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**THE IMPACT OF THE RELATIONSHIP BETWEEN MAINE'S FUNDING FORMULA
CHANGES AND STUDENT ACHIEVEMENT**

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INTRODUCTION

In recent years there have been significant changes made in Maine's Funding Formula. With passage of the Essential Programs and Services (EPS) Funding Act in 2004, Maine moved to an adequacy-based funding school system. The EPS Funding Act, together with a successful statewide referendum and the subsequent passage of LD1, ushered in three major changes in Maine's school funding formula: (1) a change in the calculation of the total cost of K-12 education; (2) a change in the state/local cost sharing formula; and (3) a substantial increase in the amount of state funding of local K-12 education.

Under the Essential Programs and Services funding model, as in other adequacy-based funding systems, the calculation of the state subsidy for each School Administrative Unit (SAU) is carried out in two phases. First, a total cost of education is calculated according to the cost model outlined in the statute. Second, the total allocation is divided between the state and local shares according to the funding formula. The local share is an amount determined by each district's equalized property valuation and a statewide required property tax rate called the mill rate expectation. The state share that results from subtracting the local share from the total allocation is the State Subsidy.

In fiscal year 2006 the state began ramping up toward full implementation of EPS and LD1. Upon full implementation, the total state and local allocation was designed to be 100% of the computed adequacy cost with a 55% state share. By fiscal year 2008, the total allocation was 95% of the adequacy cost with a 53.51% state share. During the ramping up period, the total allocation was an annually increasing percentage of the total cost of education. State subsidy peaked in fiscal year 2008, and declined in fiscal years 2009 and 2010 due to lower state tax revenues.

In 2009-10 the Joint Standing Committee on Education and Cultural Affairs of the Maine State Legislature began a review of the impact of the school funding formula changes. One of those impacts scheduled for review was the impacts of the changes on student achievement. In essence, the committee requested an answer to the following

empirical question: Is there a positive relationship between the increases in Allocation and General Purpose Aid (GPA) to school districts and student achievement? As part of its 2009-10 workplan, the Maine Education Policy Research Institute (MEPRI) attempted to address this question, and this report describes the preliminary result of this analysis.

FINDINGS

To answer the empirical question of the relationship between the changes in the funding formula and student achievement, the MEPRI researchers conducted two analyses; one of the changes in student achievement, and a second one of changes in the Allocations and amount of GPA school districts received immediately prior to the funding formula changes, and two years after the changes were implemented. The goal was to examine student achievement in terms of MEA 4th and 8th grade performance, and 11th grade SAT performance.

An initial analysis revealed that the 4th and 8th grade MEA scores could not be used in the analysis. The MEA proficiency standards had been reviewed and modified in 2006. Consequently it was not possible to determine accurately any changes in the percent of students achieving proficiency in the two time periods under examination (i.e., prior to and after implementation of funding formula changes). That is to say, because the score for being classified as proficient changed, pre and post funding formula scores were not comparable.

The MEPRI researchers then turned their attention to Maine 4th and 8th grade National Assessment of Education Progress (NAEP) scores. The NAEP is administered to a sample of students from each state, but not from each school district. Thus, the researchers concluded the NAEP scores may provide a statewide picture of any changes in student achievement but could not be used to examine school and district profiles. Additionally this analysis had to be limited to Reading and Mathematics because of the variance in testing years. Given these caveats, the research team examined NAEP performance prior to and after the initial implementation of the funding formula changes.

Table 1 presents Maine's NAEP Reading and Mathematics scores and proficiency levels for 4th and 8th graders. This evidence indicates little changes in student performance in reading and only a slight improvement in student performance in mathematics from

2005 to 2007. That is to say, the percent of 4th graders demonstrating proficiency in mathematics increased by 3 percent (39% to 42%) and 8th grader proficiency increased by 4 percent (30% to 34%). While helpful in examining student performance statewide, the MEPRI researchers concluded that these results were of limited value in determining the

Table 1: NAEP Scores 2005-2007

Grade	Year	Reading		Math	
		Scale Score	% Proficient	Scale Score	% Proficient
4 th Grade	2005	225	36%	241	39%
	2007	226	35%	242	42%
8 th Grade	2005	270	38%	281	30%
	2007	270	37%	286	34%

amount of change in performance (or the lack of) and the relationship between performance and funding increases at the school level.

Thus, the focus of the analysis for this report had to be limited to SAT performance. School average scores for the school years 2006-07 and 2008-09 were examined. The school average composite SAT score was constructed using the scores for reading, writing, and math. This allows for an overall comparison of student performance of Maine students on a national exam that is consistent across time. Additionally, this allowed an analysis at the school administrative unit (SAU) to look at the relationship between performance and funding, since all SAUs that have a high school have only one high school with the exception of Portland which was excluded from this study. A school by school profile appears in Appendix A.

The first question to be answered is whether there is a difference between SAT performance from 2006-07 to 2008-09. Table 2 shows the State average SAT scores for 114 high schools in 114 SAUs for 2006-07 and 2008-09. Similar to the student performance exhibited on the 4th and 8th grade NAEP, grade 11 SAT performance shows little evidence of difference between 2006-07 and 2008-09. A t-test was performed to determine if the difference was statistically significant, and this analysis showed no statistical difference between the SAT scores for the two years.

Table 2: State SAT Performance 2006-07 & 2008-09

Performance	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
State	114	1139.58	1139.74	0.16

A second phase of the SAT performance analysis entailed examining school district funding changes in Allocation, State Subsidy, Total Local funding, and Total State & Local Funding in relation to SAT performance . All changes within funding components are categorized as the differences from FY05 to FY08 with an increase defined as greater than or equal to zero and a decrease less than zero. It is important to note that these funding expenditures represent school district level data, and not information for high schools only. High school level data were not available, which in turn, limits some of the findings in the analysis. One has to assume that any changes in funding within the district impacted the district’s high school, albeit possibly limited in some cases.

Tables 3 and 4 report SAT performance by change in Allocation from FY05 to FY08 and change in Per Pupil Allocation respectively. The results reported in Table 3 show that the majority of SAUs with a high school had an increase in Allocation (N=103), that SAUs with increased allocation had slightly higher SAT scores than SAUs with decreased allocations in both years (i.e. +0.22 points vs. -0.45 points). However, the average changes

Table 3: Performance by Allocation Change

Change in Allocation 2005 to 08	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
Increase	103	1139.86	1140.08	0.22
Decrease	11	1137.03	1136.58	-0.45

were not statistically significant.

Table 4 shows similar results, but in this case based on Per Pupil Allocation. Both groups showed improvement and there was more improvement in the decreased per pupil allocation group (2.81 vs. 0.11). It is important to note that only two SAUs were categorized as having a decreased per pupil allocation from FY05 to FY08, and, thus, the analyses are not generalizable.

Table 4: Performance by Per Pupil Allocation Change

Change in Per Pupil Allocation 2005 - 08	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
Increase	11 2	1139.69	1139.80	0.11
Decrease	2	1133.68	1136.49	2.81

SAT performance by State Subsidy change and Per Pupil State Subsidy change are described in Tables 5 and 6. Tables 5 and 6 show more SAUs with State Subsidy increases overall and by per pupil and slightly better SAT performance across time for the increase category compared to the decrease category. However for overall State Subsidy the increase category has an average SAT score change of 0.22 vs. -0.13 and for per pupil

Table 5: Performance by State Subsidy Change

Change in State Subsidy 2005 -2008	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
Increase	94	1139.78	1140	0.22
Decrease	20	1138.68	1138.55	-0.13

state subsidy both increase and decrease categories had positive change in SAT scores with the decreased Per Pupil State Subsidy group having a larger SAT score change. Again, the average changes were not statistically significant.

Table 6: Performance by Per Pupil State Subsidy Change

Change in State Subsidy 2005 - 2008	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
Increase	100	1139.78	1139.85	0.07
Decrease	14	1138.19	1139	0.91

Total Local change is the local required funding and any additional local funds the local community is willing to contribute to education. For both overall Local Funds and Per Pupil Local Funds the majority of SAUs have decreased their local funds, mainly in terms of additional dollars over the required amount as may be seen in Tables 7 and 8. Also both for overall Local Funds and Per Pupil Local Funds the decreased categories have slightly

higher scores across time. In Table 7, though scores are not dramatically different by overall local fund change, the decrease category had a larger average change in SAT scores (0.2 vs. 0.08).

Table 7: Performance by Total Local Change

Change in Total Local 2005 -2008	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
Increase	35	1139.52	1139.60	0.08
Decrease	79	1139.61	1139.81	0.20

In Table 8, which reports change in Per Pupil Local Funds, the larger change in SAT scores was in the increase Per Pupil Local Funds category and the decrease category had a 0.05 score decrease on the average SAT. None of the average changes reached the level of being statistically significant.

Table 8: Performance by Per Pupil Total Local Change

Change in Total Local 2005 - 2008	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
Increase	53	1138.93	1139.32	0.39
Decrease	61	1140.16	1140.11	-0.05

Tables 9 and 10 examine overall Total State and Local Funding and Per Pupil State and Local Funding. For both overall Total Funding and Per Pupil Total Funding, most SAUs had an increase of funds from FY05 to FY08. As shown in both tables, the increase category had higher SAT scores across time and greater gains in SAT scores compared to the decrease category. However, in Table 9 for the decreased category there was a loss of 0.25 in average SAT scores and in Table 10 there was a gain for the decreased category, though only a minor gain (0.02) from FY07 to FY09.

Table 9: Performance by Total State & Local Change

Change in State & Local 2005 -2008	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
Increase	82	1139.83	1140.14	0.31
Decrease	32	1138.96	1138.71	-0.25

Table 10: Performance by Per Pupil Total State & Local Change

Change in State & Local 2005 to 2008	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
Increase	97	1139.70	1139.88	0.18
Decrease	17	1138.94	1138.96	0.02

In summary, comparison of changes in funding components, overall or on a per pupil level, yielded no statistically significant SAT performance change from 2006-07 to 2008-09.

Table 11 explores the relationship between EPS groups and SAT scores. SAUs were broken down into three groups: (1) those spending below their EPS allocation; (2) those spending between 100% – 110% of their EPS allocation; and (3) those spending more than 110% of their EPS allocation. Once again the average scores are not significantly

Table 11: Performance by EPS Grouping

EPS Group	N	Average SAU SAT Composite Score 2006-07	Average SAU SAT Composite Score 2008-09	Average Change
Below 100% EPS	14	1138.14	1138.55	0.41
100% -110% EPS	45	1139.22	1139.22	0.0
Over 110% EPS	55	1140.25	1140.47	0.22

different by grouping across time. The SAUs within the Below 100% EPS category have had the most change in SAT score (0.41) followed by the Over 110% EPS category with an average change of 0.22. What is noticeable from Table 11 is the linear relationship between EPS grouping within each SAT year, meaning higher SAT scores by increased level of EPS expenditure grouping.

Finally an analysis was done to identify differences in funding, if changes in SAT scores from 2006-07 to 2008-09 were classified as increasing, greater than or equal to zero, or decreasing, less than zero. Table 12 displays the relationship between pre- and post- EPS Per Pupil State Subsidy and Per Pupil State and Local Funding by SAT performance increases and decreases. The table shows that per pupil state funding increased from FY05 to FY08 with the largest percent change for the decrease performance category at 21.4%, and the decrease category receiving slightly more Per Pupil State

Subsidy across the observed time period. However when viewed in conjunction to Per Pupil State and Local Funding , average funding amounts and percent change are similar, and the increase performance change category has slightly more funds across the given period.

Table 12: Per Pupil State Subsidy and Per Pupil Total State & Local Funding Comparison

Performance Change	N	PP State Subsidy FY05	PP State Subsidy FY08	PP State Subsidy Percent Change	PP State & Local FY05	PP State & Local FY08	PP State & Local Percent Change
Increase	56	\$3,762	\$4,431	17.8%	\$9,550	\$10,323	8.1%
Decrease	58	\$4,028	\$4,889	21.4%	\$9,504	\$10,283	8.2%
Total	114	\$3,897	\$4,666	19.7%	\$9,527	\$10,302	8.1%

Table 13 reports changes in three expenditure categories for the same two groups of school districts for purposes of examining differences in funding decisions within the SAUs. The results in this case are quite telling. Both groups decreased Regular Instructional spending by almost 3% to 4 % from FY05 to FY08, with the greatest decrease for those school districts which include high schools with increased SAT performance. School

Table 13: Expenditure Percent Changes

Performance Change	N	Expenditure Percent Change		
		Regular Instruction	School Admin.	System Admin
Increase	56	-3.6%	-.7%	.1%
Decrease	58	-2.7%	-.3%	-.3%
Total	114	-3.1%	-.5%	-.1%

administrative expenditures were also decreased in both categories with the larger decrease in the increase performance group. There were very small changes in system administrative expenditures (-.3%- .1%) with a slight increase for the increasing performance group.

CONCLUSION

The analysis was designed to examine the following empirical questions: Is there a positive relationship between changes in the school formula and student achievement? Have changes in funding translated into higher student performance? The analysis presented in this report suggests the answers to these questions are “No”. There appears to be no relationship between funding formula changes and student achievement. This may in fact be the case. However, readers are encouraged not to rush to judgment. The analysis presented in this report was severely limited by the data available. More accurate and precise data will be needed in the future to adequately address the study questions.