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1 Introduction

1.1 Regression Task Team

The 2003 Indiana General Assembly established the Government Efficiency Commission to provide the General Assembly and the Governor with recommendations for improving overall efficiency and reducing waste and other unnecessary costs in state government. One of the charges given to the Commission was to investigate the efficiency of public education financing in the state. To this end, the Commission established the K-12 Education Subcommittee to focus on ways to improve efficiencies in the delivery of education services. Some members of the Subcommittee wished to investigate the workings of the Foundation Program (i.e., the school funding formula) in more detail, and in particular, examine the relationship between various categories of K-12 education expenditures and student achievement. Consequently, the Subcommittee contacted the Center for Evaluation and Education Policy (CEEP) at Indiana University to provide statistical assistance with examining the ways in which education financing may affect the performance of students in Indiana's public school corporations. From this collaboration the Regression Task Team was formed, whose membership was open to all interested agencies. The following organizations were given opportunities to review and comment on preliminary reports that were presented to the Task Team: Indiana Urban Schools Association, Indiana Association of School Principals, Indiana State Teachers Association, Indianapolis Public Schools, Indiana Education Institute, Sagamore Institute, Indiana Department of Education, fiscal analysts for the House Ways and Means Committee, fiscal analysts for

the Senate majority and Senate minority, Legislative Services Agency, State Budget Agency, and Crowe Chizek. Members of the K-12 Education Subcommittee and the Center for Evaluation and Education Policy were present at all meetings.

After reviewing data availability and discussing the suitability of an array of variables, the Task Team identified factors that could be related to student performance and grouped them into two main categories: (a) those that can potentially be affected by school corporations and/or state policymakers (labelled “policy factors”), and (b) those that are beyond the control of school corporations and/or state policymakers but may, nonetheless, affect student performance (labelled “background factors”). The distinction is important because failure to account for the effect of background factors on school corporation performance could give rise to misleading interpretations of the effect of policy factors. The Task Team discussed and agreed upon the data sources and data elements that were to be used in this study. The data were obtained from the Indiana Department of Education and are available to the public on the Indiana Department of Education website.

The next section of the report provides some information on education in Indiana in order to help set the context for the analyses that follow. We will review selected trends and findings and describe how they have motivated the approach used here. The numbers, however, are meant to be illustrative of particular issues and are not central to the analysis. When appropriate we refer readers to other sources for more detailed discussion.

1.2 The Policy Question

What are the specific factors that impact student achievement in K-12 education? This question is of utmost importance to many policymakers around the nation. Confronted with competing demands for scarce tax dollars, states increasingly are seeking information about the quality of existing educational structures as well as what course(s) of action

might improve student learning. In particular, the attention of policymakers often focuses on the effects of financial resources on educational effectiveness. Does the level of spending on K-12 education have a positive effect on student gains? Can student achievement be raised by reallocating education dollars towards certain activities such as classroom instruction? Do some factors beyond the control of schools, such as the socioeconomic status of a community, also affect student performance?

These questions are of particular importance to the State of Indiana. Prior to the “No Child Left Behind” act in 2001, Indiana passed legislation (P.L. 221) in 1999 that established aggressive performance targets for school corporations based on the percentages of students passing the state exam (ISTEP+). Aggregate data suggest that the state has made some progress over time in raising student achievement levels:

- The percentage of students (public and nonpublic) passing both the English and Mathematics portions of the ISTEP+ exam has increased from 53.7 percent in 1996-97 to 64.1 percent in 2005-06;¹
- The percentage of 12th graders in public schools who have taken the Scholastic Aptitude Test (SAT), a requirement for applying to many postsecondary institutions, has increased from 51 percent in 1995-96 to 55 percent in 2004-05;²
- The average scaled scores in both reading and mathematics from the National Assessment of Educational Progress (NAEP) test for Indiana’s 4th graders exceed both the national averages and the averages for neighboring states Illinois, Kentucky, and Michigan;³
- The percentage of public high school graduates in Indiana who pursue a college education has risen from 59 percent in 1995-96 to 74 percent in 2004-05.⁴
- The percentages of Indiana students receiving academic honors or Core 40 diplomas have risen steadily since the late 1990s.⁵

1. Source: Indiana Department of Education. Retrieved July 28, 2006 from http://mustang.doe.state.in.us/TRENDS/trends1.cfm?var=es_skill

2. Source: Indiana Department of Education. Retrieved July 28, 2006 from http://mustang.doe.state.in.us/TRENDS/trends1.cfm?var=sat_pct

3. National Center for Educational Statistics (2005). *Digest of Educational Statistics*, Retrieved July 20, 2006 from <http://nces.ed.gov/programs/digest/>

4. Source: Indiana Department of Education (n.d.). Retrieved July 20, 2006 from <http://www.doe.state.in.us/>

- The average SAT math and verbal scores of Indiana seniors have increased slightly during the past 10 years.⁶

Despite these positive signs, many policymakers remain concerned about the state of education in Indiana. While the increase in ISTEP+ pass rates in recent years is encouraging, nonetheless, current rates remain far below the even higher pass rates specified in P.L. 221 for future years. The pass rates for public school corporations — and thirty-six subgroups within each corporation — are specified to increase on a graduated scale until they reach 100 percent by 2014. Preliminary data reported by the state for 2004-05 suggest that one in ten Indiana high school seniors do not graduate from high school, and the true drop-out rate is likely higher than this figure. Recent reports state that Indiana's graduation rate lags that of 27 other states.⁷ The ISTEP+ pass rates for Indiana students are considerably lower for students in traditionally-underrepresented racial/ethnic categories, students receiving Special Education services, and students in lower socioeconomic categories. The pass rates for the mathematics portion of the ISTEP+ in 2005, for example, were highest for Asian/Pacific Islander students (87%), followed by white (78%), multiracial (69%), American Indian (68%), Hispanic (57%), and black (55%) students. Likewise, the pass rate for Special Education students (51%) is far below the pass rate for their counterparts (78%), and students who are eligible for free or reduced price lunch pass the mathematics portion of ISTEP+ at much lower rates than other students (62% versus 81% respectively).⁸

National comparisons of educational attainment have also been a source of some concern for state policymakers. Indiana is one of only nine states in 2000 that had fewer than 20 percent of its adult population holding a bachelor's degree or higher, and Indiana ranks in

5. Smith, Victor. (2005). *A Decade Plus Five: Continued Improvement in Indiana's Public Schools*. Indianapolis: Indiana Education Services, Inc.

6. Ibid.

7. See: 27% of Indiana Students Don't Graduate (2006). *Indianapolis Star*, June 21. Greene, Jay P. & Froster, Greg. (2002). Indiana's Graduation Rate Doesn't Add Up. *Indianapolis Star*, Sept 21. Retrieved July 24, 2006 from http://www.manhattan-institute.org/html/_indstar-indianas_grad_rate.htm. Domanico, Raymond. (2002). State of the New York City Public Schools. Retrieved July 24, 2006 from http://www.manhattan-institute.org/html/cr_26.htm

8. Indiana Department of Education. Retrieved July 13 from <http://www.doe.state.in.us/istep/>

the bottom half of states in 2003 in terms of the percentage of adult population that graduates from high school.⁹ Finally, a recent report argued that Indiana has the highest school dropout rate in the nation.¹⁰

The need to continue to raise student performance in Indiana has focused interest on the possible policies — such as the level and distribution of funding for education — that might be enacted to help achieve this goal. K-12 education is a substantial enterprise in Indiana. In fiscal year 2004-05, total expenditures in K-12 public schools were about \$10.6 billion, with about \$6 billion in General Fund spending.¹¹ From the state's perspective, in fiscal year 2005-06, Education accounts for about 32 percent of all state expenditures, exceed only by Health and Human Services.¹² The vast majority of state spending on education is directed towards public K-12 education. Approximately 83 percent of General Fund revenues for K-12 public schools are provided by the state of Indiana.¹³

Aggregate data for the State of Indiana illustrate the concern among some policymakers that education spending has not been as effective as it could be for delivering education services in an efficient manner. Current expenditures per pupil in public schools have increased almost 300% from 1981-82 (\$2,319 per pupil) to 2004-05 (\$10,492 per pupil); even after adjusting for inflation,¹⁴ per-pupil spending has increased 159 percent during this same period, or an average annual increase of about 4 percent.¹⁵ Part of this spending increase has been used to raise staffing levels in public schools. Table 1 illustrates that

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9. U. S. Census Bureau. Retrieved July 18, 2006 from <http://www.census.gov/population/www/socdemo/education.html>
 10. Hupp, Staci. (2006). Dropout Rate Is the Worst. *Indianapolis Star*, July 3. Retrieved July 24 from <http://www.indystar.com/apps/pbcs.dll/article?AID=/20060703/NEWS01/607030412/1006/NEWS01>
 11. Expenditure data received January 6, 2006 from Education Information Services, Indiana Department of Education. Precise amounts may differ somewhat from other published numbers based on 293 school corporations.
 12. State Budget Agency. Retrieved July 24, 2006 from <http://www.in.gov/sba/budget/>
 13. Toutkoushian, Robert K., Michael, Robert S. (2006). *Indiana's School Funding Formula: Impact Study for 2005*. Bloomington, IN: Center for Evaluation and Education Policy at Indiana University.
 14. Inflation adjusted expenditures per pupil in 2004-05 was \$6,019, with 1982 as the base. Inflation adjustment calculator located at <http://www1.jsc.nasa.gov/bu2/inflateGDP.html>
 15. Indiana Department of Education. Retrieved July 20, 2006 from <http://mustang.doe.state.in.us/TRENDS/trends1.cfm?var=curr>. Expenditure data received January 20, 2006. See also *Report on Expenditures Per Capita* (2006) prepared by the Department of Local Government Finance. According to this report the average school expenditure per capita is \$1,778 (p. 64). Available at http://www.in.gov/dlgef/pdfs/2005_Expenditures_Per_Capita_Report.pdf

TABLE 1. Indiana Trend Data: Public School Students, Teachers, and Other Employees, 1974-75 to 2004-05¹⁶

| Year | Enrollments | Number of Teachers (FTE) | Number of Other Certified Employees (FTE) | Ratio: Students to Teachers | Ratio: Students to Certified Employees |
|---------|-------------|--------------------------|---|-----------------------------|--|
| 1974-75 | 1,186,800 | 52,579 | 7,462 | 22.57 | 159.05 |
| 1984-85 | 972,700 | 51,304 | 7,659 | 18.96 | 127.00 |
| 1994-95 | 968,357 | 55,239 | 8,965 | 17.53 | 108.02 |
| 2004-05 | 1,021,197 | 60,470 | 10,143 | 16.89 | 100.68 |

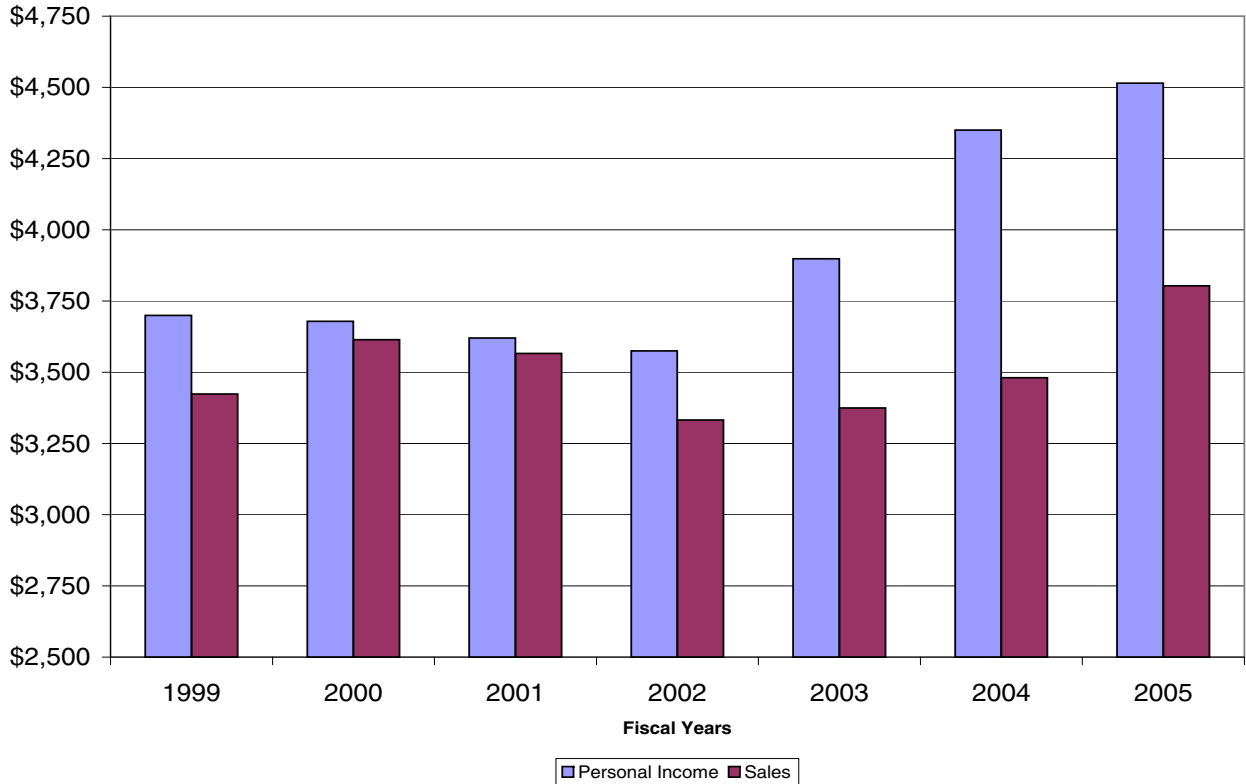
there has been a significant reduction in the ratios of students to teachers and students to administrators over the past thirty years. Specifically, the ratio of students to teachers has decreased 25 percent and the ratio of students to certified employees has decreased nearly 37 percent.

The concern about student performance and education spending comes at a time when the state of Indiana faces significant financial pressures. The downturn in the national economy beginning in 2000 had a negative effect on the tax revenues received by states that rely on income and sales taxes to fund programs. This subsequently led to budget deficits for Indiana and many other states. Figure 1 shows individual income tax and sales tax revenues in Indiana for fiscal years 1999-2005, adjusted for inflation.¹⁷ Both personal income and sales taxes began to decline in 2001 and recovery did not begin until 2003. In addition, reserve balances as a percentage of operating revenues dropped to historical lows that have only recently begun to show improvement. As a result, Indiana was faced with difficult choices regarding the types and levels of financial assistance to distribute among all of the competing demands, including K-12 education. The negative effect on tax revenues still exists as evidenced by the \$131 million budget cut made after the fiscal 2006 budget was passed.¹⁸

16. Indiana Department of Education. Retrieved July 19, 2006 from <http://mustang.doe.state.in.us/TRENDS/trends0.cfm>

17. *Indiana Handbook of Taxes, Revenues, and Appropriations*. Retrieved August 4, 2006 from <http://www.in.gov/legislative/publications/handbook.html>.

FIGURE 1. Personal Income and Sale Taxes, Fiscal Years 1999-2005 (Millions, Inflation Adjusted)¹⁹



Indiana used a variety of techniques to reduce the impact of this decline in revenue, such as moving the distribution of tuition support for K-12 education forward, and thus eliminating one distribution in fiscal 2002. The state also permitted school corporations to use revenues from other funds to help cover the daily education expenditures which are, by law, paid only from General Fund revenues. For example, school corporations could, in certain years, cover unreimbursed free textbook expenses from the Debt Services fund, and corporations were permitted, for specific years, to transfer some dollars from the Capital Projects fund to cover property insurance and utility costs. Such “outside provisions” were invoked to help local corporations meet their operating expenses when the

18. National Governors Association. (2006). *The Fiscal Survey of States*. Retrieved July 27, 2006 from <http://www.nasbo.org/Publications/PDFs/FiscalSurveyJune06.pdf>

19. Ibid.

state could not provide larger revenue increase into the General Fund of school corporations.

1.3 Overview

The remainder of this report is broken into three main sections. The first section focuses on the effects of background factors that are beyond the direct control of school corporations on their ISTEP+ pass rates. These factors would include some of the socioeconomic metrics currently used in the state's Complexity Index, as well as other factors identified by the regression Task Team. In the second section, we turn to an examination of how policy factors that can be influenced by school corporations and decision makers affect their ISTEP+ pass rates. The factors to be examined include a range of financial measures representing the level and distribution of education spending, as well as other factors such as the size of a school corporation, whether the governing board has been appointed or elected, and the experience and salary levels for teachers. The final section contains the conclusions and recommendations.

2 Effects of Background Factors on School Corporation ISTEP+ Pass Rates

Since the release of the Coleman Report,²⁰ policymakers across the nation and in Indiana have recognized that a relationship often exists between the academic performance of students and their socioeconomic status. Some of the socioeconomic factors that have been identified as having a relationship with student performance include the educational attainment, economic, and marital status of the student's family. In addition, education researchers have observed that other factors, such as a student's race/ethnicity, may also be related to their academic performance. We refer to such factors collectively as "background factors" because they are all related to a student's background and cannot be influenced by the school, the school corporation, or the state.²¹

If student performance is connected to these background factors, then a school corporation's performance will also be connected to these same background factors. For example, if students from higher-income families tend to perform better than students from lower-income families, then school corporations located in higher-income areas are also likely to perform better than school corporations in lower-income areas. Such patterns are important for policymakers to understand because school corporations are required to provide educational services to students within specific geographic areas.

Before proceeding, several caveats should be noted. First, the relationships between background factors and student performance described above are based on averages across students and do not apply to each and every individual student. Many examples of students from lower socioeconomic families who have performed very well in school can be

20. Coleman, James. (1966). *Equality of Educational Opportunity*. Washington, D.C.: U. S. Office of Health, Education, and Welfare.

21. For thicker descriptions of these factors and the controversy that surrounds them, see, for example: Dalrymple, Theodore. (2001). *Life at the Bottom*. Chicago: Ivan R. Dee Publisher. Mangum, Garth L., Mangum, Stephen L., & Sum, Andrew M. (2003). *The Persistence of Poverty in the United States*. Baltimore: John Hopkins. Ng, Jennifer C & Jury, John L. (2006). Poverty and Education: A Critical Analysis of the Ruby Payne Phenomenon. *Teachers College Record*. Retrieved July 18, 2006 from <http://www.tcrecord.org/PrintContent.asp?ContentID=12596>.

cited, as well as many examples of students from higher socioeconomic families who have not performed well.²² What is intended to be conveyed here is that, on average, a relationship appears to exist between a student's background and their academic performance. This implies that it would be more difficult for a school corporation located in a lower socioeconomic status area to achieve a specific level of performance. Second, even though schools cannot change the background factors that students bring with them to the classroom, they can — potentially — implement policies that may reduce the effects of these factors. This is the focus of the next section of this study. Finally, while the data may show relationship(s) between various background factors and student performance, these data do not permit the inference that the background factors themselves have causal effects on performance. For example, if we observe that on average students from lower-income families do not perform as well as other students, we cannot conclude that coming from a lower-income family causes students to perform poorly. The effect of low family income could reflect other unmeasured causes such as adults in those families having less discretionary time to spend with their children and help them with their school work.²³ Nonetheless, information about these relationships is important to understand when evaluating schools and educational policy proposals.

2.1 Measuring School Corporation Performance

Perhaps the most challenging aspect of any education study is to determine how to measure the performance of individual students, and hence the schools and school corporations they attend. While many parents, taxpayers, and teachers would agree that the goal of schools is to help impart knowledge to students, devising a measure that accurately captures all facets of student knowledge remains elusive. Knowledge can be divided into a

22. See Hyman, Herbert H., Wight, Charles R., and Reed, John S. (1975). *The Enduring Effects of Education*. Chicago: University of Chicago Press. and Peaker, Gilbert F. (1971). *The Plowden Children Four Years Later*. London: National Foundation for Educational Research in England and Wales.

23. For discussions of conditions necessary for causal inferences, see: Blalock, H. (1964). *Causal Inferences in Nonexperimental Research*. Chapel Hill: University of North Carolina Press. Kenny, David A. (1979). *Correlation and Causality*. New York: John Wiley. Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. New York: Houghton Mifflin.

number of different subject area categories, such as mathematics, language arts, sciences, social sciences, arts, humanities, and so on. No single test can be expected to assess all of these areas.

Standardized tests have become a widely used method for assessing student knowledge in selected areas due to the fact that most states now administer these tests to students at various grade levels to meet the requirements of the federally-imposed “No Child Left Behind” act. A number of states including Massachusetts and Indiana also require students to pass their state’s standardized test in a specific grade level in order to be eligible for graduation. Advocates argue that standardized tests provide valuable information on student performance because they are repeatable and quantifiable estimates of student knowledge in particular areas, and are uniformly applied to students across the state. Likewise, by aggregating student test scores across school corporations, standardized tests can provide one measure of the academic performance of students within a school corporation. In Indiana, the state’s standardized test is known as the Indiana Statewide Testing for Educational Progress-Plus, or ISTEP+. The ISTEP+ dates back to 1998, and is currently administered annually to all students in grades 3 through 10. The test has historically focused on two main content areas: mathematics and English/language arts.

The reliance on standardized tests, however, is often criticized by educators and other stakeholders on several grounds.²⁴ First, it is argued that standardized tests overemphasize fields such as mathematics and language arts at the expense of other subject areas. As a result, schools may divert more resources towards activities that promote student performance in mathematics and English/language arts and fewer resources towards other areas that are also an important part of a child’s overall education.²⁵ Second, the tests

24. For examples both for and against, see, Berg, R. A. (1988). Fifty reasons why student achievement gain does not mean teacher effectiveness. *Journal of Personnel Evaluation in Education*, 1, 345-363. Haladyna, Thomas M., Nolen, Susan B., and Hass, Nancy S. (1991). Raising standardized achievement test scores and the origins of test score pollution, *Educational Researcher*, 20(5), 2-7. McDonnell, Lorraine M. (2004). *Politics, Persuasion, and Educational Testing*. Cambridge: Harvard University Press. Phelps, Richard P. (Ed.) (2006). *Defending Standardized Testing*. Mahwah, N.J.: Erlbaum. Phelps, Richard P. (2003). *Kill the Messenger: The War on Standardized Testing*. Piscataway, NJ: Transaction Publishers.

themselves have been criticized as being imperfect measures of student knowledge in the content areas being covered.²⁶ Third, some have countered that standardized tests over-emphasize the memorization of facts and cannot capture higher levels of student learning that are perhaps even more important to a child's education.²⁷

Finally, a student's score on a standardized test can be influenced by socioeconomic factors that are beyond the student's control, such as the educational attainment level of their parents. Some analysts have argued that assessment systems should therefore focus on the gains made by students over time rather than their level of academic performance at a given point in time.²⁸ Another way to examine the gains in learning for students is to estimate a student's academic performance given his or her socioeconomic background, and compare this value to the student's actual performance. If the student's ISTEP+ score exceeds his or her estimated score, for example, then this suggests that the student has performed better than expected. This approach could also be applied to an entire school corporation by comparing the average performance of a corporation's students on the ISTEP+ with their estimated performance.

In this report, we use the percentage of students who passed both the mathematics and English/language arts portions of the ISTEP+ exam as the primary measure of the academic performance of students in each school corporation. Throughout the remainder of this report we refer to this as the "ISTEP+ pass rate." The ISTEP+ pass rate is appealing as a measure of school corporation performance because there are very few quantifiable

25. See Fair Test for criticism of standardized testing, <http://www.fairtest.org/k-12.htm> and Thomas, R. Murray. (2006). *High-Stakes Testing: Coping with Collateral Damage*. Mahwah, N.J.: Erlbaum.

26. See Smith, Mary L. & Pey, Patricia. (2000). Validity and accountability in high-stakes testing. *Journal of Teacher Education*, 51(5), 334-344. Kane, Thomas J. & Staiger, Douglas O. (2002). The promise and pitfalls of using imprecise school accountability measures. *Journal of Economic Perspectives*, 16(4), 91-114.

27. See Linn, Robert L., Baker, Eva L., & Dunbar, Stephen B. (1991). Complex, performance-based assessment: Expectations and validation criteria. *Educational Researcher*, 20(8), 15-21. Nickerson, Raymond S. (1989). New directions in educational assessment. *Educational Researcher*, 18(9), 3-7.

28. See Sanders, W. L., and Rivers, J. C. (1996). *Cumulative And Residual Effects Of Teachers On Future Student Academic Achievement, Research Progress Report*. Knoxville, TN: University of Tennessee Value-Added Research and Assessment Center. Wright, S. P., Horn, S. P., and W. L. Sanders. (1997) Teacher And Classroom Context Effects On Student Achievement: Implications For Teacher Evaluation. *Journal of Personnel Evaluation in Education* 1(1), 57-67. Hu, D. (2000). *The Relationship of School Spending and Student Academic Achievement When Achievement is Measured by Value-Added Scores* Ph.D. diss., Nashville, TN: Vanderbilt University.

measures of student performance that are available for this purpose, and despite its limitations, this is arguably the best available choice. The ISTEP+ is administered in the same way at all school corporations across the state, and provides information on student knowledge in two important areas of K-12 education: mathematics and English/language arts. We will also examine the differences between each corporation's actual and estimated ISTEP+ pass rate to help understand how background and policy-relevant variables affect this measure of corporation performance. However, it should be understood that the ISTEP+ pass rate is an imperfect measure of school corporation performance. Readers should remain aware of the concerns mentioned above regarding the limitations of this measure when interpreting the findings presented in subsequent sections.

2.2 Background Variables from Indiana's Complexity Index

To identify the background factors that may be related to school corporation performance in Indiana, we began with the set of five factors used in the state's Complexity Index. In 1993, Indiana revised its funding formula to provide additional revenues to school corporations that were located in lower socioeconomic areas of the state.²⁹ A corporation's per pupil funding level was set by multiplying the baseline per-pupil dollar amount set by the legislature (i.e., the foundation level) by what was known as the "At-Risk Index." The At-Risk Index was a number calculated by multiplying each of three factors by weights and then adding them together. The index was developed as part of Indiana's 1987 A+ school reform law (P.L. 390-1987, Section 26), which specified that the following three factors be included in the At-Risk Index:

1. the percentage of adults in the district with less than a high school education (*NoHS*);
2. the percentage of single parent families in the district (*OneP*); and

29. For a more details on Indiana's Foundation Program, see: Toutkoushian, Robert K., Michael, Robert S. (2005). Demystifying School Funding in Indiana. *Education Policy Brief*, 3(2), 1-5; 9-13. Bloomington, IN: Center for Evaluation and Education Policy at Indiana University.

3. the percentage of families in the district with dependent children and living in poverty (Pov_j);

Because the values for these variables were obtained from the U. S. Census, they could be updated only once every ten years. These factors and their original weights were selected and developed by Gridley and Peters in 1987, and were based on the correlations, or relationships, between these factors and measures of school corporation performance. The original weights were intended to reflect the strengths of the relationships between each factor and student performance, as represented by the attendance rate, the graduation rate, the average ISTEP score, and the average cognitive skills index for students in the corporation.³⁰

In 2003, the At Risk index was replaced by what is known as the “Complexity Index.” The Complexity Index differs from the At-Risk Index in that two additional factors were added to its calculation: (4) the percentage of children in each district eligible for free lunch at school ($FreeL_j$); and (5) the percentage of children in each district with limited English proficiency (LEP_j). These factors were added to the Index in part because their values could be obtained annually from school corporations and thus could capture demographic changes more quickly than the first three factors which are updated each decade. Likewise, policymakers felt that the English proficiency of students represented another important background factor that affects student performance but was not reflected in the other four factors. The Complexity Index (CI_j) is computed as follows:

$$CI_j = 1 + \beta_1 * NoHS_j + \beta_2 * OneP_j + \beta_3 * Pov_j + \beta_4 * FreeL_j + \beta_5 * LEP_j$$

with β_1 through β_5 representing the weights assigned to each variable. An additional upward adjustment is made to the Complexity Index when the resulting value for a school corporation exceeds 1.25. The adjustments generally range between 0.02 and 0.04, and

30. Gridley, B., and Peters, R. (1987). *Report to Indiana Department of Education At-Risk Functional Group* (unpublished manuscript). More details on the development of the state’s at-risk index can be found in Vesper, N. (1995). *Options for Indiana’s At-Risk Index* (unpublished manuscript, Bloomington, IN: Indiana Education Policy Center).

only affected a few school corporations in Indiana.³¹ School corporations with larger values of the five factors shown above would have larger values of the Complexity Index, and would therefore receive more money per pupil for education based on the foundation grant calculation.

The Complexity Index relies on past values of the five factors in its calculation. For example, the 2005-06 Complexity Index uses values from the 2000 U. S. Census for *NoHS*, *OneP*, *Pov*, and values from 2004-05 for *FreeL* and *LEP*. The following table shows descriptive statistics for the five factors used in the Complexity Index for 2005-06. The data are for 289 public school corporations in Indiana.³²

TABLE 2. Descriptive Statistics for Complexity Index Variables³³

| Variable Name | Median | Average | Standard Deviation | Minimum Percent | Maximum Percent |
|--------------------|--------|---------|--------------------|-----------------|-----------------|
| NoHS ^a | 18.4% | 18% | 6.7 | 2.9 | 61.4 |
| OneP ^b | 22.1% | 23% | 7.6 | 8.9 | 61.2 |
| Pov ^c | 7.4% | 8% | 4.9 | 1.1 | 32.1 |
| FreeL ^d | 18.1% | 20% | 11.1 | 1.9 | 76.4 |
| LEP ^e | 0.4% | 2% | 4.0 | 0.0 | 23.8 |

- a. NoHS = Percent of adults \geq 25 yrs with no high school education in 2000.
- b. OneP = Percent of single parent households in 2000.
- c. Pov = Percent of families with related child less than 18 yrs and income below poverty level in 2000.
- d. FreeL = Percent of students eligible for free lunch in 2003-04.
- e. LEP = Percent of students with limited English proficiency in 2004-05.

The descriptive statistics illustrate the wide variations in Complexity Index factors across school corporations. For example, the percentage of adults without a high school education varies from a low of about three percent to a high of over 61 percent. This can also

31. More details on this adjustment can be found in the *2005-07 Digest of Public School Finance in Indiana* (Indiana Department of Education, 2005). Available from <http://www.doe.state.in.us/publications/financedigest.html>

32. Corporations without complete ISTEP+ scores were excluded from this analysis. The excluded corporations follow. Dewey Township Schools (corporation number 4790) has only seven students in grade three. The Indiana Department of Education does not report ISTEP scores for less than ten students. Grade four in Dewey Township has only nine students. New Harmony Town and Township Consolidated Schools (6610) is missing ISTEP scores for grade eight. Cass Township School Corporation (4770) is missing ISTEP scores for grades nine and ten.

33. Data received from the State Budget Agency, June 2005. Due to data availability, we used *FreeL* values for 2003-04 throughout this report.

be seen in Table 3, where we report the ten highest and ten lowest school corporations in terms of their total Complexity Index:

TABLE 3. Indiana School Corporations with the Highest and Lowest Complexity Index Values,³⁴ 2005-06

| School Corporation | % adults with less than a high school education (NoHS) 2000 | % children eligible for free lunch at school (FreeL) 2004-05 | % children with limited English proficiency (LEP) 2004-05 | % single-parent families (OneP) 2000 | % population below poverty level (Pov) 2000 | Adjusted Complexity Index, 2006 |
|-------------------------------------|---|--|---|--------------------------------------|---|---------------------------------|
| Ten Highest Complexity Index | | | | | | |
| School City of East Chicago | 0.3939 | 0.7635 | 0.0745 | 0.5111 | 0.3078 | 1.5012 |
| Gary Community School Corporation | 0.2665 | 0.6569 | 0.0017 | 0.6416 | 0.3212 | 1.3960 |
| Indianapolis Public Schools | 0.2832 | 0.6553 | 0.0724 | 0.5549 | 0.2432 | 1.3866 |
| River Forest Community Sch Corp | 0.2911 | 0.6166 | 0.2023 | 0.4000 | 0.1948 | 1.3583 |
| School City of Hammond | 0.2441 | 0.6541 | 0.1366 | 0.3842 | 0.1813 | 1.3437 |
| Lake Ridge Schools | 0.2937 | 0.6424 | 0.0345 | 0.3763 | 0.1532 | 1.3356 |
| Cannelton City Schools | 0.2539 | 0.5674 | 0.0000 | 0.3939 | 0.2073 | 1.2951 |
| Scott County School District 1 | 0.3706 | 0.4815 | 0.0000 | 0.2911 | 0.2358 | 1.2829 |
| Lake Station Community Schools | 0.2487 | 0.5356 | 0.0980 | 0.3156 | 0.1440 | 1.2729 |
| Muncie Community Schools | 0.2377 | 0.5205 | 0.0025 | 0.4030 | 0.2073 | 1.2720 |
| Ten Lowest Complexity Index | | | | | | |
| Carmel Clay Schools | 0.0290 | 0.0457 | 0.0144 | 0.1078 | 0.0176 | 1.0354 |
| MSD Southwest Allen County | 0.0381 | 0.0416 | 0.0051 | 0.1214 | 0.0153 | 1.0369 |
| Zionsville Community Schools | 0.0520 | 0.0252 | 0.0039 | 0.1280 | 0.0280 | 1.0371 |
| Hamilton Southeastern Schools | 0.0333 | 0.0480 | 0.0320 | 0.1160 | 0.0166 | 1.0397 |
| School Town of Munster | 0.0702 | 0.0442 | 0.0088 | 0.1471 | 0.0433 | 1.0505 |
| Northwest Allen County Schools | 0.0666 | 0.0691 | 0.0091 | 0.1241 | 0.0152 | 1.0517 |
| Porter Township School Corporation | 0.0674 | 0.0773 | 0.0000 | 0.1034 | 0.0336 | 1.0521 |
| Center Grove Community School Corp | 0.0769 | 0.0655 | 0.0036 | 0.1342 | 0.0288 | 1.0547 |
| Southern Hancock Comm. Sch Corp | 0.0853 | 0.0650 | 0.0000 | 0.1461 | 0.0292 | 1.0576 |
| Eastern Hancock Comm. Sch Corp | 0.1293 | 0.0938 | 0.0000 | 0.1437 | 0.0161 | 1.0743 |

To begin the analysis of the effects of the Complexity Index factors on school corporation performance, in Table 4 we compare the pass rates on the combined English and

34. Data from the School Finance Application Center. Retrieved June 19, 2006 from <https://dc.doe.state.in.us/StateAid/>. Values for *FreeL* 2004-05 were copied individually for each school corporation shown here from their respective budget worksheets.

math sections of the ISTEP+ exam for school corporations that are above and below the medians for the five Complexity Index factors:

TABLE 4. Comparison of Average ISTEP+ Pass Rates for School Corporations

| Factor | Average Pass Rate on ISTEP for Below Median Values | Average Pass Rate on ISTEP for Above Median Values | Difference in Pass Rates (Below average minus Above average) |
|--|--|--|--|
| % adults with less than a high school education (NoHS), 2000 | 69.15 | 61.08 | 8.07 |
| % single parent families (OneP), 2000 | 69.02 | 61.10 | 7.92 |
| % families with dependent children and living in poverty (Pov), 2000 | 69.18 | 60.94 | 8.24 |
| % children eligible for free lunch at school (FreeL), 2003-04 | 70.34 | 59.89 | 10.45 |
| % children with limited English proficiency (LEP), 2004-05 | 65.66 | 64.49 | 1.17 |

On average, school corporations with lower values of each of the Complexity Index factors tend to have higher percentages of students passing the ISTEP+ exam than do other school corporations. For example, for corporations in which the percentage of single parent families is less than the median (22 percent), the average ISTEP+ pass rate is 69 percent, compared to only 61 passing in those corporations where the percentage of single parent families is greater than 22 percent. The difference in average ISTEP+ pass rates is noticeably lower, however, for the limited English proficiency (*LEP*) variable — in fact, this difference is 6.6 times smaller than the next lowest variable (*OneP*).

One challenge in determining the impact of each Complexity Index factor on school corporation performance is that the five factors are likely to be related, or correlated, with each other. For example, school corporations that have a high percentage of students who are eligible for free lunch may also have a high percentage of single-parent families, families who are below the poverty level, and/or families in which adults have less than a high school education.

Table 5 contains the correlation coefficients for the five Complexity Index variables with each other and with the percentage of students passing both the English and math sections of the ISTEP+ exam. The ISTEP+ pass rates are from 2005-06; *NoHS*, *OneP*, *Pov* are from the 2000 U. S. Census; *FreeL* is from the 2003-04 school year; *Lep* is from the 2004-05 school year.

TABLE 5. Correlations Between Complexity Index Factors and ISTEP+ Pass Rates.

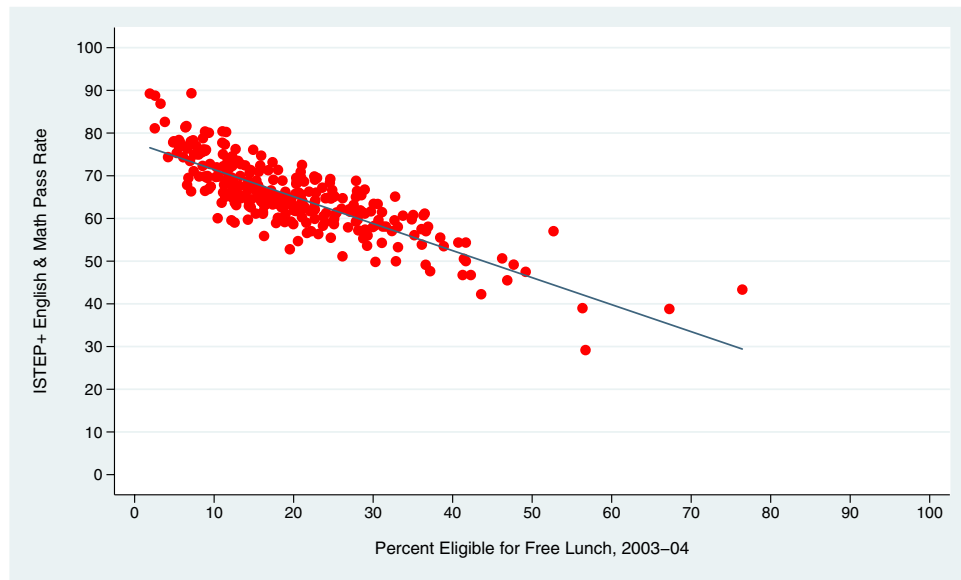
| | ISTEP+ | NoHS | OneP | Pov | FreeL | Lep |
|--------|--------|------|------|------|-------|------|
| ISTEP+ | 1.00 | | | | | |
| NoHS | -0.50 | 1.00 | | | | |
| OneP | -0.70 | 0.30 | 1.00 | | | |
| Pov | -0.64 | 0.55 | 0.67 | 1.00 | | |
| FreeL | -0.82 | 0.54 | 0.79 | 0.81 | 1.00 | |
| Lep | -0.27 | 0.28 | 0.24 | 0.18 | 0.35 | 1.00 |

These correlation coefficients (r) indicate the degree to which two variables move in the same or the opposite direction. Correlation coefficients can range from $r = -1.0$ to $r = +1.0$. A correlation coefficient of zero usually means no linear relationship exists, but the two variables may, nonetheless, still be related in a non-linear fashion. The closer the correlation coefficient is to either -1 or $+1$, the stronger the relationship, with a value of one indicating the strongest possible relationship. A positive correlation indicates that whenever one variable is high or low, so is the other. A negative correlation indicates that whenever one variable is high, the other tends to be low, and vice versa.

The correlations show that all of the five Complexity Index factors are negatively associated with the combined ISTEP+ pass rates for school corporations, with the strongest correlations found for the variables *FreeL*, *OneP*, and *Pov*. In addition, this table shows that the five Complexity Index variables are positively correlated with each other. Not surprisingly, the strongest positive correlation exists between the two measures of family income/wealth: *Pov* and *FreeL* ($r = +0.81$).

A scattergram is another way of showing the relationship between a pair of variables. Figure 2 shows the relationship between ISTEP+ English and Math pass rates for 2005-06, and the percent of students eligible for free lunch in 2003-04. As can be seen in Table 5, the correlation coefficient for these two variables is -0.82. The dots in Figure 2 show the intersection of these two variables for each of the 289 school corporations and the line represents the overall “line of best fit.” The figure is a visual display of a negative relationship. That is, as the percent of students eligible for free lunch increases, the percent of students passing ISTEP+ English and Math tends to decrease.

FIGURE 2. Correlation Between ISTEP+ Performance and Free Lunch.



These correlations among the Complexity Index variables suggest that some of the relationships shown earlier between performance on the ISTEP+ exam and these Complexity Index factors could be due to the overlapping relationships among the factors themselves. We therefore estimated a series of regression models to identify the relationships between each of the Complexity Index factors and the percentage of students in the school corporation who have passed both the mathematics and English portions of the ISTEP+ exam. The main regression equation that we estimated was of the form:

$$(1) \quad \text{ISTEP+} = \beta_0 + \beta_1 * \text{NoHS} + \beta_2 * \text{OneP} + \beta_3 * \text{Pov} + \beta_4 * \text{FreeL} + \beta_5 * \text{LEP} + e$$

where β_0 is the Y-intercept for the equation, β_1 to β_5 represent the effects of each of the Complexity Index factors on a school corporation's ISTEP+ pass rate while holding the other factors constant, and e = error term. As an illustration of how to interpret the results from this equation, if the regression analysis showed that $\beta_1 = +0.50$, then this would mean that as the percentage of adults in a community without a high school education increases by one percentage point — and the other variables (*OneP*, *Pov*, *FreeL*, and *LEP*) remain unchanged — the estimated percentage of students passing both sections of the ISTEP+ would increase by one-half of one percentage point. The error term includes the effects of all other factors that are related to a school corporation's performance but are not included in the model, as well as any measurement error in the variables used here.

Table 6 contains the results from the regression analysis of the Complexity Index factors on the ISTEP+ pass rates for public school corporations in Indiana. Columns A to E show the effects of each Complexity Index factor on ISTEP+ pass rates when we did not control, simultaneously, for the effects of the other four factors. In columns F through I we examine how the impact of selected factors change as we add variables to the model.

In column J, we included all five Complexity Index factors in the regression model. The models in columns F through I use various subsets of the five factors. By comparing the results across columns, we can see the extent to which overlapping relationships among the Complexity Index factors affect the inferred relationships between each of them and the ISTEP+ pass rates of school corporations.

The numbers in the table represent the estimates of the coefficients β_0 to β_5 shown in equation 1. The numbers in parentheses are the standard errors, which provide an indication of how much variability exists in these coefficient estimates. Dividing the coefficients by the standard errors yields the calculated *t*-ratio, which is used to determine if a variable

is statistically significant. If it is, the variable is said to make a significant contribution to the ISTEP+ pass rate. That is, its impact is unlikely attributable to random variation.

In this study, the t -ratio must exceed 2.575 in order for us to be 99 percent confident that a statistically significant relationship exists. Likewise, the t -ratio must exceed 1.96 to be statistically significant at the 95 percent confidence level. We use a double star to indicate when a coefficient is statistically significant at the 99 percent confidence level, and a single star for the 95 percent confidence level.

The intercept is the estimated value (i.e., the estimated ISTEP+ pass rate) when the values of all the other factors in the equation are zero.

At the bottom of each regression table are other numbers that are used to make judgments about a model. The F -statistic indicates whether or not the overall model is statistically significant. If it is not, this in effect means that β_0 through β_5 are all very close to zero and the factors in the model do not vary in any regular way (i.e., no relationship) with the variations in ISTEP+ pass rates. If the F -statistic is statistically significant, the variables in the model are said to explain, collectively, the deviations in the ISTEP+ pass rates.

The Degrees of Freedom (df) refers to the number of pieces of information that can vary independently of one another, or more specifically, the number of values free to vary when computing a test statistics such as F . This number is used to help determine if the value calculated for F is statistically significant.

The R-squared (R^2) statistic shows how much of the total deviations in the ISTEP+ pass rates can be attributed to the factors in the model. When $R^2 = 0$, none of the variations in the ISTEP+ pass rates can be attributed to the model factors. As the value of R^2 approaches one (its maximum value) we can say that more and more of the variations in ISTEP+ pass rates are due to the factors included in the model. $1-R^2$ indicates the amount of variation that remains unexplained by the model.

TABLE 6. Effects of Complexity Index factors on ISTEP+ Pass Rates, Fall 2005

| | A | B | C | D | E | F | G | H | I | J |
|----------------------|----------------------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1 NoHS ^a | -0.635** ^b (0.065) | — | — | — | — | -0.332** (0.058) | -0.312** (0.060) | -0.136** (0.051) | -0.140** (0.052) | -0.183** (0.053) |
| 2 OneP ^c | — | -0.785** (0.047) | — | — | — | -0.589** (0.057) | -0.573** (0.058) | -0.198** (0.061) | -0.197** (0.061) | -0.221** (0.061) |
| 3 Pov ^d | — | — | -1.111** (0.079) | — | — | -0.253** (0.101) | -0.271** (0.102) | — | — | 0.279** (0.104) |
| 4 FreeL ^e | — | — | — | -0.633** (0.026) | — | — | — | -0.482** (0.048) | -0.487** (0.048) | -0.567** (0.056) |
| 5 Lep ^f | — | — | — | — | -0.574** (0.121) | — | -0.111 (0.086) | — | 0.050 (0.075) | 0.103 (0.077) |
| 6 Inter- cept | 76.76** (1.28) | 83.01** (1.13) | 74.42** (0.77) | 77.77** (0.59) | 66.24** (0.54) | 86.80** (1.30) | 86.42** (1.33) | 81.78** (1.21) | 81.84** (1.21) | 82.31** (1.21) |
| 7 F ^g | 94.15** (1, 287) | 277.71** (1, 287) | 199.45** (1, 287) | 604.56** (1, 287) | 22.43** (1, 287) | 137.91** (3, 285) | 104.09** (4, 284) | 214.82** (3, 285) | 160.91** (4, 284) | 133.02** (5, 283) |
| 8 dj ^h | | | | | | | | | | |
| 9 R ²ⁱ | 0.25 | 0.49 | 0.41 | 0.68 | 0.07 | 0.59 | 0.59 | 0.69 | 0.69 | 0.70 |

- a. Percent Adults in 2000 who did not graduate from High School
- b. ** p <= .01
- c. Percent Single parent families in 2000
- d. Percent Families with dependent child in 2000 below poverty level
- e. Percent Students eligible for free lunch in 2003-04
- f. Percent Students Limited English Proficiency in 2004-05
- g. F-Test Statistic
- h. Degrees of Freedom for the F-Test Statistic
- i. R-Squared

The results in columns A through E show that when considered individually, each of the five Complexity Index factors exhibit negative and statistically significant relationships with the percentage of a school corporation’s students who pass both the math and English/Language Arts sections of the ISTEP+ exam. Because larger values of the Complexity Index factors are associated with lower socioeconomic status, this suggests that student performance tends to increase along with the socioeconomic status of the school corporation’s community. Column J, however, shows that substantial changes in the results occur when all five variables are examined at the same time. In particular, note that

the variable for English language proficiency (LEP) no longer has a statistically significant effect on the pass rate for both the English and math portions of the ISTEP+ exam, after subtracting the overlapping effects of the other four variables.

Likewise, the effect of the variable for poverty status (*Pov*) changes from negative in Model C to positive in Model J. This latter result is due to the high correlation between the two variables in the Complexity Index that represent family income or wealth (*Pov* and *FreeL* ($r = 0.81$)). To clarify the impact of this strong relationship between *Pov* and *FreeL*, columns F and H repeat the analysis after omitting the variable *LEP* and either *Pov* or *FreeL*. When considered in isolation from each other, each income/wealth measures has a negative and statistically significant relationship with the percentage of students passing both sections of the ISTEP+ exam.

To choose among these two models, we refer to the percentage of variation in the outcome variable (ISTEP+ pass rate) that is explained by each collection of factors. This is shown in the row with the heading R^2 . The results for models F and H show that the use of *FreeL* leads to a substantially higher R-squared value ($R^2=0.69$) than when *Pov* is used ($R^2=0.59$). Accordingly, we included only the following three Complexity Index variables — *NoHS*, *OneP*, and *FreeL* — in the set of background variables for our full analysis.³⁵

2.3 Other Background Variables.

In addition to the three Complexity Index factors identified above, the Task Team felt that other background factors may also affect student, and hence school corporation, achievement. First, the percent of students eligible for reduced lunch (*ReduL*) was added because we found, in additional analyses (cf. Table 8, p. 26), that there was a negative and statistically significant relationship between the percentage of students eligible for reduced price lunches and the ISTEP+ pass rate. This would suggest that the notion of

35. Additional analysis not included in this report show LEP has a statistically significant impact on ISTEP+ English/Language Arts pass rates ($p \leq .05$), but not on ISTEP+ Math pass rates.

financial need might be expanded to also include students who are eligible for reduced price meals.

Second, communities with higher proportions of adults who have college degrees may see higher student performance levels than do other corporations. To capture the impact of this factor, we used data from the U. S. Census Bureau on the percentage of adults ages 25 and older who have a bachelor degree or higher.

Third, the racial/ethnic composition of students in the school corporation may also be related to the corporation's performance. As reported earlier, the ISTEP+ pass rates for students in Indiana appear to vary considerably by race/ethnicity, with Asian students exhibiting the highest performance levels followed by white students and then students in other race/ethnicities. The issue of race/ethnicity takes on added importance in Indiana due to the fact that racial/ethnic subgroups within each school corporation must all meet established targets for ISTEP+ pass rates in order for the corporation to be labeled as making "Adequate Yearly Progress" (AYP). Accordingly, we used enrollment data for 2005-06 to divide students into three categories — Asian, white, and minority — and then calculated the percentage of students in each category.

Fourth, it is possible that the proportion of students requiring Special Education services may be related to the school corporation's performance level. It was noted earlier that students who receive Special Education services have lower average pass rates on ISTEP+ than non-Special Education students. Anecdotally, superintendents across the state have suggested that some school corporations have not made Adequate Yearly Progress due to the Special Education subgroup not meeting its target. To test this possibility, we calculated the percentage of students in each school corporation in 2005-06 that received Special Education services.

Finally, a school corporation's performance may also be related to the stability or mobility of students within the school corporation. School corporations vary with regard to how

likely students are to attend school on a regular basis. Such variations could be due to students moving from one school corporation to another, or students with propensities to attend school wherever they happen to be living. This is reflected in the variable mobility (M126), which is the percentage of students in 2005-06 who were recorded present at least 126 school days in the academic year. Descriptive statistics for these variables are shown in Table 7.

TABLE 7. Descriptive Statistics for Selected Variables, Indiana Public School Corporations.

| Variable Name | Average | Standard Deviation | Minimum | Maximum |
|--------------------|---------|--------------------|---------|---------|
| BaMa ^a | 15.1 % | 8.9 | 3.8 | 68.9 |
| ReduL ^b | 8.3% | 3.1 | 0.0 | 16.9 |
| M126 ^c | 89% | 3.1 | 74.7 | 97.5 |
| SpEd ^d | 19.4% | 3.9 | 11.6 | 35.1 |
| Asian ^e | 0.7% | 1.3 | 0.0 | 17.6 |
| White ^f | 89.7% | 15.1 | 0.6 | 100.0 |
| Minor ^g | 9.6% | 14.8 | 0.0 | 99.3 |

- a. BaMa = Percent adults in 2000 that are 25 years of age or older with a bachelors or higher degree
- b. ReduL = Percent Students in 2005-06 eligible for reduced lunch.
- c. M126 = Percent students in 2004-05 who were present at least 126 of 180 school days
- d. SpEd = Percent students in 2005-06 who received Special Education services
- e. Asian = Percent students in 2005-06 who were Asian
- f. White = Percent students in 2005-06 who were Caucasian
- g. Minor = Percent students in 2005-06 who were either Black, Hispanic, Indian, or Multiracial

These descriptive statistics show, for example, that on average a public school corporation in Indiana is located in an area where 15 percent of the adults have at least a bachelors degree. As was true for the five Complexity Index variables, the percentages for these seven variables vary greatly across the state, as indicated by the minimum and maximum values and the standard deviations.

In Table 8 we present the results from a series of regression models that examine the effects of the possible background factors on school corporation performance. The general equation for these models is the same as Equation 1 (cf. page 20) with the following

exceptions: (a) *Pov* and *LEP* are dropped, (b) *NoHS* is replaced by *BaMa*, and (c) *ReduL*, *M126*, *SpEd*, *Minor*, and *Asian* are added.

TABLE 8. Effects of Selected Background Variables on ISTEP+ Pass Rates, 2005-06.

| | | A | B | C | D | E | F |
|----|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| 1 | NoHS | 0.146** (0.056) | — | — | — | — | — |
| 2 | OneP | -0.226** (0.055) | -0.249** (0.054) | -0.174** (0.057) | -0.171** (0.057) | -0.128* (0.056) | -0.127* (0.056) |
| 3 | FreeL | -0.451** (0.044) | -0.407** (0.041) | -0.399** (0.040) | -0.385** (0.041) | -0.302** (0.044) | -0.307** (0.045) |
| 4 | ReduL | -0.208* (0.099) | -0.199* (0.100) | -0.196* (0.098) | -0.189 (0.097) | -0.248** (0.095) | -0.247** (0.095) |
| 5 | BaMa | 0.295** (0.038) | 0.240** (0.032) | 0.267** (0.032) | 0.266** (0.032) | 0.321** (0.033) | 0.297** (0.048) |
| 6 | M126 | — | — | 0.361** (0.098) | 0.377** (0.097) | 0.246* (0.099) | 0.251* (0.100) |
| 7 | Sped | — | — | — | -0.145* (0.066) | -0.232** (0.068) | -0.224** (0.069) |
| 8 | Minor | — | — | — | — | -0.113** (0.027) | -0.110** (0.027) |
| 9 | Asian | — | — | — | — | — | 0.197 (0.281) |
| 10 | Intercept | 73.86** (1.70) | 76.95** (1.22) | 42.54** (9.39) | 43.49** (9.34) | 54.95** (9.47) | 54.67** (9.48) |
| 11 | F | 177.63** | 216.02** | 183.24** | 155.50** | 143.92** | 125.76** |
| 12 | df | (5, 283) | (4, 284) | (5, 283) | (6, 282) | (7, 281) | (8, 280) |
| 13 | R² | 0.76 | 0.75 | 0.76 | 0.77 | 0.78 | 0.78 |

Pov was dropped because of its strong correlation with *FreeL* and the inclusion of *FreeL* contributes to a larger R^2 , as shown in Table 6. *LEP* was excluded because it was not statistically significant and thus did not contribute to the explanation of ISTEP+ pass rates. *ReduL* was added because it exhibits a moderate correlation with ISTEP+ pass rates and low to moderate correlations with other background variables.

As before, the coefficients shown in Table 8 represent the estimated change in the ISTEP+ pass rate due to a one percentage point change in each variable, assuming that the other variables in the model do not change.

The results in Column A are interesting in that when we added the variable *BaMa* to the equation with the three Complexity Index factors that were statistically significant, we found that the effect of the variable *NoHS* switched from negative (in Table 6) to positive.

This is most likely due to the high negative correlation between the variables *NoHS* and *BaMa* ($r = -0.65$). In Column B, we removed the variable *NoHS* and found that the model explained more of the variations in ISTEP+ pass rates than when *NoHS* was used instead of *BaMa* (75 percent versus 70 percent, Table 6, Column J). Accordingly, we used the variable *BaMa* in place of *NoHS* in the set of background factors for this study.

In columns C through F, we sequentially added the other potential background factors to the regression model; that is, Model C adds mobility, Model D adds special education, Model E adds minority, and Model F adds Asian. The results show that each of these additional factors, except Asian, had significant effects on the ISTEP+ pass rates for Indiana school corporations. In Table 8, Model F, it can be seen that as the percentage of students who stay in the same corporation for at least 126 days rises, the ISTEP+ pass rate is estimated to increase by 0.251 percent. The coefficient for the variable *SpEd* in column F (-0.224) shows that a one percentage point increase in students receiving Special Education services is associated with a 0.224 percent decrease in the corporation's estimated ISTEP+ pass rate. With regard to race/ethnicity, a one percentage point increase in the minority student population corresponds with a 0.11 percent decrease in estimated ISTEP+ pass rates. The percentage of Asian students in a corporation is not statistically significant, due to the strong correlation between *BaMa* and *Asian* ($r = 0.76$). We therefore settled on Model E as the set of background factors affecting ISTEP+ pass rate.

Comparing the overall findings from Models B and F shows that the four factors account for an additional three percent of the variation in ISTEP+ pass rates.

These results show that these seven background factors — *OneP*, *FreeL*, *ReduL*, *BaMa*, *M126*, *SpEd*, and *Minor* — each have statistically significant effects on the academic performance of students in Indiana school corporations. Collectively, these seven factors account for 78 percent of the differences in ISTEP+ pass rates that occur across school corporations in the state. This is important information for education policy makers to know because public school corporations cannot control or affect these factors, and yet they have an undeniably large influence on their ISTEP+ pass rate. The remaining 22 percent of the variations in ISTEP+ pass rates are thus affected by variables such as school spending that can be determined by policy makers, as well as other important background variables that cannot be measured.

To examine how these background variables can affect perceptions of academic performance, we calculated a range of estimated ISTEP+ pass rates for each school corporation based on the variables and their coefficients in Model E from Table 8. The estimated ISTEP+ pass rate for a single corporation is obtained as follows:

$$\begin{aligned} \text{Estimated ISTEP+} = & 54.95 - 0.128 * \text{OneP} - 0.302 * \text{FreeL} - 0.248 * \text{ReduL} + 0.321 * \text{BaMa} \\ & + 0.246 * \text{M126} - 0.232 * \text{SpEd} - 0.113 * \text{Minor} \end{aligned}$$

where “Estimated ISTEP+” = pass rate estimated by the regression equation, and the estimated coefficients for each variable. To illustrate how the estimated ISTEP+ pass rate of 43.4 is calculated for the River Forest Community School Corporation, the following equation contains the specific values for that corporation:

$$\begin{aligned} \text{Estimated ISTEP+} = & 54.95 - 0.128 * 40 - 0.302 * 52.7 - 0.248 * 13.66 + 0.321 * 3.38 \\ & + 0.246 * 83.7 - 0.232 * 18.05 - 0.113 * 41.81 \end{aligned}$$

$$\text{Estimated ISTEP+} = 43.416$$

Due to the variability in coefficient estimates, however, there will also be variation in the estimated ISTEP+ pass rates for school corporations. We therefore constructed 95 percent confidence intervals around each school corporation's estimated ISTEP+ pass rate. These intervals mean that the chances are 95 out of 100 that the true ISTEP+ pass rate will fall within the specified range. For the previous example, we can be 95 percent confident that the ISTEP+ pass rate for River Forest falls between 35 percent and 52 percent.

Compare this estimated confidence interval (low of 35 percent and a high of 52 percent), which is based on the background characteristics, to the actual pass rate of 57.02. Because the actual pass rate lies outside of the confidence interval range, this particular school corporation is clearly performing better than would be expected based on an inspection of this corporation's background characteristics.

We used the results from Model E in Table 8 (page 26) to calculate the confidence interval for the estimated ISTEP+ pass rate for each of the 289 school corporations. In Table 9 we show 10 school corporations with actual ISTEP+ pass rates that fall either near the upper boundary or above their confidence interval. Table 9 also displays 10 school corporations with actual ISTEP+ pass rates that fall either near the lower boundary or below the confidence level. The complete listing of the actual ISTEP+ pass rates and corresponding confidence levels for all school corporations, sorted by corporation number, is provided at the end of this report.

Table 9 draws attention once again to the reason for examining the relationship between the background factors that cannot be altered by the school corporation and ISTEP+ pass rates. The primary goal of this study is to identify possible relationships between school corporation characteristics, including revenues and expenditures, and school corporation

TABLE 9. Actual vs. Estimated ISTEP+ Pass Rates for Selected School Corporations, 2005-06

| School Corporation | Actual ISTEP+ Pass Rate | Estimated ISTEP+ Pass Rate | 95% Lower Confidence Boundary | 95% Upper Confidence Boundary |
|--|-------------------------|----------------------------|-------------------------------|-------------------------------|
| Actual Score Near or Above Upper Boundary | | | | |
| River Forest Community Sch Corp | 57 | 43 | 35 | 52 |
| School City of East Chicago | 43 | 32 | 21 | 39 |
| Plainfield Community Sch Corp | 80 | 68 | 61 | 77 |
| School Town of Speedway | 68 | 58 | 50 | 67 |
| Milan Community Schools | 73 | 63 | 56 | 72 |
| Argos Community Schools | 74 | 66 | 58 | 74 |
| West Central School Corporation | 66 | 58 | 50 | 66 |
| Beech Grove City School | 70 | 61 | 53 | 70 |
| Eastern Howard School Corp | 81 | 73 | 65 | 81 |
| Union Township School Corp | 82 | 74 | 66 | 82 |
| Actual Score Near or Below Lower Boundary | | | | |
| Lake Station Community Schools | 42 | 49 | 41 | 57 |
| Southwestern Con Schools Shelby Co | 64 | 71 | 63 | 79 |
| Seymour Community Schools | 57 | 64 | 56 | 72 |
| Franklin Township Com School Corp | 63 | 71 | 63 | 79 |
| Crothersville Community Schools | 52 | 61 | 53 | 69 |
| Eminence Community School Corp | 60 | 69 | 61 | 77 |
| Goshen Community Schools | 50 | 59 | 51 | 67 |
| Rensselaer Central School Corp | 55 | 64 | 56 | 72 |
| M S D Shakamak Schools | 50 | 60 | 52 | 68 |
| Monroe-Gregg School District | 59 | 70 | 62 | 78 |

academic achievement. The manner in which corporations allocate their revenues may vary among corporations, with some kinds of expenditures exhibiting a relationship with academic achievement while other kinds of expenditures do not.³⁶ However, the effect of factors that a school corporation can control may be masked by the variations in the background factors that overwhelm the corporation effects. Thus, in order to obtain accurate estimates of the effects of policy variables, we first identify and statistically subtract the

36. Bedard, Kelly & Brown, Jr., William O. (2000). *The Allocation of Public School Expenditures*. Claremont Colleges Working Papers in Economics. Retrieved August 1 from <http://econ.mckenna.edu/papers/2000-16.pdf>

effects of the background factors. Likewise, Table 9 provides a way of identifying school corporations that have higher than estimated ISTEP+ pass rates after taking into account the effects of background factors. This information may aid policymakers in deciding where to look for evidence of practices and policies that help school corporations overcome the influence of these background factors.

3 Effects of Policy Factors on School Corporation ISTEP+ Pass Rates

In this section we look at the possible impact of several school corporation factors on ISTEP+ pass rates, after controlling for the effects of background factors. The factors examined in this section can all, to some degree, be influenced by either the school corporation or by education policymakers.

We begin by examining whether the level of financial resources given to public school corporations in Indiana is related to their ISTEP+ pass rate. It would seem reasonable to presume that there is a positive relationship between the level of revenues given to school corporations and their performance. School corporations with more revenues at their disposal would be able to hire more teachers per student, acquire more and better educational materials, and implement other changes that might have a positive impact on student, and hence corporation, achievement.

Over the past thirty years, there have been numerous studies conducted to determine if “money matters.” Some of these studies have found that higher levels of education resources are associated with greater student performance, and others have concluded that higher student to teacher ratios lead to lower performance. However, as documented by the work of Eric Hanushek, the vast majority of these studies have failed to find evidence of a positive connection between educational resources, student to teacher ratios, and student achievement. The debate concerning the manner in which money is related to K-12 education achievement continues to this day.³⁷

37. See Betts, Julian R. (1995). Which Types of Public School Spending are Most Effective? New Evidence on the School Quality Debate. Discussion Paper 95-03, University of California San Diego, Department of Economics. Hanushek, Eric A. (1986) The Economics of Schooling: Production and Efficiency in Public Schools. *Journal of Economic Literature*, 24(1), 1141-1177. Hanushek, Eric A. (1996). A More Complete Picture of School Resource Policies. *Review of Educational Research*, 66(3), 397-409. Wilson, Kathryn. (2000). Using the PSID to Study the Effects of School Spending. *Public Finance Review*, 28(5), 428-451.

To examine these issues, we began by calculating the following variables for each public school corporation in Indiana:

- Ratio of students to teachers,³⁸
- Revenues per pupil for the General Fund,
- Revenues per pupil for All Funds.³⁹

Revenues per pupil in the General Fund can be directed only towards the basic operations and programs of the school corporation. This includes salaries for teachers, administrators, and other personnel, as well as other costs associated with the day-to-day operations of running schools. While the General Fund is by far the largest single fund in virtually every school corporation, there are a number of additional funds used by school corporations for specific purposes. For example, the Debt Service Fund is used to account for the receipts and expenses relating to the long-term debt of the corporation. Accordingly, we use the revenues per pupil for All Funds as an alternative measure of total education resources available to the school corporation. It is important to note, however, that under state law school corporations **cannot** transfer revenues between funds unless exceptions are permitted by the state legislature.

In Table 10 we examine how these three factors affect the ISTEP+ pass rate for Indiana school corporations. All of the models shown here (A through D) control for the effects of the set of background variables identified in the previous section of this report. In Model A, we control for only the background variables identified earlier, and thus this is the same as Model E in Table 8 (page 26). Model B adds a variable for the student to teacher ratio in each school corporation. Model C includes the per-pupil revenues for the General Fund as a policy variable. Finally, the last model in this table (D) uses the per-pupil revenues from All Funds as the measure of financial resources for education.

38. Indiana Department of Education, variable “ptrat” calculated by IDOE in corporate universe dataset. Retrieved June 14, 2006 from <http://mustang.doe.state.in.us/SAS/sas1.cfm>

39. Revenues calculated by Center for Evaluation and Education Policy. Data provided by the Legislative Services Agency. Received June 25, 2005.

TABLE 10. Effects of Student-Teacher Ratio, Target Revenue, Basic Grant on ISTEP+ Pass Rates, 2005-06

| | | A | B | C | D |
|-----------------------------|---|----------------------------------|---------------------|---------------------|---------------------|
| <i>Background Variables</i> | | | | | |
| 1 | OneP | -0.128** ^a (0.056) | -0.117* (0.056) | -0.128* (0.056) | -0.128* (0.056) |
| 2 | FreeL | -0.302** ^b (0.044) | -0.299** (0.044) | -0.304** (0.046) | -0.303** (0.046) |
| 3 | ReduL | -0.248** (0.095) | -0.229* (0.096) | -0.247* (0.096) | -0.248** (0.096) |
| 4 | BaMa | 0.321** (0.033) | 0.320** (0.033) | 0.321** (0.034) | 0.321** (0.033) |
| 5 | M126 | 0.246* (0.099) | 0.252* (0.099) | 0.248* (0.100) | 0.246* (0.101) |
| 6 | SpEd | -0.232** (0.068) | -0.198** (0.071) | -0.232** (0.068) | -0.232** (0.070) |
| 7 | Minor | -0.113** (0.027) | -0.117** (0.027) | -0.113** (0.027) | -0.113** (0.027) |
| <i>Policy Variables</i> | | | | | |
| 8 | Students per Teacher | — | 0.223 (0.147) | — | — |
| 9 | Target Revenue / pupil '05^c | — | — | 0.068 (0.566) | — |
| 10 | Basic Grant per pupil '05^d | — | — | — | 0.006 (0.581) |
| 11 | Intercept | 54.95** (9.47) | 49.49** (10.10) | 54.47** (10.28) | 54.91** (10.35) |
| 12 | F-statistics | 143.92** | 126.80** | 125.49** | 125.48** |
| 13 | Degrees of freedom | (7, 281) | (8, 280) | (8, 280) | (8, 280)" |
| 14 | R² | 0.78 | 0.78 | 0.78 | 0.78 |

a. *p <= .05

b. **p <= .01

c. Target Revenue is the amount of revenue designated for each corporation's General Fund. Coefficient is expressed in thousands of dollars.

d. Basic Grant revenue is equal to the Target Revenue plus the "categorical" dollars for enrollment growth, academic honors diploma, supplemental remediation, special education, vocational education, and Prime Time. Coefficient is expressed in thousands of dollars.

The results from Table 10 show that while the estimated coefficients for each of these three variables are positive, none of them are statistically significant at the common levels

of significance. Therefore, there is no evidence in these models that either the *level* of education revenues nor the student-to-teacher ratio are related to the ISTEP+ pass rate after removing the effects of background factors.

In the next step, we consider whether the *distribution* of education spending is related to the ISTEP+ pass rates across public school corporations. A number of education researchers, including Allan Odden, have argued that the way in which education dollars are spent is more important than the level of total spending for increasing student achievement.⁴⁰ School corporations in Indiana vary considerably in terms of how they distribute revenues among alternative uses. For example, school corporations can use added revenues either to raise teacher salaries, to hire more teachers, or some combination. Likewise, dollars earmarked for the school corporation's General Fund can be distributed between uses that are directly related to instruction and other uses such as administration and support services. Recently, some states have explored the use of the "65 Percent Solution" in which school corporations are required to allocate at least 65 percent of their revenues towards activities that pertain only to the classroom.⁴¹ Advocates of this policy hold that diverting more dollars to the classroom will have a positive impact on student achievement. However, others have countered that there is no evidence to support this contention.⁴² Significant disagreement also exists as to what uses can be categorized as "instructional expenses."

We created the following variables to examine these contentions:

- Average teacher salary in the school corporation,
- Average years of teacher experience in the school corporation,
- Instructional expenditures per pupil,

40. Odden, Allan, and Archibald, Sarah. (2001). *Reallocating Resources: How to Boost Student Achievement Without Asking for More*. Thousand Oaks, CA: Corwin Press.

41. Standard & Poor's (2006). The Issues and Implications of the "65 Percent Solution." *School Matters*. Retrieved August 06, 2006 from http://www.schoolmatters.com/pdf/65_paper_schoolmatters.pdf

42. Henderson, Michael. (2006). Education Finance Reform: A 65% Solution? Public Affairs Research Council of Louisiana. Available at <http://www.la-pra.org>

- Instructional expenditures as a percentage of the General Fund expenditures.

Teacher salary, years of experience, and students per teacher were all read directly from various datasets located on the Indiana Department of Education website. The instructional expenditure per pupil, and instructional expenditure as a percentage of the General Fund, were calculated as described earlier.

In Table 11 we examine whether each of these factors are related to the ISTEP+ pass rates across Indiana's public school corporations. Model A begins with the background factors and adds to them the variable for the average teacher base salary in the school corporation. Model B adds the student to teacher ratio to Model A, and thus tests whether the effect of average teacher salaries on ISTEP+ pass rates is affected by the ratio of students to teachers. In Models C and D, we replaced the average teacher salary variable with the average teacher experience variable to determine if the results found in Models A and B were due to teacher experience rather than teacher salaries. Finally, in Models E, F, and G we focus on whether the level or distribution of funding for instruction versus other uses has an effect on the ISTEP+ pass rates across school corporations.

Beginning with Model A, the results show that there is a positive and statistically significant relationship between the average teacher base salary level in a school corporation and the ISTEP+ pass rate. The findings in Models B through D show that when we also control for the ratio of students to teachers, or take into account the average experience level of teachers the results do not change. The estimated coefficient of 0.259 in Model A means that for each \$1,000 increase in average teacher salary, holding the background factors constant, the estimated ISTEP+ pass rate would rise by 0.259 percent. While the effect is statistically significant, the size of the effect is relatively small. To illustrate, this means that for an increase pass rate of one percent, average base salary per teacher would need to increase \$3,861. A school corporation with 100 teachers would have to spend an additional \$386,100 on teacher salaries plus benefits in order to raise their ISTEP+ pass rate by only one percentage point.

TABLE 11. Effects of Teacher Salary, Experience, and Instructional Expenditures on ISTEP+ Pass Rates, 2005-06

| | | A | B | C | D | E | F | G |
|-----------------------------|---|----------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| <i>Background Variables</i> | | | | | | | | |
| 1 | OneP | -0.131* ^a (0.055) | -0.127* (0.056) | -0.128* (0.056) | -0.117* (0.056) | -0.130* (0.056) | -0.126* (0.056) | -0.121* (0.056) |
| 2 | FreeL | -0.304** ^b (0.043) | -0.303** (0.043) | -0.303** (0.044) | -0.299** (0.044) | -0.302** (0.044) | -0.305** (0.045) | -0.319** (0.045) |
| 3 | ReduL | -0.243** (0.094) | -0.235* (0.095) | -0.246* (0.096) | -0.229* (0.097) | -0.250** (0.095) | -0.245* (0.096) | -0.223* (0.095) |
| 4 | BaMa | 0.302** (0.033) | 0.302** (0.033) | 0.322** (0.034) | 0.320** (0.034) | 0.320** (0.034) | 0.323** (0.034) | 0.305** (0.033) |
| 5 | M126 | 0.271** (0.098) | 0.272** (0.098) | 0.246* (0.997) | 0.252* (0.100) | 0.249* (0.100) | 0.249* (0.100) | 0.291** (0.099) |
| 6 | SpEd | -0.211** (0.067) | -0.198** (0.070) | -0.231** (0.068) | -0.198** (0.071) | -0.236** (0.069) | -0.231** (0.068) | -0.198** (0.070) |
| 7 | Minor | -0.120** (0.026) | -0.122** (0.026) | -0.113** (0.027) | -0.117** (0.027) | -0.113** (0.027) | -0.113** (0.027) | -0.121** (0.026) |
| <i>Policy Variables</i> | | | | | | | | |
| 8 | Avg. Salary^c | 0.259** (0.080) | 0.244** (0.084) | — | — | — | — | 0.298** (0.091) |
| 9 | Avg. Exp^d | — | — | 0.016 (0.120) | -0.002 (0.120) | — | — | — |
| 10 | S/T^e | — | 0.092 (0.151) | — | 0.223 (0.148) | — | — | 0.035 (0.156) |
| 11 | Inst. Exp^f | — | — | — | — | 0.328 (0.872) | — | — |
| 12 | Inst. Exp % Gen Fund^g | — | — | — | — | — | -0.017 (0.056) | -0.088 (0.061) |
| 13 | Intercept | 41.19** (10.23) | 39.72** (10.52) | 54.71** (9.66) | 49.51** (10.23) | 53.86** (9.91) | 55.50** (9.64) | 41.01** (10.53) |
| 14 | F-statistics | 131.53** | 116.69** | 125.49** | 112.31** | 125.56** | 125.54** | 105.65** |
| 15 | df | (8, 280) | (9, 279) | (8, 280) | (9, 279) | (8, 280) | (8, 280) | (10, 278) |
| 16 | R² | 0.79 | 0.79 | 0.78 | 0.78 | 0.78 | 0.78 | 0.79 |

a. *p <= .05

b. **p <= .10

c. Average teacher base salary, in thousands of dollars.

d. Average years of teacher experience.

e. Students per teacher

f. Instructional expenditures per pupil, in thousands of dollars. Expenditure accounts 11100-14300

g. Instructional expenditures as percentage of General Fund total expenditure.

Turning to Models E through G, we see that neither the amount nor share of education dollars that are allocated to instructional activities have a significant effect on ISTEP+ pass rates after accounting for the effects of background factors. Accordingly, these models do not support the notion that directing a greater share of education spending to direct instruction would lead to gains in academic performance of students.

One limitation of the above analysis is that it compares spending for instruction to all other uses, and does not distinguish among these other uses. To examine in greater detail whether the use of education funding affects corporation performance, we created a series of variables measuring different ways of allocating General Fund expenditures to different activities. The results from these models are presented in Table 12. Model A contains the results from adding the General Fund expenditures per pupil as an explanatory variable. In Model B, we divided General Fund spending into three categories — instruction (expenditure codes 11000-16999), support services (codes 21000-26999), and all other — and added the first two factors as policy variables to Model A⁴³ In Model C, we removed administrative expenditures (codes 23000-24999) from support services and tested whether the shares of expenditures for instruction, administration, support services, and all other uses were related to ISTEP+ pass rates. We then divided the instructional expenditures into two variables — regular instruction (codes 11000-11999) and other instruction (codes 12000-16999) — and examined whether this distinction affected the ISTEP+ pass rates for school corporations in Model D.

Finally, in the last model in Table 12, we focused on whether the per-pupil spending for Debt Service and Capital Projects funds had an effect on the ISTEP+ pass rates for school corporations. Although education dollars **cannot** be moved between these funds

43. The descriptions for expenditure codes are published by the Indiana State Board of Accounts. (2005). *Indiana Public School Corporation Manual - Revised 2005*. Retrieved May 6, 2006 from <http://www.in.gov/sboa/publications/manuals/school/school05/>

Effects of Policy Factors on School Corporation ISTEP+ Pass Rates

TABLE 12. Effects of General Fund Exp. per Pupil; Instructional, Support & Administration Expenditures as Percentage of General Fund; and Debt Service plus Capital Projects on ISTEP+ Pass Rates, 2005-06

| | | A | B | C | D | E |
|-----------------------------|------------------------------|----------------------------------|---------------------|---------------------|---------------------|---------------------|
| <i>Background Variables</i> | | | | | | |
| 1 | OneP | -0.133* ^a (0.056) | -0.136* (0.057) | -0.137* (0.057) | -0.114 (0.058) | -0.135* (0.056) |
| 2 | FreeL | -0.313** ^b (0.045) | -0.311** (0.045) | -0.309** (0.046) | -0.308** (0.046) | -0.305** (0.046) |
| 3 | ReduL | -0.242* (0.095) | -0.248* (0.098) | -0.251* (0.097) | -0.245* (0.097) | -0.245* (0.095) |
| 4 | BaMa | 0.324** (0.033) | 0.322** (0.034) | 0.325** (0.035) | 0.333** (0.035) | 0.313** (0.035) |
| 5 | M126 | 0.261** (0.100) | 0.264** (0.101) | 0.271** (0.104) | 0.281** (0.104) | 0.267** (0.100) |
| 6 | SpEd | -0.247** (0.069) | -0.249** (0.069) | -0.248** (0.070) | -0.210** (0.072) | -0.241** (0.069) |
| 7 | Minor | -0.112** (0.027) | -0.111** (0.027) | -0.109** (0.028) | -0.106** (0.027) | -0.113** (0.027) |
| <i>Policy Variables</i> | | | | | | |
| 8 | GF Exp / pupil ^c | 0.508 (0.428) | 0.573 (0.466) | 0.573 (0.467) | 0.702 (0.469) | 0.574 (0.433) |
| 9 | Inst % GF ^d | — | -0.004 (0.066) | -0.005 (0.067) | — | — |
| 10 | Supt Svcs % GF ^e | — | -0.025 (0.071) | — | — | — |
| 11 | Admin % GF ^f | — | — | 0.014 (0.155) | 0.028 (0.154) | — |
| 12 | Supt Svcs % GF ^g | — | — | -0.028 (0.072) | 0.039 (0.079) | — |
| 13 | Reg inst % GF ^h | — | — | — | 0.119 (0.088) | — |
| 14 | Other inst % GF ⁱ | — | — | — | -0.122 (0.092) | — |
| 15 | DS+CP / pupil ^j | — | — | — | — | 0.056 (0.057) |
| 16 | Intercept | 51.06** (10.01) | 51.45** (11.09) | 50.48** (11.63) | 40.37** (12.64) | 49.26** (10.17) |
| 17 | F-statistics | 126.29** | 100.39** | 90.97** | 84.62** | 112.36** |
| 18 | df | (8, 280) | (10, 278) | (11, 277) | (12, 276) | (9, 279) |
| 19 | R ² | 0.78 | 0.78 | 0.78 | 0.79 | 0.78 |

-
- a. *p <= .05
 - b. **p <= .01
 - c. General Fund expenditures per pupil, 2004-05, in thousands of dollars
 - d. Instruction (11000-16999) as percentage of General Fund
 - e. Support Services (21000-26999) as percentage of General Fund
 - f. Administration expenditures (23000-24999) as percentage of General Fund
 - g. Support Services (21000-22999, 25000-26999) as percentage of General Fund
 - h. Regular Instruction expenditure (11000-11999) as percentage of General Fund
 - i. Other Instruction expenditure (12000-16999) as percentage of General Fund
 - j. Debt Service plus Capital Projects per pupil, 2004-05, in thousands of dollars

and the General Fund without permission from the state, school funding for construction projects has received considerable attention from education stakeholders. Critics have argued that Indiana ranks high nationally in terms of school construction spending, and that these dollars might be better used for direct instruction. Others have countered that it is not clear from national data how Indiana compares to other states in facilities expenditures, that many corporations are in need of building renovations due to aging facilities, and more modern facilities may even lead to improvements in academic achievement.

Perhaps the most striking aspect of this table is that none of the policy variables added to Models A through E was found to have a significant relationship with the ISTEP+ pass rates. Each of the spending categories, for example, had small estimated coefficients that were statistically insignificant. This means that holding the background factors constant, variations across school corporations in how education dollars were allocated between these categories had no bearing on school corporation performance as measured by the ISTEP+ pass rate. Likewise, the results for Model E show that the per-pupil level of spending for Debt Service and Capital Projects does not have an effect on the ISTEP+ pass rates for school corporations.

As a further check on the robustness of these findings, we examined expenditures for All Funds rather than only the General Fund and repeated the analysis above. Because we were now using All Funds, we expressed Debt Service plus Capital Projects spending as a percentage of all spending, rather than as a per-pupil expenditure. The results are shown below in Table 13. As with the previous table, we found that none of the expenditure

Effects of Policy Factors on School Corporation ISTEP+ Pass Rates

TABLE 13. Effects of Selected Expenditures as Percentage of All Expenditures on ISTEP+ Pass Rates, 2005-06

| | | A | B | C | D | E |
|-----------------------------|------------------------------------|----------------------------------|---------------------|---------------------|---------------------|---------------------|
| <i>Background Variables</i> | | | | | | |
| 1 | OneP | -0.128* ^a (0.056) | -0.135* (0.057) | -0.136* (0.057) | -0.122* (0.057) | -0.123* (0.057) |
| 2 | FreeL | -0.307** ^b (0.044) | -0.308** (0.045) | -0.305** (0.046) | -0.306** (0.045) | -0.295** (0.046) |
| 3 | ReduL | -0.242* (0.095) | -0.246* (0.097) | -0.251* (0.098) | -0.248* (0.097) | -0.251** (0.097) |
| 4 | BaMa | 0.320** (0.033) | 0.320** (0.034) | 0.324** (0.035) | 0.331** (0.035) | 0.313** (0.037) |
| 5 | M126 | 0.257* (0.100) | 0.262** (0.100) | 0.276** (0.104) | 0.292** (0.104) | 0.298** (0.104) |
| 6 | SpEd | -0.235** (0.068) | -0.244** (0.069) | -0.244** (0.069) | -0.215** (0.071) | -0.202** (0.071) |
| 7 | Minor | -0.115** (0.027) | -0.114** (0.027) | -0.111** (0.027) | -0.106** (0.028) | -0.107** (0.028) |
| <i>Policy Variables</i> | | | | | | |
| 8 | Exp All Funds / pupil ^c | 0.165 (0.146) | 0.332 (0.251) | 0.346 (0.252) | 0.482 (0.263) | 0.586* (0.273) |
| 9 | Inst % All Exp. ^d | — | 0.064 (0.091) | 0.062 (0.092) | — | — |
| 10 | Supt Srvs % All Exp. ^e | — | 0.023 (0.069) | — | — | — |
| 11 | Admin % All Exp. ^f | — | — | 0.129 (0.219) | 0.050 (0.223) | 0.007 (0.224) |
| 12 | Supt Srvs % All Exp. ^g | — | — | 0.007 (0.076) | 0.032 (0.077) | 0.048 (0.078) |
| 13 | Reg Inst % All Exp. ^h | — | — | — | 0.168 (0.110) | 0.204 (0.112) |
| 14 | Other inst % All Exp. ⁱ | — | — | — | -0.159 (0.156) | -0.171 (0.157) |
| 15 | DS+CP % All Exp. ^j | — | — | — | — | 0.085 (0.059) |
| 16 | Intercept | 52.36** (9.73) | 48.10** (11.06) | 46.46** (11.53) | 40.34** (12.02) | 36.18** (12.33) |
| 17 | F-statistics | 126.22** | 100.56** | 91.20** | 84.46** | 78.43** |
| 18 | df | (8, 280) | (10, 278) | (11, 277) | (12, 276) | (13, 275) |
| 19 | R ² | 0.78 | 0.78 | 0.78 | 0.79 | 0.79 |

- a. *p <= .05
- b. **p <= .01
- c. Total expenditure, all funds, per pupil, 2004-05, in thousand of dollars
- d. Instruction (11000-16999) as percentage of all expenditures
- e. Support services (21000-26999) as percentage of all expenditures
- f. Administration (23000-24999) as percentage of all expenditures
- g. Support services (21000-22999, 25000-26999) as percentage of all expenditures
- h. Regular instruction (11000-11999) as percentage of all expenditures
- i. Other instruction (12000-16999) as percentage of all expenditures
- j. Debt Service plus Capital Projects as percentage of all expenditures

allocation variables had a significant effect on the ISTEP+ pass rates of school corporations. Likewise, ISTEP+ pass rates were unaffected by the share of total expenditures going to the Debt Service and Capital Projects funds. It should also be noted that the R^2 values remained virtually constant across models, suggesting that the policy variables as a whole did not contribute to explaining the variation among school corporations in the ISTEP+ pass rates.

Finally, we considered whether several additional variables had an effect on the ISTEP+ pass rates of school corporations. The complete results are shown in Table 14. First, questions arose as to whether the size of the school corporation, as measured by the enrollment or average daily membership, may have an effect on school corporation performance. Policymakers in Indiana as well as other states have considered whether there were efficiency gains to be made from consolidating school corporations. In Indiana, for example, approximately 40 percent of school corporations enroll 1,500 or fewer students. If these corporations could be consolidated, the reasoning goes, then certain fixed costs of education such as central office administration, purchasing, and so on could be combined and thus reduce the per-pupil education cost. It is not clear from the literature, however, whether student performance would be affected by the size of the school corporation. Accordingly, Model B adds the enrollment level to the set of background variables used for explaining ISTEP+ pass rates.

Questions also arose within the task team as to whether the positive effect of average teacher salaries shown earlier was attributed to the relationship between average teacher

Effects of Policy Factors on School Corporation ISTEP+ Pass Rates

TABLE 14. Effects of Corp. Size; Teacher Salary, Exp; Educational Media Exp.; & School Board Appointment on ISTEP+ Pass Rates, 2005-06.

| | | A | B | C | D | E |
|-----------------------------|----------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| <i>Background Variables</i> | | | | | | |
| 1 | OneP | -0.128* (0.056) | -0.119* (0.056) | -0.134* (0.055) | -0.128* (0.056) | -0.137* (0.055) |
| 2 | FreeL | -0.302** (0.044) | -0.297** (0.044) | -0.290** (0.044) | -0.299** (0.044) | -0.304** (0.044) |
| 3 | ReduL^a | -0.248* (0.095) | -0.254** (0.095) | -0.270** (0.094) | -0.255** (0.096) | -0.247** (0.094) |
| 4 | BaMa | 0.321** (0.033) | 0.341** (0.036) | 0.278** (0.035) | 0.321** (0.033) | 0.322** (0.033) |
| 5 | M126 | 0.246* (0.099) | 0.260** (0.100) | 0.289** (0.098) | 0.276* (0.103) | 0.242* (0.098) |
| 6 | SpEd | -0.232** (0.068) | -0.223** (0.068) | -0.221** (0.067) | -0.234** (0.068) | -0.219** (0.067) |
| 7 | Minor | -0.113** (0.027) | -0.101** (0.028) | -0.131** (0.027) | -0.111** (0.027) | -0.113** (0.026) |
| <i>Policy Variables</i> | | | | | | |
| 8 | Adm^b | — | -0.102 (0.078) | — | — | — |
| 9 | Avg. Salary^c | — | — | 0.322** (0.087) | — | — |
| 10 | Avg Exp^d (Yrs) | — | — | -0.268* (0.133) | — | — |
| 11 | Library^e Svcs. | — | — | — | -0.006 (0.006) | — |
| 12 | Board^f Appt'd | — | — | — | — | 2.80** (1.067) |
| 13 | Intercept | 54.95** (9.47) | 53.24** (9.55) | 41.46** (10.18) | 54.47** (9.69) | 55.11** (9.37) |
| 14 | F-statistics | 143.92** | 126.44** | 118.13** | 123.76** | 129.43** |
| 15 | df | (7, 281) | (8, 280) | (9, 279) | (8, 279) | (8, 280) |
| 16 | R² | 0.78 | 0.78 | 0.79 | 0.78 | 0.79 |

- a. Percentage eligible for reduced lunch 2005-06
- b. Average Daily Membership 2005-06 (thousands)
- c. Average teacher base salary in thousands of dollars
- d. Average teacher experience in years
- e. Educational Media services expenditure per pupil
- f. School Board members appointed.

salaries and average teacher experience. Because teacher pay schedules are directly affected by years of experience, it is possible that some corporations have higher teacher salaries simply due to having more experienced teachers. In Model C, we controlled for both average teacher base salaries and average teacher experience to determine whether each has a significant effect on ISTEP+ pass rates after taking the other into account. In the fourth model (D), we tested whether the level of per-pupil spending on Library Services had an impact on the ISTEP+ pass rates of school corporations. Finally, we tested whether the method by which the school board is chosen — appointed versus elected — is related to the ISTEP+ pass rates of school corporations.

Beginning with Model B, the results show that student performance does not appear to vary according to the size of the school corporation, as represented by the average daily membership. Accordingly, students tend to do just as well in large corporations as they do in small corporations, holding constant the background factors described earlier. With regard to teacher salaries, Model C shows that after controlling for the effects of average years of experience, which itself is statistically significant, corporations with higher average teacher base salaries tend to have higher ISTEP+ pass rates. The findings in Model D demonstrate that spending more per pupil on library services is not associated with higher ISTEP+ pass rates. Finally, we found that corporations with an appointed school board as opposed to an elected board tend to have higher ISTEP+ pass rates.

4 Conclusions and Recommendations

4.1 Conclusions

In this study, we examined the question of whether policy variables such as the level and distribution of funding to public school corporations in Indiana affect the academic performance of students. The data used in the study were assembled by the Indiana Department of Education and represent verified figures on the ISTEP+ pass rates, background factors, and policy factors for all public school corporations in the state. Because student performance has been shown to be highly correlated with student background factors, it was first necessary to estimate the effects of these background factors on performance and remove their influences prior to being able to answer questions about the effects of policy variables. These background factors, such as the educational attainment and income level of families in the corporation, have been shown in many studies across the nation to have a large influence on student performance. These factors cannot be controlled by the school corporation, and failure to take them into account could give rise to incorrect estimates of the effects of policy variables on student performance.

The results of our analysis show that the academic performance of students, as measured by the school corporation's ISTEP+ pass rate, were strongly associated with the background factors in each school corporation. Collectively, the seven background factors identified here account for seventy-eight percent of the variations in ISTEP+ pass rates across public school corporations. This indicates that student background characteristics play a very large role in explaining differences in the average student performance levels across Indiana's public school corporations. Although policymakers cannot control or change the background characteristics of students, they can implement strategies in school corporations that would aim to reduce the effects of these background factors on student performance. For example, Indiana's foundation program is intended to provide more money per pupil to school corporations in lower socioeconomic areas to help

reduce the connection between a student's background and his/her performance in school. The fact that student performance, on average, is largely determined by background factors suggests that either more financial resources are needed for traditionally-disadvantaged students, and/or new approaches to instruction are needed to help reduce the achievement gap. It is also possible that due to the use of "hold harmless provisions" in the state's foundation program (such as the Minimum Guarantee provision), the dollars that are targeted to particular student groups are not being allocated as intended (see Toutkoushian and Michael, 2006).⁴⁴

With regard to the policy variables studied here, we found little evidence that either the level of education spending or the distribution of education spending were associated with higher levels of student performance at the corporation level. After controlling for the effects of background factors, we found that the ISTEP+ pass rates in school corporations with higher-than-average per pupil expenditures were about the same as in school corporations with below-average per-pupil expenditures. The findings also show that there is no relationship between the ISTEP+ pass rate of public school corporations and the percentage of revenues that are spent on direct instruction, administration, or student support services. While these results may seem counterintuitive to policymakers who argue that spending more money on education and/or direct instruction must lead to gains in student achievement, the findings are very consistent with those from leading education researchers such as Eric Hanushek who have studied the same phenomenon in other states. Based on our findings, neither increasing the level of funding for public school corporations nor the proportion of revenues going to direct instruction would give rise to larger proportions of students scoring proficient on the ISTEP+ at the school corporation level.

44. Toutkoushian, Robert K., & Michael, Robert S. (2006). Hold Harmless Provisions in School Funding Formulas: Are they Good or Bad? Paper presented at the annual meetings of the American Education Finance Association, Denver, CO, March 22-25, 2006.

Before concluding that “money doesn’t matter,” however, it should be noted that the results pertain only to the relationship between spending and performance at the corporation level. It is quite possible that within school corporations, the level of spending can vary across schools and even across students, and that these variations may lead to differences in student performance. To test this conjecture, data would be needed on the expenditures at the school level, and breakdowns of student background factors by schools. Similarly, an analysis of individual student performance could also yield insight into this issue, but the data are not yet available for this purpose. It is also possible that the level and distribution of financial resources to education are associated with outcomes other than the ISTEP+ pass rate examined here.

At the same time, our findings show that there is a positive and statistically significant relationship between the average teacher salary in a school corporation and the ISTEP+ pass rate. The positive effect of teacher salaries on performance is even greater once we controlled for the average experience level of teachers. This is important because teacher salaries are determined by each individual’s years of experience and educational attainment. The positive relationship between teacher salaries and student performance could reflect the fact that school corporations with higher pay scales can attract better teachers. If this is the case, and more research is needed to draw definite conclusions on this point, then there may be gains to alternative teacher compensation schemes that would allow school corporations to differentiate salaries to compete for better teachers. However, it should be kept in mind that it would be very expensive to raise student performance levels only by increasing teacher salaries. The results suggest that a \$1,000 increase in average teacher salaries would lead to only a minimum increase (one third of one percent) in the ISTEP+ pass rate.

4.2 Recommendations

We have two main recommendations based on the work that was reported here:

1. *Studies are needed of the effects of policy relevant variables on student performance at both the school and student levels.* Due to data availability, our analysis focused on student performance, background, and policy factors at the corporation level. As noted earlier, it is possible that different relationships would be found between student performance and policy factors if the analyses were conducted at either the school level or the student level. This would require the creation of datasets with comparable information to that used here at the school level and the student level.

2. *More in depth investigation is warranted of those school corporations that were found to have unusually high or low ISTEP+ pass rates relative to their estimated ISTEP+ pass rates.* The analyses that we presented here examined only those factors that could be quantified and measured for each school corporation. However, this approach may overlook a number of other factors that are important determinants of student achievement, but could not be easily included in a multiple regression model. We recommend that a study be conducted of a subset of school corporations such as those shown in Table 9 that were found to have large differences between their actual and estimated ISTEP+ pass rates. Another approach would be to conduct studies of those school corporations with lower socioeconomic status and have large differences between their actual ISTEP+ pass rates and their estimated ISTEP+ pass rates. In this way, policymakers may uncover additional factors that help explain why some school corporations appear to do better or worse after adjusting for the effects of background factors on student performance. These factors could then be measured and included in an analysis similar to this to determine if the results from the case studies can be applied to the larger set of school corporations in Indiana.

5 Appendix A: ISTEP+ Actual and Estimated Pass Rates

Actual ISTEP+ Pass Rates, Estimated Pass Rates and Confidence Intervals

Sorted by Corporation Number

| Corporation Number | Corporation Name | Actual ISTEP+ Pass Rate | Estimated ISTEP+ Pass Rate | 95% Lower Confidence Boundary | 95% Upper Confidence Boundary |
|-----------------------|---------------------------------|----------------------------|----------------------------------|-------------------------------------|-------------------------------------|
| 0015 | Adams Central Community Schools | 75 | 73 | 65 | 81 |
| 0025 | North Adams Community Schools | 59 | 63 | 55 | 71 |
| 0035 | South Adams Schools | 66 | 69 | 61 | 77 |
| 0125 | M S D Southwest Allen County | 81 | 84 | 76 | 92 |
| 0225 | Northwest Allen County Schools | 78 | 79 | 71 | 87 |
| 0235 | Fort Wayne Community Schools | 53 | 55 | 47 | 63 |
| 0255 | East Allen County Schools | 63 | 62 | 54 | 70 |
| 0365 | Bartholomew Con School Corp | 66 | 67 | 59 | 75 |
| 0370 | Flat Rock-Hawcreek School Corp | 62 | 64 | 56 | 72 |
| 0395 | Benton Community School Corp | 62 | 61 | 53 | 70 |
| 0515 | Blackford County Schools | 59 | 62 | 54 | 70 |
| 0615 | Western Boone Co Com Sch Dist | 76 | 70 | 62 | 78 |
| 0630 | Zionsville Community Schools | 89 | 87 | 79 | 96 |
| 0665 | Lebanon Community School Corp | 69 | 66 | 58 | 74 |
| 0670 | Brown County School Corporation | 65 | 67 | 59 | 75 |
| 0750 | Carroll Consolidated Sch Corp | 71 | 69 | 61 | 77 |
| 0755 | Delphi Community School Corp | 63 | 67 | 59 | 75 |
| 0775 | Pioneer Regional School Corp | 64 | 69 | 61 | 77 |
| 0815 | Southeastern School Corp | 63 | 68 | 60 | 76 |
| 0875 | Logansport Community Sch Corp | 54 | 58 | 50 | 66 |
| 0940 | West Clark Community Schools | 64 | 68 | 60 | 76 |
| 1000 | Clarksville Com School Corp | 51 | 56 | 48 | 64 |
| 1010 | Greater Clark County Schools | 55 | 59 | 51 | 67 |
| 1125 | Clay Community Schools | 60 | 62 | 54 | 70 |
| 1150 | Clinton Central School Corp | 68 | 67 | 59 | 75 |
| 1160 | Clinton Prairie School Corp | 65 | 68 | 60 | 75 |
| 1170 | Community Schools of Frankfort | 56 | 52 | 44 | 60 |
| 1180 | Rossville Con School District | 75 | 71 | 63 | 79 |
| 1300 | Crawford Co Com School Corp | 61 | 56 | 48 | 64 |
| 1315 | Barr-Reeve Com Schools Inc | 76 | 70 | 61 | 78 |
| 1375 | North Daviess Com Schools | 69 | 65 | 57 | 73 |
| 1405 | Washington Com Schools Inc | 55 | 59 | 51 | 67 |
| 1560 | Sunman-Dearborn Com Sch Corp | 71 | 72 | 64 | 81 |
| 1600 | South Dearborn Com School Corp | 65 | 65 | 57 | 73 |
| 1620 | Lawrenceburg Com School Corp | 64 | 65 | 57 | 73 |
| 1655 | Decatur County Com Schools | 69 | 66 | 59 | 74 |
| 1730 | Greensburg Community Schools | 63 | 65 | 57 | 73 |
| 1805 | DeKalb Co Eastern Com Sch Dist | 61 | 65 | 57 | 73 |
| 1820 | Garrett-Keyser-Butler Com | 66 | 63 | 55 | 71 |
| 1835 | DeKalb Co Ctl United Sch Dist | 65 | 68 | 60 | 76 |
| 1875 | Delaware Community School Corp | 71 | 70 | 62 | 78 |
| 1885 | Wes-Del Community Schools | 63 | 66 | 58 | 74 |
| 1895 | Liberty-Perry Com School Corp | 67 | 66 | 58 | 74 |
| 1900 | Cowan Community School Corp | 77 | 73 | 65 | 81 |
| 1910 | Mt Pleasant Twp Com Sch Corp | 70 | 75 | 67 | 83 |
| 1940 | Daleville Community Schools | 72 | 71 | 63 | 79 |
| 1970 | Muncie Community Schools | 49 | 51 | 43 | 59 |
| 2040 | Northeast Dubois Co Sch Corp | 75 | 72 | 64 | 80 |

Actual ISTEP+ Pass Rates, Estimated Pass Rates and Confidence Intervals

Sorted by Corporation Number

| Corporation Number | Corporation Name | Actual ISTEP+ Pass Rate | Estimated ISTEP+ Pass Rate | 95% Lower Confidence Boundary | 95% Upper Confidence Boundary |
|-----------------------|------------------------------------|----------------------------|----------------------------------|-------------------------------------|-------------------------------------|
| 2100 | Southeast Dubois Co Sch Corp | 78 | 76 | 68 | 84 |
| 2110 | Southwest Dubois Co Sch Corp | 67 | 67 | 59 | 75 |
| 2120 | Greater Jasper Con Schs | 76 | 73 | 65 | 81 |
| 2155 | Fairfield Community Schools | 73 | 72 | 64 | 80 |
| 2260 | Baugo Community Schools | 62 | 65 | 57 | 73 |
| 2270 | Concord Community Schools | 62 | 62 | 54 | 70 |
| 2275 | Middlebury Community Schools | 76 | 71 | 63 | 79 |
| 2285 | Wa-Nee Community Schools | 72 | 69 | 61 | 77 |
| 2305 | Elkhart Community Schools | 48 | 54 | 46 | 62 |
| 2315 | Goshen Community Schools | 50 | 59 | 51 | 67 |
| 2395 | Fayette County School Corp | 61 | 58 | 50 | 66 |
| 2400 | New Albany-Floyd Co Con Sch | 65 | 65 | 57 | 73 |
| 2435 | Attica Consolidated Sch Corp | 65 | 62 | 54 | 70 |
| 2440 | Covington Community Sch Corp | 60 | 66 | 58 | 74 |
| 2455 | Southeast Fountain School Corp | 63 | 65 | 57 | 73 |
| 2475 | Franklin County Com Sch Corp | 62 | 64 | 56 | 72 |
| 2645 | Rochester Community Sch Corp | 69 | 64 | 56 | 72 |
| 2650 | Caston School Corporation | 63 | 67 | 59 | 75 |
| 2725 | East Gibson School Corporation | 65 | 67 | 59 | 75 |
| 2735 | North Gibson School Corp | 64 | 60 | 53 | 68 |
| 2765 | South Gibson School Corp | 70 | 70 | 62 | 78 |
| 2815 | Eastbrook Community Sch Corp | 68 | 70 | 62 | 78 |
| 2825 | Madison-Grant United Sch Corp | 62 | 64 | 56 | 72 |
| 2855 | Mississinewa Community School Corp | 63 | 60 | 52 | 68 |
| 2865 | Marion Community Schools | 51 | 53 | 45 | 61 |
| 2920 | Bloomfield School District | 67 | 66 | 58 | 74 |
| 2940 | Eastern Greene Schools | 60 | 64 | 56 | 72 |
| 2950 | Linton-Stockton School Corp | 65 | 65 | 57 | 73 |
| 2960 | M S D Shakamak Schools | 50 | 60 | 52 | 68 |
| 2980 | White River Valley Sch Dist | 61 | 63 | 55 | 71 |
| 3005 | Hamilton Southeastern Schools | 87 | 87 | 78 | 95 |
| 3025 | Hamilton Heights School Corp | 75 | 70 | 62 | 78 |
| 3030 | Westfield-Washington Schools | 78 | 80 | 72 | 88 |
| 3055 | Marion-Adams Schools | 70 | 68 | 60 | 76 |
| 3060 | Carmel Clay Schools | 89 | 90 | 81 | 98 |
| 3070 | Noblesville Schools | 80 | 78 | 70 | 86 |
| 3115 | Southern Hancock Co Com Sch Corp | 78 | 75 | 67 | 83 |
| 3125 | Greenfield-Central Com Schools | 66 | 69 | 61 | 77 |
| 3135 | Mt Vernon Community Sch Corp | 74 | 76 | 68 | 85 |
| 3145 | Eastern Hancock Co Com Sch Corp | 70 | 70 | 62 | 78 |
| 3160 | Lanesville Community School Corp | 69 | 73 | 65 | 81 |
| 3180 | North Harrison Com School Corp | 69 | 65 | 57 | 73 |
| 3190 | South Harrison Com Schools | 61 | 64 | 55 | 72 |
| 3295 | North West Hendricks Schools | 78 | 74 | 66 | 82 |
| 3305 | Brownsburg Community Sch Corp | 78 | 78 | 70 | 86 |
| 3315 | Avon Community School Corp | 78 | 73 | 65 | 81 |
| 3325 | Danville Community School Corp | 76 | 73 | 65 | 81 |
| 3330 | Plainfield Community Sch Corp | 80 | 69 | 61 | 77 |

Actual ISTEP+ Pass Rates, Estimated Pass Rates and Confidence Intervals

Sorted by Corporation Number

| Corporation Number | Corporation Name | Actual ISTEP+ Pass Rate | Estimated ISTEP+ Pass Rate | 95% Lower Confidence Boundary | 95% Upper Confidence Boundary |
|-----------------------|---------------------------------|----------------------------|----------------------------------|-------------------------------------|-------------------------------------|
| 3335 | Mill Creek Community Sch Corp | 72 | 69 | 61 | 77 |
| 3405 | Blue River Valley Schools | 68 | 69 | 61 | 77 |
| 3415 | South Henry School Corp | 65 | 65 | 57 | 73 |
| 3435 | Shenandoah School Corporation | 68 | 68 | 60 | 76 |
| 3445 | New Castle Community Sch Corp | 61 | 58 | 50 | 66 |
| 3455 | C A Beard Memorial School Corp | 68 | 65 | 57 | 73 |
| 3460 | Taylor Community School Corp | 60 | 62 | 54 | 71 |
| 3470 | Northwestern School Corp | 80 | 75 | 67 | 83 |
| 3480 | Eastern Howard School Corp | 81 | 73 | 65 | 81 |
| 3490 | Western School Corp | 72 | 72 | 64 | 80 |
| 3500 | Kokomo-Center Twp Con Sch Corp | 57 | 53 | 45 | 62 |
| 3625 | Huntington Co Com Sch Corp | 63 | 67 | 59 | 75 |
| 3640 | Medora Community School Corp | 60 | 61 | 53 | 70 |
| 3675 | Seymour Community Schools | 57 | 64 | 56 | 72 |
| 3695 | Brownstown Cnt Com Sch Corp | 69 | 64 | 56 | 72 |
| 3710 | Crothersville Community Schools | 53 | 61 | 53 | 69 |
| 3785 | Kankakee Valley School Corp | 64 | 65 | 57 | 73 |
| 3815 | Rensselaer Central School Corp | 55 | 64 | 56 | 72 |
| 3945 | Jay School Corp | 65 | 62 | 54 | 70 |
| 3995 | Madison Consolidated Schools | 65 | 62 | 54 | 70 |
| 4000 | Southwestern-Jefferson Co Con | 62 | 61 | 53 | 69 |
| 4015 | Jennings County Schools | 63 | 61 | 53 | 69 |
| 4145 | Clark-Pleasant Com School Corp | 70 | 69 | 61 | 77 |
| 4205 | Center Grove Com Sch Corp | 81 | 81 | 72 | 89 |
| 4215 | Edinburgh Community Sch Corp | 61 | 57 | 49 | 65 |
| 4225 | Franklin Community School Corp | 71 | 65 | 57 | 73 |
| 4245 | Greenwood Community Sch Corp | 72 | 69 | 61 | 77 |
| 4255 | Nineveh-Hensley-Jackson United | 67 | 72 | 64 | 80 |
| 4315 | North Knox School Corp | 63 | 61 | 53 | 69 |
| 4325 | South Knox School Corp | 65 | 68 | 60 | 76 |
| 4335 | Vincennes Community Sch Corp | 60 | 60 | 52 | 68 |
| 4345 | Wawasee Community School Corp | 62 | 66 | 58 | 74 |
| 4415 | Warsaw Community Schools | 69 | 67 | 59 | 75 |
| 4445 | Tippecanoe Valley School Corp | 59 | 64 | 56 | 72 |
| 4455 | Whitko Community School Corp | 66 | 66 | 58 | 74 |
| 4515 | Prairie Heights Com Sch Corp | 61 | 64 | 56 | 72 |
| 4525 | Westview School Corporation | 72 | 69 | 61 | 77 |
| 4535 | Lakeland School Corporation | 64 | 64 | 56 | 72 |
| 4580 | Hanover Community School Corp | 73 | 67 | 58 | 75 |
| 4590 | River Forest Community Sch Corp | 57 | 43 | 35 | 52 |
| 4600 | Merrillville Community School | 56 | 62 | 53 | 70 |
| 4615 | Lake Central School Corp | 77 | 75 | 67 | 83 |
| 4645 | Tri-Creek School Corp | 74 | 70 | 62 | 78 |
| 4650 | Lake Ridge Schools | 48 | 46 | 38 | 54 |
| 4660 | Crown Point Community Sch Corp | 76 | 74 | 66 | 82 |
| 4670 | School City of East Chicago | 43 | 32 | 23 | 41 |
| 4680 | Lake Station Community Schools | 42 | 49 | 41 | 57 |
| 4690 | Gary Community School Corp | 29 | 35 | 27 | 44 |

Actual ISTEP+ Pass Rates, Estimated Pass Rates and Confidence Intervals

Sorted by Corporation Number

| Corporation Number | Corporation Name | Actual ISTEP+ Pass Rate | Estimated ISTEP+ Pass Rate | 95% Lower Confidence Boundary | 95% Upper Confidence Boundary |
|-----------------------|--------------------------------|----------------------------|----------------------------------|-------------------------------------|-------------------------------------|
| 4700 | Griffith Public Schools | 68 | 65 | 57 | 73 |
| 4710 | School City of Hammond | 39 | 42 | 34 | 50 |
| 4720 | School Town of Highland | 68 | 74 | 66 | 82 |
| 4730 | School City of Hobart | 65 | 65 | 57 | 73 |
| 4740 | School Town of Munster | 83 | 79 | 71 | 87 |
| 4760 | Whiting School City | 54 | 50 | 42 | 59 |
| 4805 | New Prairie United School Corp | 71 | 70 | 62 | 78 |
| 4860 | M S D of New Durham Township | 66 | 64 | 56 | 72 |
| 4925 | Michigan City Area Schools | 47 | 52 | 44 | 60 |
| 4940 | South Central Com School Corp | 75 | 70 | 62 | 78 |
| 4945 | LaPorte Community School Corp | 70 | 65 | 57 | 73 |
| 5075 | North Lawrence Com Schools | 61 | 64 | 56 | 72 |
| 5085 | Mitchell Community Schools | 60 | 61 | 53 | 69 |
| 5245 | Frankton-Lapel Community Schs | 63 | 67 | 59 | 75 |
| 5255 | South Madison Com Sch Corp | 69 | 70 | 62 | 78 |
| 5265 | Alexandria Com School Corp | 58 | 62 | 54 | 70 |
| 5275 | Anderson Community School Corp | 47 | 53 | 45 | 61 |
| 5280 | Elwood Community School Corp | 53 | 56 | 48 | 64 |
| 5300 | M S D Decatur Township | 56 | 58 | 50 | 66 |
| 5310 | Franklin Township Com Sch Corp | 63 | 71 | 63 | 79 |
| 5330 | M S D Lawrence Township | 62 | 67 | 59 | 75 |
| 5340 | M S D Perry Township | 61 | 63 | 55 | 71 |
| 5350 | M S D Pike Township | 62 | 63 | 54 | 71 |
| 5360 | M S D Warren Township | 58 | 53 | 45 | 61 |
| 5370 | M S D Washington Township | 68 | 66 | 58 | 74 |
| 5375 | M S D Wayne Township | 58 | 53 | 45 | 61 |
| 5380 | Beech Grove City Schools | 70 | 61 | 53 | 70 |
| 5385 | Indianapolis Public Schools | 39 | 36 | 28 | 44 |
| 5400 | School Town of Speedway | 69 | 58 | 50 | 67 |
| 5455 | Culver Community Schools Corp | 61 | 60 | 52 | 68 |
| 5470 | Argos Community Schools | 75 | 66 | 58 | 74 |
| 5480 | Bremen Public Schools | 68 | 69 | 60 | 77 |
| 5485 | Plymouth Community School Corp | 65 | 63 | 55 | 71 |
| 5495 | Triton School Corporation | 67 | 66 | 58 | 74 |
| 5520 | Shoals Community School Corp | 61 | 58 | 50 | 66 |
| 5525 | Loogootee Community Sch Corp | 73 | 67 | 59 | 75 |
| 5615 | Maconaquah School Corp | 66 | 63 | 55 | 72 |
| 5620 | North Miami Community Schools | 65 | 68 | 60 | 76 |
| 5625 | Oak Hill United School Corp | 72 | 69 | 61 | 77 |
| 5635 | Peru Community Schools | 63 | 58 | 50 | 66 |
| 5705 | Richland-Bean Blossom C S C | 65 | 69 | 61 | 77 |
| 5740 | Monroe County Com Sch Corp | 69 | 73 | 65 | 81 |
| 5835 | North Montgomery Com Sch Corp | 71 | 67 | 59 | 75 |
| 5845 | South Montgomery Com Sch Corp | 71 | 67 | 59 | 75 |
| 5855 | Crawfordsville Com Schools | 65 | 59 | 51 | 67 |
| 5900 | Monroe-Gregg School District | 59 | 70 | 62 | 78 |
| 5910 | Eminence Community School Corp | 60 | 69 | 61 | 77 |
| 5925 | M S D Martinsville Schools | 67 | 66 | 58 | 74 |

Actual ISTEP+ Pass Rates, Estimated Pass Rates and Confidence Intervals

Sorted by Corporation Number

| Corporation Number | Corporation Name | Actual ISTEP+ Pass Rate | Estimated ISTEP+ Pass Rate | 95% Lower Confidence Boundary | 95% Upper Confidence Boundary |
|-----------------------|---------------------------------|----------------------------|----------------------------------|-------------------------------------|-------------------------------------|
| 5930 | Mooreville Con School Corp | 67 | 69 | 61 | 77 |
| 5945 | North Newton School Corp | 60 | 65 | 57 | 73 |
| 5995 | South Newton School Corp | 62 | 61 | 53 | 69 |
| 6055 | Central Noble Com School Corp | 65 | 66 | 58 | 74 |
| 6060 | East Noble School Corp | 63 | 65 | 57 | 73 |
| 6065 | West Noble School Corporation | 54 | 55 | 47 | 63 |
| 6080 | Rising Sun-Ohio Co Com | 64 | 69 | 61 | 77 |
| 6145 | Orleans Community Schools | 69 | 62 | 54 | 70 |
| 6155 | Paoli Community School Corp | 62 | 63 | 55 | 71 |
| 6160 | Springs Valley Com School Corp | 65 | 61 | 53 | 69 |
| 6195 | Spencer-Owen Community Schools | 59 | 61 | 53 | 69 |
| 6260 | Southwest Parke Com Sch Corp | 57 | 58 | 50 | 66 |
| 6300 | Rockville Community School Corp | 64 | 64 | 56 | 72 |
| 6310 | Turkey Run Community Sch Corp | 59 | 61 | 53 | 69 |
| 6325 | Perry Central Com Schools Corp | 67 | 69 | 61 | 77 |
| 6340 | Cannelton City Schools | 50 | 50 | 42 | 58 |
| 6350 | Tell City-Troy Twp School Corp | 66 | 66 | 58 | 74 |
| 6445 | Pike County School Corp | 67 | 62 | 54 | 70 |
| 6460 | M S D Boone Township | 76 | 71 | 63 | 79 |
| 6470 | Duneland School Corporation | 73 | 72 | 64 | 80 |
| 6510 | East Porter County School Corp | 78 | 72 | 64 | 80 |
| 6520 | Porter Township School Corp | 74 | 75 | 67 | 84 |
| 6530 | Union Township School Corp | 82 | 74 | 66 | 82 |
| 6550 | Portage Township Schools | 66 | 61 | 53 | 69 |
| 6560 | Valparaiso Community Schools | 80 | 75 | 67 | 83 |
| 6590 | M S D Mount Vernon | 71 | 66 | 58 | 74 |
| 6600 | M S D North Posey Co Schools | 73 | 70 | 62 | 78 |
| 6620 | Eastern Pulaski Com Sch Corp | 65 | 67 | 59 | 75 |
| 6630 | West Central School Corp | 66 | 58 | 50 | 66 |
| 6705 | South Putnam Community Schools | 68 | 69 | 61 | 77 |
| 6715 | North Putnam Community Schools | 63 | 63 | 55 | 71 |
| 6750 | Cloverdale Community Schools | 58 | 58 | 50 | 66 |
| 6755 | Greencastle Community Sch Corp | 69 | 66 | 58 | 74 |
| 6795 | Union School Corporation | 59 | 63 | 55 | 71 |
| 6805 | Randolph Southern School Corp | 59 | 64 | 56 | 72 |
| 6820 | Monroe Central School Corp | 63 | 66 | 58 | 74 |
| 6825 | Randolph Central School Corp | 65 | 62 | 54 | 70 |
| 6835 | Randolph Eastern School Corp | 57 | 59 | 51 | 67 |
| 6865 | South Ripley Com Sch Corp | 62 | 60 | 52 | 68 |
| 6895 | Batesville Community Sch Corp | 75 | 74 | 66 | 82 |
| 6900 | Jac-Cen-Del Community Sch Corp | 64 | 64 | 56 | 72 |
| 6910 | Milan Community Schools | 73 | 64 | 56 | 72 |
| 6995 | Rush County Schools | 65 | 67 | 59 | 75 |
| 7150 | John Glenn School Corporation | 66 | 66 | 58 | 74 |
| 7175 | Penn-Harris-Madison Sch Corp | 79 | 77 | 69 | 85 |
| 7200 | School City of Mishawaka | 61 | 56 | 48 | 64 |
| 7205 | South Bend Community Sch Corp | 46 | 51 | 42 | 59 |
| 7215 | Union-North United School Corp | 66 | 66 | 58 | 74 |

Actual ISTEP+ Pass Rates, Estimated Pass Rates and Confidence Intervals

Sorted by Corporation Number

| Corporation Number | Corporation Name | Actual ISTEP+ Pass Rate | Estimated ISTEP+ Pass Rate | 95% Lower Confidence Boundary | 95% Upper Confidence Boundary |
|-----------------------|------------------------------------|----------------------------|----------------------------------|-------------------------------------|-------------------------------------|
| 7230 | Scott County School District 1 | 51 | 53 | 45 | 61 |
| 7255 | Scott County School District 2 | 61 | 62 | 54 | 70 |
| 7285 | Shelby Eastern Schools | 67 | 69 | 61 | 77 |
| 7350 | Northwestern Con School Corp | 77 | 72 | 64 | 80 |
| 7360 | Southwestern Con Sch Shelby Co | 64 | 71 | 63 | 79 |
| 7365 | Shelbyville Central Schools | 65 | 61 | 53 | 69 |
| 7385 | North Spencer County Sch Corp | 77 | 71 | 63 | 79 |
| 7445 | South Spencer County Sch Corp | 68 | 65 | 57 | 73 |
| 7495 | Oregon-Davis School Corp | 59 | 63 | 55 | 71 |
| 7515 | North Judson-San Pierre Sch Corp | 58 | 60 | 52 | 68 |
| 7525 | Knox Community School Corp | 58 | 58 | 50 | 66 |
| 7605 | Fremont Community Schools | 67 | 70 | 61 | 78 |
| 7610 | Hamilton Community Schools | 60 | 66 | 58 | 74 |
| 7615 | M S D Steuben County | 63 | 68 | 60 | 76 |
| 7645 | Northeast School Corp | 58 | 59 | 51 | 67 |
| 7715 | Southwest School Corp | 56 | 61 | 53 | 69 |
| 7775 | Switzerland County School Corp | 65 | 61 | 53 | 69 |
| 7855 | Lafayette School Corporation | 54 | 59 | 50 | 67 |
| 7865 | Tippecanoe School Corp | 69 | 73 | 65 | 81 |
| 7875 | West Lafayette Com School Corp | 89 | 88 | 80 | 97 |
| 7935 | Northern Com Sch Tipton Co | 66 | 68 | 60 | 76 |
| 7945 | Tipton Community School Corp | 70 | 67 | 59 | 75 |
| 7950 | Union Co/Clg Corner Joint Sch Dist | 67 | 62 | 54 | 70 |
| 7995 | Evansville-Vanderburgh Sch Corp | 56 | 58 | 50 | 66 |
| 8010 | North Vermillion Com Sch Corp | 60 | 64 | 55 | 72 |
| 8020 | South Vermillion Com Sch Corp | 57 | 62 | 54 | 70 |
| 8030 | Vigo County School Corp | 60 | 60 | 52 | 68 |
| 8045 | Manchester Community Schools | 62 | 67 | 59 | 75 |
| 8050 | M S D Wabash County Schools | 65 | 69 | 61 | 77 |
| 8060 | Wabash City Schools | 58 | 59 | 50 | 67 |
| 8115 | M S D Warren County | 65 | 66 | 58 | 74 |
| 8130 | Warrick County School Corp | 72 | 71 | 63 | 79 |
| 8205 | Salem Community Schools | 64 | 65 | 57 | 73 |
| 8215 | East Washington School Corp | 57 | 63 | 55 | 71 |
| 8220 | West Washington School Corp | 58 | 59 | 51 | 67 |
| 8305 | Nettle Creek School Corp | 67 | 68 | 60 | 76 |
| 8355 | Western Wayne Schools | 62 | 62 | 54 | 70 |
| 8360 | Centerville-Abington Com Schs | 69 | 68 | 60 | 77 |
| 8375 | Northeastern Wayne Schools | 64 | 66 | 58 | 74 |
| 8385 | Richmond Community School Corp | 54 | 53 | 45 | 61 |
| 8425 | Southern Wells Com Schools | 66 | 70 | 62 | 78 |
| 8435 | Northern Wells Com Schools | 69 | 69 | 61 | 77 |
| 8445 | M S D Bluffton-Harrison | 65 | 69 | 61 | 77 |
| 8515 | North White School Corp | 49 | 54 | 46 | 62 |
| 8525 | Frontier School Corporation | 67 | 67 | 59 | 75 |
| 8535 | Tri-County School Corp | 65 | 67 | 59 | 75 |
| 8565 | Twin Lakes School Corp | 60 | 62 | 54 | 70 |
| 8625 | Smith-Green Community Schools | 66 | 70 | 62 | 78 |

Actual ISTEP+ Pass Rates, Estimated Pass Rates and Confidence Intervals

Sorted by Corporation Number

| Corporation Number | Corporation Name | Actual ISTEP+ Pass Rate | Estimated ISTEP+ Pass Rate | 95% Lower Confidence Boundary | 95% Upper Confidence Boundary |
|--------------------|-------------------------|-------------------------|----------------------------|-------------------------------|-------------------------------|
| 8665 | Whitley Co Cons Schools | 70 | 70 | 62 | 78 |