Impact of Meeting a Benchmark for Non-Instructional Spending on Student Performance in Ohio School Districts

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Executive Summary

Ohio schools have been under pressure to cut costs and increase efficiency in all areas of spending. A major affected area is non-instructional spending, which is money that does not make it directly in to the classroom. It is usually assumed that non-instructional spending has no effect on student performance and can be cut to save districts money. This study seeks to understand the relationship between non-instructional spending and students' academic performance by examining three areas of non-instructional spending: transportation, food service, and central administration. Our study builds on a 2011 study by Ohio Education Matters that identified benchmark schools—schools spending the least amount on transportation, school lunches, and central administration while still maintaining quality in those areas. Controlling for various demographic characteristics of districts, we determine whether academic performance is different in districts meeting the benchmark and in districts spending above the benchmark.

Our analysis of spending on transportation showed no relationship between spending at a benchmarked level and student performance. In other words, districts spending above the benchmark did not achieve significantly higher academic performance. However, our analysis of spending on school lunches revealed that academic performance was significantly *lower* in the benchmark districts. That is, food service expenditures above the benchmark appear to be important for how students perform in the classroom. Finally, our analysis of spending on central administration showed exactly the opposite. Students perform significantly *better* in school districts that spend the least on central administration while still maintaining quality across various indicators of administrative capacity.

Introduction

The economic downturn in 2008 and the subsequent recession have led to a greater strain on state budgets as more people are using social services and tax revenues have declined. These factors have combined to cause state governments to enact cuts because most states, like Ohio, are not allowed to borrow money in order to run a deficit. One area where state and local governments have targeted cuts is education. Education spending is normally broken down into instructional spending, which goes to activities directly in the classroom, and non-instructional spending, which is money spent on other programs provided by the school district. It is usually assumed by policy makers and school officials that cutting non-instructional spending will have no effect on student performance. While this might make sense intuitively, the effects of such cuts on student performance are seldom analyzed.

This study focuses on understanding and quantifying the connection between spending in the non-instructional categories of transportation, food service, and district level administration costs and student performance throughout Ohio schools districts. We find important differences across these three categories. Establishing the relationship between spending levels on non-instructional spending and student success rates in the classroom will allow school boards and state governments to make the right kinds of cuts in non-instructional spending.

The rest of this paper is organized around three major sections. First is an overview of the current literature on benchmarks, school transportation, food service, and central administration. We review what others have found concerning the relationship between non-instructional spending and student performance in our three areas. Next, we describe our data and methodology, and then we review our results. We conclude with a discussion of

how school boards and other decision makers could use this study to better understand how their funding decisions relate to categories that could affect student performance.

Literature Review

Transportation

Ohio law states that districts must provide transportation to all kindergarten through eighth grade students who live more than two miles from their school. Many districts go beyond these basic requirements and bus high school students or students within a one-mile radius of school. Spending per district depends on these factors as well as other factors including district density and road conditions. Districts currently spend 683 million dollars annually in state and local funds on school transportation. The benchmark study on student transportation reviews school district spending and quality in student busing for Ohio. To do this, the study identified costs, set quality indicators to test the efficiency of each district, and, after applying these indicators, identified potential savings for each district and for the state as a whole.

The benchmark report selected four transportation quality indicators to measure the success of school districts. The report maintains that these quality indicators are basic standards of an efficient and successful school transportation system. The four quality indicators are (1) must not be in fiscal caution, watch, or emergency; (2) has an average age for its bus fleet equal to or no older than the state average of 9.42 years; (3) has no regularly assigned buses more than 15 years old; and (4) has an inspection passage rate at least the state average of 93.3 percent. After applying the quality indicators, the study found that of the 601 districts studied, 451 spend more than the benchmark averages. This

amounts to a total potential annual savings across the state of 121.2 million dollars in transportation spending.

To realize these potential savings and ensure greater efficiency, the study by Ohio Education Matters (OEM) suggests best practices in school transportation. These practices are included by the study to improve routing and purchasing power in districts through collaboration and pooling efforts. The routing practices that the benchmark study suggest are (1) move from single-routed buses to double or higher routed buses; (2) ensure continual maximum capacity and efficiency with frequent student counts and routing adjustments; (3) reduce the number of bus stops, and (4) use routing and scheduling software. Moving from single-routed buses to double or higher-routed buses can reduce costs by increasing ridership per bus. This allows a district to have fewer buses while maintaining transportation for all students. The study does, however, acknowledge the time problem that would occur with this practice in rural areas due to longer routes. Frequent student counts and routing adjustments could increase efficiency and reduce costs by making routes more efficient. Reducing the number of bus stops will reduce travel time and increase efficiency as students board buses. Finally, using routing and scheduling software will help manage multiple routes, streamline data, and make routing adjustments automatically. This can reduce labor-hours of employees and reduce the amount of data storage necessary for routing and scheduling information.

When looking at Ohio's transportation spending, it is also useful to also look at what other states have done to cut spending and increase efficiency. The Texas Legislative Budget Board report; "The Texas School District Transportation Services" from the Texas School Performance Review reviewed the school transportation funding system and district costs in Texas public schools using data from the 2000-2001 and 2004-2005 school years

and made recommendations to cut spending and increase efficiency. While a few of the recommendations are similar to the benchmark study, the Texas report makes more and in-depth suggestions that could be useful when trying to find solutions to Ohio's transportation spending problems.

In making their recommendations, the Legislative Budget Board separates the most common transportation recommendations for efficient school transportation into eight categories. These categories are; adopt a bus replacement plan, manage transportation department staffing, establish efficient bus routes and schedules, implement regular driver and mechanic training programs, establish and implement a vehicle maintenance plan, measure and monitor transportation department performance, follow state reporting requirements, and evaluate transportation privatization.

The first recommendation is to adopt a bus replacement plan, which involves maintaining buses by rotating them from long short routes to extend bus life. The report also expresses the need for districts to have a plan for introducing new buses to replace old ones gradually to not strain the transportation budget in one year. The recommendations to increase efficiency and reduce costs in department staffing are; implementing management and staffing changes to eliminate over-staffing, controlling overtime, and improving staff recruitment and retention. Because salaries and benefits of staff represent 62 to 66 percent of a districts transportation budget, these changes can help districts become more efficient and save money. Establishing efficient bus routes and schedules through the use of automated bus routing and scheduling software allows districts to reduce the number of buses, drivers, and maintenance staff which will reduce costs. Driver and mechanic training programs is districts holding regular training programs and classes to keep drivers and mechanics current on knowledge about safety and effective operation techniques. The

report also suggests driver evaluations to see what areas can be improved, and that mechanics be certified through the National Institute for Automotive Service Excellence. The report suggests the district provide incentives, such as pay increases, for mechanics to become certified. A comprehensive vehicle maintenance plan to ensure bus fleet longevity entails preventative maintenance schedules, which require maintenance records and a system to track maintenance on each vehicle. Another recommendation the report made was measuring and monitoring transportation department performance. By doing this, districts can identify areas to improve, reduce costs in staffing and budgeting, and improve scheduling, maintenance, and safety. Finally, the report recommends that each district evaluate transportation privatization to see if this would reduce costs and provide better service. The report cites research that shows between 30 and 40 percent of school districts nationwide use private contractors to provide all or part of the district's transportation services.

The suggestions and recommendations made in the Texas Legislative Budget Board report are directed toward Texas school transportation, but some of the recommendations are similar if not the same as the benchmark requirements for Ohio school district transportation. Both reports suggest ways in addressing school transportation to reduce costs and increase efficiency, but the Texas report states more numerous and detailed recommendations.

When thinking about how non-instructional spending can affect student performance, transportation is not an area that usually comes to mind, but there are some ways in which transportation spending could possibly affect performance. Bus scheduling and routing practices are implemented to provide efficiency and cost savings for school districts but can also mean long bus rides and early mornings for students. These unintended consequences

can possibly affect student performance through loss of sleep, less time for homework and studying, daily fatigue, and general negative feelings toward school and academics.

Studies suggest that teens and adults need at least 7-8 hours of sleep each night. Waking up earlier to ride the bus to school can cut down sleep time to below recommended levels. The National Institute of Neurological Disorders and Stroke (NINDS) asserts, “that lack of sleep can lead to inability to concentrate, impaired memory and physical performance abilities, and a reduced ability to carry out mathematical calculations” (Chen, Dramatic Link between Sleep and Student Performance). If a student is unable to concentrate, or has trouble remembering their performance on tests and schoolwork will be lower.

In addition to losing sleep because of early morning bus rides, long bus rides can also take a toll on student performance. The article, Long School Bus Rides: Their Effect on School Budgets, Family Life, and Student Achievement by Beth Spence from Rural Education Issue Digest looks at this problem. This article cites a study done by Michael Fox in Canada that found “as travel time increases, students have less time for homework”. Fox also found that with longer bus rides “parents and students are less satisfied with the educational system” and that “students suggest that time donated to travel causes fatigue”. Overall, this study found that students with long bus rides could be less attentive and less willing to put in the time and effort necessary for schoolwork. Another study cited in Spence’s article was done by Lu and Tweeten in 1973 looking at 27 Oklahoma districts’ 4th, 8th, and 11th graders. Their study found that if all other variables were held constant, each hour per day-spent riding the bus could be predicted to reduce student achievement by 2.6 points for 4th graders, 4.0 points for 8th graders, and .5 points for 11th graders. This study concluded that longer bus rides negatively affect student performance. Both of these

studies cite long bus rides as reducing student time for schoolwork, increasing fatigue, and contributing to students' negative attitudes towards school.

An argument for higher transportation spending leading to higher performance is that it allows for field trips and extracurricular activities that can educate students outside of the classroom. With cuts to transportation spending, students may not have the opportunity to take trips to museums and science centers for hands-on learning. Without such opportunities, some students could be less motivated to learn, causing student performance to decrease.

On the other side of this argument is the idea that school transportation has no effect on student performance. The Spence article cites a study from Montana in 1997 by Thibeault, Zether, and Wilson that concluded that there was no evidence that riding buses up to 90 minutes per day affects achievement of students. This study finds the exact opposite of the Lu and Tweeten study. Many believe that transportation spending, as non-instructional spending, does not affect performance. Whether a student wakes up early or has a long bus ride does not necessarily mean that a student will not get enough sleep or lose focus. Students could spend the time while riding on the bus to study or sleep. Nothing stops students from going to bed earlier and getting enough sleep in the night. If a student has to ride the bus to school, their transportation to and from school will certainly be different from students who have other transportation, but this does not necessarily put them at an automatic disadvantage.

Food Service

The benchmark study also focuses on the non-instructional spending area of food service. The study acknowledges that a student's nutrition can affect his or her performance, but that food service is also a large non-instructional budget area for every

school district. The ideal benchmark school was one with a low cost per meal, high participation rates, and one that met the minimum federal regulations for breakfast and lunch. The study's main focus was on efficiency and effectiveness. The seven quality indicators for the benchmark study in the food service area are (1) must not be in fiscal caution, watch or emergency; (2) must be self-supporting; (3) must be in compliance with federal food service regulations (Coordinated Review Effort); (4) must have lunch participation greater than state average of 54.3 percent; (5) must offer the National School Lunch Program; (6) must provide breakfast in compliance with state law; and (7) must reach 99 percent or more of poor students eligible for federal subsidies. Of 605 school districts in the state, 551 were spending more than the benchmark average. Based on the benchmark averages, the estimated potential statewide savings in the area of food service are close to $141 million.

The Family Living Program, a part of the University of Wisconsin – Extension, conducted a cost-benefit analysis of School Breakfast Programs in 2007. They acknowledge that the benefits of adopting a School Breakfast Program (SBP) are numerous, but many people cite the costs as a reason not to adopt such a program. The benefits involved in a school breakfast program include improved nutrition, higher student performance, and potentially bringing additional funds into the school district while also increasing the overall efficiency of the food service program. The costs involved in a School Breakfast Program come from gaining support, start-up costs, and evaluation costs. The cost benefit analysis of the SBP explains that many of the costs involved with a SBP are fixed, meaning that they are the same no matter how many students are participating in the program. The Family Living Program believes that increasing productivity and participation could potentially make SBPs not only cost-effective, but also profitable. This study includes

strategies that can be used to make a SBP profitable. The strategies include increasing participation, planning for expected expenses, charging appropriately, serving nutritious and appealing foods, pricing a la carte appropriately, increasing productivity, and tracking progress (*School Breakfast Program Cost-Benefit Analysis* Hilleren).

These strategies could potentially be utilized to meet benchmark spending levels for food service in general and not just SBPs. The benchmarking study discussed earlier includes providing breakfast as one of the quality indicators for the food service category. Since districts must meet these quality indicators, it is possible that districts that meet the quality indicator, but spend more than the benchmark, may be doing so because they are attempting to provide more nutritious food service programs. At the same time, districts that meet the benchmark in food service may not be providing effective breakfast programs. The benefits of SBPs are numerous, including increasing nutritional intake, decreasing obesity, decreasing risk for health problems, increasing school performance, increasing attention spans, and decreasing bad behavior (Hilleren p. 4). There could be negative effects on a school district if they were forced to meet benchmark-spending levels. If a district is spending at a higher level to provide more nutritious foods, then it may have a more effective program and focusing on the SBP Study's strategies to make a SBP profitable would make more sense.

In 2007, the School Nutrition Association conducted a study to examine how schools were implementing nutrition standards that were passed in 2004. Every school that participated in the National School Lunch Program was required to have district wellness policies in place by the beginning of the school year in 2006. The School Nutrition Association (SNA) surveyed district nutrition directors all over the United States to assess progress since wellness policies were scheduled for implementation the prior year. One of

the survey questions dealt with challenges to implementing wellness policies. Over 75 percent of the responding districts stated that they had experienced increased costs due to implementation. The costs they experienced came from food prices, labor, and equipment. Respondents also noted other hurdles to implementation such as support of parents, students, and administrators as well as the cost of oversight. While these school districts experienced rising costs from their wellness programs, many of them also saw a decrease in revenues from supporting food programs. Overall districts saw costs rising and revenues decreasing. This led the School Nutrition Association to call for more funding (federal, state, and local) for food service programs so that school districts can meet and then go above and beyond nutrition standards and wellness policies (*From Cupcakes to Carrots: Local Wellness Policies One Year Later*).

One of the quality indicators for food service is meeting federal regulations for the National School Lunch and Breakfast Programs. One regulation is meeting nutritional standards for the food that is served. It is possible that meeting this quality indicator would control for nutrition when creating a benchmark level of spending. If this is the case, there should be no relationship between food service and student performance. If the federal regulations and minimum standards set forth by the quality indicators are enough to provide nutritious meals than student performance would not be affected by the food they are receiving. It is also possible that meeting the benchmark could have a positive effect on student performance. As mentioned in the Cost Benefit Analysis of the School Breakfast Program, one of the major barriers to an efficient food service program is participation. If schools at the benchmark level have high enough levels of participation this could mean that their food service programs may be profitable, allowing them to spend more on

nutritional food. This would also have serious implications for increasing participation levels for food service programs in all districts.

The link between nutritious meals and higher student performance has already been made (*School Breakfast Program and Student Performance* Meyres) and through the SNAs survey of schools it is clear that nutrition programs do not come without a cost. It is possible that the benchmark level of spending for food service is not adequate to provide the nutrition needed to increase student performance. If the benchmark allows schools to just barely meet only the quality indicators they set forth then there may not be enough money to go above and beyond nutrition standards and experience all the benefits associated with them. The seven quality indicators from the benchmark study are minimum requirements that do not mention nutrition. If a school is meeting the benchmark, but not providing nutritional foods for their students, it is our hypothesis that academic performance would suffer. As stated earlier, the number one barrier to providing nutritional food is cost. Fresh, nutritional food is more costly to provide than highly processed food. Without a quality indicator that controls for this cost, it is our hypothesis that schools would be able to provide more nutritional food above the benchmark and this would have a positive impact on student academic performance.

Central Administration

The Benchmark study done by Knowledge Works established quality indicators and identified benchmark schools in the area of central administration. The study separated central administration and school level administration to better examine costs and spending at each level. The study identified the costs of central administration as the costs incurred for the board of education, the superintendent's offices, fiscal services, business manager services, and support services. The benchmark study does note that these costs do not

directly deal with student education, but rather the planning, research, information and staff services, and data processing costs. OEM selected nine quality indicators to ensure districts maintain basic fiscal and academic health while keeping administration spending low. These nine quality indicators are; (1) must not be in academic watch or emergency; (2) must not be in fiscal caution, watch or emergency; (3) must have a teacher attendance rate at or above the state average of 95 percent; (4) must have an ending fund balance at or above two percent of total revenue; (5) must not have a projected deficit in fiscal years 2011 or 2012; (6) must have a Bureau of Workers Compensation Composite Rate at or below 1; (7) must have an instructional ratio greater than or at the state average of 55.4 percent; (8) must have no material financial violations in most recent state audit; and (9) must not have failed its most recent levy, if any, in the past three years. These quality indicators serve as a general test to see whether central administrations meet management and financial outcomes, ensuring fiscal responsibility and basic academic success. The study found that of the 609 districts studied, 502 districts spent more than the benchmark averages and still met the quality indicators. The study finds that the total potential savings across all 609 districts for the central administration category is 248 million dollars annually.

The benchmarking study also lays out best practices in administration. These best practices come from performance audits by the state auditor's office that the study feels will help ensure good district management and reduce costs. These best practices apply to both central and school-level administration. The best practices outlined in the study are; (1) formal staff planning; (2) strategic and capital planning; (3) use performance based management; (4) increased collaboration/use of distance and alternative learning models; and (5) more efficient use of building capacity. Formal staff planning is using a structured system to help the district identify and allocate its personnel better. All personnel would be

placed in an organized framework based on job function, skills, and workload measures. This system would help in hiring and attrition decisions by identifying when workloads change. Strategic and capital planning is used to guide programs and spending to focus on academic goals with limited measures. This can help districts be more prepared for future events and business related operations. Using performance based management would allow districts to track the cost and performance of programs, which is valuable in evaluating program offerings. Districts can better anticipate costs and savings related to programs by using this method of evaluation. Increased collaboration and use of distance and alternative learning models would increase cooperation in course offerings among districts. This allows many programs to exist at a lower cost. The study mentions this collaboration being used in western states to pool resources to maintain student access to programs while reducing costs. Finally, more efficient use of building capacity means utilizing buildings fully. This can include closing a building to cut out unnecessary costs and create immediate and long-term savings.

"School District Size and Student Performance" by Donna Driscoll studies the impact that school district size may have on student performance in the state of California. One of her major arguments is that size effects top-down planning and communication in school districts. In her study, she found that the larger a school district is, the less likely students are to perform well. Especially at the middle school level, she found that larger districts affect student performance negatively. One of her major arguments for why this occurs is that she believes larger districts cause a disconnect between central administrators (superintendents, treasurers, school boards) and school level administrators (principals and teachers), which make it more difficult to be efficient and effective. An example Driscoll gives is with implementing new policies and how there can be confusion if communication is

not sufficient. This confusion and lack of implementation can negatively affect student performance. However, it would also seem reasonable that if a school had too much bureaucracy, student performance could be negatively affected as well. Too much bureaucracy could potentially have the same effect as too little administration. If the process of communicating across levels of administration is so extensive that it is inefficient, then the same confusion that negatively affected student performance in California could occur in a smaller district.

Methodology

Our study seeks to answer whether spending above the benchmark correlates with higher student performance. This relationship has significant implications because if higher non-instructional spending correlates with higher performance, then the minimum quality standards set in the original benchmark study would not be adequate. If there is not a correlation between spending above the benchmark and higher performance, then school districts can cut the funding from that category in order to meet the benchmark within their typology. Schools that spent at or below the benchmark, but did not meet the quality indicators, were omitted from the analysis. These schools may need to spend more to meet the quality indicators.

The first step in analyzing the relationship between overspending and student performance was to create a measure of student performance. The variable created to analyze performance in this study is the average of 14 different measurements of performance available from the Ohio Department of Education. The first 12 of the 14 measurements are the 2008-2009 school year percent of students passing the three fourth grade achievement tests (math, reading and writing), the four eight grade achievement tests

(math, reading, science, and social studies), and the five Ohio Graduation Tests (OGT) (math, reading, writing, science, and social studies). The last two measurements are attendance rates and high school graduation rates for the 2008-2009 school year. These are measured as percentages to make them compatible with the other 12 measures. Data from the 2008-2009 school year were chosen to match the spending fiscal year data that was used in the original benchmark study by OEM. Fourth and eighth grade, along with the OGT, were chosen because these years are the most important in the Ohio school system and most stressed by teachers. In summary, then, our dependent variable is the average of 14 different measures of academic performance across three different grade levels. This variable ranges from 0 to 100, indicating the average percentages of students passing achievement tests, attending school, and graduating from high school.

The main independent variable in the analysis is a dummy variable indicating whether a school district was a benchmark district. We conducted separate regression analyses for each of the spending areas, controlling for factors that should affect academic performance across districts. The controlling variables we used in each of the regressions analyses were percentage of single parent households in the district, median family income in the district, percentage of adults in the district who did not complete high school, the percentage of adults in the district who received at least a Bachelors' degree, the total number of schools in the district, whether the district is rural or urban, and the percentage of households below the poverty line. The food service regression used percentage of free and reduced lunches served by the district to account for poverty levels in the district instead of percentage of households below the poverty line. These variables were used in order to analyze districts with different demographics instead of using the state typologies as in the OEM benchmark study. Several additional variables were included for particular

spending areas. The transportation regression includes percentage of children in the district who ride the bus to school, number of buses regularly used by the district, and the number of square miles in the district. For the food service analysis, the other control variables included were paid lunches in the district and the percentage of schools within the district that served breakfast. Central administration only included the average number of students per school as an extra controlling variable. The data on whether a district was a benchmark school came from Andy Benson and Julie Brinker from Knowledge Works. The district demographic data was obtained from the National Center for Education Statistics and their School District Demographics System.

After running the analyses using the 14-variable performance index, we analyzed a second dependent variable for comparison. This second variable is one used by the Ohio Department of Education to measure student performance on all standardized tests administered by the state from the third to tenth grades. For the ODE measure, students can fall into one of six categories: advanced, accelerated, proficient, basic, below basic or untested. The percentage of students that fall into each category is then multiplied by the scores weighted factor in order to obtain the score for the district. The weighted factors are 1.2 for advanced, 1.1 for accelerated, 1.0 for proficient, 0.6 for basic, 0.3 for below basic and 0 for untested. This measure of student performance allows the difference between groups of students to be clearer because of the six performance categories, instead of two. The state considers any scores over a 100 to be excellent, any score in the 90s, like the state average of 93.3, to be effective, and anything less as needing improvement.

For each regression, the null hypothesis is that being a benchmark district is not related to student performance. Under the null hypothesis, the coefficient for the benchmark variable is expected to be zero. The alternative hypothesis is that being a benchmark school

has a negative impact on student performance. Since being a benchmark school is coded as a 1 and not being a benchmark is coded as a 0, if the alternative hypothesis is plausible, the relationship will be negative and statistically significant.

Results and Implications

Transportation

A quick comparison of school performance among the benchmark and non-benchmark schools for the transportation category shows that districts that meet the benchmark have better academic results. The benchmark schools have a slightly higher mean score (84.6 to 82.5) for the 14-variable performance metric. This means that on average the benchmark schools receive two more percentage points across the average of the 14 categories in that metric. A look at the ODE performance index also shows a similar result with the benchmark schools outscoring the other schools 97.5 to 96.3. This result is harder to interpret because any movement between the six categories could cause the difference, but it means that the students of benchmark schools are performing better than non-benchmark schools when not controlling for demographic differences.

In order to control for the varying demographics of school districts, a regression was run for the performance metric and whether the district was a benchmark school, together with the demographic variables described above. The results for this regression are shown in Table 1. The benchmark coefficient of 0.933 indicates that meeting the benchmark results in a gain of 0.933 percentage points across the average of the fourteen measured aspects of performance. However, this coefficient is not significantly different from zero by usual statistical tests, and so the null hypothesis cannot be rejected. The results of the analysis also yield r-squared and adjusted r-squared values, which are helpful in helping determine

how much of the variance in the dependent variable is explained by the given independent variables. In this test, just about 50 percent of the variance in the performance measure can be explained by the independent variables in the analysis. This means that the inputs are a decent predictor of variance for the created performance metric.

A similar regression analysis was run for the second benchmark, which compares how well students achieve on the exams and not just if they passed. The results of this analysis, which are in Table 2, indicate that like the previous regression, the results appear to point to a positive relationship between meeting the benchmark and school performance. Although this appears to be the case when examining the coefficient result, the result of the t-statistic shows that this relationship is not close to being statistically significant. Looking at this aspect of the results from the regression analysis it can be concluded that there is also no relationship for the achievement category version of measuring performance and the district meeting the benchmark for spending levels under transportation. The r-squared values for this analysis is a little improved over the previous measure of performance jumping up to about 54 percent of the variance explained by the independent variables.

The results of both regression analyses show that there is no statistically significant relationship between meeting the transportation benchmark and student performance. These results show that the benchmark spending study from OEM is correct in this spending category to suggest that all districts should cut out the waste in their transportation budgets in order to match the benchmark for their specific typology. The data suggest that the performance of students will not be harmed by cutting spending in transportation, as long as the districts still meet the quality indicators.

We interviewed administrators in charge of transportation from high performing, high spending districts in order to understand if these districts were spending more on programs

that benchmark schools were not in order to achieve their high level of performance. When contacted, a school district official from a suburban, very high median income, very low poverty district defended the district's level of spending above the benchmark because they have higher parochial and vocational transportation obligations. The official cited providing more transportation for field trips in their district, which would cause their districts cost per bus to be higher than districts that only spend at the minimum. A different school district official from a rural, high poverty, low median income district that spent over the benchmark stated that over the past years they have been able to cut costs from FY 2009 (where the benchmark study pulled their data). Though they are still slightly above the benchmark level, they have eliminated a transportation director, mechanic, and a bus garage. The Superintendent and Secretary now take care of administrative transportation requirements while a bus driver who is already on the payroll is paid an hourly wage for minor maintenance requests. The school district official said that even though they have been able to cut costs they would always appear above the benchmark since their district is extremely rural and some routes take 45 minutes to deliver fifteen students. The benchmark study sets an ideal level of spending for districts, but some may face other obstacles to reaching this level than just being more efficient.

Food Service

A look at the average scores for the two performance variables sorted on whether the district is a benchmark or not appears to show that meeting the benchmark results in a decrease in student performance for both variables. The average for not meeting the benchmark is 2.1 higher (83.0 to 80.9) for the created performance variable and 1.7 higher (96.7 to 95.0) for the state's performance index. This initial glance at the numbers cannot determine whether the relationship is significant or lasting because demographic variables

have not been controlled. This leads to the need for regression analysis in order to draw conclusions about the relationship between student performance and meeting the benchmark in the food service category.

For this regression, the null hypothesis is that benchmark will have a coefficient of zero, and the alternative hypothesis is that the coefficient will be negative and significant; meaning that meeting the benchmark will hurt performance. The results for the regression of whether the district is a benchmark and the created performance metric, shown in Table 3, indicate that meeting the benchmark and performance are negatively related for food service. The coefficient for the benchmark category shows that if a school were to meet the benchmark, scores on the 14 averaged categories of the performance measure would drop by an average of 1.5 points. The t-statistic for the benchmark independent variable is -2.18, which has an absolute value greater than two and makes the negative relationship between meeting the benchmark and the created performance metric statistically significant. The high r-squared value of around 0.71, meaning 71 percent of the variance in the performance metric is explained by the independent variables, means that the statistically significant negative relationship does a good job of explaining why performance varies among the schools.

The regression analysis for ODE's performance index matches the results for the regression for the created performance metric. The results of this analysis, which are shown in Table 4e, indicate the same trend as with the other performance variable. The coefficient for the benchmark independent variable is -1.3. This number does not have a tangible meaning like the coefficient from the regression with the created performance metric because of how the state performance index is calculated. An increase from proficient to accelerated would register the same increase as a student moving up from accelerated to

advanced. This means that the only conclusion that can be drawn from the performance index is that meeting the benchmark for food service causes a decrease in performance when it is calculated by performance categories. It can also be said that the negative relationship between meeting the benchmark and the state's performance index is statistically significant due to its t-statistic score of -2.25. As in the other performance metric, the r-squared value of around .74 for the regression for Ohio Department of Education's performance index is very high, which means that the independent variables in the analysis do an excellent job of explaining for the variance in the performance index.

Both measures of performance, the 14-variable measure created by this study and the ODE index, were able to reject the null hypothesis, and showed a significant and negatively correlated relationship between meeting the benchmark for food service. This result indicates that the benchmark is either not applicable to food service and that the more spent on feeding children at school the better they perform; or, and more likely, the benchmark is currently calculated at the wrong level, meaning that the quality indicators used in the OEM study are not sufficient to establish a proper benchmark that won't harm student performance.

The negative relationship between meeting the benchmark for food service and performance could be due to the different plans undertaken by the schools to meet the wellness policies in order to comply with the National School Lunch Program (*From Cupcakes to Carrots: Local Wellness Policies One Year Later*). If some districts met just the bare minimum of these standards, while others went further to provide better nutrition at a greater cost, it could explain the difference in performance and meeting the benchmark based on the link between better nutrition and higher performance (*School Breakfast Program and Student Performance* Meyres). The Ohio Education Matters study would need

to include a quality indicator on the nutrition of a school in order to figure out if this is causing the benchmark to hurt performance. School boards face a tougher decision in budgeting for this non-instructional spending category because the evidence from this study shows that meeting the benchmark hurts student performance, yet most school districts run a deficit every year in their food service spending. This spending area necessitates more study in order to determine if a benchmark is a valid approach for food service, and if it is, a more appropriate spending level for the benchmark to be placed so school districts can save money without compromising student performance.

Central Administration

A quick overview of the average values on the two performance variables used in this study appears to show a positive relationship between performance and meeting the benchmark for central administration. The difference in the created performance metric is 2.3 with benchmark schools scoring on average an 84.4 compared to the non-benchmark average of 82.1. For the state's performance index, the benchmark districts score 98.3 while the non-benchmark districts only average 95.9. In order to determine if these results are significant a regression analysis needs to be run to control for other variables.

The null hypothesis for this regression analysis is that the coefficient for the benchmark variable will be zero. The alternative hypothesis is that the coefficient will be statistically significant and negative, which would mean that meeting the benchmark harms student performance. The results of this regression analysis for the created performance index are in Table 5. The analysis supports the general conclusions that were drawn from the initial data examined from the averages of the two categories. According to this regression, there is a statistically significant relationship, due to its t-statistic of 3.12, between meeting the benchmark and achievement across the 14-variable student

performance categories used to calculate the created performance metric. The significant relationship is a large positive factor with the average test scores going up by 2.2 percentage points if a school meets the benchmark spending levels. This finding suggests that more students are passing the standardized tests in districts that meet the benchmark for central administration spending.

In order to determine if this trend held up when inputs for the performance variable are measured across achievement levels instead of percentages passed, a second regression was run using ODE's performance index as the dependent variable. The results of this analysis, which are in Table 6, substantiate the findings from the other regression. The coefficient value between meeting the benchmark and the performance index is 2.089, which means that the students are doing better on tests, even when factoring in what range they fall into and not just if they passed. This relationship is statistically significant with a t-statistic of 2.4.

Both of these regressions have high r-squared values, with both being in the .60 range, which means that a majority of the variance in the dependent performance variables can be explained by the chosen independent variables. The higher r-squared values provide more support to the claim that meeting the benchmark in central administration actually helps student performance by both measures of performance used in this study. The finding of the positive, significant relationship between meeting the benchmark and both tests of student performance is enough to reject the null hypothesis for the central administration spending category. The relationship, however, is in the opposite direction of what the alternative hypothesis had predicted. It is possible that the higher levels of performance are achieved through the cutting of "bureaucratic red tape", which would save money and allow better communication between teachers and district officials on how to

improve the schools. The causality behind the improved performance and meeting the benchmark needs further study in order to completely understand the relationship. Districts should cut the waste out of their central administration budgets in order to meet the benchmark spending levels for their school typology. This will not hurt student performance, but will in fact improve the results according to this study.

Conclusion

As school boards across Ohio look to cut costs and increase efficiency in school spending, non-instructional spending is the area most likely to be affected. The objective of this study was to understand the relationship between meeting a benchmark spending level in the non-instructional spending areas of transportation, food service, and central administration and student performance. Understanding this relationship should help school districts better understand the effects of cuts to non-instructional spending on student performance.

In the area of school transportation, the results show that there is no relationship between spending at the benchmarked level and student performance. This confirmation of the null hypothesis indicates that the benchmarking process and quality indicators established by Ohio Education Matters were appropriate, and that school districts should start implementing these more efficient practices in order to meet the benchmark.

The null hypothesis of no relationship between benchmark level spending and student performance was rejected in the analysis food service expenditures. This means that spending at the benchmarked level in the food service category hurt student performance, and that districts that met the food service quality indicators and also spent more than the benchmark districts had higher student performance. This area of non-

instructional spending needs further study to determine if the quality indicators utilized by OEM were adequate or if benchmarks are not applicable to food service. School boards should still try to eliminate waste from this area as long as it will not affect the nutrition of school lunches, which has been well established, and is probably the reason behind the negative relationship.

In the central administration category, a positive relationship between spending at the benchmark level and student performance was found. This relationship indicates that spending at the benchmark level resulted in higher student performance. The positive relationship, although it rejects the null hypothesis, still supports the findings of the benchmark study because meeting the benchmark level of spending will not negatively affect student performance. Districts should cut out wasteful spending to meet the benchmark even though the reason for the improved performance is not well established.

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Table 1.

Regression of Created Performance Metric and Meeting the Transportation Benchmark as a Function of Demographic Characteristics

	Coefficient (t-statistic)
Benchmark	0.933
	(1.16)
Percent of Single Parent Households	-26.118
	(-7.50)
Percent of Households Below Poverty Line	-0.079
	(-1.74)
District Rural or Urban	-0.122
	(-0.16)
Percent of Adults Who Didn't Finish High School	-0.098
	(-2.05)
Percent of Adults with a Bachelors Degree or More	0.120
	(2.58)
Median Family Income (Thousands)	0.047
	(1.20)
Square Miles of District	-0.001
	(-0.23)
Percent of Children who Ride the Bus to School	0.376
	(0.24)
Number of Buses Used by the District	-0.024
	(-0.94)
Number of Schools in the District	0.091
	(0.65)
Number of Observations	414
R-Squared	0.498
Adjusted R-Squared	0.484

Table 2.

Regression of State Performance Index and Meeting the Transportation Benchmark as a Function of Demographic Characteristics

	Coefficient (t-statistic)
Benchmark	0.100
	(0.15)
Percent of Single Parent Households	-23.375
	(-8.25)
Percent of Households Below Poverty Line	-0.037
	(-1.01)
District Rural or Urban	-0.117
	(-0.19)
Percent of Adults Who Didn't Finish High School	-0.078
	(-1.99)
Percent of Adults with a Bachelors Degree or More	0.113
	(3.00)
Median Family Income (Thousands)	0.048
	(1.53)
Square Miles of District	-0.003
	(-0.90)
Percent of Children who Ride the Bus to School	0.289
	(0.23)
Number of Buses Used by the District	-0.011
	(-0.51)
Number of Schools in the District	0.073
	(0.64)
Number of Observations	414
R-Squared	0.537
Adjusted R-Squared	0.524

Table 3.

Regression of Created Performance Metric and Meeting the Food Service Benchmark as a Function of Demographic Characteristics

	Coefficient (t-statistic)
Benchmark	-1.545
	(-2.18)
Percent of Single Parent Households	-7.582
	(-7.26)
Percent of Schools that Serve Breakfast	-0.348
	(-0.58)
Free or Reduced Lunch Percent	-19.736
	(-10.23)
Paid Lunches (in thousands)	-0.000
	(-0.07)
Number of Schools	-0.127
	(-3.78)
Percent of Adults with a Bachelors Degree or More	0.102
	(3.17)
Percent of Adults Who Didn't Finish High School	-0.033
	(-0.82)
District Rural or Urban	1.073
	(2.23)
Median Family Income (Thousands)	-0.032
	(-1.09)
Number of Observations	517
R-Squared	0.715
Adjusted R-Squared	0.710

Table 4.

Regression of State Performance Index and Meeting the Food Service Benchmark as a Function of Demographic Characteristics

	Coefficient (t-statistic)
Benchmark	-1.291
	(-2.25)
Percent of Single Parent Households	-6.166
	(-7.30)
Percent of Schools that Serve Breakfast	0.001
	(0.00)
Free or Reduced Lunch Percent	-18.169
	(-11.66)
Paid Lunches (in thousands)	-0.000
	(-0.18)
Number of Schools	-0.093
	(-3.44)
Percent of Adults with a Bachelors Degree or More	0.101
	(3.88)
Percent of Adults Who Didn't Finish High School	-0.009
	(-0.29)
District Rural or Urban	1.163
	(2.99)
Median Family Income (Thousands)	-0.026
	(-1.11)
Number of Observations	517
R-Squared	0.745
Adjusted R-Squared	0.739

Table 5.

Regression of Created Performance Metric and Meeting the Central Administration Benchmark as a Function of Demographic Characteristics

	Coefficient (t-statistic)
Benchmark School	2.204
	(3.123)
Percent of Single Parent Households	-27.780
	(-9.932)
Number of Schools	-0.124
	(-5.124)
Students Per Schools (Thousands)	-0.004
	(-0.004)
Percent of Households Below Poverty Line	-0.008
	(-0.214)
Percent of Adults Who Didn't Finish High School	-0.099
	(-2.519)
Percent of Adults with a Bachelors Degree or More	0.066
	(1.930)
District Rural or Urban	0.513
	(0.998)
Median Family Income (Thousands)	0.079
	(2.524)
Number of Observations	443
R-Squared	0.654
Adjusted R-Squared	0.647

Table 6.

Regression of State Performance Index and Meeting the Central Administration Benchmark as a Function of Demographic Characteristics

	Coefficient (t-statistic)
Benchmark School	2.089
	(2.433)
Percent of Single Parent Households	-32.128
	(-9.440)
Number of Schools	-0.157
	(-5.357)
Students Per Schools (Thousands)	-0.484
	(-0.478)
Percent of Households Below Poverty Line	-0.049
	(-1.130)
Percent of Adults Who Didn't Finish High School	-0.129
	(-2.685)
Percent of Adults with a Bachelors Degree or More	0.075
	(1.797)
District Rural or Urban	0.489
	(0.781)
Median Family Income (Thousands)	0.067
	(1.775)
Number of Observations	443
R-Squared	0.654
Adjusted R-Squared	0.647