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Funding and high school student achievement in the State of Illinois

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ABSTRACT

FUNDING AND HIGH SCHOOL STUDENT ACHIEVEMENT IN THE STATE OF ILLINOIS

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Northern Illinois University, 2019
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The purpose of this study was to examine the relationship among selected school funding variables, percentage of low socioeconomic status students, and student achievement. Funding variables included percentage of funds a school district received from the three primary sources: local, state, and federal. Additional funding variables included per pupil expenditures, as well as teacher salaries and administrative salaries. Student achievement variables included ACT composite, ACT math, ACT reading, and the percentage of students that met or exceeded state standards. The population studied consisted of Illinois school districts containing high schools. The data used was the data the Illinois State Board of Education provided to the Illinois Interactive Report Card. The years studied consisted of the data sets for the 2011, 2012, 2013 and 2014 school report cards.

The concentration of low socioeconomic status students was found to have the strongest correlation to student achievement. Specifically, the greater the concentration of low socioeconomic students present in a district, the lower the student achievement scores. The second strongest indicator of student achievement was the percentage of funding that came from local sources or property taxes. Although schools with greater degrees of local source funding saw higher student achievement scores, the indicator's significance was not confirmed by linear regression. There was minimal correlation between student achievement and the average per pupil expenditure rate.

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FUNDING AND HIGH SCHOOL STUDENT ACHIEVEMENT IN THE STATE OF
ILLINOIS

BY

MICHAEL E. TRESNAK
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A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

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DEPARTMENT OF LEADERSHIP, EDUCATIONAL PSYCHOLOGY AND
FOUNDATIONS

Doctoral Director:
Dr. Benjamin Creed

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Completing the requirements of a doctoral program takes perseverance. Along the way the person who is trying to complete the tasks realizes that he/she is not in it alone. There are a number of people that I wish to acknowledge for without their help, assistance, and support, I would not have completed this journey.

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continues to encourage me to complete this phase in my life. He is a person that I can turn to
for professional advice

DEDICATION

This study is dedicated to educators everywhere. The field of education is a noble profession. Those of us that work in the front lines of education see the many issues first-hand. My hope is that the research that was completed in this study is used to enhance our ability to better meet the needs of our students.

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CHAPTER 1: INTRODUCTION TO THE STUDY

Background

“A fundamental goal of the People of the State is the educational development of all persons to the limits of their capacities.

The State shall provide for an efficient system of high quality public educational institutions and services. Education in public schools through the secondary level shall be free. There may be such other free education as the General Assembly provides by law.

The State has the primary responsibility for financing the system of public education.”
(Illinois Const., Art. X)

The Illinois Constitution of 1970 calls for the development of all persons to the limit of their capabilities. It also declares that it is the state’s responsibility to be the primary source of financing for the system of public education. The authors of the constitution are therefore stating their desire for all students to achieve at the highest possible level, as well as their belief that the state is responsible for ensuring the necessary funding to achieve that desire. Despite this charge from the Constitution’s authors, Illinois recently ranked forty-seventh out of fifty states in the equitable funding of public school, calling into question whether the state’s funding system recognizes the need for extra resources to be funneled to districts with higher concentrations of students living in poverty (Baker, Farrie, Luhm, & Sciarra, 2016). In Illinois there has historically been a high dependence on the local property tax for the funding of school districts. The substantial variation in local property value present in the state, has led to substantial variation in the amount of funding available to a school district from local property taxes. In other words the location of the school district, as opposed to the needs of the school district, had

stronger determination in the amount of resources available. For instance, in LaSalle county there is a nuclear power plant, which has a high-assessed property value. Because the plant physically falls within the Seneca High School District limits, Seneca High School has a higher equalized assessed value (EAV) than Ottawa Township High School, the adjacent school district. Because Seneca High School District has a higher EAV, it is able to access a higher level of revenue from property taxes than Ottawa Township High School District. So the amount of local revenue available to Seneca is based on the physical value of the property that is in its district and is not related to the student needs of the school district.

The State of Illinois's funding formula, until recently, was based on supplementing local sources so that each school district had at least a foundation level of funding, calculated on a per student basis. The formula did not have on its own any funding enhancements based on high needs or at-risk students. The state did provide funding to offset extra-ordinary special education costs as well supplementing the cost of special education teachers.

Up until 2016-2017 under the old formula, it was documented on the Illinois Annual School Report Card that students have not shown significant improvement in achievement scores (ISBE, 2016). So even though the state constitution has a strong statement about the achievement of students as well as the funding of schools, apparently neither of those goals has a history of being achieved prior to 2017-2018. According to Dean (2006, p. 289), "the amount of proper funding appropriated by state legislatures for America's elementary and secondary schools is one of the most multifarious and vigorously debated issues among policymakers, the educational and legal establishment, and legislators alike." There have been many attempts to change the state funding formula for public schools in order to address the vast differences in per

pupil spending throughout the state. In the past these conversations have not resulted in any substantial change in the manner in which public schools have been funded (Broadway, 1997).

The question of school funding in Illinois in terms of equity and adequacy has been litigated with little to no relief afforded schools by the courts. Two cases that were litigated in 1996 and 1999 seemed to set the precedent that the Illinois Supreme Court was not going to involve itself in what it considered a legislative issue. Specifically in *Committee for Educational Rights v. Edgar* and *Lewis v. Spagnolo*, the Supreme Court determined that the funding of schools might not be equitable, but it was not the responsibility of the court to determine an equitable manner in which to fund Illinois schools (*Committee for Educational Rights v. Edgar*, 1996; *Lewis E v. Spagnolo*, 1999).

In 1997 the Governor of Illinois, Jim Edgar, championed a comprehensive school funding reform that was subsequently defeated in the legislature. The resultant funding bill that was accepted in some cases increased the funding inequities in the state (Broadway, 1997). Despite the various initiatives to address funding inequities, the dependence on property tax as a primary means to provide financial support to schools has created a wider gap in per pupil spending (ISBE, 2016). The state funding formula was designed to supplement local resources and reduce the inherent disparities in resource availability by guaranteeing a base level of funding to each school. In reality the funding formula has not been able to make up that difference. In reviewing financial data from the school report card, evidence shows that there were differences in the amount spent per pupil between school districts in Illinois in excess of 300% (ISBE, 2016).

However, on August 31 of 2017 the funding formula for Illinois schools was legislatively modified to an evidence-based formula that compensates districts based on the

needs of the district as determined by evidence-based factors. After many years of discussion at⁴ the legislative level, in the summer of 2017 the State of Illinois passed Public Act 100-0465, the Evidence-Based Funding for Student Success Act, which was a comprehensive school funding law that redefined the mechanism used to determine the level at which a school district was funded. In the past a foundation level was set, and used for all school districts throughout the state. In general terms, if the local resources available to the school were not enough to cover the foundation level, the state supplemented the local funding through state aid. The amount of funding the state provided was determined by the average daily attendance (the average number of students that attended each day throughout the school year) and the amount needed to make up the difference. Thus the state looked at the revenue the district had the ability to generate through local resources. It then calculated what the per pupil expenditure would be based on that potential revenue. If that amount was below the foundation level, then the state would make up the difference based on the average daily attendance, rather than the total number of students enrolled. The new formula departs from this previous process by including components, which recognize variation in individual student needs and account for differences in costs associated with district location. It continues to incorporate the capacity of the local district to fund itself from local revenues. The formula is designed to close funding gaps between wealthier districts and less affluent districts. The formula further promises to be stable and sustainable by including a hold harmless element in the formula to guarantee that school districts will not have funding reduced by the state (Figueira, Boer, & Jacoby, 2017). The new formula addresses the concerns that were detailed in a study of the structure of Illinois school finance systems that was commissioned by The Illinois State Board of Education (Augenblick & Associates, 2013). As stated in the executive summary of the report:

Based on the information presented in this report, we conclude that the Illinois school finance system is inequitable for both students and taxpayers. Despite the existence of state aid programs that are either wealth equalized (Formula Grant), the amount of revenue distributed by them is not sufficient to overcome the impact of local revenue, which is more than twice as large, strongly associated with district wealth, and inversely related to student need (Augenblick & Associates, 2013, p. 2).

The Illinois Constitution requires the state to provide an “efficient system of high quality public educational institutions and services” (Illinois Const., Art. X). The Augenblick, Palaich, and Associates (2013) report is just one of the more recent reports to document the financial issues of public school in Illinois, in addition to the ever-present questions about equity and adequacy of the educational funding streams in Illinois. The new funding formula addresses some of these concerns by allocating funds to districts based on the needs of the students based on two key words: adequacy and equity. Equity “ensures fair distribution of local, state and federal funds amongst all school districts, schools and students” (Jacoby & Mangan, 2016, p. 33). Equity can be taken a step further and divided into horizontal and vertical equity. Horizontal equity refers to having resources equally available to all students who have equal needs (Baker & Green, 2014). Vertical equity according to Baker and Green (2014) examines groups of students and determines if those students have different needs and if to meet those needs will require additional resources. Adequacy is more complex. It “refers to the level of funding sufficient for every child to have equal educational opportunities to achieve to state proficiency standards” (Jacoby & Mangan, 2016, p. 33). Adequacy applies the fundamental concepts of vertical equity in the very specific concept of student learning outcomes as determined by comparison to state proficiency standards.

What is an adequate amount of money and how is it determined? One landmark case that gives insight to funding as it relates to public education was *Brown v. Board of Education*

(Brown v. Board of Education, 1954), by which the court overturned the separate but equal doctrine that had been in place since Plessy v. Ferguson (Plessy v. Ferguson, 1896). In Brown the court found that separate was inherently unequal and declared the practice of segregation in public schools to be unconstitutional (Brown v. Board of Education, 1954). Some of the arguments in that case were based on inadequate funding of the “separate but equal” schools (Brown v. Board of Education, 1954). Even though the states were claiming that the schools were funded adequately, students based on the color of their skin were not receiving equitable education, thus linking “adequacy” to the need for equitable opportunities (Brown v. Board of Education, 1954). If adequacy requires equitable opportunities, it logically leads to questions about the relationship between funding and student achievement. Can student achievement be used as one means to determine if a school is adequately funded?

In Illinois the data indicates the funding of public schools is certainly not equal; per pupil expenditures differ vastly across communities and districts throughout the state. The question we must consider is deeper than equality: Is school funding in Illinois equitable? Does school funding in Illinois meet adequacy standards, as measured by student achievement levels as compared to state standards? A deeper examination into student achievement and how it is measured is necessary in order to answer these questions.

Student achievement came to the public’s attention when the “A Nation at Risk” report was released in 1983 (“A Nation at Risk: The Imperative for Educational Reform,” 1983). That report called into question the ability of public schools to adequately prepare students for post-secondary life. The resulting public debates ultimately lead to a fundamental shift in legislators’ attitudes toward public school funding. In 1994 the Elementary and Secondary Education Act (ESEA) was due for reauthorization. ESEA is the federal legislation that came in existence

during the Johnson presidency as part of his war on poverty (Rudalevige, 2003). “The lesson that many policymakers and analysts took from the 1994 reauthorization was that federal dollars needed to be tied more explicitly to measurable gains in student performance.” (Rudalevige, 2003, p. 62) Another legislative response to the report was “No Child Left Behind” or NCLB, which was enacted by the federal government in 2001 (No Child Left Behind Act of 2001, 2001). NCLB established certain student achievement percentages that schools must achieve. The ultimate goal was one hundred percent of all students meeting or exceeding state standards by the year 2014 (No Child Left Behind Act of 2001, 2001). If schools did not improve they could face various punitive actions including the reduction or elimination of federal funding. The federal government, in a sense, had the intention of basing funding on student achievement. In Illinois the measure of student achievement used was the Prairie State Achievement Exam (PSAE).

School funding and student achievement appear to be politically related. Increased funding should at least reflect some increase in student achievement. In other words as per pupil funding increases, there is a natural desire or expectation to see student achievement increase. The argument is that as more resources are made available to address the question of student achievement, there should be an increase in student achievement. If there is not an increase, then the increase in resources is not meeting its goal to improve outcomes.

Table 1.1 compares student achievement data with financial data, based on data provided by the Illinois State Board of Education on its website. The data available from the ISBE includes fifteen-year trend data from the annual school report cards as well as financial and inflation data from the Bureau of Labor Statistics. As the State has been assessing Illinois school student achievement for a number of years now, there is a substantial amount of readily available

data which can be utilized to assess and determine if there is a relationship between school funding and student achievement. Prior to moving to the PARCC assessment in 2015, Illinois used the Prairie State Achievement Exam (PSAE) to determine student achievement growth. All public high school juniors took the PSAE, which included the ACT exam. In order to determine if there is a relationship between funding and student achievement, results from the PSAE and the ACT can be compared to the financial data.

Table 1.1

Data from the ISBE and US Inflation Calculator

Year	Average Per Pupil Expenditure in 2015 dollars	Percent increase from previous year	Percent met Exceed on PSAE as reported on Report Card	Percent increase from previous year	Average ACT Composite Score as reported on Report Card	Percent increase from previous year
2002	\$6,148		55.8		19.9	
2003	\$6,237	1.45%	56.1	0.54%	20.0	0.50%
2004	\$6,301	1.03%	55.2	-1.60%	20.0	0.00%
2005	\$6,330	0.46%	56.4	2.17%	20.1	0.50%
2006	\$6,308	-0.35%	54.9	-2.66%	20.3	1.00%
2007	\$6,363	0.87%	54.3	-1.09%	20.3	0.00%
2008	\$6,393	0.47%	52.6	-3.13%	20.5	0.99%
2009	\$6,742	5.46%	52.5	-0.19%	20.6	0.49%
2010	\$7,046	4.51%	53.0	0.95%	20.5	-0.49%
2011	\$7,136	1.28%	53.0	0.00%	20.6	0.49%
2012	\$6,838	-4.18%	50.5	-4.72%	20.6	0.00%
2013	\$7,095	3.76%	51.3	1.58%	20.3	-1.46%
2014	\$7,102	0.10%	53.3	3.90%	20.4	0.49%
2015	\$7,410	4.34%	54.3	1.88%	20.5	0.49%

(ISBE, 2016; US Inflation Calculator)

Table 1.1 shows per pupil expenditures, percentage of students who met or exceeded state standards, and average ACT scores over a 15-year period. While per pupil expenditures increase at a rate approximately double the inflation rate for the same time period, the percentage of students, who met or exceeded state standards only varied within a range of six percentage points (50.5% to 56.4%), and ACT average scores only varies by one point (19.6 to 20.6). In fact, the percentage of students who met or exceeded state standards was actually lower in 2015 than it was in the base year of 2002.

The data contained in Table 1.1 shows a discrepancy in the relationship between funding and student achievement. On the surface, increases in per pupil funding does not appear to relate to the same level of increase in student achievement. In examining the data it can be seen that per pupil spending increased over the fifteen years. When the per pupil expenditure is standardized over the 15 years, using 2015 as the base year, there still is an increase. Just looking at per pupil expenditure does not examine the complex method in which Illinois schools are funded. An examination of the funding streams used by districts as they relate to student achievement will give a more detailed picture of the funding / student achievement relationship.

In Illinois the three primary sources of funding are federal, state, and local. The proportion of the district budget that is generated from these different sources varies from district to district (ISBE, 2016). Federal funds are typically categorically based. For instance most school districts receive Title funding. The amount of Title funding is determined by the proportion of low socioeconomic status students to the total school district population. Title I funds are to be used to enhance math and/or reading skills.

As previously discussed the amount of state funding that a district receives is determined by a funding formula. Each year the legislature determines a foundation level. That foundation level is a minimum amount of funding that should be spent on a per pupil basis to provide an adequate education. The state would look at the ability of a school district to fund that foundation level from local sources. If the district was unable to provide funds to make the foundation level, the state would make up the difference. For a number of years the state has not fully funded the foundation level. Due to revenue shortfalls the state has had to resort to prorating the funding to local districts. The funding formula was recently modified to an evidence based formula. The new formula was not being used during the period of this study.

Local funds are primarily provided by property taxes. The amount of property tax available to a district is dependent upon the Equalized Assessed Valuation (EAV) of the property that is contained in the district's boundaries. Throughout the state there is wide variance of property value, which leads to a wide variance in available property tax or local resources available to a school district. The relationship between the proportions of funding that school receives from these sources and how it relates to student achievement is an area this study wants to examine.

Given this highly variable and widely disparate funding profile, a comprehensive examination of the relationship(s) between school district funding sources profile(s) as well as the manner in which those funds are used and the link to student achievement must be conducted rather than relying upon just a single characteristic or factor to predict student achievement. This study seeks to examine these relationships.

Conceptual Framework

“Over the past four decades, many states have revised their funding of schools, through either judicial or legislative initiatives, in an effort to improve schools serving disadvantaged children. Too often, however, these actions have not yielded improved student achievement” (Hanushek, Lindseth, & Rebell, 2009, p. 39). With the last two reauthorizations of the Elementary and Secondary Education act, No Child Left Behind and Every Student Can Succeed Acts, there is an ever-increasing focus on how well students are achieving in public schools. The success and failure of a school is determined by student achievement. According to Hanushek since 1970 the achievement of students in reading and math as measured by the National Assessment of Educational Progress (NAEP) has remained relatively flat while during the same period of time spending has increased at a dramatic level (Hanushek, et al., 2009). As student achievement has not measurably improved despite a massive investment, the last decade has seen an increased focus on better understanding of both student achievement and school funding, as well as the relationship between the two.

Educational researchers have debated the question of the influence of funding on student achievement. Schrag (2003) in the book “Final Test: The Battle for Adequacy in America’s Schools” devotes an entire chapter to the concept of “Does Money Matter?” Schrag questioned if increasing funding improved student achievement. “The core of Hanushek’s argument, based on some thirty years of research, is that a generation of sharply increasing spending on schools, much of it for increased teacher salaries and reduced class sized (plus a substantial chunk for increasing special education needs), has produced little if any measurable increases in student achievement” (Schrag, 2003, p. 207). Bracey, in his book, disputed the Hanushek argument that is referenced in Schrag’s book. Specifically he said: “Hanushek’s own data contradict

Hanushek's conclusion that no strong relationship links money and achievement" (Bracey, 1997, p. 21). Hanushek's (1979) writings were based on the production function as it relates to education. The production function in its simplest form has two parts: inputs and outputs. The inputs are referring to the resources that are used in education, such as funding. The outputs are referring to student outcomes including: graduation, attendance, attending college, going into the military, and student achievement. Student achievement as an output has been brought into focus for many reasons, including No Child Left Behind. Student achievement can be measured in a number of ways but the majority of studies that are based on the production formula used standardized testing. There have been other measures of outputs such as student attitudes, attendance rates, college continuation and dropout rates (Hanushek, 1979).

In order to develop a comprehensive view of the relationship between these factors a framework that creates a justification for the examination of the various elements must be constructed. This section is being divided into multiple subparts that will serve to develop the framework. The sections will include a review of the general education production function framework, decisions districts can make to shape quality of inputs, and funding sources and impact of decisions districts make. The section will be summarized in the final subsection: conceptual framework for the impact of funding sources on student outcomes.

General Education Production Function Framework

Hanushek (1979) describes the production function framework as an extension of the relationship between inputs and outputs. The production formula when examined under the lens of a business is developing the relationship between inputs and outputs. If a company produces a certain product, the cost of the production of the item is an example of an output. All of the

aspects of the production of that product are considered the inputs. Aspects such as raw products, manufacturing processes, human resources are various types of inputs. A company wants to produce a product in the most efficient manner possible in order to control cost. So a company is going to examine all of the inputs to try to determine which inputs have the strongest relationship to overall cost to produce the item. For instance a company may look at various options on the acquisition of the raw product. A cheaper raw product might be available but does that affect the overall quality of the product, which could change the amount the company, can charge consumers for the product. Does the higher cost of a more experienced worker improve the quality or the efficiency of producing a product? Overall the company desires to adjust the inputs in a manner that allows for the efficient production of a quality product

The concept of production function in the educational realm also focuses on dividing variables into inputs and outputs. A school district ultimate goal is to produce a product, a student that is achieving at a high level. So in the case of a business the product is some manufactured item. In schools the product is related to the student. Where a business has control overall virtually all the aspects of production, a school does not control all aspects of the production of a high achieving student. For instance a school does not control the home life of a student. The school does not control the emotional or physical needs of a student. In most cases a student is in the control of school for around a quarter to a third of the day. The rest of the time the student is not under the control of the school. So where a company can have control of the production of an item from raw product to completion, schools do not.

So production is the education that the student receives. Production is the various inputs that are involved in controlling the quality of the education of the student. There are many inputs that may relate to the outcome of student achievement. More specifically, inputs in a broad

sense are characteristics of schools and students that might or might not affect an outcome including: sources of funding, student demographics, amount teachers are paid, experience of teachers, class sizes, amount administrators are paid, amount of funds dedicated to classroom resources, amount of funds dedicated to technology for the classroom, age of the building, amount of funds dedicated to professional development, student to teacher ratios, student to administrator ratios, and education level of teachers. In examining these inputs some are controlled by the district while others are not.

The district cannot control the amount of funds that comes from the various sources. Local sources are determined by property value. State sources in general terms are determined by the ability of a district to fund itself locally. More state resources become available if a district is unable to fund itself as well locally. Federal funding is primarily based on need as determined by the concentration of low socio economic students. A district that receives a high level of federal funding most likely has a high concentration of low socio economic students. It should be noted that districts have discretion in the use of state and local funding. So in a sense the local funding and the state funding comes into the district essentially without any restriction in how it is used. The district can determine to focus on salaries, supplies, or other priorities. Per federal mandates federal funds have to be used in specified manners such as for the improvement of reading and math. Even though federal funding is determined primarily by concentration of socioeconomic students, it does not mean those fund have to be used for low socio economic students. For instance the federal title I funds are determined by the concentration of low socio economic students in a district. The district then has the option based in its title I plan on what specific area(s) it is going to focuses support: math or reading. The

determination of which students get help is based the need of the student, not the economic status of the student's family.

The district has to determine which inputs it controls have the greatest effect on student output, for instance student achievement. One area that a district can focus on is teachers. If a district is known to have a competitive salary schedule then the district is more likely to attract a higher quality teacher. If the district feels that the student-to-teacher ratio is important, then it can devote resources to hire more teachers, thus reducing the ratio of students to teachers. To extend this thought further, a district might feel that having more administrators might strengthen instructional leadership for the teachers, which in turn will create a more effective educator. If the district is known to have a higher salary schedule for administrators, it should be able to attract higher quality administrators. The district might also look at the level of instructional supports that are available to the teacher. Supports such as increases in supply budgets and increases in technology availability might be an area of priority within a district. Any and all of these inputs, which are within the control of the district, could have an effect on student outcomes, and could be utilized to ameliorate any potential negative effects of the uncontrollable inputs. It will be up to the district to determine which inputs have the greatest potential for positive impact, and prioritize the development of those inputs.

The output as touched on before is essentially what is produced. In business terms it is the product that is produced using the various inputs. Educational outputs in simplest terms are student outcomes such as: graduation rates, percent of students that go on to post-secondary education, earning potential, and student achievement to name a few. So to clarify, the output in the educational production formula is not the student but the qualities of the student. The output of student achievement has always been important but has gained more attention when federal

education policy was based on No Child Left Behind. There was an increased focus on student achievement as the means to assess how well a school or district was performing. NCLB based district performance on student achievement. Districts that had low student achievement risked having federal funding reduced or removed. In examining how student achievement has been assessed in Illinois on a statewide basis, variables such as percentage of students that meet or exceed state standards and average scores on ACT assessments could be considered as specific examples of variables that define output. For each school district there is a need to determine which outputs it will focus on, which are typically that of greatest concern. Secondary to that is a determination of how to assess that output. For instance graduation rate might be important. The assessment of that is the number or percent of students that graduate. It might be important for a district to determine what happens to students after they graduate. Do they go to college? Do they succeed in college? Do they move into the workforce? How does a district develop this data?

Student achievement is one area for which all Illinois school districts have analogous, comparable data. All high school juniors during the period of this study took the ACT as part of the Prairie State Achievement Exam (PSAE). The PSAE was used to determine the number student that met or exceeded state standards. The ACT has a composite score as well as skill set scores in math and reading that can be compared district to district. The use of student achievement scores from the ACT/PSAE allows for direct comparison of equivalent, analogous data between districts.

The education production formula is being used for this study because there is a desire to examine the relationship between inputs and outputs. The majority of the inputs examined are financially related. The outputs are student achievement indicators. The production formula

structures the study to examine the relationships between the inputs and output. If the value of¹⁷ the input is changed what does that do to the output? Does the output increase, decrease, or stay the same. The production formula by no means comprehensively examines all aspects that relate to student achievement. In the case of this study, specific inputs are being looked at to determine if that input has relationship to the output of student achievement. The production formula does not necessarily examine the inter-relationship between inputs and the output of student achievement. For example districts that have higher paid teachers might be related to the fact that the teachers have been in the district for an extended period time therefore being higher on the salary schedule. Is it the higher pay or the fact that the teachers have more experience that has the relationship to student achievement? Also there are some inputs that are not easily quantifiable, but still could have a relationship to student achievement. For example, some districts might provide time for teachers to collaborate. Collaboration can be structured in many ways. It could be two teachers who are team teaching. It could be a department working together on curriculum. It could be a group of teachers in a freshman academy structure developing strategies to enhance the transition into high school. Any of these initiatives on the part of the school district might have a relationship to student achievement. The desire of the district is to improve student achievement, so the hope is that any initiative will enhance student achievement. The problem is quantifying these initiatives. For example, in the case of collaboration, is in the amount of time that is given, or the quality of the actual collaboration that is most important.

Decisions Districts Can Make to Shape Quality of Inputs

A school district's job is to educate students. How that is achieved varies from district to district. Local school boards are able to determine how to use available revenue sources to

provide educational opportunities. The school district determines the amount of money that should go to salaries, supplies, maintenance, support services, and multiple other uses.

For most school districts one of the largest consumers of funds is the cost of staffing. The compensation of the teaching staff is governed by a collectively bargained agreement. Even though the agreement governs the amount teachers get paid, the board still controls who gets hired. For school districts, as with any large organization, the single largest line in their budget is typically any and all lines related to staffing. In a school district, the largest employee category is teachers. Teacher compensation in Illinois is governed by collectively bargained agreements between the faculty association and the school district. While the agreement regulates what employees are paid, the board determines who is hired and can substantially influence district finances as well as staff quality and/or experience depending upon what is prioritized in the hiring process. Teacher salaries are generally determined based upon years of experience and amount of education, but the board can dramatically influence the average salary paid to teachers in the district by what they prioritize when hiring new staff. If they prioritize hiring staff with less experience and/or less educational training, average district salaries will be lower. For instance, if the board is directing administration to hire teachers with minimal experience and minimal schooling, then the average salary cost could be decreased. The district determines what its priorities are.

Along those same lines a district can determine the importance of professional development. It can allocate more money for professional development in the name of improving instructional practice. If the district feels that increasing the level of instructional practice will increase the output of student achievement, more resources will be dedicated to professional development. The local school board also determines instructional supplies

including textbooks, online resources, and technology. If the board believes that increasing the availability of these resources for teachers to use in the classroom will increase student achievement, then the board can allocate more financial resources to these items.

For everything a district can control, there are some variables that a district has no control over. The availability of local resources is out of the control of the school district. The school board can adjust the property tax rate, but the amount of revenue available through property tax is dependent on the Equalized Assessed Valuation (EAV) of the property. A school district that is located in an area of housing growth or an area with a high concentration of industrial property is going to have a higher equalized assessed valuation than a district that is located in an area that is lacking in industrial property or has depressed property values. Additionally rural areas have property values that are based farm property. The value of farm property varies depending on the part of the state the property is located.

There are other variables that a school district does not control. The district, using economic or business parlance does not control its raw product: students. Students are why schools are in business. The demographic make-up of the students is out of the control of the school district. Public school districts are required to accept all students who reside within its boundaries, and provide the services necessary to ensure the student's education, regardless of the characteristics of the student which may affect their ability to learn, such as ethnicity, gender, IEP status, 504 status, English Language Learner classification, and socioeconomic status.

For instance the number of students that come from low socioeconomic status families is outside the control of the district. How those students are assisted, or what inputs are put in place to assist are determined by the school district. For example many schools are part of the

Federal Free Lunch Program. The federal government provides funding to school districts to pay for the lunch of students that are from low socioeconomic status families. In some cases districts can elect to provide breakfast also. The school district can provide programming that is specifically geared to address the deficiencies a child has based on the fact that the child comes from a low socioeconomic status family.

Of all of the demographic variables examined, low socioeconomic status appears to have a strongest relationship to student achievement. According to Reardon (2011) a low socioeconomic status student does not have the same foundation of support from the home that a student from a more affluent home has. A low socioeconomic student's parents might be working several jobs and not have the time to do simple things such as reading a book to a child. That same parent might be deficient in educational background, which would prevent the parent from being able to help the child. Students from these families do not have access to resources that in some houses are considered commonplace. A student might not have a place to study at night. He/she might not have access to the Internet. In order to help the family the child might have to work a job as well as supervise younger siblings. The family might not be able to provide proper nutrition to the children of the house. All of these factors, any single one of which could have detrimental effect on student achievement, seem to all be found in students that come from low socioeconomic status households (Reardon, 2011).

Funding Sources and Impact on Decisions Districts Make

As a school district determines its spending priorities it first has to look at the source of funding. The source of the revenue might have rules attached to it that dictates how it must be used. Other sources of funds might have minimal to no restrictions. School district revenue is

received from one of three primary sources: local, state, and federal. Local revenue for the most part is generated from property taxes. For the purposes of this study the focus will be on funds that come into the district education fund. Those are the funds that are used to purchase supplies and pay instructional and administrative staff salaries. The percentage a district can levy is codified in the school code. Some school districts have passed referendums that allow for a higher tax rate. Some districts are governed under the Property Tax Extension Limitation Law that restrict amount of growth in revenue that a district can receive from property taxes. Once the district receives these local funds, how the funds are used is primarily at the discretion of the school board.

State funds that a district receives are based on a formula. During the period of time this study takes place, the general state aid funding formula was based on setting a foundation level or spending amount on a per pupil basis. The state would examine the ability of a school district to fund itself and would supplement the district so that the funding level could reach the foundation level. If the district had resources that exceeded the foundation level, the state would just give a flat grant to the district. For example if the state set the foundation level at \$6,000 per student and examined a school district and found that that district could generate revenue equivalent to \$5,500 per student, the state would provide aid at \$500 per student (based on average daily attendance) to make up the difference. One issue, which arose, is that even though the state had set a foundation level, there are occurrences of the state not fully funding its promise to the districts. This proration causes districts to have to prioritize how to use funds. The district might have funding priorities that have to be abandoned because the amount of revenue that is supposed to be available is not realized. Once the school district receives the funds from the state it can use the funds in the same manner as local funds.

The state provides other funding that has restricted use. For instance the state, based on the previous funding structure, would provide salary reimbursement for special education teachers. This type of funding is commonly referred to as categorical funding. As the name implies, such funds must be utilized for the specific purpose, and the school district has no authority to spend these funds in any manner other than that specified by the funding source.

The final broad revenue source is federal funds. Federal funding is typically restricted in use. For instance the federal government has provided funding through Title I. Title I is designed to provide extra support in reading and math. The federal government determines a district's allocation based on the number of students that come from low socioeconomic status households. When the district receives the funds these funds can be used for any student that meets the criteria of needing additional reading and math help. A student does not have to be from a low socioeconomic status household to receive Title I services.

So to summarize, a school district receives funds from three primary sources: local, state, and federal. The proportion of the total revenue that comes from each of those sources is dependent on many factors. The district determines the tax rate for property taxes or local revenue but does not control Equalized Assessed Valuation. The amount of money that flows from the state is dependent on the ability of the district to generate local revenue. Federal funds are typically related to at risk factors such as percent of population from low socioeconomic status households. How those funds are used depends on the source of the funds. In some cases the school district has broad discretionary powers to determine use. In other cases the use of the funds is prescribed by the source. Figure 1.1 gives a graphical portrayal of the relationship between funds and how the district determines to use the funds to student outcomes.

Figure 1.1

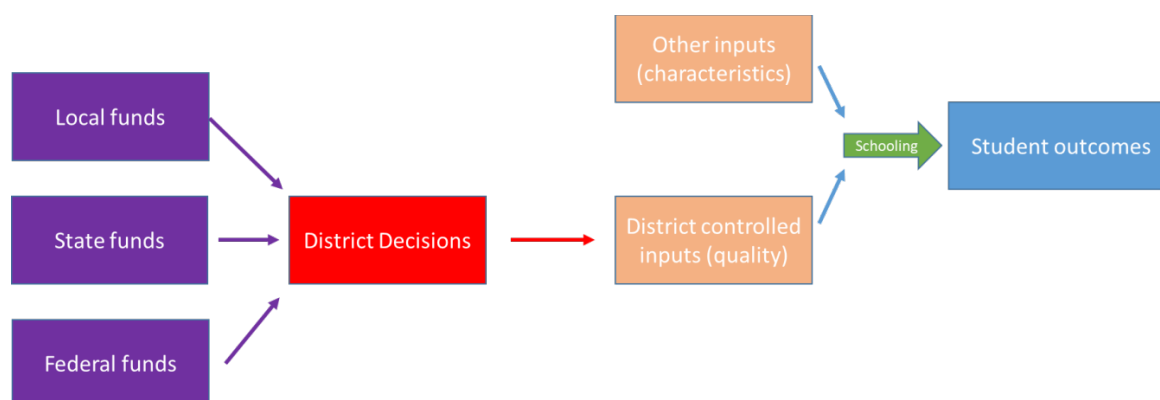


Figure 1.1 provides a flow chart of how funding follows a path to student outcomes or student achievement. A district receives funds from one of the three sources. The proportion of the total revenue that comes from each of these sources is different from one district to another. The district determines how to use the funds. In some cases the usage is predetermined by the source. In other cases the district has full discretion on the use of the funds. Ultimately, district decisions shape the quality of a number of key educational inputs within the district's control. For instance, the district controls how much it wants to spend on staffing. The district controls how much it wants to dedicate in the general category of instructional expenditure. However, there are other inputs at play that are not in the district control. The district does not control the raw product or the student. The district does not control if a student is from a low socioeconomic status family. All of these come together in the schoolhouse. All of the students receive instruction. Student achievement is the product or the output.

So progressing left to right on the figure gives several opportunities to determine the relationship between inputs and outputs. Those relationships will fit one of three categories. Either the relationship will be positive (an increase in the input will relate to an increase to the output), the relationship will be negative (an increase in the input will relate to a decrease in the

output or an decrease in the input will relate to an increase in the output), or the relationship will be null (an increase or decrease in the input will not relate to any in the output). All three of these relationships provide useful information, even a null relationship. For instance it might be advantageous to a school district to know that changing a particular input will not detrimentally affect student achievement outcomes. Referring back to the chart the first area examined is the source of funding. Does the proportion of funding a district receives from each broad funding area have a relationship to the output that is student achievement? The second area on the chart relates to inputs that the district controls; specifically, how to use the funding. The relationship between these inputs and the output of student achievement can be compared to other inputs to determine which input appears to have the strongest relationship to student achievement. As is indicated on the chart, there are other influences such as the proportion of students that come from low socioeconomic status families. Is that a determinant of student achievement? If it is related to student achievement, how strong is the relationship relative to the other inputs?

Conceptual Framework for the Impact of Funding Sources on Student Outcomes

The intent of this study is to use the production formula lens to examine the relationship between various inputs and the output of student achievement. The goal of the study is to determine which inputs show the strongest relationship to student achievement.

Figure 1.1 gives a broad outline of the framework of the study. First, revenue sources will be examined. Specifically the proportion of funding that a district receives from each revenue source will be examined to determine if it is related to student achievement. In looking at revenues sources it is realized that there is some interconnection between the three. Districts in more affluent areas tend to have higher proportions of their funding coming from local

sources; specifically, property taxes. The greater the value of property, the increased revenue that is available to the district. The state funding formula during the time of this study was designed to supplement district revenue so that every district in the state had at least a foundation level of funding available for all students. The greater the local revenue is, the lower the state funding. The lesser the local revenue proportion, the greater the state portion will be. Federal funding typically is related to concentration of low socioeconomic status students in a district. The greater the poverty rate in a district, the greater the amount of federal funding that is provided.

So essentially the use of local and state funding is at the discretion of the local school board while federal funds are to be used specific purposes such as Title I. Examining the proportion of funding from the various sources allows for a philosophical discussion of the appropriate way to fund schools. Local and state funding represents a philosophy of allowing for local control of the use of funds. Federal funding represents a philosophy of directing funding to a need. Is there a relationship between these funding philosophies and student achievement? So for instance federal funding, specifically title I funding is to be used to help enhance math and reading. What is the relationship between federal funding and student achievement? Is this funding philosophy supported by the data? Also by examining the relationship between the proportions of funding from each of the broad sources to student achievement, a baseline statistical relationship can be found. As the various inputs are examined it can be determined if the relationship between each of them and student achievement is stronger statistically than just the proportion of funds coming from the three founding sources. In other words, do the decisions a district makes on how to use the funding have a stronger relationship to student achievement than just the proportion of funds that comes from each funding source? Specific

inputs that can be looked at are the per pupil expenditure rate as well as the average salaries of²⁶ teachers and administrators. There are inputs that the district does not control. Do these inputs have a relationship to student achievement? One of the inputs that districts do not control that will be examined is the proportion of students from low socioeconomic status families.

Statement of the problem

To operate a public school district costs money. However, the amount of money needed to adequately educate students is a number that educators and politicians cannot agree (Broadway, 2016). Educators typically want more funding; legislators in balancing the needs of the whole state are reluctant to give more because of the fear that other state programs might suffer. In the state of Illinois the per-pupil spending can vary by over \$15,000 between the lowest and highest spending districts (ISBE, 2016).

Illinois has tried to make school funding more equitable through the use of state aid. The intent of state funding is to supplement local resources so that all school districts have the same minimum foundation of funding. In some school districts, local resources exceed the foundation level set by the state. In those cases the schools receive a flat grant amount. The intent of the funding system in Illinois is to provide more equitable funding across the state. In reality, because of the wide range in local resources available, the difference in funding available to district varies by a great amount (ISBE, 2016). The zip code of the mailing address of a student is a stronger determinant of available resources than the actual needs of the student (Broadway, 2016).

Recently the state of Illinois enacted school funding reform. The old formula essentially treated all districts the same. It looked at the resources available to the district and then

determined the amount needed to supplement the district so that per pupil funding reached a minimum amount. The new formula looks at the needs of the district in order to determine the amount of funding that the state will provide to the district. The old formula looked at the number of students in a district. The new formula looks not only at the number of students in the district but also the number of students that have at-risk factors such as coming from low socioeconomic status households and students that are considered English Language learners (Figueira et al., 2017). The new formula includes an examination of local resources available to the district. As part of the examination it takes into account issues that some districts have because they are in areas that fall under PTELL (Property Tax Extension Limitation Law) (Figueira et al., 2017). The formula protects all school districts from a reduction by providing mechanisms to prevent districts from receiving less money from the state than they received during the previous year. This will eliminate changes in state funding because of changes in district enrollment (Figueira et al., 2017).

As is detailed in Table 1.1, actual school funding has increased at a rate that is approximately double that of the inflation rate. Overall more funding has been made available to Illinois schools. During that same period time the improvement in student achievement as recorded on the Prairie State Achievement Exam (PSAE) has been minimal. The assumption would be that increases in funding for schools would correlate to improvement in student achievement. On the surface this assumption does not appear to be true. “The accumulated research simply says that there is no clear systematic relationship between resources and student outcomes.” (Schrag, 2003, p. 211) Another assumption would be that more funding available to educate a student as measured by per pupil expenditure would correlate to higher student achievement. Bracey (1997) contradicts Schrag’s (2003) statement. He argues that funding does

indeed matter. His argument is more based on how the funding is used. “Certainly, if spending dropped to zero, achievement would plummet. If spending rose to \$37,000 a year – enough to provide each student with a full time tutor – achievement would soar” (Bracey, 1997, p. 26). The issue then would be to determine what types of funding sources have the greatest impact on student achievement in Illinois.

Although there is a need to determine a more efficient manner in which to fund Illinois schools which is being addressed with the new funding formula that came in place in the fall of 2017, determination of the proper funding mechanism for Illinois schools is outside of the scope of this study. The purpose of this study is to determine the relationship between student achievement and the different funding sources, including what percentage of district funding is received from local, state and federal sources. Additionally it will look at other data such as salaries to see if how a district uses the funds relates to student achievement. Finally, an examination of the relationship between the proportion of students from low socioeconomic status families and student achievement will be performed.

Various statistical analyses will be performed as part of the study. Descriptive statistics, T-tests, correlations, and regression will all be used to determine the relationship between the various financial factors as well as low socioeconomic status and student achievement. The goal will be to determine if any factor has a relationship to student achievement.

School funding is a problem. All stakeholders may never agree upon the correct answer on how a school should be funded. This study proposes to better quantify the problem. Is how a school district is funded the problem as determined by student achievement? Is how a school district determines to use the funding the problem, for example teacher and administrator

salaries, as determined by student achievement? Or is the real problem not so much the funding but rather the demographic make-up of the district population, specifically the proportion of students that come from low socioeconomic status families as measured by student achievement?

Significance/Justification of the Study

There have been studies of student achievement as compared to per pupil funding. There is disagreement in the research as to the nature of the relationship between school funding and student achievement. It is the opinion of some educators, politicians, and tax-payers that the school funding system in Illinois is broken and needs to be fixed (Augenblick & Associates, 2013). Illinois recently passed legislation to revamp school funding and use an Evidence Based Funding Formula. The significance of a study of the funding streams and other variables as it relates to student achievement will allow for an educated conversation on the appropriate means to fund public education. Since Illinois is now using an Evidence Based Funding Formula, this research will allow for an examination of past trends and compare it to the initiatives of the new formula.

This study is unique in that it will examine revenue sources (local, federal, and state) and compare each of those to various student achievement data points. It will also look at how a district determines to use funds and relate that to student achievement data points. Additionally it will look at demographic data such as low socioeconomic status. Many of these variables have been studied on an individual basis without looking at a relationship between them. For instance there is a significant amount of research on the performance of students from low socioeconomic status families. There have been studies on student achievement such as progress on the ACT.

This study will compile all of the statistical analysis in one place so the strength of the relationship between various variables and student achievement can be examined as a collective whole.

Purpose of the Investigation

Using student achievement data, student demographic data, and school finance data from the Illinois State Board of Education School Report Card, this study is designed to determine the relationship among various funding source amounts and how districts determine to use those funds and student achievement. Additional available data points will be studied such as poverty rate and teacher and administrative salary averages. Those data points will also be studied to see if there is a relationship to student achievement. Data from every public school district that has a high school in Illinois will be used. Four years of data will be used.

Research questions

RQ1: What are the means/standard deviations/distributions of student achievement at the district level (math and reading), instructional expenditure (per pupil expenditure), low income students, average teacher salary, average administrator salary, revenue from local property tax, revenue from state sources, and revenue from federal sources?

RQ2: What are the differences in academic achievement based on school district demographics (percentage low socioeconomic, average teacher salary, average administrator salary, percentage of funding from property tax (local sources), percentage of funding from State, percentage of funding from federal sources, and per pupil expenditure by the district)?

RQ3: What are the relationships among the student achievement and funding variables?

RQ4: How are various factors associated with student achievement?

Delimitations of the study

School districts with high schools in the state of Illinois will be used as the subjects of the study. Specifically student achievement as measured by the Prairie State Achievement Exam (PSAE) and the ACT will be compared with various financial variables. Demographic information such as low socioeconomic status will be included in the study. Four years of data will be studied for comparison purposes.

Limitations

The student achievement data will be limited to results on the ACT. Determination if a student has met or exceeded state standards has as one of its elements performance on the ACT. There is not access to other student achievement data points such as the SAT, since all students in Illinois took only the ACT during the period of this study. The SAT was taken on a volunteer basis. Similar studies for other states could be done, but due to the fact the definition of meeting and exceed state standards varies from state to state, it would be difficult to compare those results from state to state. Additionally each state has the option as to which assessment tool it used to determine student achievement. Illinois for several years had all juniors take the ACT. Results on the ACT will be examined as part of the study. Since the ACT is a nationally normed assessment, that data in a limited sense could be used to make conjectures outside of the state of Illinois.

Assumptions

It is assumed that all data that is available from the Illinois State Board of Education is accurate and correct.

Definition of Terms

Funding – the various streams used to fund public schools. The funding streams to be included in this study will be the amount of support supplied by local resources (property tax), state resources (state aid), and federal resources to the individual school districts.

Student Achievement – the level of mastery a student has of predefined objectives.

Adequacy – “the level of funding sufficient for every child to have equal educational opportunities to achieve to state proficiency standards.” (Jacoby & Mangan, 2016, p. 33)

Equity – “ensures fair distribution of local, state and federal funds amongst all school districts, schools and students.” (Jacoby & Mangan, 2016, p. 33)

Horizontal Equity – “resources should be equally available to all students attending school within a state, provided all students have equal needs” (Baker & Green, 2014, p. 232).

Vertical Equity – “...specific students or groups of students have identifiably different educational needs and where meeting those needs requires additional resources” (Baker & Green, 2014, p. 232)

Summary

This study will help develop an image of school funding sources and the relationship to student achievement. The demands on schools are ever increasing. Funding for schools has increased. Is the method by which schools are being funded consistent with the data on student achievement? Can we develop school funding methodology that most effectively uses the

limited resources of the federal, state, and local governments in a manner that maximizes student achievement?

This study can be used to develop the data necessary to answer the very difficult questions associated with school funding, student achievement, and equitable access to a public education. Bringing these questions into a single study will allow the researcher to develop solutions that could be put into place to more efficiently educate the state's youngest citizens. The research that examines the relationship between these important topics specific to the state of Illinois is limited thereby creating a need to conduct this type of study.

CHAPTER 2 – REVIEW OF LITERATURE

Introduction

The review of literature is broken into multiple parts corresponding to various focus areas of research. The first section is a brief review of the constitutional relationship between federal and state governments. The next section reviews school funding litigation. Following is a section that looks at school funding litigation specific to the state of Illinois. Once the discussion of school funding litigation is complete the chapter turns to a review of legislative initiatives related to school funding. Because adequacy and equity is a reoccurring theme in both the judicial and legislative realm, a brief examination of that topic is presented. Next is a section that reviews literature discussing the relationship between school funding and student achievement. Literature as it relates to student achievement is the focus of the final section. This chapter ends with a summary of the literature that has been reviewed.

Legal Relationship between Federal and State Governments

The legal backbone of the United States is the Federal Constitution. The Constitution defines a separation of powers between the three branches of government (legislative, executive, and judicial). It also defines a separation of powers between the federal government and state government. The Federal Constitution does not speak to public education, but by omission determines public education to be a concern of the state. The tenth amendment of the United

States Constitution limits the powers of the government to those powers specifically written into the constitution. Any item not discussed in the constitution “are reserved to the States respectively, or to the people.” (Federal Constitution, Amendment 10, 1791) So historically the larger responsibility to fund public education has fallen to the states. However the federal government through various pieces of legislation such as ESEA (Elementary Secondary Education Act), IDEA (Individuals with Disabilities Education Act), ADA (Americans with Disabilities Act), and NCLB (No Child Left Behind), has attempted to influence education policy (IDEA, 2004; No Child Left Behind Act of 2001, 2001). The federal government is able to work around the constitution because the mandates as specified in the law are tied to the state’s use of federal money. So in the case of No Child Left Behind, if a state and/or school district did not comply with the legislation, it risked losing funding from the federal government. In the case of No Child Left Behind the government not only had mandates such as assessing student progress as well as assessing the progress of subgroups, it also had a punitive element of reduction of federal funding if a school district did not show progress. So even though the constitution by omission left the question of public education to the states, the federal government has been able to mandate changes by controlling funding (No Child Left Behind Act of 2001, 2001).

One of the primary sources of federal funding to schools is through Title funding, specifically Title I funding. Title I funding is used to supplement district resources so that services can be provided to students who need assistance in math and reading. The determination of the amount of funding provided to a district is based on the concentration of low socio economic students. The higher concentration, the more federal funding that is made available to the district. As was discussed in the framework, the amount of federal funding a

district receives is of interest because the district has to use the funds in a specified way. The district has discretion in how to use local and state funding. It does not have this same discretion in the use of federal funding. By looking at the relationship of federal funding to student achievement, it allows for examination of the relationship between funding that is to be used for a specific purpose and student achievement. In the case of federal funding, the Title I funds are focused on enhancing reading and math. Does this method of funding produce better results than the non-discretionary method that is used for local and state funding?

Fundamentally, school districts which are reliant upon federal funding sources for a greater percentage of their annual budget have less flexibility in utilizing those funds. They are bound by the restrictions imposed by the funding source. More affluent districts have a greater percentage of their overall funding available from more flexible state and local funding sources, allowing them to adapt their spending patterns, in theory, to more directly target the needs of their students.

School Funding Litigation

Even though the federal constitution does not directly address the public education question, or more specifically the funding of public education, there still have been instances where plaintiffs have asked the federal court system to try to address funding inequities. The issue of appropriate funding of public school has been litigated in a number of the states. Lundberg conducted a fifty state analysis of state court litigation of school funding. According to her analysis forty-one state Supreme Courts have considered state funding litigation. Of those forty-one cases, seventeen of the courts have found the funding systems being litigated to be

unconstitutional. Twenty-four courts decided there was no constitutional issue in the suits (Lundberg, 2000).

Obhof (2004) reviewed the history of litigation in school funding. He indicated that there have been three different waves of litigation. The first two waves were more concerned with equity. The time span of these two waves dated from the early 1970's to the early 1990's. Both waves considered equity as a primary motive. However; the second wave focused more on adequacy. The third wave of litigation claimed that current funding formulas were failing to provide a constitutional minimal standard. In eleven of the twenty-two "third-wave" cases, the plaintiffs won. In general terms, when the concern that is being litigated is in terms of adequacy as opposed to equity, the courts seem to be more sympathetic. Courts seem to know that determining equity is next to impossible, whereas establishing adequacy is an easier concept to quantify (Obhof, 2004).

DeMoss (2003) in reviewing school funding litigation, found similarities in the cases brought before various state supreme courts, but there seemed to be a lack of consistency in the findings. When education finance scholars study the cases looking for any similarities in case facts, precedent, or constitutional language, there still is no consistency in the findings (DeMoss, 2003). The United States Supreme Court in *Brown vs. Board of Education* apparently set the stage for arguments about funding inequities in public education. *Brown* used the fourteenth amendment as its basis for the overturning the separate but equal standard that had been the law of the land. Litigators trying to get court relief in school funding cases thought that the fourteenth amendment strategy would work in their cases. *San Antonio v. Rodriguez* was one of the first cases to use the fourteenth amendment strategy. The Supreme Court in its decision did

not side with the plaintiffs. It found that “funding inequity was not subject to fourteenth Amendment guidelines” (DeMoss, 2003).

In the early 1990’s Rhode Island had fiscal issues in the state government that caused higher burden to be placed on the property tax. In the *City of Pawtucket v. Sundlun* (1995) a trial court found that the Rhode Island system of funding was unconstitutional. The case was appealed to the Rhode Island Supreme Court. That body determined that the state funding system was indeed constitutional. The court indicated that it is a legislative prerogative to establish the funding system for schools (DeMoss, 2003).

In the state of Washington, two cases helped define how that state’s court system viewed school funding: *Northshore School District No. 417 v. Kinnear* (1974) and *Seattle School District No. 1 v. State* (1978). In *Northshore* the Supreme Court of the state of Washington ultimately declared that the system of funding was constitutional. Washington’s funding system is based on a complex formula that tried to equalize funding. Four years later the *Seattle* case was considered. It should be noted that in that four year span of time that five of the nine sitting Supreme Court Justices had been voted out. In *Seattle* the court overturned its ruling in the *Northshore* case. This time the Supreme Court found that the funding system was unconstitutional. During those four years between the cases, the funding system did not change substantially – the primary difference was the change in sitting justices (DeMoss, 2003).

In many rural areas of the United States, schools suffer from a lack of adequate funding. Dayton (2004) reviewed rural school funding cases starting with *Serrano v. Priest*. In *Serrano*, the California Supreme Court found that California’s school funding system violated the equal protection tenets of the California constitution. Following the *Serrano* decision there was an

increase in litigation that challenged the funding of schools. One case of note was San Antonio Independent School District et al. v. Rodriguez et al. The Rodriguez case originated in the Texas court system but was ultimately decided by the United States Supreme Court. The case challenged the public school funding system in Texas claiming that the system discriminated against a specific class of students.

The plaintiffs in Rodriguez compared two school districts in San Antonio. Edgewood Independent School District was in a primarily residential area of town (not much industrial property) and was populated by people of Mexican-American descent. The average assessed property value per student was \$5,960. The median family income was \$4,686. Edgewood spent approximately \$356 per student. Alamo Heights was the most affluent school district in San Antonio. The student population was predominately Anglo. The assessed property value per student was greater than \$49,000 with a median family income of just over \$8,000. Alamo Heights spent approximately \$594 per student (San Antonio Independent School District et al. v. Rodriguez et al., 1973).

The plaintiff's argument was that the state's funding system was not equitable. A student's place of residency was the greatest determining factor as to the quality of their education. The plaintiff's argument was that the student's constitutional rights of equal protection under the law were being violated by the Texas school funding system (San Antonio Independent School District et al. v. Rodriguez et al., 1973).

While the United States District Court for the Western District of Texas found for the plaintiffs, the United State Supreme Court subsequently reversed the lower court decision – essentially negating all Fourteenth Amendment claims in school funding litigation (San Antonio

Independent School District et al. v. Rodriguez et al., 1973). The Supreme Court indicated that if it could be proven that the poorest people always live in the poorest districts (as defined by expenditures), and then an argument of discrimination based on a person being poor could be made. The court indicated that there is no substantial evidence that the state, within its funding system, was specifically trying to discriminate against a person based on a person's wealth (San Antonio Independent School District et al. v. Rodriguez et al., 1973). It should be noted that the court in its reversal did express an opinion that the State of Texas relied too heavily on the property tax to fund public education (Dayton, 2004).

In Pennsylvania there is a wide gap between the haves and have-nots. One school district spent almost \$15,000 more per student than the lowest spending district (Martin, 2006). While there has been litigation in Pennsylvania challenging the funding structure the Pennsylvania judiciary "does not believe it is obligated to ensure that the state funding system passes constitutional muster" (Martin, 2006, p. 818). Martin (2006) reviewed a number of cases from the state of Pennsylvania. There were litigants who challenged the "hold harmless" and the artificial floor, artificial ceiling" provision that the legislature enacted to stabilize state subsidies (Martin, 2006). In all cases the Pennsylvania judiciary was reluctant to interfere with the legislative process in regards to school funding. Martin (2006, p. 822) notes that there are only two other states that the court majorities "have explicitly declared education finance cases non-justiciable."

In *DeRolph v. State*, the Ohio Supreme Court found that the state funding system was unconstitutional based on the State Constitution (*DeRolph v. State*, 2002). In O'Neil's (1999) review of the *DeRolph* case, it is noted that the challenge which was raised was if the state's financing system violates the equal protection clause of the Ohio Constitution. The court

reviewed a vast amount of data as presented by the plaintiffs that quantified the lack of funding to the school districts in question (O'Neil, 1999). The Supreme Court of Ohio in DeRolph essentially ordered the legislature to reform public school funding so that enough funding is provided “to ensure an adequate educational program statewide” (O'Neil, 1999, p. 927).

In Connecticut there have been two significant court cases that have shaped public school funding. *Horton v. Meskill* litigated the differences in funding between rich and poor schools in Connecticut. *Sheff v. O'Neill* challenged the racial and economic segregation clause by Connecticut's school districting (Enrich, 2003). *Horton* focused on the Connecticut Constitution's equal protection provision. The Connecticut Supreme Court found in favor of the plaintiffs and stated that the “school funding system violated the state constitution” (Enrich, 2003, p. 535). *Sheff v. O'Neill* moved away from the funding equity or adequacy and concentrated on the de facto segregation that was present in the Hartford schools. The state Supreme Court found in favor of the plaintiffs (Enrich, 2003).

School Funding Litigation Specific to Illinois

Since this study intends to focus on funding and student achievement relationship in Illinois, the next logical step in research is to look at litigation that is specific to Illinois. In general terms, what was found was that the Illinois courts find that the funding issue is a legislative issue. The Illinois courts have been reluctant to make a ruling to force the legislature to make changes.

With the lack of direction by the federal constitution, states such as Illinois addressed the public education question within its constitution. Specifically the Illinois constitution places the

responsibility of funding schools primarily with the state. The legislature's historic response to the constitution was to develop a funding formula that combines property tax receipts with the state funding. The formula was based on funding each school on a minimum per pupil expenditure amount. In general terms the state makes up any money not raised by property taxes so that the per pupil amount does not fall below a set level. The formula in its design places a heavy dependence on the property tax (105 ILCS 5/18-8.05). There are also many inequities due to the formula. The funding situation in Illinois has been the subject of many articles. People for the American Way commissioned three reports that specifically looked at Illinois funding issues ("Inequity in Illinois: How Illogical School Funding Has Eroded Public Education. Special Report," 2004; Keenan, 2003; Mincberg, 2002). In one article the inequitable funding mechanism was studied at length. It was found that there was a significant difference in funding between urban and rural school districts ("Inequity in Illinois: How Illogical School Funding Has Eroded Public Education. Special Report," 2004). The suggestion was made that the state needed to overhaul its funding mechanism and reduce the dependency on the property tax. Both Keenan (2003) and Mincberg (2002) studied the Illinois Tuition Tax Credit which was enacted as a means to help middle class families with the cost of education for children. In reality Keenan (2003) found that families had to have an income greater than \$80,000 in order to use the credit. Mincberg (2002) studied the mechanism further and found that a family would have to have at least \$2,250 in actual educational expenses in order to achieve the maximum credit.

Additionally, there have been a few legal challenges to Illinois' funding mechanism. In Illinois the basis of most arguments has been the language in the Illinois constitution that says the primary responsibility for public education falls on the state (Illinois Const., Art. X). Illinois's funding structure is very dependent on the property tax ("School Report Card for

Ottawa Township High School," 2005). The amount a particular district spends for the education of its students depends on its ability to levy property taxes. If a district is in an affluent area, it is better able to levy adequate property taxes to finance the school's operation. In 2004 a report was released ranking Illinois in fiftieth place of all states in the funding difference per student between the state's highest and lowest poverty districts. ("Inequity in Illinois: How Illogical School Funding Has Eroded Public Education. Special Report," 2004). Litigation has been brought against the state arguing that the system of funding in Illinois is not fair and equitable.

In 1996 the Illinois Supreme Court ruled in the *Committee of Educational Rights v. Jim Edgar*. The plaintiffs in the case consisted of a number of public school districts, parents and students. The argument brought was that the current funding system in the State of Illinois was unconstitutional based on the language in the Illinois Constitution. The plaintiffs argued that the funding system lead to vast differences in available resources due to the difference in property values throughout the state. The plaintiffs pointed out that the ratio of average tax bases in the wealthiest and poorest unit school districts was seven to one. The plaintiffs also argued that the difference in available funding had led to disparities in educational quality (*Committee for Educational Rights v. Edgar*, 1996).

The Illinois Supreme Court found for the defendants – the state of Illinois. In its decision the court referenced the deliberations from the 1970 Illinois Constitutional Convention to address the plaintiff's argument that the tenth amendment was being violated by the current funding system. In those deliberations the court quotes: "Delegate Netsch explained that the purpose of the amendment was "to put the Convention on record" that the State should bear greater responsibility for school funding..." The court further references Netsch when Netsch explained

that the language added in the tenth amendment was “not a legally obligatory command to the state legislature” (Committee for Educational Rights v. Edgar, 1996, p. 19). The court is of the opinion that even though the constitution says the primary responsibility of public education falls on the state, it should be interpreted as a “goal or objective” not a command (Committee for Educational Rights v. Edgar, 1996, p. 19).

The court further stated that there was a difference between educational equality and efficiency. In the opinion of the court, the framers of the constitution chose to address the issue of unequal educational funding and opportunity with a “purely hortatory statement of principal.” The court further stated that in interpreting the Constitution, it would be wrong of the court to interpret the efficiency requirement as a guarantee of equality (Committee for Educational Rights v. Edgar, 1996, pp. 19-20). “Whether more money would make any difference in schooling was the court’s first order of business as it parsed plaintiffs’ arguments. Justices deemed there was no basis for the claim that money provided better educational opportunities...”(DeMoss, 2003).

The court appeared to contradict itself when it made the statement that any statement and/or report made by the constitutional delegates should not be considered as part of the constitution. The court found such reports useful for interpreting ambiguous parts of the constitution. It further stated: “It would be improper for this court to transform statements made during the constitutional convention in constitutional requirements where such statements are not reflected in the language of the constitution (Committee for Educational Rights v. Edgar, 1996, p. 20).” It appears that the court indeed used the comments of the delegates to decide that the language of the Constitution in the tenth amendment was more of a recommendation than a requirement, in direct contradiction to its statement in opposition to using such commentary.

In its concluding remarks the court state: “In closing, it bears emphasis that our decision in no way represents an endorsement of the present system of financing public schools in Illinois, nor do we mean to discourage plaintiffs’ effort to reform the system. However, for the reasons explained above, the process of reform must be undertaken in a legislative forum rather than in the courts.” (Committee for Educational Rights v. Edgar, 1996, p. 40) The Supreme Court of Illinois, in its decision, stated its reluctance to involve itself in the issue that it feels best solved in the legislative forum.

In *Lewis v. Spagnolo*, the Supreme Court of Illinois affirmed its decision in *Committee for Educational Rights v. Edgar* (*Lewis E v. Spagnolo*, 1999). In *Lewis v. Spagnolo*, a group of students from East St. Louis school district (students were represented by their parents) argued that the school that they attended was mismanaged, unsafe, poorly maintained, and provided inadequate educational services (*Lewis E v. Spagnolo*, 1999). Therefore the plaintiffs felt that their constitutional rights had been infringed. The Supreme Court, again, was reluctant to intervene in what it considered to be a legislative matter, and found for the defendants. The defendants claimed that in the *Committee for Educational Rights v. Edgar* decision that the court had interpreted the constitution to say that the funding of public education is a legislative issue not a judicial issue. The court stated that it was unable to constitutionally define high quality in the context as it was stated in the constitution. It felt that high quality was better defined by the legislature (*Lewis E v. Spagnolo*, 1999).

Chief Justice Freeman, in a dissenting opinion, indicated that he was bothered by the fact the court is reluctant to interfere in what it considers as a legislative problem. He felt that the court failed in its obligation to interpret the constitution. “I view the plaintiffs as simply asking the judicial department of state government to do its job and interpret the Illinois Constitution.”

(Lewis E v. Spagnolo, 1999, p. 236) Based on that dissenting view, it was obvious that some in the court felt that the Supreme Court needed to become more involved in public school issues as they relate to the Illinois Constitution.

Legislative Initiatives Related to School Funding

The first step to changing school funding is in the legislative realm. Verstegen and Jordan (2009) examined the funding policies of all fifty states. The authors were surveying the funding systems for each state looking for similarities and differences. They found that states funded schools in one of four traditional manners: foundation program, district power equalization systems, full-state funding, and flat grants (Verstegen & Jordan, 2009). The authors found that the majority of the states (forty) used a foundation program to fund schools (Verstegen & Jordan, 2009). In general terms the foundation program was based on the state providing funding to schools so that every school was receiving a set foundation level. The foundation level was the amount of money the state believed was sufficient for teaching students to state standards (Verstegen & Jordan, 2009). The amount that each school received was dependent on the local resources that were available to the school. Determination of the appropriate foundation level varied from state to state. “For example, Connecticut supports a per-pupil foundation level of \$5,891, while Michigan pays \$7,108; Massachusetts, an average of \$8,425 per student; New Jersey, \$7,913; Nevada, \$5,122; and New Mexico, \$3,446” (Verstegen & Jordan, 2009).

Jordan and Verstegen (2009) also examined how states determined special education needs of school districts. The funding mechanisms varied from applying a weight per pupil (twenty states), cost reimbursement (ten states), instructional unit (6 states), census (5 states),

and other grants (17 states) (Verstegen & Jordan, 2009). As with foundation grants there was not a preferred method of funding to address the additional costs associated with special education.

Some states provided additional funding to address costs associated with providing services for student from low income households. Verstegen and Jordan (2009) found that thirty-four states had systems in place to provide funding to support low-income students. The amount of additional support varied from state to state. Minnesota was on the high end, doubling the per pupil funding for students from low socioeconomic families. On the other end of the spectrum was Mississippi which added five percent per student (Verstegen & Jordan, 2009). Overall, the method of funding schools, be it general funding or specific concerns such as special education or low-socioeconomic students, was inconsistent from state to state.

Baker and Duncombe (2004) in examining school aid formulas found that states had a difficult time balancing the needs of students and the needs of school districts. The authors found that states make changes in school aid formulas based on politics. The states were slow in considering the various student need factors. Sometimes the student need factors such as low socioeconomic status could cause the per pupil cost to educate to double. So a district that had a high percentage of students that had need factors such as low socioeconomic status or limited English proficiency needed more funding than was provided in a traditional funding system (Baker & Duncombe, 2004). The author suggests that states when developing the methodology for funding school needed to consider multiple variables (Baker & Duncombe, 2004).

Legislative initiatives have occurred in Illinois also. The long standing funding formula in Illinois had not been deemed unconstitutional by the courts. That particular formula

determined the amount of funding the state would provide to the districts based on the amount of funding available to the districts from local sources. The more local resources available, the fewer funds the state would provide. The state would set a foundation level that each district should be spending on each student. In the simplest terms, if a district did not have enough in local resources to cover that cost, the state in theory would make up the difference. The formula put a heavy dependence on property tax. In order to address concerns by property owners who have to pay high property taxes the legislature in the state of Illinois passed the Property Tax Extension Limitation Law (PTELL) as well as the Senior Citizen Assessment Freeze Homestead Exemption Act. These two laws limited the ability of the taxing bodies such as school districts to assess property taxes on the full property value of properties (35 ILCS 200/18-185).

Additionally the legislature has placed school districts at odds with municipalities. One specific legislative effort to cause this conflict was Tax Increment Financing (TIF) (Benson, 2005, 2006). Benson in her doctoral dissertation and subsequent journal article showed the negative impact of TIF districts on various school districts in LaSalle County, Illinois. In the case of TIF districts, as described by Benson, the concept was a way to enhance the economy of the community. What was not as obvious was the negative impact of the TIF to the respective taxing bodies, namely the school districts (Benson, 2005, 2006). Essentially a municipality can create a TIF district. The amount that taxing bodies can assess against properties in the TIF is based on the assessment of property before the creation of the TIF. Any property value enhancement that occurs to the TIF cannot be taxed by the taxing bodies. Instead those potential funds can be used by the municipality for infrastructure enhancements to the TIF district.

The funding situation in Illinois has been well documented. Park (2004) reviewed the finding as published by *Education Week* and gave a complete picture of the funding structure in

the state of Illinois. The end result is that Illinois ranks near the bottom of all states in terms of adequate state funding for education.

The funding situation in Illinois is exacerbated by the number of federal and state level unfunded or underfunded mandates. Since 1985 the state of Illinois has initiated a number of school reform measures. Vogel (2004) reviewed one mandate in particular: standards aligned classroom (SAC) initiative. The program was adequately funded at its inception, but with the advent of No Child Left Behind, funding intended for SAC disappeared to help fund NCLB initiatives. Vogel (2004) gives the opinion that the federal government is supporting accountability systems that do not encourage school reform.

Most recently the Illinois legislature passed funding reform for Illinois schools. The funding reform used an Evidence Based Model (EBM) that has as essential elements and goals: individual student needs, differences in local resources, closing funding gaps, providing a stable and sustainable system, and to ensure that no school district loses state funding (Figueira et al., 2017). In the past the funding formula that was used set a foundation level. That foundation level was used for all school districts. The new funding system has a mechanism in place that individualizes the needs of the district. The new formula has four major components. The first component determines a unique adequacy target. The second component determines a districts local capacity. The third component determines the percentage of adequacy, which is the percentage of the adequacy target that a district is able to fund from its current revenue sources. The final component of the new formula is an updated distribution method which calls for all new dollars to be pushed to districts with the most need (Figueira et al., 2017).

Calculating an adequacy target for each school district is a departure from the old method of setting a foundation level that was used for each school district in Illinois. The concept of the adequacy target is to determine what it costs to provide an evidence based education. To determine those costs, the cost of staffing based on the area that district is located is taken into account. The student demographics of a district such as number of low socioeconomic status students that are present, number of students that receive IEP services, and number of students that are considered English Language Learners (Figueira et al., 2017).

Calculating the percentage of adequacy is not near as complex as determining the adequacy target. In simplest terms the adequacy target will be set for a district. Next the amounts of resources that are currently available to the district are examined to see if they are sufficient to fund the target. The state will attempt to make up the difference through state funding (Figueira et al., 2017).

A key component to determining the percentage of adequacy is the amount of local resources available to the school district. Local resources vary greatly from one district to another. In the past the formula would look more at the capacity of a district to use local resources to fund the school. In other words the formula did not take in account the amount of money that actually came in from the taxes, but rather the amount of money the district had the potential of bringing in. “The new formula calculates local funding based on both an ideal for each district’s local contributions, called the Local Capacity Target (LCT), and the actual amount each district currently collects in local tax revenues (Real Receipts) (Figueira et al., 2017).

The final component of the new funding formula is the distribution method. With the old formula, the state would set a foundation level and then would determine the amount each

district should get. For a number of years the state determined it did not have the funding available to fully fund districts at this level. The state would pro-rate funding and would apply that pro-ration to all school districts. Districts that were more dependent on state funding were harder hit than districts that had a higher dependence on local resources. The new formula takes in account the history of the state to not fund schools adequately. As part of the formula it divides schools into four tiers. A tier one school district is considered the least well-funded. Tier one districts are to receive fifty percent of all new state dollars. Tier two districts are all districts that have an adequacy level below ninety percent (this tier will include tier 1 districts). Tier two districts are to receive forty-nine percent of new state dollars. Since a Tier One district is included with Tier two districts, Tier One districts will get fifty percent of funding plus a portion of the 49 percent of the funding that is allocated to Tier Two districts. Tier three districts are those districts that have adequacy level between 90 and 100 percent. Tier three districts are to receive 0.9 percent of new state dollars. Tier four districts are districts with adequacy level above 100 percent. These districts are to receive 0.1 percent of new state dollars (Figueira et al., 2017).

Adequacy and Equity

Adequacy and equity are topics that seem to be related to school finance. Adequacy and equity are part of the recent changes in the Illinois funding formula (Figueira et al., 2017). Baker and Duncombe (2004) discussed the need to look at student need factors in determining adequate funding. Baker and Green (2014) discussed the concept of adequacy further with a review of vertical and horizontal equity. Horizontal equity is defined as equal treatment of equals and vertical adequacy is defined as unequal treatment of un-equals (Baker & Green, 2014). Horizontal equity essentially means that resources should equally be available to all students

whereas vertical equity relates back to the idea of student need factors. Vertical equity looks at the needs of individual students and understands that additional resources need to be brought to to address those needs (Baker & Green, 2014). The authors questioned the use of state standardized tests scores as a means to determine student achievement. Standardized scores were being used in litigation to show that funding was not adequate across a state. “Less attention has been paid to longer term outcomes such as college attendance and completion, future earnings, or harder-to-measure quality of life outcomes...” (Baker & Green, 2014, p. 236).

Fernandez and Rogerson (2001) examined the output of public school expenditures. The authors wondered what kind of relationships there were between per-student education expenditures and the personal income that a student is able to earn. “Our results imply that over this period, per-student educational expenditures tended to grow at the same rate as personal income per student” (Fernandez & Rogerson, 2001, p. 581). The results of this study suggested an investment / return relationship with school funding. The more funding that was made available for the instruction of a student appears to indicate that a student will have higher earning potential.

Relationships between School Funding and Student Achievement

Why look at the relationship between funding and student achievement? There have been legislative initiatives and judicial rulings that have tried to address both equitable and adequate funding of schools. How do you quantify adequacy? Downes and Stiefel (2015) define adequate funding as a minimum threshold of resources that provides students the opportunity to reach a minimum threshold of state standards. What are the state standards? Downs and Stiefel (2015) make the point that because state standards in most states were determined by the

legislature, there was some question about what really is adequate. This question has been the grounds for judicial review.

So as adequate financing is examined, there is an increased focus on the relationship between financing and achievement scores. Nyham and Alkadry (1999) examined the means by which a district had to use its funding and the effect on student achievement. The authors looked at class size and the results were mixed. Elementary and middle school were not statistically significant. There was a significant relationship at the high school level. The authors looked at per student expenditures and again found mixed results depending on level. At elementary and high school levels there was not a statistically significant relationship. There was a significant relationship at the middle school level. The authors examined the relationship with poverty. “This study consistently reinforces the previous findings that poverty is a primary determinant of student achievement scores” (Nyhan & Alkadry, 1999, p. 224). The authors found that all levels (elementary, middle, and high) there was an inverse relationship between student achievement and poverty levels (Nyhan & Alkadry, 1999).

Verstegen and King (1998) reviewed the literature that compared student achievement and school spending. It was found that the literature contradicts itself. Hanushek referencing the Coleman report indicates that inputs (such as financing) do not matter and are not the answer to educational problems. The authors cite the work of Card and Krueger that argue that test scores are not a good means to judge student achievement, but rather looking at the earnings of a student after school and comparing that to the expenditure of resources is a better means of judging student achievement (Verstegen & King, 1998). The authors in looking at Card and Kreuger’s work found that it is critical for students to have equal education opportunities and

resources. Those resources make a difference in a student's life opportunities (Verstegen & King, 1998).

Verstegen and King (1998) examined the finding on the relationship of teacher characteristics and student outcomes. One of the variables studied was salary. In 17 of 19 studies reviewed it was found that teacher salary had a significant statistical relationship to student outcomes (Verstegen & King, 1998). Childs and Skakeshaft (1986) in an early work found some of the same results. They found that the relationship between student achievement and educational expenditures is minimal but that there is a relationship between teacher salary and student achievement (Childs & Skakeshaft, 1986).

Sharp (1993) studied the relationship between student achievement and school funding. Specifically he looked at the student performance level on state assessments as compared to the per pupil expenditure. He studied grades three, six, eight, and eleven. Per pupil expenditures ranged from a low of \$4,424 to a high of \$14,316. "Results showed a small, but statistically significant, negative correlation between spending and achievement in every subject in every grade level, with the exception of the eleventh grade, where there was no significant correlation between the variables." (Sharp, 1993)

Jungeman (Jungmann, MacGregor, & Crader, 2004) conducted a study in Missouri that studied the relationship between various funding indicators and student achievement. The author found three variables that indicated correlation to student achievement: the number of students on free/reduced lunch program, districts that have a heavier reliance on state funding than local funding, and the amount teachers and administrators are paid (Jungmann et al., 2004). What Jungeman specifically found was that a district with a large percentage of students on

free/reduced lunch program had a negative correlation with student achievement.

Additionally, if schools had a heavier reliance on state funding, there was a negative correlation to student achievement. Finally, there was a correlation found between amount paid to teachers and student achievement as well as the amount paid to administrators and student achievement (Jungmann et al., 2004).

Research and Data Related to Student Achievement

Student achievement can be quantified in numerous ways. For the United States there is one assessment that gives an overall picture of student achievement and that is the National Assessment of Education Progress or NAEP. “Since the 1970’s, the National Assessment of Educational Progress (NAEP) has monitored the academic performance of 9-, 13-, and 17-year-old students with what have become known as the long-term trend assessments. Four decades of results offer an extended view of student achievement in reading and mathematics.” (“NAEP 2012 Trends in Academic Progress Reading 1971-2012 Mathematics 1973-2012,” 2013)

In looking at the trends for reading, the performance levels are subdivided in three areas at age 17, level 250 or above, level 300 or above, or level 350. Level 250 is defined as Interrelate Ideas and Make Generalizations. Level 300 is defined as Understand Complicated Information. Level 350 is defined as Learn from Specialized Reading Materials. From 1971 to 2012, Level 250 or above varied from 79 to 86 percent. It started at 79 percent in 1971 and ended at 82 percent on 2012. The high mark of 86 was achieved in 1988. Level 300 or above varied from 58 to 66 percent with a high of 66 percent in 2012. Level 350 varied from five to seven percent with many instances of each throughout the period of the study. In looking at the trends for mathematics, there are also three levels considered at age 17: level 250 or above, level

300 or above, and level 350. Level 250 or above varied from 92 to 97 percent. It started at 92⁵⁶ percent in 1978 and ended at 96 percent. It had a maximum of 97 percent over a span from 1992 to 2004. Level 300 or above varied from 49 percent to 61 percent. It had a low of 40 percent in 1982 and high of 61 percent in 1999. The level 350 varied from 5 to 8 percent. It has a low of five percent in 1982 and a high of eight percent in 1999 ("NAEP 2012 Trends in Academic Progress Reading 1971-2012 Mathematics 1973-2012," 2013).

NAEP provides subgroup data analysis. In the reading subject area there was not a large change in performance from 1971 to 2012 when looking at all students. The white subgroup increased by four percent. The African-American subgroup increased by thirty percent. The Hispanic subgroup increased by 21 percent. The male subgroup increased by four percent, with no appreciable change in the female subgroup. The score gap between white and black narrowed as well as for white and Hispanic. The score gap between female and male was negligible ("NAEP 2012 Trends in Academic Progress Reading 1971-2012 Mathematics 1973-2012," 2013).

On the mathematics assessment, there was not any significant change from 1973 to 2012 for the entire group. The white subgroup increased by four percent. The African-American subgroup increased by eighteen percent. The Hispanic subgroup increased by seventeen percent. The male subgroup showed no significant change. The female subgroup increased by three percent. The score gap between white and black, white and Hispanic, and male and female all narrowed ("NAEP 2012 Trends in Academic Progress Reading 1971-2012 Mathematics 1973-2012," 2013). Did more intentional funding of programs for minority students contribute to these improvements in student achievement? The research is not clear.

In general terms the growth of seventeen year olds in student achievement was not significant from 1971 to 2012. In reviewing the statistical studies as provided by the National Center for Educational Statistics, there was not a sub group break down for students in the low socioeconomic area. There also was not any breakdown based on the financial resources available to the school ("NAEP 2012 Trends in Academic Progress Reading 1971-2012 Mathematics 1973-2012," 2013).

The state of Illinois has been using the ACT as part of the Prairie State Achievement Exam (PSAE) for over ten years. The ACT is a curriculum- and standards based educational and career planning tool that assesses students' academic readiness for college (ACT, 2016). It is a national test allowing for comparisons across state lines. It can be used as a benchmark to assess growth in student achievement as it relates to college readiness. ACT produced an ACT profile Report for the State of Illinois that examined data from 2008 to 2012 ("ACT Profile Report - State. Graduating Class 2012 - Illinois"). Table 2.1 shows the percentage of students meeting college readiness benchmarks from 2008 to 2012.

Table 2.1

Percentage of Students Meeting College Readiness Benchmarks (State of Illinois)

	English	Mathematics	Reading	Science
2008	66	40	47	27
2009	66	40	48	27
2010	64	40	48	27
2011	65	42	48	28
2012	65	44	47	30

Table 2.2

Average Composite Score by Race/Ethnicity (State of Illinois)

	2008	2009	2010	2011	2012
Black / African American	16.8	16.8	16.7	17.0	17.1
American Indian / Alaska Native	19.8	20.0	20.1	19.4	18.6
White	22.0	22.4	22.4	22.6	22.7
Hispanic/Latino	18.0	18.2	18.0	18.3	18.5
Asian	23.3	23.7	23.8	24.1	24.2
Native Hawaiian / Other Pacific Islander	No Data	No Data	No Data	21.2	21.0
Two or more races	20.4	20.7	20.6	20.7	21.4

("ACT Profile Report - State. Graduating Class 2012 - Illinois")

In reviewing the assessment data from both ACT and NAEP it appears that there has not been a significant overall increase in student performance. The ACT assessment is designed to

determine college readiness. There appears not to be any significant change in the percentage of students that meet the college readiness benchmark. There has been some improvement on both the NAEP and ACT in the various subgroups. It should be noted the racial demographics in the United States have been changing in the past two decades as is indicated in the NAEP data ("ACT Profile Report - State. Graduating Class 2012 - Illinois" ; "NAEP 2012 Trends in Academic Progress Reading 1971-2012 Mathematics 1973-2012," 2013). So when comparing table 2.2 and 1.1, student achievement remained relatively flat while financial resources increased.

Peter Schrag (2003) in chapter four of his book "Final Test" examined the research of Eric Hanushek. Hanushek examined the relationship between student achievement and the increase in school funding. He found that the increase in funding did not necessarily equate to an increase in student achievement. "The core of Hanushek's argument based on some thirty years of research, is that a generation of sharply increasing spending on schools, much of it for increased teacher salaries and reduced class sizes (plus a substantial chunk for special education), has produced little if any measurable increases in student achievement" (Schrag, 2003, p. 207).

Gerald Bracey (1997) questions Hanushek's research. Bracey claim that "Hanushek's own data contradict Hanushek's conclusion that no strong relationship links money and achievement" (Bracey, 1997, p. 21). Bracey claims that "Well-conducted, honest studies have found that, indeed money is related to achievement" (Bracey, 1997, p. 21). So even within the research there is disagreement about the relationship between student achievement and school funding.

Much of the literature about student achievement and school funding references the work of Eric Hanushek. In completing the literary review on this subject, it made sense to review a number of his articles. Hanushek (1986) reviewed many studies looking for consistent findings. In 112 studies that examined the relationship of teacher / pupil ratio, twenty-three studies either found positive or negative statistical significance. As for the level of teacher education, of 106 studies eleven found positive or negative statistical significance. One hundred and nine studies examined teacher experience. Forty of those found a positive or negative statistical significance. Of those forty, thirty-three were found to have a positive statistical significance. Teacher salary was found to be positive or negatively significant in ten out of sixty studies. Nine of those ten were positive. There were sixty-five studies that examined pupil expenditures. Of those sixteen found positive or negative statistical significance with thirteen of those sixteen being positive (Hanushek, 1986).

Hanushek (1979) in an older work discussed the entrance of economists into the research on student achievement as it related to school funding. School funding had been thought of as an input and student achievement as an output. The analysis was referred to as input-output analyses. Economists introduced new terminology referred to as educational production functions. The production function is based on economics. "...a firm's production possibilities are assumed to be governed by certain technical relationships, and the production function simply describes the maximum output feasible with different sets of inputs" (Hanushek, 1979, p. 353). Hanushek (1979) explains that the production function as used in education is being expanded from just answering questions to being the basis of argument in both the legislative and judicial realm.

Hanushek (2003) discusses issues with an input based funding system. He feels there has been a focus on adjusting inputs such as school funding. That focus has not lead to improvement in student achievement. The author claims that government policy that provides additional resources to schools is an ineffective way to improve quality (Hanushek, 2003). He says that there is not much evidence that student outcomes have grown with additional resources (Hanushek, 2003). He argues that differences in families are important for student achievement. He cites family situations such as single parent families as well as child poverty rate as significant factors (Hanushek, 2003).

Hanushek discusses poverty rate as a significant factor. Reardon (2011) expounds on this factor and discusses that the achievement gap between high and low-income families has expanded. Reardon (2011) indicates that the achievement gap has shown steady growth for fifty years. Why has this achievement gap increased? Reardon (2011) list four possible explanations. One is that income inequality has grown during the last forty years. The second factor is high-income families tend to make higher investments in time and resources towards their children's cognitive development. Third is that high-income families have greater socioeconomic and social resources that they can use to benefit their children. The final explanation is that increased segregation of income amongst families is a contributor to greater differentiation in quality of schools as well as schooling opportunities between students that come from affluent families and those that do not (Reardon, 2011).

Summary

The review of literature on the topics of achievement/assessment and school finance finds some research that claims there is a relationship and some research claims there is not. School

funding is discussed extensively. It has been the subject of judicial review. For most states the question of school funding appears to revolve around adequacy more than equality. The definition of adequacy is part of the issue. The definition of adequacy differs from community to community. The question of what is adequate funding has been asked of the judicial branch, but more times than not that question has been referred back to the legislative branch. Student achievement is quantified through student assessment. In looking at NAEP and ACT, there has not been significant growth in student achievement as measured by those assessments over a twenty year period.

Two studies in particular were reviewed that looked at the relationship between student achievement and the funding of schools. In the Sharp (1993) study there was no correlation between per pupil funding and student achievement at the high school level. In the Jungeman (Jungmann et al., 2004) study there was a correlation found between teacher and administrator pay and the achievement of students. In reviewing both studies it appears that any correlation that exists is between school funding and achievement is minimal. Schrag (2003) and Hanushek (1979, 1986, 2003; 2009) appear to support this conjecture. Bracey (1997) disagrees and says that there is a relationship between student achievement and school funding.

The federal government through No Child Left Behind and Race to the Top has pushed the states to improve student achievement. NCLB had a goal of 100 percent of all students achieving at prescribed levels by the year 2014 (No Child Left Behind Act of 2001, 2001). Based on the review of available literature there is some doubt if increasing financial resources available to a school district is the solution. There needs to be more research on the relationship between school funding and student achievement. The goal is to improve student achievement. Is the solution to improve funding? The goal of this study will be to quantitatively review the

various funding streams that are used to fund schools and the achievement level of the students of that school. Additionally the study will look at how a district determines to allocate those funds. The study will determine if there is a statistically relevant correlation between the variables.

CHAPTER 3: RESEARCH METHODOLOGY

Introduction

The intent of this chapter is to develop the design and methodology of the research that is to be conducted. The primary purpose of this study is to examine various relationships between inputs that include funding variables and outputs that include student achievement variables. This chapter is broken into multiple sections including: problem and purpose overview, research questions, design, population and sample, data collection and instrumentation, and data analysis. Through these various sections the design and methodology of this study will be developed.

Problem and purpose overview

In Illinois the Illinois State Board of Education keeps data on both school funding and student achievement. The connection between funding and student achievement is of interest. With the funding of schools continually being a subject of many political initiatives as well as student achievement, looking at the connections between the two is of interest. Such an examination can be taken a step further by examining how districts use funds. Each of those uses (inputs) can be compared to the output of student achievement to determine if there is a relation. Other inputs such as low socioeconomic status as compared to student achievement can be examined to see if there is a connection. Academic achievement outcomes will be based on the performance of Illinois high school juniors. High school juniors in Illinois for many years have been assessed using the Prairie State Achievement Exam (PSAE). One component of the

PSAE is the ACT. After the 2013-2014 school year the PSAE as an assessment of student achievement was retired. This study will examine the last four years of PSAE student achievement and funding data to determine if there is a connection between the funding variables and student achievement variables. The last four years is being used in order to examine if there is consistency of results over many years. The last four years that the ACT was a component of the PSAE is being used since they are the most recent four year span that used the same base assessment.

Research Questions

RQ1: What are the means/standard deviations/distributions of student achievement at the district level (math and reading), instructional expenditure (per pupil expenditure), low income students, average teacher salary, average administrator salary, revenue from local property tax, revenue from state sources, and revenue from federal sources?

RQ2: What are the differences in academic achievement based on school district demographics (percentage low socioeconomic), average teacher salary, average administrator salary, percentage of funding from property tax (local sources), percentage of funding from State, percentage of funding from federal sources, and per pupil expenditure by the district?

RQ3: What are the relationships among the student achievement and funding variables?

RQ4: How are various factors associated with student achievement?

Design

In educational research most designs use either a quantitative or a qualitative approach. There are some that use a combination of both. Quantitative is used as a method when it is

desired to determine trends or statistical truth. Qualitative is used “if the researcher wants to observe in detail by his/her own research viewpoint.” (Katsuko, 1995, p. 351) A quantitative approach is being used to examine this data. According to Katsuko (1995, p. 351) quantitative research uses neutral scientific language in the discovery of existing facts. Muijs (2011) describes quantitative research as analyzing collected numerical data using mathematical (statistical) methods. “The ultimate goal of a quantitative research approach is to find out the facts which exist in reality.” (Katsuko, 1995, p. 351) The quantitative approach is chosen for this study because the goal is to establish if there is a relationship between funding variables and student achievement. It should be noted that the study is considered as non-experimental. The study will be examining existing data looking for trends and relationships.

Population and Sample

The population for this study will be all Illinois school districts that contains high schools. Districts with public high schools provide financial and demographic data to the Illinois State Board of Education (ISBE). ISBE combines that with annual assessment data as part of the annual school report card for each school. These data sets will be accessed from ISBE. All districts with high schools will be used.

Data collection and Instrumentation

The data needed has been collected by ISBE and is readily available. ISBE obtains the data either from the local school districts (as is the case for most of the financial data) or by third party vendors such as ACT (which is the case for student achievement data). ISBE determines the criteria for “Meets and Exceeds” based on performance on the ACT and Workkeys. “Meets and Exceeds” is not based on overall performance on the tests but rather it is based on

performance on questions on the tests that are related to the specific state standards. A list of ⁶⁷ the specific data points to be analyzed is contained in Table 3.1.

Table 3.1

Table of variable, definitions, and coding

Variable	Definition	Coding
District Type	High School district or Unit District	High School or Unit
District Size	District size based on enrollment. ISBE splits districts into one of three types: Small, Medium, and Large. Small represents about 25% of the smallest districts by type. Medium represents the middle fifty percent by type. Large represents the 25% of the largest districts by type.	Small, Medium, Large
Per Pupil Expenditure	Per Pupil Instructional expenditure rate as published on the school report card (per district)	Dollar amount per student
Low Income	Percent of students in a school that meet the federal low income definition (National School Lunch Program Eligibility)	Percent
Average Teacher Salary	Average Teacher Salary of the teachers in the school district.	Dollar Amount
Average Administrator Salary	Average Administrator Salary of the administrators in the school district.	Dollar Amount
Percent Administrative Expense is of Instructional Expenditure	Percent of the instructional expenditure that is used for administrative expenses.	Percent
Local Sources	Percent of total district revenue is generated from local sources -property tax)	Percent
General State Aid	Percent of total district revenue is generated general state aid (does not include categoricals)	Percent
Federal Funding	Percent of total district revenue is generated from federal funding	Percent

(Continued on following page)

Table 3.1 continued.

Variable	Definition	Coding
Percent of Students that Meets and Exceeds	Percent of students that meets or exceeds state standards. (Meets and exceeds are combined because that is the data point that is used to determine if a school is meeting annual yearly progress.)	Percent
ACT Composite Score	Average district ACT composite score	Number between 1 and 36
ACT Math Score	Average district ACT math score	Number between 1 and 36
ACT Reading Score	Average district ACT reading score	Number between 1 and 36

It should be noted that ACT has three data points: composite, reading, and math. The percentage that meets and exceeds is the percentage of student met and exceeded state standards in both math and reading. The state determines if a student has met or exceeded state standards by examining specific questions on the assessments. Meets and exceeds is not based on overall performance on the tests but rather based on the weighting specific questions that address the state standards. The percentage meets and exceeds is used by the state to determine if the school and/or district is making adequate yearly progress. Part of the data that is used to make this determination comes from the ACT. Because the ACT data that is provided is the average score, it is able to give a more detailed picture of achievement than the percentage that meets and exceeds. For this reason the study does not limit itself to the ACT composite, but also examines the results on the math and reading components.

All data being used has already been collected and published by ISBE through the Illinois Interactive Report Card. Every school district in Illinois is required to provide data to ISBE. ISBE through its web site provides for public access to the data files. End users are able to

download the data sets in various formats including SPSS. Because this data is publicly available, this will allow for this study to include every public high school in the state of Illinois. The financial variables are based on budgetary and annual financial report data that school districts provide to ISBE. Since a third-party auditor completes the district annual financial report, there is a high confidence in the validity of the data. The student achievement data is compiled by ISBE. Since ISBE compiles student achievement data in combination with ACT, there is a high confidence in the validity of the data. The low-income variable is based on the number of students that qualify to receive benefits per the National School Lunch Program. That data point is provided to ISBE by the local school districts. The federal government directs schools on the manner in which students or families can qualify for benefits per the National School Lunch Program. Because all school districts follow the same set of federal guidelines, there is a high level of confidence in the validity of this data point.

Data Analysis

The research questions form the foundation of the study. Based on those questions a quantitative approach is being used to analyze the data. According to Muijs (2011) the quantitative method is indicated when the research questions are demanding quantitative answers or when the questions are trying to explain phenomena. “Statistical treatments of educational information have two purposes. The first is descriptive – to summarize information in an easily comprehended, quantitative form. The second is inferential – to provide an estimate of how likely a sample of people or events accurately represents a broader population of people or events” (Thomas, 1998, p. 193). In this study various statistical measurements will be used to study the relationship between the variables.

In order to answer the first research question various descriptive statistics will be used. Much of the data that is being obtained from the Illinois State Board of Education employ percentages. “A valued feature of percentages is their ability to translate disparate measures into a common coin that permits easy comparisons among measures” (Thomas, 1998, p. 194). The mean will be calculated for each variable. The mean gives one measure of central tendency. It will show in the data set what the average value is. It allows for a single number to generalize the value of the variable (Thomas, 1998).

The mean within itself only gives a partial picture of the values of the data represented by a variable. “For many research interests, it is not sufficient to learn only the average of an array of measurements. It is also important to learn how much the measurements are bunched together or spread out. For this purpose, we need statistics that summarize the extent of variability or dispersion in a distribution” (Thomas, 1998, p. 199). Is the data relatively close together in value, or is spread out? The measure of standard deviation can be looked at for each input variable and output variable to determine how tightly packed the values are. The larger the standard deviation value is, the greater distribution of the data that the variable represents (Thomas, 1998).

The mean and standard deviation focus on single variables. The second research question focuses the study on examining differences in the variables. In order to address that question the next step is to look at specific characteristics of the schools to see if those characteristics have a statistical effect on the variables. Specifically, for this study two characteristics will be examined. The first is the type of school district that a high school is organized under. In Illinois a high school can be part of a high school district (district composed of high schools only) or it can be part of a unit district (district that represents all grades, K-12). Looking at

different based type district organization is useful because the decision-making can be different between the two types of districts. A high school district is focused on high school issues. Budgetary decisions are based on high school needs only. In a unit district the concerns of all grade levels are part of the decision making process. One area that the difference becomes evident is with teacher pay. For instance if a high school district is having difficulties attracting quality teachers, it can look to raise the overall pay of teachers. If a unit district does the same, it is raising the level of pay for all teachers, even those grade levels where there might not be a shortage.

The second type will be the size of the district. In theory the larger the district the more efficiently the district can operate. Does this efficiency difference create a difference in the disparate variables? The Illinois State Board of Education separates school districts into three size categories: small, medium and large. For each type of school district (unit, elementary, high school) ISBE divides the districts into one of three size types. Small school districts comprise the bottom twenty-five percent of districts by enrollment. Medium size districts comprise the middle fifty percent of districts by enrollment. Large sized districts are the remaining twenty-five percent of districts. To put this in perspective Table 3.2 shows a breakdown of enrollments for high school districts in 2014. Unit districts are not presented in this table because unit district enrollments include students that are not in high school.

Table 3.2

High School District Enrollments by Size Type in 2014

District Type	District Size	Min	Max	Mean	Standard Deviation	Number	Percent of Type
High School	Small	34	636	368	172	24	24.24%
	Medium	681	3,463	1,814	899	50	51%
	Large	3,662	12,265	5,921	2,338	25	25%

Small and medium districts, which represent seventy-five percent of all districts, will be compared to large districts that represent twenty-five percent of all districts. It is not an even split of the districts. It is however a split that allows an examination of the largest twenty-five percent of school districts compared to the rest of districts. In examining the framework for this study there is a desire to look at the relationship between district decisions and student achievement. Every district has its own specific priorities that can drive those decisions. There are similarities in priorities that can be found by looking at the size of the district. By looking at the size of the district it allows for a more comprehensive look of the variable of district size. By looking at the largest school districts compared to the rest of the school districts it will give an indication if being part of a larger district relates to student achievement. In larger districts there typically is more opportunity to provide specialized services to students because it is more cost effective. For instance if one percent of the population is in need of reading interventions, there might not be enough students in a small district to afford hiring the personnel to provide those services. In a large district one percent could represent enough students to make a reading intervention program financially feasible. In general terms a larger district is able to be more efficient. Do the district decisions that are made by larger districts relate to student

achievement? A T-test will be used to determine if there is significant difference between the variables based on the two district classifications specified. An independent measure T-test will be used for this analysis. The independent measures T-test is indicated because the data is broken into two independent sets based on either the school district type or size (Gravetter & Wallnau, 2008).

In order to address the third research question it is necessary to look at the relationship between variables. There is a desire to examine the relationship between input variables including funding variables and student achievement output variables. For this study a Pearson r correlation analysis will be conducted. "In judging whether the Pearson product moment method (symbolized by the letter r) is appropriate for a given study, the researcher needs to decide whether both of the variables being compared represent equal-interval scales" (Thomas, 1998, p. 207). The variables that are being used in this study are equal-interval scales. An equal-interval scale is characterized as a scale in which the distance between the units is the same. For instance the measurements on a football field would be considered as an equal-interval scale. If a football player advances the ball from the twenty-yard line to the thirty-yard line, the distance traveled is the difference or ten yards. The same result would be found if the player started on the ten-yard line and ended at the twenty-yard line. In the case of ACT scores the scores vary between zero and thirty-six. A number of the variables are in terms of percentages that vary between zero and one hundred. Average salaries are in terms of U.S. Dollars. The use of the Pearson r correlation is appropriate. The Pearson r will show if there is a statistical connection between two variables. Do changes in one variable correlate with changes in another variable? There are two situations in particular that are examined. If variable x increases, does variable y increase or if variable x increases, does variable y decrease? In either case, what is being

determined is if there is a relationship between the two variables. The Pearson r will be used to determine if there is a statistically significant relationship between the input variable and a student achievement (output) variable. A number between 1 and -1 determines the strength of correlation. The closer the value is to 1 or -1 the stronger the correlation. The closer the value is to 0, the weaker the correlation. A positive number indicates direct correlation, or in other words as the value of one variable increases the value of the other variable increases. A negative number indicates the inverse, or in other words as the value of one variable increases the other decreases. The correlation coefficient squared is the percentage of variation in one variable explained by another. For instance if the correlation coefficient is 0.5 or -0.5, then the input variable explains twenty-five percent of the variation in the output variable or vice versa. Significance was calculated for both $P=0.01$ and $P=0.05$. The P -values are used to determine significance. It is based on the probability that one would have obtained the same result by chance if the actual correlation coefficient was zero. If the value that was found was less than 5% ($P<0.05$) then the correlation was determined to be significant (Urdan, 2001). SPSS calculates this value when the correlation is calculated. Since the opportunity to evaluate the relationship between achievement and percentage of students that come from low socioeconomic families is possible, that will be done also. In this study, dependent variables will include student achievement data. Independent variables will be financial factors as well as low socioeconomic status indicator.

Additionally the relationship between average teacher salary and ACT scores in districts that have the percentage of low socioeconomic status students that are one standard deviation removed from the mean in both directions will be examined. The data will be filtered to examine districts in which the percent of low socioeconomic students is one standard deviation from the

mean (both positive one and negative one). This will allow for an examination of districts with both a high percentage and low percentage of low socioeconomic status students. This will show if the relationship between the selected input variables and the select output variables is different from what is seen with the large group. There will be a focus on average teacher salary and performance on ACT assessments. This examination will allow a comparison of results. By separating out two groups based on the average socioeconomic status of students in the school, this will allow for examination if the relationship between teacher salary and student achievement is more significant in districts with high and low concentrations of low socioeconomic status families. For instance, if a positive relationship between teacher salaries and student ACT scores exists in high poverty districts but not in low poverty districts it would suggest increasing teacher salaries may be an effective strategy in high poverty settings.

A second filter will be performed. In this case two subgroups of districts will be created based on the per pupil expenditure. Specifically the data will be split into two groups, one that is one standard deviation from the mean of per pupil expenditure; the other with negative one standard deviation from the mean of per pupil expenditure. The focus on low socioeconomic status students will be continued. The relationship between the concentration of low socioeconomic status students and student achievement will be examined. By looking at these specific conditions, the study will be able to see if the relationship between the input variable of percentage of students from low socioeconomic status families and the ACT student achievement output variables are similar in districts that spend a lot compared to districts that do not spend as much. In other words, is there a performance difference for low socioeconomic status students in districts that have a high level of instructional expenditures compared to districts that do not spend as much? Is the relationship between low socioeconomic status concentration and student

achievement more pronounced based on district instructional expenditures? This examination is pertinent now that the state of Illinois has transitioned to a new funding formula that uses the concentration of low socioeconomic students as one factor to determine the amount of funding the district gets from the state. If in districts with high levels of instructional expenditures, it can be shown that low socioeconomic status students are achieving significantly better, then the increased funding from state can be justified.

To address the final research question, linear regression will be used. Linear regression creates a line of best fit based on the plot of the independent variable (x-value) and the dependent variable (y-value). The equation of the line of best fit uses the same format as the slope intercept form of the equation ($y=mx+b$, m =slope, b = y-intercept) of a line that is taught in Algebra classes. The equation of a line describes the relationship between the independent (x) variable and the dependent (y) variable. A positive slope indicates that as the independent variable increases the dependent variable increases. A negative slope indicates that as the independent variable increases as the dependent variable decreases or as the independent variable decreases, the dependent variable increases. Slope also determines the magnitude of the change. For instance if the relationship is $y=5x+0$ then the dependent variable is found by multiplying the independent variable by 5. The linear equation describes the relationship between the independent variable and the dependent variable. Rarely, if ever, will there be an instance where the linear equation precisely describes the relationship between the independent variable and dependent variable. There is a need to quantify the accuracy of the linear regression. In other words how close to the equation of the linear regression do the actual data points fall?

In order to better understand how accurately the equation is describing the relationship between the independent and dependent variable the standard error is calculated. Standard error

is measuring the accuracy of the relationship. The linear equation that is developed for the linear regression attempts to plot all of the data points on a line. Rarely, if ever, will all of the points fall on that line. Standard error quantifies how close the value is to the actual data. The closer the standard error is to zero the more accurate the equation is.

As was done in the correlation studies, the low socioeconomic percentage in a district will be split into two groups that represent one standard deviation in each direction from the mean. Regression will be examined using the composite ACT score as the dependent variable and average teacher salary as the independent variable. Also the per pupil expenditure is being split into two groups that represent one standard deviation in each direction from the mean. Again the ACT composite score is the dependent variable. The independent variable for this case will be the percentage of students from low socioeconomic status households.

Research Method Summary

In summary, the relationship between student achievement variables and school financial variables will be examined using statistical methods. The examination will be started by looking at the mean values of the variables as discussed in the research questions. T-tests will be used to look for differences based on school district type and size. The examination will become more detailed with the inclusion of comparisons of variables using statistical correlation as well as linear regression. All public schools in Illinois that have provided data to ISBE will be examined. Four consecutive years of data will be used. All data is public domain. The data is the data that ISBE provides to Illinois Interactive Report Card at NIU. Survey instruments will not be used.

For clarification, the analysis methodology for this study has as a goal to determine if there is a relationship between input variable and the output variables of student achievement. The relationship that is developed will not be causal. Causal relationships indicate that a change in one variable will always lead to a change in another variable. For instance there is a causal relationship if a student does not turn in an assignment and if he/she will get credit for it. The relationships that will be developed will be correlational. The study will be looking for indications that one variable relates to another that can be explained using statistical significance. Also it should be noted that this study does not meet the definition of experimental. The study is not looking at a control group and a non-control group to see if there is an output change based on a specific intervention.

CHAPTER 4: RESULTS AND INTERPRETATION OF DATA

Introduction

The purpose of this study was to examine the relationship between various funding variables as well as the demographic variable of low socioeconomic status students and student achievement. The following research questions were developed in order to focus this study.

RQ1: What are the means/standard deviations/distributions of student achievement at the district level (math and reading), instructional expenditure (per pupil expenditure), low income students, average teacher salary, average administrator salary, revenue from local property tax, revenue from state sources, and revenue from federal sources?

RQ2: What are the differences in academic achievement based on school district demographics (percentage low socioeconomic), average teacher salary, average administrator salary, percentage of funding from property tax (local sources), percentage of funding from State, percentage of funding from federal sources, and per pupil expenditure by the district?

RQ3: What are the relationships among the student achievement and funding variables?

RQ4: How are various factors associated with student achievement?

In this quantitative study, the financial variables as well as the percentage of low socioeconomic students are the independent variables. The student achievement variables are the dependent variables. The population that was studied was all public districts with high

schools in the state of Illinois. In Illinois, in 2011, 2012, 2013 and 2014, all juniors were assessed using the Prairie State Achievement Exam, which used the ACT as a component. The percentage of students that met and/or exceeded state standards as well as results on the ACT composite, ACT reading and ACT math were used for the student achievement variables.

All data for this study was obtained from the Illinois State Board of Education (ISBE). ISBE provides all data through the Illinois Interactive Report Card (IIRC). The data used in this study is from 2011 through 2014 school report cards. SPSS version 16.0 for Windows was used to analyze the data collected from ISBE. This chapter will begin with analysis of the mean and standard deviations for each of the variables studied. In order to examine any differences in the variables based on the type and size of the school district, T-tests were used. In order to obtain an understanding of the relationship between the financial variables and the student achievement variables, Pearson Moment Correlations were used to determine if there was a significant correlation between the two types of variables. Additionally, SPSS was used to complete a linear regression analysis in order to determine if any of the variables could be used to describe achievement results.

Analysis of Mean Score Values

The first research question focuses on an examination of the mean values as well as the standard deviation of each of the variables. Table 4.1 presents the descriptive statistical analysis that includes number, minimum, maximum, mean, and standard deviation.

Table 4.1

Descriptive Statistics of Variables

Variable	School Year		n	Min	Max	m	SD
	(Report Card)						
Federal Funding Percent	2011		494	0.9	59	12.5	6.8
	2012		476	1.0	40.2	8.4	4.6
	2013		476	0.5	38.3	6.4	4.4
	2014		476	0.6	37.5	6.5	4.4
General State Aid Percent	2011		494	0.7	55.4	21.9	12.8
	2012		476	0.9	63.7	25.1	14.8
	2013		476	0.9	62.8	24.4	15.1
	2014		476	0.8	59.0	22.8	14.5
Local Property Tax Percent	2011		494	7.2	91.8	50.1	20
	2012		476	6.4	92.0	51.1	19.7
	2013		476	8.6	92.7	53.8	19.5
	2014		476	9.8	91.8	54.3	19.2
Instructional Expenditure	2011		494	\$3,798	\$12,563	\$6,131	\$1,501
	2012		476	\$3,716	\$12,667	\$6,078.9	\$1,534
	2013		476	\$3,632	\$12,891	\$6,224	\$1,600
	2014		476	\$3,476	\$13,368	\$6,302	\$1,678
Average Administrator Salary	2011		494	\$63,604	\$170,615	\$99,840	\$18,044
	2012		482	\$58,034	\$175,375	\$100,811	\$18,741
	2014		477	\$48,636	\$165,125	\$91,846	\$16,193
Average Teacher Salary	2011		495	\$33,550	\$108,336	\$57,317	\$14,520
	2012		482	\$34,443	\$116,044	\$57,736	\$14,775
	2014		477	\$30,981	\$109,903	\$52,946	\$14,138
Administrator Expense as a percent of Instructional Expenditure	2011		493	1.2	45.4	10.3	6.0
	2012		475	1.3	42.8	10.9	5.9
	2013		476	1.3	50.9	10.9	6.0
	2014		476	1.4	50.0	11.0	6.2
Low-Income Percent	2011		495	3.6	99.6	38.2	17.8
	2012		482	3.5	99.8	39.7	18.0
	2013		478	2.8	99.4	41.4	18.2
	2014		477	0.1	99.7	43.0	18.7
ACT Composite	2011		495	13.3	27.5	20.4	1.8
	2012		481	14.6	27.7	20.4	1.8
	2013		476	14.4	27.5	19.9	1.8
	2014		474	14.8	27.4	20.1	1.8

(Continued on following page)

Table 4.1 continued.

Variable	School Year (Report Card)	n	Min	Max	m	SD
ACT Reading	2011	495	12.9	27.3	20.5	1.7
	2012	481	14.2	27.7	20.4	1.9
	2013	476	14.1	27.8	19.9	1.8
	2014	474	14.9	27.4	20.3	1.8
ACT Math	2011	495	14.9	27.8	20.3	1.9
	2012	481	15.0	27.9	20.5	1.9
	2013	476	15.3	27.4	20.0	1.8
	2014	474	15.3	27.2	20.1	1.8
Percent Meets and Exceeds	2011	494	8.5	89.6	53.7	14.1
	2012	480	8.5	89.6	53.6	14.1
	2013	476	10.5	88.8	54.2	13.1
	2014	476	8.3	92.0	53.9	12.2

In table 4.1, the variables were sorted first by funding source, funding use, and then by student achievement. The low socioeconomic status demographic variable was placed between the funding variables and the achievement variables. Each variable is broken into subsection by school year. For each variable/school year the number of data points examined, the minimum value, the maximum value, the mean value, and the standard deviation are reported.

The first variable reported is the Federal Funding Percent. This variable represents the portion of the district budget that comes from federal sources. The mean of this variable varied from a high 12.5 percent in 2011 to a low of 6.4 percent in 2013. In general terms, the amount of federal support to public schools in Illinois is limited. There are isolated districts where federal funding is a large portion of the overall budget as evidenced by a maximum value of 59 percent in 2011. The standard deviation ranged from 4.4 to 6.8. One standard deviation on each side of the mean was approximately equal to 70 percent of the total population studied (Gravetter & Wallnau, 2008, p. 102). In the case of 2011 approximately 70 percent of districts or about 345

districts ranged from 5.9 percent to 25.1 percent of their funding coming from local sources.

In 2014 that range decreased and varied from 2.1 percent to 10.9 percent. So for the majority of school districts, in 2014 less than ten percent of their funding came from federal sources.

The next funding source reported is general state aid. The mean value varied from a high of 25.1 percent in 2012 to a low of 21.9 percent in 2011. Upon examination that difference between the minimum and maximum values as well as the standard deviation, shows that amount of state aid the state sends to districts varies greatly. In 2013, for instance, (the year with the greatest standard deviation), 70 percent of districts had state aid that varied between 9.3 percent and 39.5 percent.

The state funding formula that was in place during the period of this study used the availability of local resources to determine the level of state support. Because of this, it is expected that there will be similar patterns evident when examining the local property tax percentage. The mean value of the percentage of revenue that came from property taxes varied from a high of 54.3 percent in 2014 to a low of 50.1 percent in 2011. The standard deviation combined with the difference between the minimum and maximum values shows a wide variance in the percentage of property tax that is part of a district budget. For instance in 2011 the standard deviation was 20, meaning that about seventy percent of the districts varied between 30.1 percent and 70.1 percent. There are some districts that rely on over ninety percent of their budget to come from property taxes. There are other districts that rely on less than ten percent of their budgets to be derived from property taxes.

The next set variables reported are related to how a district chooses to use the funding that is available. The first variable is instructional expenditure. This variable takes the amount

of money that is used by the district to support the instruction of students. Included in this variable are expenses such as supplies and salaries. The mean value of the instructional expenditure varied between \$6,078 and \$6,302. The standard deviation varied between \$1,501 and \$1,678. In looking at the most recent year in the study, seventy percent of districts had an instructional expenditure that varied between \$4,624 and \$7,980. In that same year, there was at least one district that had an instructional expenditure amount of only \$3,476 and another district with an amount of \$13,368. This large variance of amount demonstrates the difference between districts throughout the state of Illinois.

One-way districts determine use of the funding that is available is through the amount it pays its administrators and teachers. Average administrator salaries varied between \$91,846 and \$100,811 during the period of the study. The standard deviation ranged between \$16,193 and \$18,741. There is a large variance between the minimum and maximum values. There is a case of a minimum value below \$50,000 and a maximum value of over \$175,000. This large difference is attributed to the priorities a district has. A district might determine that one manner to improve achievement is to have high quality administrators. It might be the opinion of the district that the best way to attract (hire) and retain quality administrators is through competitive compensation packages.

There are similar results with average teacher salaries. The mean value varies between \$52,946 and \$57,736. The standard deviation varies from \$14,138 to \$14,775. So in 2014 for instance the standard deviation indicates that the average teacher salary varied between \$38,808 and \$67,084 for about seventy percent of school districts. As with administrative salaries, this large difference in values can be attributed to the differences in available resources to districts and/or differences in district spending priorities.

Administrator expense as percent of instructional expenditure was examined. The mean value of that percentage varied between 10.3 percent and 11 percent. The standard deviation varied between 5.9 and 6.2 percent. There was a wide difference between the minimum (1.2) and maximum values (50.9). For seventy percent of school districts the range of values was approximately five percent to seventeen percent. This shows that throughout the state there is a large difference in the values. In terms of one standard deviation, there is not the same level of difference.

The next variable reported is demographic in nature. The percent of low socioeconomic status students indicates the percentage of students that come from low socioeconomic status homes. The mean value of this variable varied from 38.2 to 43 percent. It is noted that over the four years of the study, this mean value increased each year. The standard deviation varies between 17.8 percent and 18.7 percent. In 2014 for approximately 70 percent of school districts, the percentage of low socioeconomic students varied from 24.3 to 61.7. Another way of looking at this, for approximately 70 percent of school districts 25 percent or more of their student population came from low socioeconomic status homes. In looking at minimum and maximum values, the range in 2014 alone was 0.1 percent to 99.7 percent. This large difference indicates the large differences in the concentration of low socioeconomic status households across the state.

In order to determine levels of student achievement, two primary sources are used: ACT scores and the percentage of students that meet or exceed state standards. In the case of the ACT, the scores are broken into three types: composite, math, and reading. The ACT composite score varied between 19.9 and 20.4. The standard deviation was consistently at 1.8. So for approximately seventy percent of the school districts the ACT composite score in 2014 varied

between 18.3 and 21.9. The minimum and maximum values varied from a low of 13.3 to a high of 27.7. Over the period that the data was collected there was an overall decrease in performance on the ACT composite.

One of the components of the ACT Composite score is the ACT Reading. During the period of the study the ACT Reading had a mean value that varied from 19.9 to 20.5. The standard deviation varied between 1.7 and 1.9. In 2014 for approximately seventy percent of school districts the mean reading score varied between 18.5 and 22.1. The minimum and maximum values varied between 12.9 and 27.8.

Another component of the ACT composite score is the math score. During the period of this study the mean value of the math score varied between 20 and 20.5. The standard deviation varied between 1.8 and 1.9. In 2014 for approximately seventy percent of school districts the ACT math score varies from 18.3 to 21.9. The difference between the minimum and maximum values over the four years was 14.9 and 27.9.

To summarize the ACT scores, the average score is fairly consistent over the period of the study. The ACT score is a score out of 36. The standard deviation was approximately 1.8 for all of the ACT scores that were reported. 1.8 is five percent of 36. So in approximate terms, for the seventy percent of the districts that represent one standard deviation from the mean, the ACT score ranged between five percent above the mean and five percent below the mean for a total percent difference of ten percent. To summarize 70 percent of the districts studied were within ten percent of each other in regards to ACT scores.

The other indicator of student achievement that was examined was the percentage of students that met or exceeded state standards. The mean value varied between 53.6 and 54.2.

The standard deviation varied between 12.2 and 14.1. In 2014 the combination of the mean and the standard deviation indicated that for approximately seventy percent of the school districts examined that average percentage of students that met or exceeded state standards varied from 41.7 to 66.1. The minimum and maximum values over the period of the study varied from 8.3 to 92.5. Over the period of the study, there does not seem to be a significant increase in the number of students meeting and exceeding state standards. This is consistent with the ACT scores. In general terms, based on the ACT scores and the percentage of students that met or exceeded state standards, student achievement rates appeared to stay relatively the same.

Analysis of T-tests

In order to address the second research question, an Independent Samples T-test was performed. Independent Samples T-test is used when the data set is broken into sets that do not overlap. There were two situations that were examined that both related to the type of school district. The T-test is used to examine differences. For this study the differences looked at were the type of school district that the high school was part of: unit or high school; and the size of the district the high school was part of: large or not large (for the purposes of this study medium sized districts and small districts were combined and were considered as not large). In both of these cases the data sets are being broken into two independent sub sets, there is not a school district that is in both subsets. The size of the school districts was divided in this manner so that the large group represented the approximately twenty-five percent of the largest school districts. The other group represents the remaining 75 percent.

The T-test is used to determine if there is a significant statistical difference based on the type of school district. In order to make this determination, results from SPSS are examined

using a two-step procedure. SPSS breaks the results into two categories: equal variances assumed and equal variances not assumed. To determine which category to use to determine significance, results from the “Levene’s Test for Equality of Variances” are studied. If the Levene’s test value for significance is greater than 0.05 then the test indicates that the equal variances are assumed. If the value for significance is less than or equal to 0.05 then equal variances are not assumed. Essentially what is being determined is if the square of the standard deviation or variance is the same for the two sub groups or different. If the variance is the same then one set of results is used. If the variances are different then a different set of results is used. Based on the result of the Levene’s test the next step is to look at appropriate row and examine the 2-tailed significance. If that value is greater than 0.05 then there is not statistical significant difference between the two groups. If that value is less than or equal to 0.05, then there is a statistically significant difference in regards to that variable and the two groups (Bryman & Cramer, 2001, p. 142). In both tables that present results either the variances assumed or variances not assumed result is reported based on the results of the Levene’s test

The first type of grouping that was examined was district type: high school and unit. Each variable is examined for fiscal years 2011, 2012, 2013, and 2014. Table 4.2 presents the results.

Table 4.2

T-test for Differences between High School Districts and Unit Districts

	Year	High School District		Unit District		T-test for equality of Means
		N	Mean	N	Mean	
Local Property Tax Percent	2011	99	69.95	377	50.17	-4.49***
	2012	98	67.8	378	46.82	-3.749***
	2013	99	69.68	377	49.63	-4.657***
	2014	99	69.95	377	50.17	-4.661***
General State Aid Percent	2011	99	11.77	377	25.68	2.681**
	2012	98	13.67	378	28.09	2.462*
	2013	99	12.74	377	27.41	3.308**
	2014	99	11.77	377	25.68	3.065**
Federal Funding Percent	2011	99	4.14	377	25.68	3.455**
	2012	98	4.82	378	9.31	3.074**
	2013	99	4.09	377	6.97	3.889***
	2014	99	4.14	377	7.09	3.681***
Instructional Expenditure per Pupil	2011	99	8,329.43	377	5,770.65	1.409
	2012	98	7,833.99	378	5,623.93	1.433
	2013	99	8,128.40	377	5,725.08	2.441*
	2014	99	8,329.43	377	5,770.64	2.516*
Average Teacher Salary	2011	99	69,754.88	378	48,543.35	18.365***
	2012	102	75,896.47	380	52,862.41	12.449***
	2014	99	69,754.88	378	48,543.35	10.974***
Average Administrator Salary	2011	99	107,470.90	378	87,753.54	13.177***
	2012	102	120,077.41	380	95,640.28	13.806***
	2014	99	107,470.9	378	87,753.54	12.394***
Administrative Expense as a percent of the instructional expenditure	2011	99	10.14	377	11.24	11.003***
	2012	97	10.36	378	11.09	10.41***
	2013	99	9.91	377	11.17	10.037***
	2014	99	10.14	377	11.24	10.062***

(Continued on next page)

Table 4.2 continued.

	High School District			Unit District		T-test for equality of Means
	Year	N	Mean	N	Mean	
Low Income Percentage	2011	99	34.93	378	45.09	-9.651***
	2012	102	33.38	380	41.43	-9.323***
	2013	100	33.55	378	43.46	-9.349***
	2014	99	34.93	378	45.09	-9.222***
ACT Composite	2011	98	20.7	376	19.95	10.302***
	2012	101	20.89	380	20.28	-9.257***
	2013	99	20.56	377	19.76	-6.17***
	2014	98	20.7	376	19.95	-6.123***
ACT Math	2011	98	20.76	376	19.88	12.249***
	2012	101	21.11	380	20.33	11.061***
	2013	99	20.71	377	19.77	11.737***
	2014	98	20.76	376	19.88	11.86***
ACT Reading	2011	98	20.86	376	20.25	0.192
	2012	101	20.72	380	20.37	-0.107
	2013	99	20.35	377	19.75	1.854
	2014	98	20.86	376	20.25	2.769
Percent of students Meeting or Exceeding State Standards	2011	98	56.92	376	53.72	-0.717
	2012	102	53.91	379	54.08	-0.883
	2013	99	56.55	377	53.58	-1.577
	2014	99	57.33	377	52.94	-1.331

* p < .05; ** p < .01; *** p < .001

The examination of the results as reported in Table 4.2 is conducted in two parts. First it was determined if there was a statistically significant difference between the two groups. For variables where there was a statistically significant difference the next step is to look at the “T” value which is shown as the “t-test for equality of means”. A negative value indicates that the mean in the second group is larger than the mean in the first group. A positive value indicates that the mean in the first group is larger than the mean in the second group. An examination of

the two means allows for clearer picture of the difference. For Table 4.2 high school district is⁹¹ the first group and unit districts are the second group.

The first variable examined was the input variable of the percentage of students that come from low socioeconomic status families. It was found that there was a statistically significant difference in this variable based on the organization type of the school district. For all four years of the study the difference was negative indicating that the mean for the unit school district organization type was larger than the high school district type. The mean difference ranges from -10.16 to -8.05. So the average number of students that are from low socioeconomic status families on average is about 10 percent higher for unit school districts.

The second variable examined is ACT composite. It was found there is a statistically significant difference between the two organizational types. For all four years the difference in the mean was positive indicating the average ACT composite score was higher for high school districts than for unit school districts. The mean differences ranged between 0.61 and 0.75. The ACT composite score can range between 0 and 36. So the difference between these two types of districts is between 1.7% and 2.0%.

The next variable was the output variable of ACT Math. For all four years that were studied there was a statistically significant difference between the two school district organizational types. For all four years the difference between the means was positive meaning that average scores were higher in high school districts. The ranges of mean differences varied from 0.78 to 0.94. Similar to the ACT Composite, the math score ranged from 0 to 36 also. Therefore, based on the values above the difference between the two organization types is 2.2% to 2.6%.

The next variable was the output variable of ACT Reading. There appeared to be inconsistent results for the four years studied. For two of the years (2011 and 2012) there was not statistical significance yet for the other two years (2013 and 2014) there was statistical significance. For all four years the difference in the mean was positive indicating that the mean value was higher in high school districts.

The next variable was the input variable of Average Teacher Salary. For all three years there appeared to be a statistically significant difference between the means. For all three years that difference was positive, indicating that the average mean salary for teachers was higher in high school districts. The average difference varied between \$19,717.40 and \$23,034.10. So teachers in high school districts received higher rates of pay than their counterparts in unit districts.

The next variable was the input variable of Average Administrator Salary. For all three years examined there was a statistically significant difference between the two organizational types. For all three years the difference is positive indicating that the average salary was higher in high school districts. The values ranged from \$19,717.4 to \$24,437.10. Similar to teacher salaries, administrators in high school districts received more pay than their counterparts in unit districts.

The next variable was the input variable of the percentage of the total revenue that comes from local property tax. For all four years there was a statistically significant difference between the two district types. For all four years the value was positive indicating that the average mean was higher in high school districts. The range of values is 19.78 and 20.98. Since this value is a percentage, this indicates that there was approximately a twenty percent difference between unit

and high school districts. High School districts appear to receive more funding from property tax than unit districts.

The next variable was the input variable of the percentage of total revenue that comes from general state aid. For all four years studied there was a statistically significant difference between the school district organizational types. For all four years the difference was negative indicating that the mean value for unit school districts was higher than for high school districts. The value ranged from -13.91 to -14.67. Unit districts receive almost fifteen percent more funding from state aid than high school districts.

The next variable was the input variable of percentage of revenue that come from federal funding sources. For all four years studied there was a statistically significant difference between the district organizational types. For all four years that difference between the mean was negative indicating that there was a higher percent of federal resources in used in unit school districts. The values ranged from -2.88 to - 21.54. In general terms federal funding appears to decrease over the four years, but unit districts still received a higher percentage than high school districts.

The next variable was the input variable of Average Instructional Expenditure per pupil. For all years examined there was statistical difference for the two district organization types. The difference in mean was positive indicating that high districts on average spend more per pupil than high school districts. The difference ranges from \$2,210.06 to \$2,558.79 indicating that high school districts on average spend in excess of \$2,000 more per pupil than unit districts.

The next variable was the output variable of percentage of students meeting or exceeding state standards. With the exception of 2014 there was not a statistical significant difference indicated. No further examination of these results is warranted.

The final variable examined was the input variable of administrative expense as a percentage of the instructional expenditure. This variable did not exhibit a statistically significant difference based on the two types of district organization.

To summarize in terms of inputs and outputs, the inputs showed a variety of results, with the majority showing statistical significance. In examining outputs, the majority of the results based on ACT data showed a significant difference. There was a consistent pattern of high school districts showing a higher mean on the ACT results. Interestingly enough there was not a significant statistical difference in the output of percentage of students that met or exceeded state standards.

The next grouping that was looked at was dividing school districts into two groups based on size. The ISBE classifies school districts as small, medium, or large. For this study small and medium districts were combined as one group. Large districts remained as a group. Small and medium districts together represented approximately seventy-five of all school districts. The large group represented the remaining 25 percent of school districts in Illinois. It is argued that larger school districts may run more efficiently than small school districts. Comparing the largest twenty-five percent of districts to the rest of the school districts in the state allows for an examination if the efficiency and the district decision that is associated with larger districts enhance student achievement. Additionally an examination of input variables can be conducted

to see if there are differences between the two types of school districts. Table 4.3 presents the results of T-test analysis.

Table 4.3

T-test for differences between Large School Districts and Small School Districts

Variable	Year	Small/Medium		Large		T-test for equality of Means
		N	Mean	N	Mean	
Local Property Tax Percent	2011	354	51.99	122	60.93	-7.663***
	2012	355	48.31	121	59.47	-5.553***
	2013	354	51.1	122	61.63	-5.533***
	2014	354	51.99	122	60.94	-4.465***
General State Aid Percent	2011	354	24.57	122	17.63	7.475***
	2012	355	27.21	121	19.01	5.402***
	2013	354	26.54	122	18.02	5.965***
	2014	354	24.57	122	17.63	4.806***
Federal Funding Percent	2011	354	6.44	122	6.57	3.791***
	2012	355	8.53	121	7.97	1.119
	2013	354	6.23	122	6.79	-1.22
	2014	354	6.44	122	6.57	-0.29
Instructional Expenditure per Pupil	2011	354	6,142.80	122	6,767.19	-4.449***
	2012	355	5,953.45	121	6,447.12	-2.794***
	2013	354	6,061.46	122	6,699.30	-3.266**
	2014	354	6,142.80	122	6,767.19	-3.078**
Average Teacher Salary	2011	356	53,439.80	138	67,259.60	-9.512***
	2012	357	54,373.40	125	67,342.70	-8.451***
	2014	355	49,784.70	122	62,143.98	-7.848***
Average Administrator Salary	2011	355	96,089.30	138	109,600.00	-7.875***
	2012	357	97,695.60	125	109,711.00	-6.608***
	2014	355	89,332.90	122	99,158.10	-5.856***
Administrative Expense as a percent of the instructional expenditure	2011	354	11.89	138	6.24	12.536***
	2012	355	12.3	120	6.94	11.302***
	2013	354	12.21	122	7.13	8.743***
	2014	354	12.47	122	6.77	12.336***

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Table 4.3 continued.

Variable	Year	Small/Medium		Large		T-test for equality of Means
		N	Mean	N	Mean	
Low Income Percentage	2011	355	43.08	122	42.69	-0.267
	2012	357	39.33	125	40.84	-0.801
	2013	355	41.31	123	41.61	-0.158
	2014	355	43.08	122	42.69	-0.197
ACT Composite	2011	352	19.89	122	20.7	-3.47**
	2012	352	20.31	125	20.68	-1.638
	2013	353	19.73	123	20.51	-3.378**
	2014	352	19.89	122	20.7	-3.47**
ACT Math	2011	352	19.89	122	20.7	-3.47**
	2012	352	19.82	122	20.75	-4.021***
	2013	353	19.7	123	20.71	-4.434***
	2014	352	19.82	122	20.75	-4.109***
ACT Reading	2011	352	20.21	122	20.86	-2.31*
	2012	356	20.39	125	20.61	-0.993
	2013	353	19.71	123	20.34	-2.644**
	2014	352	20.21	122	20.83	-2.85**
Percent of students Meeting or Exceeding State Standards	2011	352	53.82	122	56.01	0.249
	2012	356	54.22	125	53.55	0.414
	2013	353	53.78	123	55.38	0.975
	2014	354	53.02	122	56.26	-2.339*

* $p < .05$; ** $p < .01$; *** $p < .001$

As with Table 4.2, in examining Table 4.3 the first item examined is significance. If significance is indicated then the comparison of the means is examined. The first variable listed in the table is the input variable of Low Income Percentage, or in other the words, the percentage of students in the district that come from low socioeconomic status families. There was not a significant difference indicated for any of the years studied.

The next variable examined is the output variable of ACT Composite score. With the exception of 2012, there is an indication of a statistically significant difference between large school districts and the rest of the school districts. The difference in means is negative indicating the mean for the larger school districts is greater than the mean for the rest of the school districts. Since significance was not indicated for 2012, that value is being omitted. For the rest of the years the range of values varied between -0.37 and -0.81 or 1.0% to 2.25%. This indicates that students did about one to two percent better on the ACT composite in large districts.

The input variable of ACT math is examined next. ACT math showed a statistically significant difference for all years examined. All of the values were negative indicating the mean of the larger school districts was larger than the rest of the school districts. The values ranged between -0.93(2.6%) and -1.01(2.8%). As with the ACT composite, it is indicated that students performed at a higher level as recorded by the ACT math in districts that are classified as large.

The next variable examined was the output variable of ACT reading. Similar to the ACT composite results, there was a statistically significant difference based on the size of the school district for all years except 2012. For the three years in which there was significance, there was a negative difference indicating that the mean for districts that were in the large category is larger. The value of the difference for the three years varies from -0.62(.22%) to -0.65(1.8%).

The next variable examined was the input variable of average teacher salary. For all three years there is a statistically significant difference in the mean based on the size of the school districts. In all cases the difference was negative indicating that the average teacher salary is larger in the larger school districts. The difference varied from \$-12,359 to \$-13,819.

The next variable examined was the input variable average administrator salary. For all three years that were examined there was statistically significant difference in the mean based on the size of the school districts. For all three years the difference was negative indicating that the districts that are categorized as large had a higher mean than the rest of the school districts. The difference varied from \$-9,825 to \$-13,510.

The percentage of revenue that was received from local property taxes was the input variable that was examined next. For this variable there was a significant statistical difference between the two different district sizes. For all four years the difference in the means was negative indicating that the districts that were categorized as large have a higher percentage of revenue from property tax. The difference varied from 8.94 to 11.16.

The percentage of revenue that was received from general state aid is the input variable that was examined next. For this variable there was a significant statistical difference between the two different district sizes. For all four years the difference in the mean was positive indicating that the districts that were not categorized as large by enrollment were on average receiving more state aid than large school districts. The values ranged from -6.94 to -8.2.

The next input variable examined was percentage of revenue that was received from federal sources. With the exception of 2011 there is not a statistical significant difference between the means.

The next input variable examined was the instructional expenditure per pupil. For the four years examined there was statistical significant difference indicated. For all four years the difference was negative indicating that instructional expenditure per pupil was larger in school

districts that were classified as large. The difference in mean values ranged from -493.67 to -637.84.

The next variable examined was the output variable of percent of student meeting or exceeding state standards. With the exception of 2014 there was not a pattern of results that show a significant statistical difference.

The last variable examined was the input variable of administrative expense as a percent of the instructional expenditure. For all four years there was a significant statistical difference between the means. The difference was positive for all years indicating that the mean was larger for districts that are not categorized as large. The values of the difference ranged from -5.08 to -5.7.

To summarize the results as presented in Table 4.3, the majority of the variables showed statistical significance. In the case of inputs in area where a district determines how to spend money such as teacher salaries, administrator salaries, and per pupil expenditures, there was a pattern of larger districts having a higher mean value. As for outputs, a similar situation was seen for results from the ACT. In the majority of the cases the results on the ACT had a higher mean for large school districts.

In general terms the results indicate that students in high school districts and large school districts had higher outcomes as measured by the ACT. It is important to note that student attendance at a particular school is not determined by the student but by the location where a student lives. The next step in examination of the data is to look at the relationship between the input and output variables to determine if there are certain inputs that appear to have a positive or negative effect on outcomes.

In order to address the third research question there is a need to look at the relationship between the independent and dependent variables. For this study the examination performed looked for statistical correlation between inputs (independent variable) and outputs (dependent variables). For clarification the financial variables inputs included percentage of various funding sources as well as how those funds were determined to be used. SPSS has been used to calculate the correlations. Table 4.4 details the results of those calculations. The strength of correlation is determined by a number between 1 and -1. The closer the value is to 1 or -1 the stronger the correlation. The closer the value is to 0, the weaker the correlation. A positive number indicates direct correlation, or in other words as the value of one variable increases the value of the other variable increases. A negative number indicates the inverse, or in other words as the value of one variable increases, the other decreases. Significance was calculated for both P=0.01 and P=0.05.

Table 4.4

Correlation of Input variables with Output Variables

Independent variable	Year	Student outcome variables			
		Percent of student that meets and exceeds	ACT Math	ACT Reading	ACT Composite
Per pupil instructional expenditure	2011	0.463	0.262**	0.114**	0.195**
	2012	0.129**	0.266**	0.157**	0.228*
	2013	0.103**	0.305**	0.218**	0.262**
	2014	0.203**	0.318**	0.217**	0.271**

(Continued on the next page)

Table 4.4 continued.

Independent variable	Year	Student outcome variables			
		Percent of student that meets and exceeds	ACT Math	ACT Reading	ACT Composite
Percent of funding from Local Property Tax	2011	0.364**	0.580**	0.481**	0.560**
	2012	0.382**	0.523**	0.468**	0.515**
	2013	0.460**	0.556**	0.517**	0.560**
	2014	0.531**	0.541**	0.507**	0.542**
Percent of Funding from State Aid	2011	-0.312**	-0.523**	-0.424**	-0.498**
	2012	-0.355**	-0.479**	-0.424**	-0.470**
	2013	-0.417**	-0.510**	-0.481**	-0.518**
	2014	-0.494**	-0.502**	-0.461**	-0.497**
Percent of Funding from Federal sources	2011	-0.443*	-0.596**	-0.547**	-0.605**
	2012	-0.435**	-0.531**	-0.527**	-0.554**
	2013	-0.440**	-0.448**	-0.467**	-0.490**
	2014	-0.493**	-0.447**	-0.461**	-0.465**
Average Teacher Salary	2011	0.164**	0.459**	0.293**	0.386**
	2012	0.170**	0.400**	0.273**	0.349**
	2013				
	2014	0.319**	0.466**	0.370**	0.427**
Average Administrator Salary	2011	0.230**	0.477**	0.334**	0.416**
	2012	0.227**	0.414**	0.308**	0.376**
	2013				
	2014	0.352**	0.480**	0.401**	0.450**
Administrative Expense as a Percent of the Instructional Expenditure	2011	-0.093**	-0.276**	-0.214**	-0.255**
	2012	-0.124**	-0.280**	-0.194**	-0.248**
	2013	-0.143**	-0.286**	-0.235**	-0.279**
	2014	-0.191**	-0.270**	-0.238**	-0.270**
Percent of Students that come low socioeconomic families	2011	-0.700**	-0.726**	-0.741**	-0.776**
	2012	0.676**	-0.712**	-0.717**	-0.748**
	2013	-0.717**	-0.687**	-0.706**	-0.739**
	2014	-0.760**	-0.724**	-0.753**	-0.766**

* Significant at the 0.05 level, ** Significant at the 0.01 level

In reviewing the results as contained in Table 4.4 statistical significance was indicated for virtually every situation. Essentially statistical significance only indicates that there was a relationship between the two variables being examined. It does not give any indication of the strength of the relationship. The strength of the relationship is indicated by the correlation coefficient. In examining the data the input that showed the strongest correlation based on the value of the correlation coefficient was the percent of students from low socioeconomic status families. For all outputs the correlation coefficient had a negative value indicating that as the percentage of students that came from low socioeconomic status families increases, the level of student achievement decreased. For the vast majority of cases the correlation coefficient was in excess of -0.7 . The square of that value is 0.50 , indicating that low socioeconomic concentration explains in excess of 50% of the variation in value in the outputs. No other input variable had a correlation variable that had a larger absolute value.

There were some other variables that showed some strength based on the correlation coefficient. The input variable of percentage of budget that came from the local property tax consistently exceeded 0.5 . The value was also positive. This indicates that as the percentage of the district budget that came from the local property tax increased the higher the level of student achievement. The square of the coefficient was 0.25 indicating that the input of percentage of the district budget that comes from local property tax contributed to 25 percent of the variation in the output variables of student achievement.

The input of the percentage of funding that came from the state aid also had a correlation coefficient that was around 0.5 . The difference was that the coefficient had a negative value. So this input contributes to 25 percent of the variation in the output variables of student achievement. However the difference is that as state funding increased in a district, student

achievement decreased. It should be understood that the state funding formula is intended to supplement the revenue that a district obtains from local sources. So if increases in local sources show a relationship to increase student achievement, then it makes sense that an increase of state resources would indicate a decrease in student achievement.

The input of the percentage of funding that a district receives from federal sources also had a correlation coefficient that was around 0.5. As with state funding the coefficient was negative indicating that as federal funding increased student achievement decreased. So federal funding contributed to 25 percent of the variation in the output variables of student achievement. It needs to be understood that federal funding is primarily driven through Title funding. Title funding uses the concentration of students from low socioeconomic status families to determine the level of funding. So a high level of federal funding indicates a high concentration of students from low socioeconomic households. This finding is consistent with the finding in regards to concentration of students from low socioeconomic status families that is documented above.

The input of average teacher salary showed mixed results. In all cases the coefficient was positive indicating as teacher salaries increases student achievement increases. The value of the coefficient varied between 0.164 and 0.429. These values indicate that the input of average teacher salary contributed to less than twenty-five percent of the variation in student achievement.

Similar to average teacher salary the input of average administrative salary showed mixed results. In all cases the coefficient was positive indicating as administrator salaries increase student achievement increases. That value of the coefficient varied between 0.227 and 0.480. These values indicate that the input of average administrative salary contributed to less than twenty-five percent of the variation in student achievement.

The only other input that was examined was administrative expenses as a percentage of the instructional expenditure. The coefficient in this case was negative indicating that the higher percentage the lower the student achievement. The value of the coefficients ranged from -0.093 to -0.286. At the high end this input only contributed to approximately eight percent of the variation on the student achievement variables.

The concentration of low socioeconomic status students had a negative correlation with student achievement. Average teacher salary had a correlation to greater students achievement. That correlation was not as strong as seen with the low socioeconomic status students. Low socioeconomic status is an input that a district does not control. Teacher salary is an input a district does control. So in districts with a high concentration of low socioeconomic status students, does increasing the average teacher salary improve student achievement? For comparison what is the relationship between average teacher salary and student achievement in districts that have low concentrations of low socioeconomic students? In order to answer these questions the data set will be broken into two independent subsets. One group will be school districts that have a concentration of low socioeconomic students that are one standard above the mean. One group will be school districts that have concentration of low socioeconomic students that are one standard deviation below the mean. SPSS is then used to calculate the correlation between average teacher salary and ACT math, ACT reading, and ACT composite.

Table 4.5

Correlation using school districts with relatively high proportion of low-income students, average teacher salary as input variable

	Average Teacher Salary Year of Report Card Data		
	2011	2012	2014
ACT Composite	-.275*	-.307*	-.093
ACT Math	-.179	-.202	-.049
ACT Reading	-.330**	-.351**	-.118

* Significant at the 0.05 level, ** Significant at the 0.01 level

In examining the results of Table 4.5 there appeared to be inconsistent results. For the majority of the results there was not statistical significance. In cases where there was statistical significance indicated, the correlation coefficient had a maximum value at -0.351. That means that the average teacher salary in these cases only contributed to approximately twelve percent of the variation. Specifically in this case - the reading score from the 2012 report card. It should be noted that in all cases that the correlation coefficient is negative indicating that as teacher salaries increase, student achievement decreases. This is contrary to what was seen when the whole group was examined.

Table 4.6

Correlation using school districts with relatively low proportion of low-income students, average teacher salary input variable

	Average Teacher Salary Year of Report Card Data		
	2011	2012	2014
ACT Composite	.648**	.647**	.624**
ACT Math	.665**	.646**	.627**
ACT Reading	.584**	.600**	.594**

* Significant at the 0.05 level, ** Significant at the 0.01 level

Unlike what was seen in Table 4.5, in Table 4.6 all situations showed statistical significance. The correlation coefficient was positive for all situations indicating that as the teacher salaries were increased, student achievement as measured by the ACT increases. The range of values was from 0.584 to 0.665. That indicates that the average teacher salary contributes between 34% and 44% of the variation in student achievement scores.

When examining the two tables together, what is realized is that the district-controlled input of average teacher salary has a positive correlation to student achievement when the group is the entire state. When the state is broken into smaller subsets based on the concentration of students from low socioeconomic status families, in the case where the percentage of students from low socio economic status families was high the relationship between average teacher salary and student achievement as measured by the ACT appears to be uncorrelated for most years. Where there was any indication of correlation the correlation was negative indicating that the higher the teacher salary the lower the scores on the ACT.

The next examination takes the issue of the relationship between the concentration of students from low socioeconomic status families and student achievement a step further. Using the concentration of students from low socioeconomic status families as the input variable, the output variables of ACT composite, ACT Math, and ACT Reading are examined for two subsets of school districts. The first subset are school districts that have per pupil expenditures that are one standard deviation below the mean. A simpler description of this group is low expenditure districts. Table 4.7 details the results.

Table 4.7

Correlation using relatively low expenditure school district, percent of students from low socioeconomic families input variable

	Low Socio Economic Percent Year of Report Card Data		
	2011	2012	2014
ACT Composite	-.664**	-.561**	-.649**
ACT Math	-.593**	-.505**	-.544**
ACT Reading	-.635**	-.551**	-.643**

* Significant at the 0.05 level, ** Significant at the 0.01 level

In examining the results it can be seen that in all cases that the relationship between the input variable of concentration of students from low socioeconomic status families and the output variables of student achievement as measured by the ACT were statistically significant. In all cases the correlation coefficient was negative indicating that as the concentration of students from low socioeconomic status families increase, student achievement as defined by the ACT decreases. The absolute value of the correlation coefficient varied from 0.505 to 0.664.

The input variables had between about 25 percent and 44 percent variation on the output variable. Table 4.8 gives the results for districts with high expenditures.

Table 4.8

Correlation using relatively high expenditure school district, percent of student from low socioeconomic families input variable

Output Variable	Low Socio Economic Percent Year of Report Card Data		
	2011	2012	2014
ACT Composite	-.883**	-.833**	-.756**
ACT Math	-.859**	-.845**	-.734**
ACT Reading	-.868**	-.831**	-.767**

* Significant at the 0.05 level, ** Significant at the 0.01 level

In examining the results as reported in Table 4.8 there are similarities to Table 4.7. First, in all cases, the relationship was statistically significant. Second, in all cases, the relationship had a negative correlation coefficient indicating that as the concentration of students from low socioeconomic status families increased, student achievement as measured by the ACT decreased. The difference between the two tables was the higher absolute value of the correlation coefficient. In Table 4.8 the absolute value of the correlation coefficient was 0.734 to 0.883. That indicated that the input variable contributed to 53 to 78 percent of the variation in the output variable. This percentage is higher than was seen in Table 4.7. It was a very interesting result. Essentially in districts that have the combination of higher per pupil expenditures and higher concentration of students from low socioeconomic status families, there appears to be lower levels of student achievement as measured by the ACT.

Because of this result, an additional examination was performed. A T-test that used the same two district groupings was performed. The same output variables (ACT Composite, ACT Math, and ACT Reading) were also used.

Table 4.9

T-test comparison between Districts with Low and High Concentration of SES Students

	Year	Districts with Low Concentration of Low SES Students		Districts with High Concentration of High SES Students		T-test for equality of Means
		N	Mean	N	Mean	
ACT Composite	2011	89	22.526	47	18.866	13.832*
	2012	83	22.586	66	18.222	16.970*
	2013	81	22.172	63	17.802	15.497*
	2014	78	22.459	64	17.992	17.322*
ACT Math	2011	89	22.480	47	18.815	12.349*
	2012	83	22.699	66	18.408	16.029*
	2013	81	22.216	63	18.125	14.476*
	2014	78	22.342	64	18.181	15.903*
ACT Reading	2011	89	22.408	47	19.040	12.823*
	2012	83	22.478	66	18.300	16.010*
	2013	81	21.990	81	17.692	14.601*
	2014	78	22.633	64	18.231	17.811*

* $p < .001$

In all cases the T-tests indicated a statistically significant difference between the two groups. Also in all cases the mean was higher for districts where the concentration of low socioeconomic status students was small. This analysis supported that there was a difference in student academic performance between districts with the lowest concentration of low SES students and districts with the highest concentration of low SES students.

Regression Analysis

Regression Analysis is used to describe the relationship between two variables using a linear equation. The linear equation gives a mathematical (linear) relationship between an independent variable (typically known as the x variable) and dependent variable (typically known as the y variable). SPSS will take an independent and dependent variable and will create a linear equation that describes the line of best fit that approximates the linear relationship between the two variables. SPSS will also calculate significance and standard error.

Tables 4.10 through 4.13 present the results as produced by SPSS for four different dependent variables: average ACT composite score, average ACT math score, average ACT reading score, and percentage of student meeting or exceeding state standards. The independent variables were percentage of student for low socioeconomic status households, percentage of local property tax (local resources), general state aid percentage, federal funding percentage, instruction expenditure per student, average teacher salary, average administrators salary and administrative expense as a percentage of the educational expenditure.

Table 4.10

Regression Analysis, Average ACT Composite Score as Dependent Variable (2011 N=494, 2012 N=476, 2013 N=476, 2014 N = 476)

Variable	Report Card Year	B	Std. Error
Low Income Percent	2011	-0.071	0.004***
	2012	-0.067	0.004***
	2013	-0.06	0.004***
	2014	-0.066	0.004***

(Continued on following page)

Table 4.10 continued.

Variable	Report Card Year	B	Std. Error
Local Property Tax Percent	2011	-0.006	0.013
	2012	-0.012	0.012
	2013	0.001	0.009
	2014	0.001	0.008
General State Aid Percent	2011	-0.016	0.015
	2012	-0.016	0.013
	2013	-0.014	0.010
	2014	-0.004	0.010
Federal Funding Percent	2011	0.005	0.018
	2012	-0.01	0.022
	2013	-0.02	0.017
	2014	0.01	0.016
Instructional Expenditure per Pupil	2011	-3.81E-05	0.000
	2012	-7.15E-05	0.000
	2013	5.99E-05	0.000
	2014	0.00E+00	0.000*
Avg. Teacher Salary	2011	9.10E-06	0.000
	2012	2.02E-05	0.000*
	2014	2.71E-05	0.000***
Avg. Admin. Salary	2011	1.03E-05	0.000*
	2012	4.48E-06	0.000
	2014	6.50E-06	0.000
Admin. Exp. as percent of Instr. Exp.	2011	-0.035	0.009***
	2012	-0.025	0.010*
	2013	-0.04	0.010***
	2014	-0.029	0.009**

* p < .05; ** p < .01; *** p < .001

In examining the results as presented in Table 4.10, there were not that many instances where value for significance was below 0.05. There was significance when examining low socioeconomic status as the input. That significance was present for all four years. Significance

was found in 2014 when the per-pupil instructional expenditure was the input. Significance was also found in 2012 and 2014 when Average Teacher Salary was the input and in 2011 when average administrator salary was the input. Administrative expenditure as a percentage of the instructional expenditure was found to have significance as an input in all years.

There was consistency of statistical significance over four years for the low socioeconomic status percentage. The coefficient varied between -0.071 and -0.06. The low socioeconomic status variable was a percentage that could have had a range between 0 and 100. If the slope of -0.071 was used and if the socioeconomic variable changed by a value of 10, then the value of the ACT score would change by -0.71, or less than a point. If -0.06 was used as the slope then the ACT score would change by -0.6. The ACT score is a value between 0 and 36. So in the case of a slope of -0.071 the ACT score would drop by about 2 percent. In rough terms, the linear regression is indicating that when the percentage concentration of low socioeconomic students increased by a factor of ten percent then the ACT score decreased by about two percent.

A similar relationship in regards to significance was found with administrative expense as a percentage of instructional expenditure. The coefficient varied between -0.035 and -0.025. The administrative expense variable was a percent that could have a range between 0 and 100. So if the slope of -0.025 is used and the administrative expense as a percentage of instructional expenditure increased by 10 percent, then the value of the ACT score would change by -0.25, or less than a point. If -0.035 was used as the slope then the ACT score would change by -0.35 if the administrative expense as a percentage of instructional expenditure increased by ten. The ACT score is a value between 0 and 36. So in the case of a slope of -0.035 the ACT score would drop by about one percent. In rough terms, the linear regression is indicating that when the

percentage that administrative expenditure is of the instructional expenditure increases by ten percent then the corresponding decrease in the ACT score is about one percent.

So overall the strongest indicator of student achievement when the ACT composite score measures student achievement is the concentration of low socioeconomic status students. The financial variable that were examined do not show the same level of relation and it can be argued that in actuality the financial variables were really not indicating the level of student achievement.

Table 4.11

Regression analysis, Average ACT Math Score as Dependent Variable (2011 N=494, 2012 N=476, 2013 N=476, 2014 N = 476)

Variable	Report Card Year	B	Std. Error
Low Income Percent	2011	-0.069	0.011**
	2012	-0.065	0.005***
	2013	-0.056	0.004***
	2014	0.06	0.004***
Local Property Tax Percent	2011	-0.007	0.014
	2012	-0.01	0.013
	2013	9.00E-03	0.009
	2014	-0.004	0.009
General State Aid Percent	2011	-0.02	0.016
	2012	-0.016	0.014
	2013	-0.007	0.011
	2014	-0.009	0.010

(Continued on following page)

Table 4.11 continued.

Variable	Report Card Year	B	Std. Error
Federal Funding Percent	2011	0.014	0.020
	2012	0.003	0.024
	2013	-0.005	0.018
	2014	0.005	0.017
Instructional Expenditure per Pupil	2011	-3.55E-05	0.000
	2012	-7.56E-05	0.000
	2013	0	0.000*
	2014	-7.76E-05	0.000
Avg. Teacher Salary	2011	1.94E-05	0.000*
	2012	2.70E-05	0.000**
	2014	3.00E-05	0.000***
Avg. Admin. Salary	2011	1.36E-05	0.000*
	2012	5.91E-06	0.000
	2014	8.28E-06	0.000
Admin. Exp. as percent of Instr. Exp.	2011	-0.036	0.011**
	2012	-0.033	0.011**
	2013	-0.041	0.011***
	2014	-0.024	0.010*

* $p < .05$; ** $p < .01$; *** $p < .001$

In examining Table 4.11, significance was found for all four years when the low-income percentage and the administrative expense as a percentage of the instructional expenditure were the inputs. Significance was indicated for the three years that data was available for average teacher salary. There were occurrences of inputs showing significance, but not consistently over the four years of study. Those occurrences were instructional expenditure per pupil in 2013 and average administrative salary in 2011.

There was consistency of statistical significance over four years for the low socioeconomic status percentage. The coefficient varied between -0.056 and -0.069. The low

socioeconomic status variable was a percent that could have a range between 0 and 100. So if the slope of 0.069 was used and if the socio economic variable changed by a value of 10, then the value of the ACT score would change by -0.69, or less than a point. If -0.056 was used as the slope then the ACT score would change by -0.56. The ACT score was a value between 0 and 36. So in the case of a slope of -.069 the ACT score would drop by about 2 percent. In rough terms, the linear regression was indicating that when the percent concentration of low socioeconomic students increased by ten percent then the corresponding decrease in the ACT score was about two percent.

A similar relationship in regards to significance was found with administrative expense as a percentage of instructional expenditure. The coefficient varied between -0.041 and -0.024. The administrative expense variable is a percent that could have a range between 0 and 100. So if the slope of -0.041 was used and the value of administrative expense as a percent of instructional expenditure changed by 10, then the value of the ACT score would change by -0.41, or less than a point. If -0.024 was used as the slope then the ACT score would change by -0.24. The ACT score is a value between 0 and 36. So in the case of a slope of -0.041 the ACT score would drop by about one percent. In rough terms, the linear regression is indicating that when the percent that administrative expenditure is of the instructional expenditure increases by ten percent then the corresponding decrease in the ACT score is about one percent.

A similar relationship in regards to significance was found with average teacher salaries. The coefficient varied between 1.94E-05 and 3.00E-05. The magnitude of these two slopes was very small. The reason was that teacher salaries average around the mid fifty thousand dollar range. So the range in values for the two variables being compared was substantially different. So, to better examine the relationship a change by ten thousand dollars in teacher salary will be

used. So if the slope of $1.94E-05$ was used and the value of teacher salary changed by \$10,000, then the value of the ACT score would change by 0.1974, or less than a point. If $3.00E-05$ was used as the slope, then the ACT score would change by 0.3. The ACT score is a value between 0 and 36. So with a \$10,000 increase in teacher salary there would be less than a one percent increase in the ACT score.

So, overall the strongest indicator of student achievement when the ACT math score was the measure of student achievement was the concentration of low socioeconomic status students. The financial variables that were examined do not show the same level of relationship and it can be argued that in actuality the financial variables are really not indicating the level of student achievement.

Table 4.12

Regression analysis, Average ACT Reading Score as dependent Variable (2011 N=494, 2012 N=476, 2013 N=476, 2014 N = 476)

Variable	Report Card Year	B	Std. Error
Low Income Percent	2011	-0.068	0.004***
	2012	-0.064	0.005***
	2013	-0.059	0.004***
	2014	-0.067	0.004***
Local Property Tax Percent	2011	-0.012	0.014
	2012	-0.008	0.130
	2013	-3.00E-03	0.009
	2014	0.002	0.009
General State Aid Percent	2011	-0.018	0.016
	2012	-0.013	0.014
	2013	-0.018	0.011
	2014	-0.002	0.010

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Table 4.12 continued.

Variable	Report Card Year	B	Std. Error
Federal Funding Percent	2011	-0.004	0.020
	2012	-0.015	0.024
	2013	-0.023	0.019
	2014	0.004	0.017
Instructional Expenditure per Pupil	2011	-6.60E-05	0.000
	2012	0.00E+00	0.000
	2013	3.20E-05	0.000
	2014	0.00E+00	0.000**
Avg. Teacher Salary	2011	3.56E-06	0.000
	2012	1.70E-05	0.000
	2014	2.41E-05	0.000**
Avg. Admin. Salary	2011	9.14E-06	0.000
	2012	1.97E-06	0.000
	2014	5.11E-06	0.000
Admin. Exp. as percent of Instr. Exp.	2011	-0.033	0.01**
	2012	-0.016	0.011
	2013	-0.031	0.011**
	2014	-0.026	0.01*

* $p < .05$; ** $p < .01$; *** $p < .001$

In examining Table 4.12, significance was found for all four years for only one input and that was the percentage of students that come from low socioeconomic status families. For three of the four years studied significance was indicated for the administrative expenditure as a percentage of the instructional expenditure. In 2014 instructional expenditure per pupil showed significance and in 2015 average teacher salary showed significance.

The coefficient varied between -0.068 and -0.059. The low socioeconomic status variable was a percentage that could have a range between 0 and 100. So if the slope of -0.068 was used and if the socio economic variable changed by a value of 10, then the value of the ACT

score would change by -0.68, or less than a point. If -0.059 was used as the slope then the ACT score would change by -0.59. The ACT score is a value between 0 and 36. So in the case of a slope of -.068 the ACT score would drop by about 2 percent. In rough terms, the linear regression is indicating that when the percentage concentration of low socioeconomic status students increased by ten percent then the corresponding decrease in the ACT score was about two percent.

So overall, the strongest indicator of student achievement when the ACT reading score was used as the measure of student achievement was the concentration of low socioeconomic status students. The financial variables that were examined do not show the same level of relationship and it can be argued that in actuality the financial variables were really not indicating the level of student achievement.

Table 4.13

Regression analysis, Composite Percent that Meets and Exceeds as Dependent Variable (2011 N=494, 2012 N=476, 2013 N=476, 2014 N = 476)

Variable	Report Card Year	B	Std. Error
Low Income Percent	2011	-0.595	0.037*
	2012	-0.517	0.038*
	2013	-0.471	0.032*
	2014	-0.468	0.029*
Local Property Tax Percent	2011	-0.018	0.122
	2012	-0.08	0.106
	2013	3.900E-02	0.069
	2014	-0.004	0.065

(Continued on the next page)

Table 4.13 continued.

Variable	Report Card Year	B	Std. Error
General State Aid Percent	2011	-0.010	0.137
	2012	-0.108	0.115
	2013	-0.550	0.078
	2014	-0.090	0.075
Federal Funding Percent	2011	0.170	0.173
	2012	0.086	0.194
	2013	0.004	0.135
	2014	-0.090	0.124
Instructional Expenditure per Pupil	2011	0.000	0.000
	2012	0.000	0.000
	2013	0.000	0.000
	2014	0.000	0.000
Avg. Teacher Salary	2011	-5.440E-05	0.000
	2012	-3.310E-05	0.000
	2014	6.320E-05	0.000
Avg. Admin. Salary	2011	7.430E-05	0.000
	2012	2.730E-05	0.000
	2014	3.170E-05	0.000
Admin. Exp. as percent of Instr. Exp.	2011	-0.049	0.092
	2012	-0.065	0.088
	2013	-0.062	0.078
	2014	-0.126	0.071

* $p < .001$

In examining the results from Table 4.13, significance was only indicated for the relationship between the percentage of students that came from low-income families. That significance was indicated for all four years of data. No other inputs studied showed significance.

The coefficient varied between -0.595 and -0.468. If the slope of -0.595 was used and if the socioeconomic variable changed by a value of 10, then the value of the percentage of

students that met and exceeded standards would change by -5.9. If -0.468 was used as the slope then the percentage that met and exceeded standards would change by -4.6. So roughly for every ten percent increase in the percentage of low socioeconomic status students there was approximately a four and a half percent to six percent decrease on the percentage of students that met or exceeded state standards.

There was consistency between the four tables. The linear regression examination revealed a consistent pattern: the greater the percentage of students in a school that were considered as from low socioeconomic status families, the lower the value of the various indicators of student achievement. Within the ACT scores there were some indications that the average teacher salary and the average administrator salary had a positive linear regression. When examining the Administrator Expense as a percentage of the instructional expenditure, there was a negative relationship indicating the greater the percentage of funds used for administration, the lower the student achievement.

The fourth research question was focusing the study on the determining factors that indicate student achievements. In all measures of student achievement that were studied, consistently, the greater the percentage of students that came from low socioeconomic status families related to lower student achievement scores. When restricting student achievement to results on ACT assessments, it was found that the greater the percentage of administrator expenditure was of the instructional expenditure related to lower student achievement scores.

As with the correlation analyses, further examination of how the relationships between inputs and outputs vary by concentration of low socioeconomic status students provides further nuance to these patterns. The first examination isolates the districts into two subgroups based on

concentration of low socioeconomic status students. The two groups represented school districts that are one standard deviation above the mean (high poverty districts) and one standard deviation below the mean (low poverty districts) of the percentage of students from low socioeconomic status families. One of the inputs that districts control is the amount it pays its teachers. For these subgroups the regression will be examined with average teacher salary being the independent variable and at the average ACT composite score to be the dependent variable. Table 4.14 and 4.15 details the analysis.

Table 4.14

Regression analysis of High Poverty Districts: Average Teacher Salary and Average ACT Composite (2011 N = 66, 2012 N = 66, 2014 N = 64)

Variable	Report Card Year	B	Std. Error
ACT	2011	-3.565E-5	.000*
Composite	2012	-3.289E-5	.000*
Score	2014	-9.586E-6	.000

* p < .05

Table 4.15

Regression analysis, Low Poverty Districts, Average Teacher Salary and Average ACT

Composite (2011 N = 89, 2012 N = 83, 2014 N = 78)

Variable	Report Card Year	B	Std. Error
ACT	2011	6.160E-5	.000*
Composite	2012	6.073E-5	.000*
Score	2014	6.081E-5	.000*

* p < .001

In examining these results, in virtually every case there was statistically significant relationship between the two variables. There was an interesting difference between the two tables. In the case where the data was restricted to high poverty districts (Table 4.14) the coefficient was negative meaning that as the average teacher salary increases the level of student achievement as measured by the ACT composite score decreases. In examining Table 4.15, which represents low poverty school districts, the opposite relationship was realized. As the average teacher salary increased student achievement as measured by the ACT composite score increased.

When comparing the results as presented in Table 4.14 and 4.15 there was an indication that there was a significant relationship between Average Teacher Salary and the ACT composite score. By splitting the data into the two groups based on the percentage of students that come from low socioeconomic status families, it showed that the concentration of low socioeconomic status students had the effect of reversing the slope of the linear regression. It should be noted that the magnitude of the slopes in all cases was small. For instance from Table 4.15 in 2014 the slope was 6.081E-5. So in that case, if the average teacher salary were to change by \$10,000 the

ACT composite score would change by about six tenths of a point. In terms of a percentage there would be about a 1.6% change in the ACT Average score.

Also as was done in the correlation analysis, the school districts were filtered based on per pupil expenditure. Specifically two sub groups were created. One sub group was all districts that have per pupil expenditures that are more than one standard deviation above the mean. The other sub group was all districts that have per pupil expenditures that are one standard deviation or more in the negative direction from the mean. A regression analysis was performed examining the relationship between percentage of students from low socioeconomic status households (independent variable) and average district composite score on the ACT (dependent variable). Tables 4.16 and 4.17 detail the results.

Table 4.16

Regression analysis, Low spending districts, Percentage of students from low socioeconomic households and, average ACT composite score (2011 N = 41, 2012 N = 36, 2014 N = 34)

Variable	Report Card Year	B	Std. Error
Average ACT Composite Score	2011	.013	.029
	2012	-.014	.019
	2014	-.059	.012*

* p < .001

Table 4.17

Regression analysis, High Spending Districts, Percentage of students from low socioeconomic households and average ACT composite score (2011 N = 68, 2012 N =60, 2014 N =60)

Variable	Report Card Year	B	Std. Error
Average ACT Composite Score	2011	-.053	.017*
	2012	-.044	.010**
	2014	-.100	.011**

* p < .01; ** p < .001

In examining the results as presented by Tables 4.16 and 4.17 significance was only consistently observed in the case where pupil expenditures were one standard deviation above the mean. The coefficients were consistently negative and varied between -.1 and -.044. For example if the low-income percentage were to increase by ten percent, then the Average ACT score would decrease between .4 and one point. That was approximately a one to two percent change in the ACT score.

Chapter Summary

In order to address the four research questions that provide the foundation for this study, a number of variables were studied. First a presentation of descriptive statistics for each of the variables used in the study was discussed. Since there was data from four different school years, there was an opportunity to look for differences from year to year. For the most part the data was consistent from one year to the next. However there were some exceptions. In 2011 the proportion of district funds that came from federal sources was highest. In 2011 the federal government was providing stimulus funds to the states. Illinois chose to use those funds to augment the general state aid that was given to schools. This caused an increase of federal

funding to schools in that year. It also caused a decrease in state funding for that year. In 2014 both average teacher salary and average administrator salary saw a decrease from previous years.

The next step was to address the question of differences between the variables. A T-test was performed to examine the variables based on district type (high school or unit) and district size (large and not large). For the majority of the variables studied there was a statistically significant difference based on the districts. It appeared that both large districts and high school districts had a higher level of student achievement as measured by the ACT.

To answer the third research question, correlation between financial variables (independent variables) and student achievement variables (dependent variables) was calculated. In reviewing the results in virtually all cases there was a significant statistical correlation between the independent variable and dependent variable. Deeper examinations of the results led to breaking down the results into two categories. The first category was combinations that showed direct correlation. The second category was combinations that showed inverse correlation. The independent variables that showed direct correlation were per pupil expenditure, average teacher salary, average administrator salary, and percent local property tax (local funding). The independent variables that showed inverse correlation were low socioeconomic (low income) percentage, percentage state funding, percentage federal funding, and Administrative Expense as a percentage of instructional expenditure.

Correlations give an indication as to which variables have relationships with student achievement; it does not answer the fourth research question. The fourth research question focuses on determining which variables will indicate student achievement. The examination of

the analysis of the data using linear regression shows that the greater the percentage of low socioeconomic status students that are present, the lower the student achievement scores. When restricting the study to ACT scores, there was an indication that the greater the average teacher salary, the higher the student achievement scores. Also the data indicated that the greater the proportion of instructional expenditure funds that are used to support administrative expenses, the lower the achievement on the ACT assessments.

The information learned from this research helps quantify the relationship between financial factors and student achievement. In Illinois, the funding of schools has been and continues to be a topic of discussion in legislative circles. Most recently a budget was adopted that specifically referenced an evidenced based system for funding schools (Broadway, 2017a). As the state of Illinois moves towards a system that allocates funding based on evidence, it will become increasingly more important to study financial variables as well demographic factors such as low socioeconomic status and student achievement data to develop evidence on the appropriate way to allocate funds. Chapter 5 will provide more in depth interpretation of the data as well as conclusions that can be drawn from the data. Suggestions will be given for future research.

CHAPTER 5: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The argument on the proper way to fund public schools has a long history. In reviewing the literature on the subject there is a history of legislative initiatives and judicial interventions to address the concerns of funding. In *Brown vs. Board of Education* the question of proper funding of schools came to light based on practices of some states to segregate schools which was allowable under *Plessy v. Ferguson* (*Brown v. Board of Education*, 1954; *Plessy v. Ferguson*, 1896). *Plessy v. Ferguson* found that separate but equal was acceptable. *Brown v. Board of Education* found that separate was inherently unequal. Part of the argument was that states were saying they were providing for an adequate education in the segregated structure. The Supreme Court disagreed and overturned the separate but equal doctrine of *Plessy v. Ferguson*. At the root of all of this is adequacy and equity.

As adequacy and equity are examined, the concept of student achievement comes to light. Equity is defined as providing a “fair distribution of local, state and federal funds amongst all school districts, schools and students” (Jacoby & Mangan, 2016, p. 33). Adequacy “refers to the level of funding sufficient for every child to have equal educational opportunities to achieve to state proficiency standards” (Jacoby & Mangan, 2016, p. 33). Within the definition of adequacy is the reference to state proficiency standards. Student achievement in terms of those standards is examined to determine proficiency.

To address the equity and adequacy concerns, the state of Illinois in 2017 enacted a comprehensive school funding law that revamped the manner in which public schools were funded. The new system is using an evidenced based funding mechanism. In the past state funding was based on setting a minimum per pupil funding level. The district would be examined to determine if it could provide enough funding through local sources. The state, in theory, made up the difference.

The new funding formula still looks at the ability of the district to fund itself, but it also looks at various factors to determine the funding needs of the district. Factors including special education numbers and low socioeconomic status numbers are evaluated. Using these factors, it is determined as to what the adequacy target is for a district. In this sense every district is treated differently. Gone is the assumption that all districts are the same. Instead the student populations are examined to determine if there are at-risk students that need more resources. The evidence based funding formula is designed to channel more financial resources to districts based on need rather than based solely on student population.

The framework that forms the foundation of this study focuses on various inputs and how they relate to various outputs. The relationship between inputs of sources of funding as well as how districts prioritize the use of those funds, and student achievement is studied. Additionally, the demographic input variable of concentration low socioeconomic students in a district and how it relates to student achievement is examined. With the state of Illinois now using an evidence-based formula that focuses on providing adequate funding so that students can have equal opportunity to achieve, the examination of the relationship between these inputs and outputs becomes even more relevant.

For school districts, improving student achievement is a high priority. Making changes in the school with the goal of improving student achievement puts more stress on financial resources. The goal of adequate funding is to give all students opportunity to meet state standards. If determining fair funding is tied to the definition of adequacy and if adequacy is related to student achievement, there is a need to understand the relationship between funding and student achievement. A population that the literature shows has high level of need is low socioeconomic status students. Those students have needs that tax the resources of a district. Those students do not have the resources available at home that more affluent students have. It can be as simple as not having the appropriate supplies to function at school. It can be as complicated as the housing situation not being conducive to providing a beneficial learning environment.

The purpose of this study is to look at three types of relationships. The first is the relationship between funding sources and student achievement. The second is to examine how that funding is distributed by the local district: administrative salaries, teacher salaries, and per pupil expenditures; and how it relates to the output of student achievement. Because the low socioeconomic status student has been the topic of many studies and is also an element of many funding formulas, the relationship between low socioeconomic status and student achievement is examined. Additionally now that the state of Illinois has reformed its school funding to an evidence based funding formula that has as one of its aspects the concentration of low socioeconomic status students, the need to study this relationship is even more relevant (Figueira et al., 2017).

Four research questions were developed to focus and guide this study. Those questions are:

RQ1: What are the means/standard deviations/distributions of student achievement at the district level (math and reading), instructional expenditure (per pupil expenditure), low income students, average teacher salary, average administrator salary, revenue from local property tax, revenue from state sources, and revenue from federal sources?

RQ2: What are the differences in academic achievement based on school district demographics (percentage low socioeconomic), average teacher salary, average administrator salary, percentage of funding from property tax (local sources), percentage of funding from State, percentage of funding from federal sources, and per pupil expenditure by the district?

RQ3: What are the relationships among the student achievement and funding variables?

RQ4: How are various factors associated with student achievement?

Discussion

The foundation of the study is based on the framework as discussed in Chapter 1. Figure 1.1 from that chapter graphically organized the flow of the study. Schools received funding from three sources: local, state, and federal. The districts have latitude in how the revenue is used. Those priorities differ from one district to another. Districts control priorities but do not control other factors such as location of district, economic profile of the district, or demographic make-up of the district. From the standpoint of the Education Production Function all of these factors are considered as inputs. Figure 1.1 shows a structure that examines these inputs to determine if there is any relation to the output of student achievement. The relationship between the variables can be broken into three broad categories: positive, negative, or null. A positive relationship shows that an increase in the value of the input relates to an increase in the value of the output. A negative relationship shows that an the input and the output are trending in opposite directions.

A null relationship indicates that a change in the value of the input does not relate to a change in the output.

On the left hand side of Figure 1.1 are the input variables of local funding, state funding, and federal funding. A review of literature shows that amount of funding provided to schools from these various sources have been subject of legal review. There have been several court cases at both the state and federal level that have argued what is the appropriate means to fund school districts. Within those cases, arguments regarding adequate and equitable funding have been presented to the courts. The results of those cases are mixed. There have been some situations where courts have mandated change. There have been some cases where either no change is mandated, or where the courts have referred the issue back to the legislature.

The question of adequacy and equity were elements of the legislative process that lead to the comprehensive school funding reform that became law in Illinois in 2017. The new funding system uses an evidence based funding formula. The formula looks at the needs of the school district as opposed to just funding based on enrollment. If a district has a higher concentration of at-risk students then more funding is directed to the district. What the formula does not do is give direction to the district on how to use the additional revenue.

In the review of the literature the question of the relationship between funding and student achievement is explored. Depending on the author there are differing opinions. Those opinions also bring into question the manner in which districts prioritize the use of funding. Within the new funding formula, one factor that is examined is the concentration of low socioeconomic status students. Districts with greater concentrations of these students receive more funding through the new formula. Districts then choose how to use those funds to address

the needs of those students. This brings into question the relationship between funding, how funding is used, and student achievement. Is the presence of additional revenue based on the low socioeconomic status student concentration able to enhance the educational opportunities of those students so that there is an increase in student achievement?

Data from the Illinois School Report Card as provided by the Illinois State Board of Education is examined to quantify if any strong relationships between the input and output variables exist. The research question forms the basis of the rest of the discussion.

RQ1: What are the means/standard deviations/distributions of student achievement (math and reading), instructional expenditure (per pupil expenditure), low income students, average teacher salary, average administrator salary, revenue from local property tax, revenue from state sources, and revenue from federal sources?

In examining the funding sources throughout the state it was found that there was a wide range of values for the percentage that is received from each source. For some districts the vast majority of the funding resources was generated from local sources. For other districts there was high dependence on state and/or federal funding and less dependence on local sources. Once districts receive funding, local school board determine how those funds are used. As with funding sources, the data shows a difference throughout the state on per pupil expenditures as well as average administrator and teacher salaries. Additionally there was a large variation in the concentration of students from low socioeconomic status families. As literature has shown, funding in Illinois is not equitable. The data supports the literature. There are vast differences in available resources. There are vast differences in compensation for teachers and administrators. There are vast differences in the relative property wealth of districts as evidenced by the

differences in available local resources. And there are significant differences in the concentration of at-risk students such as low socioeconomic status students.

In reviewing data related to student achievement, over the four years of the study there was not much of a change in the average or the standard deviation. Specifically the ACT composite, ACT English, and ACT math mean did not vary much. The standard deviation did not vary much either. So over the four years of the study there was not an observed significant increase or decrease in student achievement as reported by ACT scores.

The state of Illinois used the ACT as part of its measure to determine if a student meets or exceeds state standards. One of the variables that was studied was the percentage of students in a school district that met or exceeded state standards. The mean of the number of students that met or exceeded state standards did not change much over the four years. The average mean was around 50%. There was, however, a large range in the scores, which is reflected by a large standard deviation. In some schools nearly all students did not meet or exceed state standards, while in other schools over 90 percent of students met or exceeded state standards. This wide range of percentages gives a picture of the wide range of schools that are present in the state of Illinois. When there is such a range it brings to question why some schools do better than others. Is it related to the funding, expenditure patterns, or to demographic factors outside of the district's control such as the low socioeconomic status of students served?

Overall, in looking at the four years of data, from year to year there were not any drastic changes. In some cases there were trends such as increasing values. Student achievement scores seemed to be fairly consistent as well as the percentage of students meeting and exceeding state standards. Financial data showed a wide range of values. The socioeconomic status also showed

a wide range of values as well as was showing a five percent increase over the four years of the study. When examining these findings through the lens of equity, it is obvious that districts are not being funded in an equitable manner. The variance in per pupil expenditures is one example of that. The vast difference in available local resources reinforces the statement. From the standpoint of adequacy the answer is not as clear. The literature shows that there is not a consistently agreed upon adequacy level. Jacoby and Mangan (2016) give a definition that adequate funding enables a student to have equal educational opportunities to achieve to state proficiency standards. An examination of the variables using descriptive statistics does not allow for a definitive discussion about adequacy. Within the definition of adequacy is a connection between input and output. If adequate funding (input) is achieved then all students will have opportunities to achieve to state standards. Adequacy is a more complex concept that needs a more rigorous examination. The next three research questions will help in that examination.

RQ2: What are the differences in academic achievement based on school demographics (percentage low socioeconomic), average teacher salary, average administrator salary, percentage of funding from property tax (local sources), percentage of funding from State, percentage of funding from federal sources, and per pupil expenditure by the district?

A school district in Illinois can be organized as a unit district (K-12), elementary district (K-8), and high school district (9-12). Districts also are classified by ISBE by size. The second research question focuses the study on both the organization type and size of districts. Since this study focused on the achievement of high school students it is of interest to examine if the different district types show a statistically significant difference in the data. The same examination is available for the size of the district.

T-tests were performed looking at differences based on district type (high school and unit) and on district size (large and not large). In the case of school district type there was a pattern of high school districts showing a higher level of student achievement as measured by the ACT. Additionally there was a pattern of high school districts having a higher level of per pupil expenditures as well higher salary levels for teachers and administrators. High School districts tended to have more resources available from local sources.

In the case of school district size there was a pattern of school districts that were classified as large choosing to spend more on teacher salaries, administrator salaries, and per pupil expenditures. When examining the administrative expense as a percentage of the instructional expenditure, small/medium sized districts were double that of large districts. It also was observed that large districts had a higher student achievement as measured by the ACT.

In general terms the data indicates students that are in high school districts and/or in larger school districts appear to achieve at a higher level. Also larger school districts and high school districts appear to have more resources available. Those districts have as an option to make the choice to compensate teachers and administrators at a higher salary. Also, larger school districts and high school districts appear to have a higher per pupil expenditure rate.

It needs to be understood that the T-test is showing that the two types of districts are distinctly different. This is true for type and size. There are many factors that could be causing differences. District type and size in of itself is not necessarily the reason for the difference. For instance in the case of a large school district, typically more resources are available because the district is located in a more urban area. Property values are higher. Also there is a higher concentration of schools, meaning there is a higher level of competition to get good teachers.

Competition for teachers can drive salaries higher. In the case of high school districts, especially high school districts in urban areas, increasing teacher salaries does not have the same effect as in unit districts. Typically in all school districts there is a collectively bargained agreement that determines salaries. If a unit district needs to raise salaries to attract quality teachers at the high school, salaries are raised for all teachers K-12. A high school district has the advantage of only representing 9-12 teachers. If it raises salaries it is for only high school teachers and does not apply to the K-8 teachers that serve in the feeder districts.

So to summarize, the examination using T-tests of district types and sizes gives the indication that students achieve at a higher rate in high school districts and in large districts. That is only an indication; it is not comprehensive proof that high school districts and large school districts in and of themselves cause the higher achievement. A similarity of structure in both high school districts and large districts is the opportunity to more efficiently allocate resources. A high school district can allocate resources to specific initiatives and not worry about the effect on lower grade levels. In the large school district initiatives that are directed at specific student groups are can be justified financially because there is a larger group of students that it will be targeted towards. In the small district such an initiative might only target a few students and might not be financially feasible. For instance, there might be an indication for more targeted response to intervention initiatives. In order to provide these initiatives a teacher might need to be hired. In large district, and perhaps in a high school district, that can be justified because there are enough students to warrant a full time teacher. In a small district or a unit district the numbers might not be there for a full time teacher. In the unit district the numbers might be there but they might be spread out in many buildings therefore not making it feasible for one teacher to provide services to all.

First when looking at the concentration of students that come from a low socioeconomic background in a school district, there was an inverse correlation between the percentage present in a district and academic achievement. What was even more alarming was that each year of the study the correlation grew more negative meaning the inverse relationship became stronger each year. The greater the percentage of students that come from a low socioeconomic background, the lower the percentage of students in the district that met or exceeded state standards.

When results on the ACT math and reading were examined there were similar results in respect to the concentration of students that came from low socioeconomic backgrounds. Unlike percentage of students meeting and exceeding, there was not a consistent pattern of change, up or down during the four years studied.

The three variables that were used to assess student achievement showed that the higher the population of low socioeconomic status students that was present in a district, the lower the measurement of student achievement. Of all of the variable relations studied, the strongest correlations (inverse) were found when examining the relationship between the concentration of low socioeconomic status students and student achievement.

Linear regression was used to determine if any of the variables showed a strong relationship to student achievement. On all four student achievement variables, the greater the percentage of low socioeconomic status students in a district, the lower the values on the student achievement indicators. In districts with higher instructional expenditures that also had higher rates of low-income students, it appeared that those students performed at a lower rate than high spending districts with lower percentages of low socioeconomic status students. If the study was

restricted to performance on the ACT, it was found that the higher the average teacher salary and the higher the administrator salary, the higher the score on the ACT composite, ACT math, and ACT reading.

Districts receive funding from three primary sources: local, state and federal. In examining the relationship between those funding sources and student achievement it was found that there was significant statistical correlation between students that meet and exceed state standards and the percentage of funding that comes from local sources. ACT math and ACT reading showed a similar relationship. The correlation was not as strong as with low-socioeconomic status students. In this case, though, the correlation was positive meaning the greater the number of resources that were derived locally the higher the students achieved. When examining the relationship between state and federal sources the correlation was negative, meaning the greater the percentage of funding from state or federal sources, the lower the achievement on all three variables. In examining linear regression, there was not an indication of funding sources showing strong relationship to student achievement.

There could be many explanations to this relationship. Local resources are primarily provided by property tax. The higher the property value of the district, the more funds that are derived locally. One way of interpreting the data is that students coming from more affluent districts (districts that have higher property values) have a better chance of achieving at a higher level. An argument could be made that a student's zip code is a strong indicator of the student's access to resources that allow him/her to achieve at a high level. Districts that have a high percentage of local funding do not have a high percentage of students from low socioeconomic households. For instance in 2014 there was a strong inverse correlation (-.596) that was statistically significant at the 0.01 level between the percentage of local sources and the

percentage of low income students in a school, indicating the more local resources that are available the fewer students that come from low socioeconomic families. Table 5.1 details this relationship for all four years of the study.

Table 5.1: Correlation of students from low-income families and percent of revenue that comes from local sources (property tax)

	Low Socio Economic Percent Year of Report Card Data			
	2011	2012	2013	2014
Percent funding from Local Property Tax	-.569*	-.572*	-.576*	-.596*

* Significant at the 0.01 level

Student achievement and how it relates to per pupil expenditures by the district was examined. There was significant statistical correlation between per pupil expenditures and the percentage of students that met and exceeded state standards as well as ACT reading, math, and composite. The level of correlation was not at the same level as with low socioeconomic status students. Linear regression did show a strong relationship between per pupil expenditures and student achievement.

The Jungmann (Jungmann et al., 2004) study of Missouri schools found statistical significance when examining student achievement as it related to average teacher salaries and average administrator salaries. In the data from 2011 to 2014 that was studied (note that there was not any data available for 2013) there was a statistically significant correlation across all student achievement variables when they were compared to average teacher salaries. The percentage of students that met or exceeded state standards did have significant correlation with average teacher salaries. ACT math did have significant statistical correlation to average teacher salary. ACT reading showed significant statistical correlation with average teacher salaries. As

for average administrator salary, there was a significant statistical correlation between the percentage of students that met or exceeded state standards. Average administrator salary compared to both ACT reading and math showed significant correlation. Linear regression did not show the same strength of relationship.

The examination of administrative salaries was taken a step further. There was an opportunity to look at the administrative expense as a percentage of the instructional expenditure. That variable was compared to student achievement variables. It was found there was significant negative correlation between administrator expense and student achievement. Linear regression again did not indicate a strong relationship.

To summarize, the strongest correlation between inputs and outputs is the correlation between the concentration of low socioeconomic status students and student achievement. The greater the concentration of low socioeconomic status students the lower the level of student achievement. When taking this examination deeper and looking at the relationship between teacher salaries and student achievement in high and low poverty districts, it was found that in high poverty districts, raising teacher salaries did not show any gains in student achievement. When examining districts with a high level of per pupil expenditures, there again is strong inverse correlation between the percentage of student from low socioeconomic families and student achievement. So even when a district decides to allocate more resources to instruction and teacher salaries, there does not appear to be an increase in student achievement in districts with high concentrations of students from poverty. Linear regression indicates a strong relationship.

With the new evidence based funding formula that Illinois has adopted, the above finding brings into question if providing additional funding based on the concentration of low socioeconomic status student makes sense. This finding also brings to light the arguments that are made by Schrag (2003) and Bracey (1997) in regards to the work of Hanushek. Schrag (2003) makes the argument that increasing funding does not increase student achievement. Bracey (1997) argues the opposite point. At first examination, it appears that in the case low socioeconomic status students that Schrag is correct. That is an over simplification of the facts. Schools have students in their care for about six to eight hours a day. Is that enough to offset the time away from school? Low socioeconomic status students do not have the same supports from families that students from non low socio economic families have (Reardon, 2011). What this finding exposes is that students from low socioeconomic families have a variety of factors that have the potential of adversely affecting student achievement. Schools do not have the ability to address all of them.

To examine the argument between Schrag and Hanushek in the light of these findings, it brings to light that increasing school funding to address the issue of the low socioeconomic status student is only one piece in the puzzle. A student that comes from a low socio economic background family has many other issues/concerns that could affect his/her ability to perform. Is the school equipped to address those issues? Does increasing the funding provide enough change so that the students can perform better?

Conclusions and Implications

Public schools need funds to operate. Without funding schools do not open and students do not have the opportunity to learn. So, to say that there is no relationship between school

funding and student achievement would be incorrect. However, beyond the base level of no money equals no opportunity to learn, the relationship between funding and student outcomes is far murkier. There have been attempts to address the issue by ensuring base-level funding of schools through the courts. The question in those cases usually revolves around equitable funding or adequate funding, assuming that base level funding is sufficient to ensure student achievement. Because the outcome that is assessed is student achievement, and student achievement levels have not reached desired levels, the argument becomes that schools are not being funded in a manner that enhances student achievement. In some cases courts have referred the issue of school funding back to the legislature. In Illinois the legislature in response to school funding concerns enacted an evidence based funding structure in attempt to correct funding disparities.

Is the answer just fixing perceived school funding inadequacies? In reviewing the literature there is some argument about school funding and if it matters. Specifically in reviewing Hanushek (1979, 1986, 2003; Hanushek et al., 2009) there are arguments about his conjecture that money does not matter in education. That is an over simplification of the facts. Money does matter in education. Without money there is not a public school system. Hanushek (1979, 1986, 2003; 2009) seems to be arguing against just throwing money at schools.

An education production function formula was used as the framework for this study. The production function formula looks at the relationship between inputs and outputs. With the disagreement between authors as is discussed in the literature review in regards to if funding matters or not, the examination of various financial inputs as they relate to the output of student achievement was warranted. In reviewing the data that was analyzed for this study, there is agreement with Hanushek. The per pupil spending was not a strong indicator for student

achievement. The two strongest indicators of student achievement were districts that had high percentages of revenue coming from local sources and schools that had low concentrations of low socioeconomic background students. Another way of looking at this result is that students in more affluent schools appear to achieve at a higher level; however, more affluent schools have a lower percentage of low socioeconomic students. Using linear regression it was shown the concentration of low socioeconomic status students indicates student achievement. Specifically high concentrations indicated lower student achievement (at a district level). Additional analysis showed that in districts that had high concentrations of students from low socioeconomic status families that increasing average teacher salary did not reverse the negative trend. The data indicates that high concentration of low socioeconomic status students is related to low student achievement. So is adding funding the answer, or is there a need to focus all funding to the needs of the low socioeconomic status student, as is done with federal Title I funding?

Part of the data examination included looking at the proportion of funding from various sources including federal sources. Federal sources, as previously discussed, are primarily allocated to districts based on the concentration of low socioeconomic students. So districts that receive a high concentration of funding from the federal government also have a high concentration of low socioeconomic students. Within the framework, there was an examination of the relationship between district decisions concerning the use of funds, for example teacher salaries, and student achievement. Federal funding has to be used in specific ways, unlike state and local funding. Increases in federal funding did not relate to increases in student achievement. At first look, it seems that federal funding is not helping in student achievement. Because federal funding is associated with students from low socioeconomic families, districts with high concentration of federal funding also have high concentration of students from low

socio economic families. The federal funding might be helping this situation, but the effects of being from a low socio economic family are so pervasive and all-encompassing that the federal funding is unable address those effects sufficiently enough to improve student achievement.

In Illinois legislation has passed both the House and Senate and was signed by the governor that revamped the school funding formula. The new formula is evidenced based and focuses funding based on need (Broadway, 2017b). According to Jacoby and Mangan (2016) the evidenced based model has at its root a shift to address the needs of the student and base the amount of funding given to a school district on the needs of the students that are enrolled in the school district. So in the case of low socioeconomic status students, there appears to be a need for more resources to address the myriad of needs that these students have. The evidence based funding model will enhance the ability of the state to provide the support where the support is needed (Jacoby & Mangan, 2016). The funding formula does not specify that these additional resources have to be used on students from low socioeconomic families. One option that a district has is to raise average teacher salary. This allows the district to attract high quality teachers. An examination of the data specifically to districts with high concentration of low socioeconomic students does not indicate that this alone is effective

The achievement of low socioeconomic students is an issue that has become worse over the years. “The achievement gap between children from high- and low- income families is roughly 30 to 40 percent larger among children born in 2001 than among those born twenty-five years earlier.” (Reardon, 2011, p. 4) There have been initiatives such as Title I (federal) that have provided supports to assist low socioeconomic status students. Why has the achievement gap widened? Reardon (2011) describes four reasons why the gap has widened. The first is that

income inequality has increased over the last forty years. Specifically the income difference between the ninetieth and the tenth percentile has increased. The second reason Reardon (2011) indicates is that affluent families invest more time and resources in the development of their children than they did earlier in the century. Third, high socioeconomic status families have “greater socioeconomic and social resources that may benefit their children.” (Reardon, 2011, p. 13) Finally, the increase in “income segregation” has increased the differentiation in the quality of schools and the schooling opportunities (Reardon, 2011, p. 13). The data from this study shows that the number of students from low socio economic families increased from 2011 to 2014. This study also shows that the greater the concentration of low socio economic students in a district the lower the student achievement scores.

Based on the work of Jungmann (Jungmann et al., 2004) there was a belief at the start of the data analysis that there would be a strong correlation between average teacher salaries and student achievement. In analyzing the data there was an increase in ACT scores in districts with higher teacher and administrator salaries. In examining the percentage of students meeting and exceeding standards, there was not the same statistical significance. The data suggests that salary averages cannot necessarily be used to indicate student achievement.

This study focused on examining various input variables or factors that could contribute to student achievement. Districts are funded from three sources: federal, state, and local. There is some indication that the source of funding relates to student achievement. Specifically the percentage of funding from local sources correlates to higher achievement. The regression study shows that even though the high the amount of local funding, the higher the student achievement, the actual increase the increase was not statistically significant. The school district or a school board determines how the funding is used. There was indication that teacher salaries are related

to student achievement. The regression study shows that average teacher salary does not significantly indicate student achievement. One factor that is not controlled by the district is the concentration of low socioeconomic status students in district. These two variables are inversely correlated. Regression significantly indicates with a negative slope that the greater the concentration of low socio economic students the lower the student achievement scores.

The education production formula gives a structure in which to examine inputs and outputs. The discussion to this point has focused on inputs that statistically show a relationship to the output, either in positive or negative manner. So what does that mean if an input variable does not show a statistical relationship to the output of student achievement? Does that mean that variable should be ignored by the school district? For example the administrative expense as a percent of the instructional expenditure was examined. It was found that as that percentage increases there was a slight decrease in the student achievement. To be precise a ten percent increase related to approximately a one percent decrease in ACT score. How does a district interpret this finding? Does that mean administrative salaries should not be increased? What this finding is showing is that in reality the percent that administrative salary is of the instructional expenditure has a minimal relationship to student achievement. If the goal is to improved student achievement, adjustment of this percent is probably not going to relate to a significant change. This same argument can be made for all the variables that were studied that did not show a significant relationship to the student achievement. It does not mean the district should ignore the variable, but rather should not make changes in those variables for the purpose of, and with the expectation of seeing a change in student achievement.

Recommendations for Future Research

With the State of Illinois moving forward with an evidence based model for funding, there is a need to develop the evidence. The Illinois State Board of Education collects a vast amount of data from schools as was evidenced by the data files that were available for use in this study. This data needs to be used to better understand student needs. This study showed that there is a strong connection between socioeconomic status and student achievement. It is suggested that the low socioeconomic status students be made into a sub group and various statistical studies be developed. One such study would be to look at the achievement scores of just low socioeconomic students. Next, look at those scores and determine which schools are seeing the highest student achievement amongst students that come from low socioeconomic families. Determine which schools are having the most success, and then study what those schools are doing to support those students that other schools are not. Do low socioeconomic students do better in a school where there is a wide gap between the haves and have nots? Where additional supports have been implemented, is there a correlation to higher income potential once the student graduates from high school? Throwing money at the problem is not the answer. The answer is to find out what works and then give supports to the schools which allows them to apply these supports in a meaningful manner.

For this study, the determination of student achievement came from state achievement tests. In particular the state has many years of ACT scores. This data was useful in completing this study. What was missing was data that examined how students fared after they left school. Student achievement should not be isolated to assessment scores. There needs to be a development of a means to assess how well a student does post-graduation, be it college, military, apprentice programs, or the work force. What is the income potential of a student once they graduate from high school? One goal of education is to produce students that can become a

productive part of society. How can we assess if a student becomes a productive member of society? ¹⁴⁸

As the State of Illinois implements the evidence based funding formula, there will need to be development of research studies to assess the effectiveness of the formula. The research studies within themselves have the possibility of become part of the evidence that is used to adjust the formula. The research that was conducted in this study supports the goals of the evidence based formula. This research is merely a beginning, not an end.

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