8%)
Enterprise Fund	\$13,704,925 (1.9%)	\$16,610,126 (1.8%)	\$17,167,966 (3.0%)	\$47,483,017 (2.3%)
All Other (includes Trust, Agency, Internal Services, and Permanent funds)	\$256,130 (0.04%)	\$355,039 (0.4%)	\$2,208,148 (0.4%)	\$2,819,317 (0.1%)
Total	\$688,049,907	\$840,601,517	\$567,456,440	\$2,096,107,864

*Percentages represent the proportion of expenditures in each fund type for districts in the poverty level group.

Expenditures from the General Fund make up the bulk of spending for all districts. Expenditures from Federal sources in FY2015 made up only 8.0% overall but were twice as much for higher poverty (10.7%) compared to lower poverty districts (5.0%). This can be partially attributed to the targeting of some federal funds, most notably Title I funds, to

districts with higher rates of FRPL-eligible students. Expenditures from State, Local, Capital, Enterprise, and All Other funds combined made up only 6.0% overall, with most (5.1%) coming from funds categorized as Capital projects and Enterprise. Lower poverty districts reported spending almost twice as much from Capital projects funds (4.4%) compared to average and high poverty districts, both of which reported spending 2.3%. State and local grants and Enterprise funds made up a larger amount of overall spending among higher poverty districts (4.3%) compared to lower poverty (2.2%) and average poverty districts (2.6%).

Per Student Expenditures by Fund, Poverty Level, and District Size

Next we examine *per pupil* spending by fund type across low, average, and high poverty districts. Because larger districts can benefit from economies of scale in the delivery of educational services, their per-pupil spending is typically lower than that of smaller districts. Thus we further categorized districts by size, with smaller districts defined as those with less than 300 attending students, medium districts as those with 300 to 1,200 students, and larger districts as those with 1,200 or more, to better illustrate poverty trends.

General Fund

Table 3 displays per pupil spending from the General Fund by district poverty level and district size. As explained above, the General Fund is the chief operating fund for districts. It contains the district's EPS allocation (including the local share and state subsidy), plus any additional revenues approved by the district above the EPS minimum required amount. The General Fund expenditure data used here include only operating expenditures for education and administration; expenditures for transportation, major capital outlay, and debt service are not included.

**Table 3: FY15 General Fund Operating Expenditure Per Attending Pupil
by District Size and Poverty Level**

	Poverty level			Total (Range)
	Lower	Average	Higher	
Smaller districts (<300)	\$14,436	\$12,843	\$10,835	\$12,599 (\$6,842- 26,397)
Medium districts (300-1,200)	\$10,974	\$10,797	\$9,827	\$10,432 (\$7,183- 18,860)
Larger districts (1,200 plus)	\$11,191	\$9,693	\$9,189	\$10,050 (\$5,235- 14,750)
All Districts (Range)	\$11,300 (\$7,839- 26,397)	\$9,993 (\$5,235- 23,509)	\$9,462 (\$6,842- 19,435)	\$10,243 (\$5,235- 26,397)

It can be seen in Table 3 that overall per pupil expenses are generally higher in smaller districts compared to larger units, as is expected based on the economies of scale that larger districts can achieve. Thus, comparisons by poverty level are most meaningful when comparing units of similar size. In doing so, Table 3 shows that in all three size categories, lower poverty districts (as categorized by the percent of students eligible for FRPL) spent more per pupil than both average and higher poverty districts, and that higher poverty districts consistently spent the least. Overall per pupil expenditures for smaller, lower poverty districts (\$14,436) were \$3,601 more than what smaller, higher poverty districts reported spending (\$10,835). The gap between medium-sized lower and higher poverty districts is \$1,147, and between larger lower and higher poverty districts, the spending gap is \$2,002. The gap in overall per pupil spending by average poverty compared to higher poverty districts is not as wide: \$2,008, \$970, and \$504 for small, medium, and large districts, respectively.

Because district level analysis can be complicated by skewed data and small sub-samples, we assessed the impact of outliers (unusually high and low spending SAUs) on the analysis and found no substantive impacts; the results remain about the same even when very high and low spending districts are excluded from the sample. We also conducted statistical analysis of district level per student expenditures as a way to provide additional

confidence that the observed differences in spending across district poverty level are not being driven by distributions within sub-groups. Additional technical notes about these statistical analyses, which assess whether the relationship between per pupil spending and district poverty level persisted after controlling for district size and sample distribution, are included in Appendix A. Regression analysis of district level per student spending from the General Fund indicates that the observed higher per pupil spending by low poverty districts is statistically significant even after controlling for district size category; the lower spending per pupil by high poverty districts compared to average poverty districts is also statistically significant.

Federal Funds

Table 4 displays Federal Fund spending by district poverty level and size. The Federal Fund contains Title I, special education, and several other federal programs that provide financial assistance to local school districts. About one third of federal assistance comes through the federal Title I program, which provides financial assistance to local school districts and schools with high numbers or high percentages of children from low-income families and other at-risk students.

Table 4: FY15 Total Federal Fund Per-Pupil Expenditures (and Range of SAU Per Pupil Amounts) by Poverty Level

	Poverty level			
	Lower poverty	Average poverty	Higher poverty	Total
Smaller districts (<300)	\$1,060 (\$275-1,804)	\$1,337 (\$609-2,853)	\$1,423 (\$606-3,063)	\$1,289 (\$275-3,063)
Medium districts (300-1,200)	\$735 (\$355-1,248)	\$1,050 (\$591-1,947)	\$1,325 (\$691-2,615)	\$1,087 (\$355-2,615)
Larger districts (1,200 plus)	\$605 (\$222-1,238)	\$980 (\$446-1,535)	\$1,179 (\$714-1,703)	\$908 (\$222-1,703)
All districts	\$644 (\$222-1,804)	\$1,006 (\$446-2,853)	\$1,237 (\$606-3,063)	\$959 (\$222-3,063)

* All districts reported Federal fund expenditures except for New Sweden, a small, higher poverty SAU

The pattern of federal assistance is evident: higher poverty districts spent significantly more per pupil from these funds than other districts. For example, overall per pupil spending by higher poverty districts was \$593 more per pupil than for lower poverty

districts. The gap was wider among medium sized and larger SAUs (\$590 and \$574, respectively) compared to smaller districts (\$363). Statistical analysis indicates that higher per pupil spending by higher poverty districts compared to lower poverty districts was statistically significant ($p < 0.001$), even after taking SAU size category into account. Higher poverty districts also spent more federal funds per student than average poverty districts, although the differences are not as large, and statistical analysis indicates that higher per pupil spending by higher poverty districts compared to average poverty districts was not significant.

Other funds

While the bulk of spending (94%) by school districts was from the General (86%) and Federal (8%) funds, SAUs also have other funds available to them. Expenditures from state grants, local grants and donations, capital funds, enterprise activities, and all other funds combined make up approximately 6.0% overall, with almost all of it coming from capital and enterprise funds. As shown above in Table 2, low poverty districts spent almost twice as much as other districts from capital funds (4.4% compared to 2.3%). Table 5 provides per pupil analysis expenditures from State, Local, Enterprise, and Trust, Agency, Internal Services, and Permanent funds combined. To focus the analysis on operating expenses, Table 5 excludes expenditures from the Capital Fund.

Table 5: FY15 Per-Pupil Expenditures from All Other Funding Sources*

	Poverty level			Total
	Lower poverty	Average poverty	Higher poverty	
Smaller districts (<300)				
Number (%) of SAUs reporting data	18 (95%)	21 (84%)	25 (100%)	64 (91%)
Overall per pupil expenditures (Range, SAU amounts)	\$261 (\$0.30-1,412)	\$154 (\$0.89-1,433)	\$564 (\$5.56-2,753)	\$328 (\$0.30-2,753)
Medium districts (300-1,200)				
Number (%) of SAUs reporting data	11 (92%)	17 (94%)	19 (100%)	47 (96%)
Overall per pupil expenditures (Range, SAU amounts)	\$275 (\$14-680)	\$520 (\$10-1,409)	\$473 (\$0.80-1,480)	\$440 (\$0.80-1,480)
Larger districts (>1,200)				
Number (%) of SAUs reporting data	20 (100%)	25 (100%)	13 (100%)	58 (100%)
Overall per pupil expenditures (Range, SAU amounts)	\$316 (\$7-883)	\$297 (\$8-625)	\$563 (\$22-1,267)	\$368 (\$7-1,267)
All				
Number (%) of SAUs reporting data	49 (96%)	63 (93%)	57 (98%)	169 (95%)
Overall per pupil expenditures (Range, SAU amounts)	\$308 (\$0.30-1,412)	\$323 (\$0.84-1,433)	\$538 (\$0.80-2,753)	\$379 (\$0.30-2,753)

*Includes State, Local, Enterprise, Trust, Agency, Internal Services, and Permanent funds (excludes Capital fund expenditures).

Most of the 177 districts (95%) reported spending from sources other than Federal and General Funds. Table 2 above showed that expenditures from these other funds made up a larger percentage of overall spending by higher poverty districts (4.7%) compared to lower poverty districts (2.2%). Per pupil spending in Table 5 shows a similar pattern. Among the 169 districts with reported expenditures from these other sources, higher poverty districts consistently spent more than lower poverty districts: the gap in overall per student spending was \$303, \$198, and \$247, among smaller, medium, and larger districts, respectively. When comparing higher poverty and average poverty districts, the picture is more mixed. Among smaller and larger sized districts higher poverty districts

reported spending more per student than average poverty districts, \$410 and \$266, respectively, but among medium sized districts the spending gap is flipped, with average poverty districts spending \$44 more than higher poverty districts.

Statistical analysis of district level per student spending from Other sources indicates that the higher spending by higher poverty districts compared to lower and average poverty districts was significant even after taking SAU size category into account. This result was driven in part by one small, high poverty SAU that reported spending \$2,753 per student from these other funds. However, even when this district is excluded from the sample, results still indicate that higher poverty districts spent more, on average, than other districts.

Total Spending

Table 6 displays per pupil spending analysis for total spending, combining operating expenditures from general funds, federal funds, and all other funds excluding capital funds.

Table 6: FY15 Total Operating Expenditure Per Attending Pupil*

	Poverty level			Total
	Lower poverty	Average poverty	Higher poverty	
Smaller districts (<300)	\$15,749 (\$9,648-26,927)	\$14,317 (\$9,173-25,928)	\$12,768 (\$8,394-23,778)	\$14,185 (\$8,394-26,927)
Medium districts (300-1,200)	\$11,970 (\$8,901-15,795)	\$12,351 (\$9,094-20,668)	\$11,625 (\$9,098-14,680)	\$11,949 (\$8,901-20,668)
Larger districts (1,200 plus)	\$12,112 (\$8,770-15,765)	\$10,969 (\$6,791-13,074)	\$10,931 (\$8,679-13,630)	\$11,326 (\$6,791-15,765)
All districts	\$12,250 (\$8,770-26,927)	\$11,319 (\$6,791-25,928)	\$11,231 (\$8,394-23,778)	\$11,578 (\$6,791-26,928)

Includes General, Federal, and all Other Funds excluding Capital expenditures

Overall per pupil spending from all funds by lower poverty districts was higher than total per pupil spending by average and higher poverty districts, and according to both regression and nonparametric analysis, the difference was statistically significant even after controlling for SAU size. The difference in overall per pupil spending between average

and higher poverty schools was smaller and according to statistical analysis, not significant once district size is accounted for. This indicates that the higher per pupil spending from Federal funds by higher poverty districts (Table 4) and State, Local, Enterprise and other funds (Table 5) was not large enough to offset the higher per student spending by lower poverty districts from the General Fund (Table 3).

Summary

The large gap between lower and higher poverty schools in General Fund spending per student was reduced when federal and other funds were considered. The General Fund spending gap between smaller lower and higher poverty districts was \$3,601, but shrank to \$2,901 in total per pupil spending. For medium districts the gap decreased from \$1,147 to \$345, and from \$2,002 to \$1,181 for larger districts. Federal funds played a larger role relative to funds from other sources in reducing the gap in per student spending between lower and higher poverty districts.

The differences between higher and *average* poverty districts in General Fund spending per student were not as large (\$2,008 for smaller districts, \$970 for medium districts, and \$504 for larger districts). The gap-closing impacts of additional allocations from federal and other funds resulted in total per pupil spending gaps of \$1,549 for smaller districts, \$726 for medium districts, and \$38 for larger districts.

The above analysis was conducted in order to address question 1 and question 2: *“How does spending in high poverty districts compare to spending in low poverty districts?”* and *“To what extent are federal funds and the EPS 15% student weight adjustment closing the spending gap between low and high poverty districts?”* Overall, analysis of spending patterns indicates that state, local, enterprise and other funds, federal funds and the economically disadvantaged student weight in the EPS formula do not result in higher poverty districts spending more per student than lower poverty schools. They do, however, narrow the gap. When all funding sources are considered, per student spending in higher poverty districts is not significantly less than average poverty districts.

Per-Pupil General Fund Amounts By Poverty Level

To attempt to identify what may be contributing to the lower spending in higher poverty districts, researchers analyzed data from another perspective. Using allocation data for the districts in our sample, we determined the amount of General Fund that was contributed by state subsidy, and the additional amount that local districts were required to raise to meet their minimum EPS allocation. Local funds raised above the EPS amount were then attributed to local optional funding that districts approved above the EPS model amount. Table 7 provides these figures on a per-pupil basis for districts by our size and poverty level categories. Note: The figures in Table 7 are not directly comparable to prior tables. In particular, the General Fund expenditure data used in Table 3 include only operating expenditure for regular education and special education, whereas Table 7 is based on total district-approved budgets. Furthermore, the data used in Table 7 reflect allocation amounts per *resident* student, and not actual expenditures per *attending* student. Appendix B provides a more detailed version of this information broken down by district size categories; the overall trends seen in Table 7 are consistent within size groups.

Table 7: FY15 General Fund Per Pupil Budget Amounts

	Poverty level		
	Lower	Average	Higher
Number of Districts	51	68	58
% Econ. Disadv. Students	27%	50%	65%
# Resident Students	55,747	71,366	49,525
Per Pupil General Fund Amounts			
A. State subsidy	\$3,630	\$4,936	\$6,243
B. Local share	\$7,126	\$6,177	\$4,545
C. Total EPS per pupil Allocation (A+B)	\$10,756	\$11,113	\$10,788
D. Economically Disadv. student allocation*	\$289	\$523	\$627
E. Local optional funding**	\$2,257	\$1,349	\$721
F. Total Per pupil amount (C+E)	\$13,013	\$12,462	\$11,509

* The per pupil allocation amount from the EPS formula's additional 0.15 student weight for economically disadvantaged students is included in the amount in Row C; it is detailed as a separate amount for illustration

** Eight districts raised less than their EPS allocation amount: Lewiston, Augusta, Auburn, RSU 87, RSU 17, RSU 88, RSU 33, RSU 20. Their optional funding amounts were set to zero. Three other districts - Milford, Waterville, and RSU 29 - raised exactly their EPS allocation.

Table 7 shows several noteworthy points. First, the total EPS per pupil allocation (Row C, the sum of rows A and B) was fairly consistent across all categories; the differences between district poverty categories were not significant. While higher poverty districts might be expected to have higher per pupil EPS allocations because of the additional student weight for economically disadvantaged students shown in Row D, this was not the case. Possible explanations include offsetting effects of regional salary adjustments and/or special education funding amounts. Each of these factors may carry more influence in a district's EPS formula allocation than the economically disadvantaged student weight.

The second issue illustrated by Table 7 is that higher poverty districts received more per pupil in state subsidy (row A), and thus were required to raise less per pupil in local funds (row B), than lower poverty districts. The overall per pupil state subsidy for higher poverty districts (\$6,243 per pupil) was \$2,613 more than for lower poverty districts (\$3,630 per pupil). These rows validate that the EPS model is generally functioning as intended by providing more state support to districts with higher poverty. This is further reinforced by row D, which illustrates the additional funds per pupil that were allocated in the EPS formula for higher poverty districts via the economically disadvantaged student weight.

Third, the table suggests that lower poverty districts have a greater ability and/or willingness to raise additional local funds above the EPS required minimum. As seen in Row E, lower and average poverty districts raised much more in additional optional funds than higher poverty districts (\$2,257 and \$1,349 versus \$721 per pupil). The impact of optional local funding above the EPS minimum resulted in total General Fund budgets that were greater in lower and average poverty districts than in high poverty areas (Row F). Taking tables 3 and 7 together, the analysis of General Fund expenditures indicates that the higher per pupil spending in lower poverty districts may be largely attributed to optional property tax revenues raised above the EPS required level. Namely, average poverty districts had \$953 more in total General Fund allocation per pupil than higher poverty districts, and \$628 of that can be attributed to greater local optional budgets. The \$1,504 in total General Fund budget gap between lower and higher poverty districts can be wholly explained by the \$1,536 difference in local optional amounts per pupil.

Analysis Part II. Special Programs and Student Services

Next, we examine spending on special programs that may benefit economically disadvantaged students, comparing lower, average, and higher poverty districts. As discussed above, additional funds are provided in the EPS formula for students who are eligible for free or reduced price lunch (FRPL). These funds may enable schools to provide additional academic support and learning opportunities to their students. This analysis addresses question 3, “*Are high poverty districts spending more than low poverty districts on targeted programs (summer school, student support, special education, and pre-K programs)?*”

Student Support

Tables 8 and 9 show spending on Student Support by fund type and district poverty level and size. Student Support services include attendance support and monitoring, guidance counseling, health care, psychological counseling, and other supportive activities including Occupational Therapy, Physical Therapy, and speech therapy.

Table 8 shows that all districts in our sample report some spending on Student Support services. Across all levels of poverty, most of the funding used for Student Support activities came from the General Fund, with federal funds and other funds making up a slightly larger proportion of overall spending on student support services in higher poverty districts.

Table 8: FY15 Student Support Services – General Information

	Poverty Categories			All
	Lower	Average	Higher	
Number of districts	51	68	58	177
Total expenditures (all sources)	\$50,394,832	\$63,870,876	\$41,348,906	\$155,614,614
General Fund \$ and %	\$46,514,753 (92.3%)	\$58,396,137 (91.4%)	\$35,524,612 (85.9%)	\$140,435,501 (90.2%)
Federal funds \$ and %	\$3,706,293 (7.3%)	\$3,687,787 (5.8%)	\$3,474,190 (8.4%)	\$10,868,269 (7.0%)
All Other funds \$ and %	\$173,786 (0.3%)	\$1,786,952 (2.8%)	\$2,350,104 (5.7%)	\$4,310,844 (2.8%)

Table 9 displays overall per attending student spending on support services from General, Federal, and Other funds according to district size and poverty level. While all 177 districts reported spending on Student Services, not all spent from every fund: all reported General fund expenditures, 79.7% reported Federal fund expenditures, and 34.5% reported spending from other funds. Larger and higher poverty districts were more likely to report spending from both federal and other sources of funds.

Table 9: Student Support Services – FY15 Per Pupil Expenditures

	Smaller (< 300)			Medium (300-1,200)			Larger (> 1,200)		
Poverty	Lower	Avg.	Higher	Lower	Avg.	Higher	Lower	Avg.	Higher
# Districts	19	25	26	12	18	19	20	25	13
General Fund	\$934	\$737	\$458	\$742	\$823	\$674	\$885	\$800	\$762
Federal funds	\$35	\$90	\$37	\$41	\$76	\$50	\$76	\$44	\$82
Other funds *	\$3	\$0	\$7	\$1	\$24	\$10	\$4	\$25	\$60
Total	\$972	\$827	\$501	\$783	\$923	\$734	\$965	\$869	\$904
Range of SAU Totals*	\$252-2,284	\$181-1,448	\$3-1,277	\$450-1,084	\$500-1,692	\$373-1,168	\$718-1,249	\$551-1,148	\$503-1,650

**Includes State, Local, and all Other funds*

Overall per student spending on support services from the General fund was \$476 more for smaller, lower poverty districts than for smaller, higher poverty districts. Among larger districts, the spending gap between lower and higher poverty districts was smaller: \$68 among medium sized districts and \$124 among larger districts. Average poverty districts also consistently spent more per student on student support services than higher poverty districts, though the gaps in spending are generally smaller: \$279, \$149, and \$38, for smaller, medium, and larger districts, respectively. Both parametric and nonparametric analysis confirm that these observed differences in per student spending from the General Fund, with higher poverty districts spending less than both lower and average poverty districts, are statistically significant.

We can also see from Table 9 that federal assistance did not fully close the gap between lower and higher poverty districts because overall federal spending was small compared to General Fund, and 20% of the districts reported no federal expenditures on student support services. Also, some federal funds for supporting students are discretionary grants and not formula grants, and thus less directly based on student poverty levels. Expenditures from other sources, including state and local grants and enterprise activities, played an even more minor role in closing the spending gap in per student spending on student support services with only 35% of districts reporting expenditures, although these other funds played a larger role in larger and poorer districts.

When total spending is taken into account, the gap in spending on student support services between smaller, lower and higher poverty districts was \$471. Among medium sized districts, lower poverty districts spent \$49 more per student than higher poverty districts. These gaps are similar to those found in General fund expenditures. Among larger districts the gap shrinks from \$124 in General Fund spending to \$61 in total spending, reflecting the relatively larger impact of additional federal and other source funds. When comparing average and higher poverty districts, the picture is mixed. In fact, federal funds and funds from other sources increase the gap, at least among smaller and medium sized districts. The gap in spending by average poverty over higher poverty districts increases from \$279 to \$326 among smaller districts, and from \$149 to \$190 among medium sized districts. Among larger districts the gap in spending is reversed slightly with higher poverty districts spending \$34 more than average poverty districts. Both parametric and nonparametric analysis confirms that the combined effects of federal and other funds is small and has a statistically insignificant effect on on-average per student spending by higher poverty districts compared to other districts.

While the results shown in Table 9 indicate that high poverty districts spent less overall for student support services than other districts, it is still possible that they provided more for some specific services within the overall mix of supports. While table 9 presents overall per student spending on student support by funding source using all 177 districts, Table 10 reports overall per student expenditures for just those districts offering the selected Student Support services. With the exception of health care services, higher poverty districts were somewhat less likely to offer targeted student support services, as

shown by their reported expenditure data. Moreover, higher poverty districts generally spent less per student on support services, except for health care and attendance services, where per student spending was higher compared to both lower and average poverty districts. However, the higher overall per student spending on health care by high poverty districts is skewed by spending in one larger, higher poverty district which spent \$511 per student (the next highest was \$172). Without including this district in the analysis, per student health care spending by higher poverty districts drops to \$130, which is less than what lower poverty districts spent and about the same as average poverty districts.

Table 10: Selected Student Support Services

	Number (and %) of districts with reported FY15 expenditures and their overall per pupil spending in selected areas			
	Poverty Category			
	Lower	Average	Higher	All
Attendance	26 (51%)	37 (54%)	25 (43%)	88 (50%)
	\$107	\$75	\$133	\$100
Guidance	50 (98%)	66 (97%)	52 (90%)	168 (95%)
	\$325	\$310	\$279	\$306
Health care services	50 (98%)	67 (99%)	58 (100%)	175 (99%)
	\$159	\$135	\$170	\$152
Psychological srvc.	45 (88%)	62 (91%)	49 (85%)	156 (88%)
	\$99	\$75	\$78	\$83
OT, PT, Speech, etc.	47 (92%)	67 (99%)	52 (90%)	166 (94%)
	\$254	\$251	\$203	\$238
Other	28 (55%)	41 (60%)	33 (57%)	102 (58%)
	\$29	\$59	\$26	\$41

Summer School

Tables 11 and 12 show spending on Summer School by fund type, district poverty level, and size. Unlike spending on student support, not all districts had summer school expenditures.

Table 11: Summer School – FY15 General Information

	Poverty Categories			All
	Lower	Average	Higher	
Number (%) of districts reporting expenditures	23 (45.0%)	35 (51.5%)	28 (48.3%)	86 (48.6%)
Total expenditures (from all funds)	\$294,880	\$758,639	\$686,724	\$1,740,243
General fund \$ and %	\$208,789 (70.8%)	\$423,789 (55.7%)	\$130,731 (19.0%)	\$763,309 (43.9%)
Federal funds \$ and %	\$47,720 (16.2%)	\$163,520 (21.5%)	\$437,608 (63.7%)	\$648,848 (37.3%)
Other funds \$ and %	\$38,371 (13.0%)	\$171,330 (22.6%)	\$118,385 (17.2%)	\$328,086 (18.9%)

Table 11 shows that higher poverty and average poverty districts were slightly more likely than lower poverty districts to offer summer school, as shown by their reported expenditure data: 48% of higher poverty districts and 51% of average poverty districts offered summer school opportunities compared to 45% of lower poverty districts. Moreover, Federal funds appear to make a difference; while Federal funds made up 16% of summer school expenditures for lower poverty districts and 21% of expenditures by average poverty districts, almost 64% in higher poverty districts came from Federal funds.

Table 12 displays per pupil spending by poverty level and district size on Summer School from the General Fund and federal and other sources for those districts offering summer school. The first thing to note is that larger average and higher poverty districts are most likely to offer summer school. Secondly, when districts do offer summer school, lower poverty units fund programs mostly through the General Fund while higher poverty districts rely more on federal funds.

Table 12: Summer School – FY15 Per pupil Expenditure

Poverty	Smaller (< 300)			Medium (300-1,200)			Larger (> 1,200)		
	Lower	Avg.	Higher	Lower	Avg.	Higher	Lower	Avg.	Higher
Number (%) reporting	6 (32%)	8 (32%)	7 (27%)	7 (58%)	18 (50%)	10 (53%)	10 (50%)	18 (72%)	12 (92%)
General fund	\$33	\$14	\$15	\$6	\$10	\$3	\$7	\$8	\$3
Federal funds	\$0	\$18	\$19	\$3	\$6	\$16	\$2	\$2	\$10
Other funds*	\$10	\$0	\$0	\$0	\$0	\$0	\$1	\$3	\$4
Total	\$43	\$32	\$34	\$9	\$17	\$19	\$10	\$13	\$17
Range of SAU amounts	\$16- 110	\$5- 65	\$7- 110	\$6- 15	\$2- 69	\$6- 28	\$1- 26	\$2- 36	\$0.50- 44

*Includes State, Local, and all Other funds

Lower poverty districts that do offer summer school spent twice as much per student from the General Fund as did higher poverty districts. Average poverty districts also spent more per student from the General fund than did higher poverty districts, except among smaller districts, which spent about the same. When spending from all sources is combined, per pupil spending by higher poverty districts was higher than both lower and average poverty districts, at least among medium and larger districts. Per pupil expenditures from federal funds were much higher for higher poverty districts, suggesting that federal funds are an especially important resource for higher poverty districts when it comes to summer school offerings. Funds from other sources, including local grants and enterprise activities, also provided some limited help with summer school programming primarily for larger, higher poverty districts.

Nonparametric tests suggest that observed differences in per pupil spending from federal sources and overall was significantly higher among higher poverty districts compared to lower poverty districts after controlling for SAU size. Small sample sizes and skewed data limit the statistical power of the parametric tests.

Special Education

National data suggest that school districts with higher poverty rates may also have higher proportions of students identified with special needs. (Children’s Defense Fund, 2003, 2007; National Center for Learning Disabilities, 2014) To investigate whether this is the case in Maine, we analyzed special education identification rates (i.e. prevalence) by

district, using data from the most recent year of EPS special education component calculations (prevalence adjustment). This funding analysis is less directly related to the EPS economically disadvantaged component, as the EPS formula has a separate and much larger component specifically for supporting the costs of special education. The economically disadvantaged student weight is not intended to support special education. However, given the potential relevance of this topic to economically disadvantaged communities, the analysis is included for discussion purposes.

First, we calculated the correlation between resident special education prevalence rate and the percent of students eligible for FRPL. The correlation was 0.31, which is a weak but statistically significant relationship. Further analysis of special education incidence, using the nine district categories employed in this report, are summarized in Table 13. This demonstrates that in Maine, as seen elsewhere, higher poverty districts tended to have a higher proportion of students identified with special education needs.

Table 13: FY14 Resident Special Education Prevalence by Size and Poverty Level

	Smaller (< 300)			Medium (300-1,200)			Larger (> 1,200)		
Poverty	Lower	Avg.	Higher	Lower	Avg.	Higher	Lower	Avg.	Higher
# Resident Students	3,017	4,081	3,198	8,213	11,313	13,739	44,517	55,972	32,588
# Special Ed. Stud.	454	639	556	1,137	1,902	2,362	6,412	9,058	5,848
Prevalence	15.0%	15.6%	17.4%	13.8%	16.8%	17.2%	14.4%	16.2%	17.9%

Tables 14 and 15 below show spending on Special Education by fund type and district poverty level and size. As with table 13, these data are from EPS special education component calculations, and represent state-approved special education expenditures in FY14. The sample of districts is slightly different than for other programs in this report because of data availability and changes in district membership between FY14 and FY15. Although prevalence rates were higher in higher poverty districts, there were no significant differences in per pupil spending across district poverty levels.

Table 14 shows the districts with reported Special Education expenditure data and the amounts spent from General and Federal funds. These expenditure data were obtained

from the Maine Department of Education and include allowable special education expenditures for instruction, administration, and related services for attending students.

Table 14: Special Education Approved Expenditures (FY2014)

	Poverty Categories			All
	Lower	Average	Higher	
Number (%) of districts reporting expenditures*	46 (90%)	64 (94%)	54 (93%)	164 (93%)
Total Special Education expenditures	\$103,530,649	\$140,351,880	\$97,268,152	\$341,150,682
Total \$ and % from general fund	\$94,879,689 (91.6%)	\$123,817,556 (88.2%)	\$85,023,738 (87.4%)	\$303,720,983 (89.0%)
Total \$ and % from federal funds	\$8,650,961 (8.3%)	\$16,534,324 (11.8%)	\$12,244,414 (12.6%)	\$37,429,700 (11.0%)

While the majority of funds for Special Education come from the General Fund, Federal Fund expenditures appear to play a slightly larger role in special education for average and high poverty districts relative to low poverty districts.

In medium and larger sized districts, all of the higher poverty districts reported special education expenditures, compared to between 90% and 96% of lower and average poverty districts. Among smaller districts, higher poverty districts were less likely (73%) to report special education expenditures compared to lower (84%) and average poverty (80%) districts. Table 15 provides the spending levels per all attending pupils for those districts that reported special education spending.

Table 15: Special Education - FY14 Expenditure Details per Attending Student

Poverty	Smaller (< 300)			Medium (300-1,200)			Larger (> 1,200)		
	Lower	Avg.	Higher	Lower	Avg.	Higher	Lower	Avg.	Higher
Number (%) reporting	16 (84%)	20 (80%)	19 (73%)	11 (92%)	17 (94%)	19 (100%)	18 (90%)	24 (96%)	13 (100%)
General fund	\$2,160	\$1,839	\$1,760	\$1,834	\$1,961	\$1,762	\$1,949	\$1,709	\$1,725
Federal funds	\$272	\$277	\$288	\$180	\$265	\$242	\$172	\$227	\$252
Total*	\$2,432	\$2,117	\$2,048	\$2,014	\$2,226	\$2,004	\$2,121	\$1,937	\$1,977
Range of SAU amounts*	\$1,290- 4,695	\$764- 3,803	\$758- 3,357	\$1,303- 2,884	\$1,109- 3,939	\$1,149- 2,516	\$1,313- 2,807	\$1,370- 2,898	\$1,446- 2,491

*Total includes Federal plus General fund expenditures

Among smaller districts, overall General Fund per student spending on special education was \$400 higher in lower poverty districts compared to higher poverty districts.

Among medium sized districts the General Fund spending gap shrinks to \$72 and among larger districts the gap is \$224. The gaps in spending from the General Fund between higher poverty and average poverty districts are generally smaller, \$79 among smaller districts and \$199 among medium districts; and among larger districts, the gap was closed with higher poverty districts spending slightly more (\$16) than average poverty districts.

Analysis of expenditures from both General and federal funds indicates that federal assistance targeted at poorer districts reduced the spending gap between lower and higher poverty districts, at least for medium and larger districts. Among medium districts the gap in per student spending dropped to \$10 down from \$72, and among larger districts the gap dropped from \$224 to \$144. Among smaller districts federal funding made little difference, with lower poverty districts out-spending higher poverty districts by \$384 compared to \$400.

Federal funds played a mixed role in aligning spending between higher and average poverty districts. Among smaller districts Federal funds reduced the gap only slightly from \$79 to \$69 while among medium districts the gap increased from \$199 to \$222, with average poverty districts receiving more in federal funds per student. Among larger districts, federal funds increased spending by higher poverty districts over average poverty districts even more to \$40 up from \$16.

Taken together, the analysis of special education General Fund expenditures and total expenditures (General and Federal Funds) suggest that both state and federal targeted funds are helping high poverty districts come closer to spending by lower and average poverty districts. Indeed, both parametric and nonparametric tests indicate that the relatively small observed differences in total spending per student across poverty levels are not statistically significant once district size is accounted for. However, since prevalence rates are higher, this means that higher poverty districts are servicing proportionally more special needs students with similar resources compared to lower poverty districts. Appendix C includes an additional set of analyses of the EPS special education allocations based on district poverty level and size, included from a separate report reviewing the EPS Special Education cost component.

Summary

In summary, these analyses demonstrated that when focusing only on General fund expenditures, higher poverty districts spent less on summer school, student support, and special education than low poverty districts. Compared to average poverty districts, higher poverty units spent less from the General Fund on summer school and student support, and about the same per pupil on special education. In total funds (General and federal combined), higher poverty districts are spending more than average and lower poverty districts per pupil to provide summer school programs, less per pupil on student support, and about the same amount on special education. Thus it appears that federal funds are helping higher poverty districts to close the spending gap in at least some areas.

Analysis Part III. Student-Staff Ratios

Research suggests that smaller classrooms and lower student-staff ratios may be beneficial to student learning in elementary grades, particularly for disadvantaged students (Whitehurst and Chingos, 2011, Brown Center on Education, Brookings Institute; Krueger and Whitemore, 2001). Rather than spending additional funds allocated through the EPS model for specific programs and services, higher poverty districts might be using the extra money to hire more staff. Because average staff salaries can vary based on the labor market region within the state, and because some districts may have less experienced (and thus lower salary) teachers than others, analysis of actual staff data provide a different perspective from expenditure data. Below we analyze student-to-staff ratios by district poverty level and size category to address question 4, *“Are high poverty districts hiring proportionally more staff than low poverty districts, resulting in reduced student-staff ratios?”*

Tables 16-18 display overall and median SAU student-staff ratios for various types of school staff. Staff levels are measured in full-time equivalent (FTE) units. The staff data are for the school year 2015-16 (reported in October 2015) and the student count data are from October 2015.

Table 16: Student to Full-Time Equivalent Teacher Ratios (and District Ranges)

	Lower Poverty	Average Poverty	Higher Poverty
Smaller (< 300)	10.3 (5.5-15.7)	11.1 (8.0-17.0)	12.1 (7.0-20.0)
Medium (300-1,200)	13.6 (10.7-16.9)	13.2 (10.8-16.4)	13.9 (12.1-15.6)
Larger (> 1,200)	14.3 (11.9-16.5)	14.6 (12.1-16.7)	15.4 (13.7-16.7)

Results show lower poverty districts had the lowest student-teacher ratios and that higher poverty districts had the highest, particularly among smaller and larger districts. Both nonparametric and parametric tests indicate lower poverty districts' lower student-teacher ratios are statistically significant after controlling for SAU size, while there is no statistical difference between higher and average poverty districts. This suggests that while additional funding enabled higher poverty districts to keep pace with average poverty districts, lower poverty districts employed proportionally more teachers.

Table 17: Ratio of Students to Ed Tech IIIs

Poverty	Smaller (< 300)			Medium (300-1,200)			Larger (> 1,200)		
	Lower	Avg.	Higher	Lower	Avg.	Higher	Lower	Avg.	Higher
Number (%) of districts	15 (79%)	22 (88%)	22 (85%)	12 (100%)	17 (94%)	118 (95%)	20 (100%)	24 (96%)	13 (100%)
Student ratio	32.5	44.1	45.5	48.4	39.3	61.1	50.1	67.9	60.6
Range of SAU ratios	16.3-194	15.2-256	3.5-370	24.9-265.3	15.6-319	32.8-256.7	23.1-753.7	33.2-393	27.0-284.4

Looking at overall student-Ed Tech III staff ratios, smaller districts were less likely than medium and larger districts to employ these paraprofessionals. Lower poverty districts had lower student-staff ratios compared to higher poverty districts across all size categories. However, the data are heavily skewed and variable across size and poverty level; this may be seen in the wide range of ratios in the bottom row of Table 17. As a result, parametric analysis cannot provide confidence that these observed per student differences are not being driven primarily by higher and lower ratio SAUs. Nonparametric analysis,

which better handles skewed data and small samples, indicates that the difference in student-Ed Tech III staff ratios between lower and higher poverty districts is significant.

The differences in student-Ed Tech III staff ratios between average poverty and higher poverty districts are smaller and less consistent across district size categories. Nonparametric analysis indicates these staff ratio differences between average and higher poverty districts are not significant once district size is accounted for.

Table 18 shows the student-staff ratios for guidance and counseling staff by district poverty level and size. Guidance and counseling staff include attendance coordinators, Directors of Guidance, drop-out prevention control coordinators, guidance counselors, behavior analysts, counselor or rehabilitation counselors, school psychologists, social workers, and licensed professional counselors.

Table 18: Student to Staff Ratios for Guidance and Counseling staff

	Smaller (< 300)			Medium (300-1,200)			Larger (> 1,200)		
	Lower	Avg.	Higher	Lower	Avg.	Higher	Lower	Avg.	Higher
Number (%) of districts	17 (89%)	21 (84%)	16 (84%)	12 (100%)	17 (94%)	19 (100%)	20 (100%)	25 (100%)	13 (100%)
Student ratio	135.9	168.0	196.2	191.3	182.5	181.3	162.6	188.1	187.2
Range of SAU ratios	50.6- 780	83.1- 420	84.1- 1,010	102.7- 449	108.4- 934	118.6- 357	116.6- 226.6	119.1- 322.7	103.3- 442.7

With the exception of medium sized districts, the data indicate that higher poverty districts had the least favorable student to guidance staff ratios. This is consistent with the analysis displayed in Table 11, showing that higher poverty districts were spending the least on guidance and related student services. Additional allocation amounts in the EPS formula from the economically disadvantaged student weight do not appear to be translating into guidance and counseling support beyond what average and lower poverty districts provided. The data are again fairly heavily skewed across size and poverty level but both nonparametric and parametric tests indicate that higher student-guidance/counselor staffing ratios for higher poverty districts are statistically significant after controlling for size category.

Conclusions

Analysis of per pupil spending shows that the additional weight for economically disadvantaged students in the EPS formula may help poor districts to maintain spending that is similar to average poverty districts. Per pupil spending amounts from the General Fund were higher in average poverty districts compared to their higher poverty peers across all size categories. However, the gaps are relatively small. The targeting of federal funds at higher-poverty districts as well as funds from other sources including local grants and enterprise activities also help to mitigate any spending gaps between average and higher poverty districts. The gaps between average and higher poverty districts for *total* per pupil spending (including general and federal funds as well as funds from other sources) are small and not statistically significant.

When it comes to comparisons between higher and lower poverty districts, the additional funding to higher poverty SAUs via the EPS economically disadvantaged student weight and from federal programs appears to be offset by other factors including the ability of lower poverty districts to raise additional local funds above the EPS required minimum. Lower poverty districts spend more than both higher and average poverty districts in general fund and total expenditures, despite receiving less per pupil in federal funds.

Additional funds provided by the federal government do appear to help higher poverty districts to provide some targeted programs that may benefit economically disadvantaged students. Higher poverty districts are more likely than lower poverty units to provide summer school, and more than half (64%) of their summer school costs are covered by federal funds. Higher poverty districts also receive more federal funding per attending pupil for special education supports. With higher prevalence rates, they also serve more special needs students with those funds.

When it comes to other types of supports, lower poverty districts are outspending their higher and average poverty peers. They have lower student to teacher ratios, and spend more per pupil on most student support services. They are more likely to provide some specific student supports, including guidance counseling and psychological counseling, and they spend more per student on those supports. These types of services have demonstrated benefits for economically disadvantaged students. It is to be noted that while this research demonstrates that high poverty districts are providing less of these

personnel and services than lower poverty districts, it cannot establish whether higher poverty districts are spending more or less than what is *adequate* for meeting student needs. Thus it may be valuable to conduct additional research to investigate two questions: “How are districts devoting the funds allocated through the economically disadvantaged student weight to meet student needs?” and “Is the current level of funding in the EPS formula sufficient to meet the needs of economically disadvantaged students?”

In conclusion, the success of the additional weight for economically disadvantaged students in the EPS formula can be measured against its intent. Higher poverty districts appear to be spending about the same per attending pupil and have similar student to teacher ratios as their average poverty peers, which may be seen as fulfilling its purpose. However, if a goal of the EPS economically disadvantaged student weight is to provide *more* funds to higher poverty units—i.e. greater total funding per pupil than average poverty districts—then the target is not being fully met. This is a question for policymakers to grapple with in formulating recommendations about providing funding for economically disadvantaged Maine students.

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Appendix A: Technical Notes

In establishing group definitions for higher, average, and lower poverty districts, a balance must be struck between definitional validity and group size. Boundaries should be set to ensure that the distinctions between groups are meaningful (i.e. lower and higher poverty groups are truly lower and higher poverty, and the average group is average).

Initially, group definitions were set in accordance with a standard statistical practice of using +/- one standard deviation. When the “average” group is defined as districts within one standard deviation of the mean percentage of FRPL eligibility, about 75% of districts are considered average, as would be expected from natural statistical distribution curves. The remaining 25% of districts are split between the low and high poverty groups, so that each has smaller numbers of included districts (23 low poverty and 21 high poverty). When further subdivided into small (less than 1,200 students) and large (more than 1,200) districts, in order to account for district size effects on per student spending, there were only four districts representing the larger, higher poverty group. This is smaller than optimal, using a general rule of thumb ideal of 5 members to represent a group when comparisons are to be made. Because the small sub-group involved larger districts, these cases are robust in total student counts, which decreases potential error in calculated per-pupil amounts; however, a sub-group this small compromises the ability to conduct district level analysis using statistics.

To address the small sub-group problem, we instead used a different definition, $\frac{1}{2}$ standard deviation above and below the mean for the average group, to categorize higher, average, and lower poverty groups. This definition reduces the distinctiveness of the poverty categories relative to that achieved using the +/- one standard deviation definition, meaning the higher poverty group is not as poor and the lower poverty group not as wealthy. The mean FRPL rate increased from 19% to 27% for lower poverty group and decreased from 76% to 68% for the higher poverty group. This approach eliminates the small sub-group problem, which enabled us to better account for district size effects by creating three categories- smaller (less than 300 students), medium (300-1,200), and larger (more than 1,200) instead of just two. Using the $\frac{1}{2}$ standard deviation definition and the three size groups, the smallest of the nine subgroups (medium, lower poverty) contains

12 districts, well above the rule-of-thumb cutoff of 5. The overall results did not change much using these poverty categories; and the larger sub-group sizes enabled us to more reliably use statistical techniques to verify observed differences in spending across poverty groups.

Because per pupil district level data can vary widely and be heavily skewed, we compared *overall per pupil spending* for the nine district categories by combining spending for all districts and students in each group rather than computing a simple mean of the per pupil spending of all the districts in each group. This method reduces the influence of outliers with small numbers of students by pooling their data with that of similar districts. We also examined *district-level per pupil spending*, using statistical analysis to determine whether observed differences in per student spending across district poverty level groups are statistically significant after controlling for district size effects. Statistical analysis and significance testing are used here to provide additional confidence that the observed differences in district-level per student expenditures are real and not being driven by outliers, skewed distributions within sub-groups, data reporting errors.

Regression analysis was used to assess the relationship between per pupil spending and district poverty level, measured as percent of students eligible for free and reduced meals, and also using indicator variables flagging higher and lower poverty districts, with average poverty districts as the reference group, controlling for district size category (smaller < 300, medium 300-1,200, and larger > 1,200). Because per pupil district level data are often skewed and thus do not always stand up well to mathematical assumptions of regression analysis, mathematical transformations (e.g., log or square root transformations of per pupil spending variable) were used to improve fidelity to the assumptions of regression-related tests. Nonparametric tests, which are more forgiving in terms of data distribution assumptions and small samples, were also conducted and the results compared to those obtained using regression. The combination of methods is a robustness check to assure confidence in the findings. In the report narrative, results are reported as significantly different when all types of analysis were in agreement. If tests results were not in agreement, this is noted in the text.

Appendix B: FY15 General Fund Per Pupil Budget Amounts

	Poverty level		
	Lower	Average	Higher
<i>Smaller Districts (<300)</i>	19	25	26
# Resident Students	3,017	4,081	3,198
% Econ. Disadv. Students	26.5%	48.9%	71.1%
A. State subsidy	\$1,790	\$2,720	\$4,806
B. Local share	\$8,386	\$8,246	\$4,973
C. EPS per pupil Allocation (A+B)	\$10,176	\$11,016	\$9,779
D. Econ. Disadv. student allocation*	\$309	\$481	\$621
E. Local optional funding	\$5,183	\$3,163	\$2,384
F. Total Per pupil amount (C+E)	\$15,359	\$14,179	\$12,163
<i>Average of SAU Total per pupil amounts (Standard Deviation)</i>	<i>\$16,842 (\$4,631)</i>	<i>\$14,115 (\$2,933)</i>	<i>\$12,689 (\$2,672)</i>
<i>Medium Districts (300-1,200)</i>	12	18	19
# Resident Students	8,213	11,313	13,739
% Econ. Disadv. Students	31.4%	51.5%	63.1%
A. State subsidy	\$3,247	\$4,857	\$5,795
B. Local share	\$7,071	\$5,759	\$4,834
C. EPS per pupil Allocation (A+B)	\$10,318	\$10,616	\$10,629
D. Econ. Disadv. student allocation*	\$318	\$524	\$610
E. Local optional funding	\$2,220	\$2,054	\$1,212
F. Total per pupil amount (C+E)	\$12,523	\$12,670	\$11,841
<i>Average of SAU Total per pupil amounts (Standard Deviation)</i>	<i>\$12,923 (\$2,632)</i>	<i>\$12,922 (\$3,502)</i>	<i>\$12,165 (\$1,973)</i>
<i>Larger Districts (> 1,200)</i>	20	25	13
# Resident Students	44,517	55,972	32,588
% Econ. Disadv. Students	25.8%	49.7%	65.5%
A. State subsidy	\$3,825	\$5,113	\$6,573
B. Local share	\$7,051	\$6,111	\$4,381
C. EPS per pupil Allocation (A+B)	\$10,876	\$11,224	\$10,954
D. Econ. Disadv. student allocation*	\$283	\$526	\$635
E. Local optional funding	\$2,065	\$1,074	\$350
F. Total per pupil amount (C+E)	\$12,941	\$12,298	\$11,304
<i>Average of SAU Total per pupil amounts (Standard Deviation)</i>	<i>\$13,072 (\$1,333)</i>	<i>\$13,294 (\$6,691)</i>	<i>\$11,278 (\$1,255)</i>

* The per pupil allocation amount from the EPS formula's additional 0.15 student weight for economically disadvantaged students is included in the amount in Row C; it is detailed as a separate amount for illustration.

Appendix C: Excerpted Table from Special Education Component Review

FY2016 EPS Special Education Allocations per All Resident Pupils*

	Small (< 300)			Medium (300-1,200)			Large (> 1,200)		
Poverty	Lower	Avg.	Higher	Lower	Avg.	Higher	Lower	Avg.	Higher
Number of districts	18	21	14	10	17	17	20	23	11
Number of Students	2,852	3,525	2,199	6,678	10,432	12,300	44,517	51,598	26,580
Per pupil Sp.Ed. Model (Steps 1-5)	\$1,129	\$1,171	\$1,133	\$1,149	\$1,175	\$1,086	\$1,272	\$1,265	\$1,257
Per pupil MOE Adjust. (Step 6)	\$766	\$655	\$624	\$625	\$587	\$475	\$606	\$462	\$621
Total Sp. Ed. EPS Alloc.	\$1,895	\$1,826	\$1,757	\$1,774	\$1,762	\$1,561	\$1,878	\$1,727	\$1,878

* For districts with data available

The above analysis is excerpted from an addendum to a separate report, the review of the EPS Special Education component. Among small and medium sized districts, lower poverty districts are receiving more allocation per resident pupil than both average and higher poverty districts, despite having lower special education prevalence rates. Likewise, average poverty small and medium districts receive higher allocations than higher poverty districts, even though average poverty districts have lower prevalence rates. This appears attributable to the maintenance of effort (MOE) adjustment, which is lower in higher poverty than average and lower poverty districts. Among large districts, lower and higher poverty districts are receiving the same allocation per resident student (\$1,878) due to a slightly higher MOE adjustment in high poverty districts while average poverty districts are receiving the least (\$1,721), due to lower MOE adjustment. However, because these per pupil amounts are based on all resident students, not just those identified for special education services, this means that lower poverty units have more overall resources for special education pupils than higher poverty districts.