UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

THE IMPACT OF THE INEQUITY OF CAPITAL IMPROVEMENT REVENUE ON THE EQUITY OF CURRENT EDUCATIONAL EXPENDITURES IN OKLAHOMA SCHOOLS

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

DEGREE of

DOCTOR OF PHILOSOPHY

By

SHAWN HIME
Norman, Oklahoma
2017

THE IMPACT OF THE INEQUITY OF CAPITAL IMPROVEMENT REVENUE ON THE EQUITY OF CURRENT EDUCATIONAL EXPENDITURES IN OKLAHOMA SCHOOLS

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY STUDIES

BY

_____
Dr. Jeffrey Maiden, Chair

_____
Dr. Gregg Garn

_____
Dr. Maeghan Hennessey

_____
Dr. Kathrine Gutierrez

_____
Dr. John Jones

TABLE OF CONTENTS

ABSTRACT viii

CHAPTER ONE: INTRODUCTION 1

Background to the Problem 1

The Impact of Funding on Educational Outcomes 3

Discrete Mechanisms for Funding Capital Outlay 4

Statement of the Problem 7

Purpose Statement 8

Research Questions 9

Significance of the Study 9

Limitations 10

Definitions 10

CHAPTER TWO: SCHOOL FUNDING EQUITY AND ADEQUACY OF CURRENT AND CAPITAL EDUCATION FUNDING 15

Fiscal Equity 15

Fiscal Adequacy 23

Oklahoma School Finance 25

Capital Improvement Funding 29

Summary 36

CHAPTER THREE: DESIGN OF THE STUDY 37

Research Design 37

Research Questions 39

Overview of Oklahoma's School Funding System 39

Crossover Funds 54

Data Collection 58

Assumptions 58

Data Analysis 58

Summary 64

CHAPTER FOUR: DESCRIPTIVE AND VISUAL REPRESENTATION OF THE RESULTS 65

Multiple Comparisons 72

Resource Accessibility Results 72

Wealth Neutrality 83

Summary 89

CHAPTER FIVE: FINDINGS, CONCLUSIONS, & RECOMMENDATIONS 90

Summary of the Study Findings 93

Conclusions 102

Recommendations for Future Research 104

Implication for Policy & Practice 105

Summary 106

REFERENCES 107

LIST OF TABLES

Table Page #

3.1: Oklahoma Public School General Fund Revenue by Source 41

3.2: Financial Impact of Weights: FY 2016 Initial Allocation 46

3.3: Average Weight Per Student 47

3.4: State Aid Revenue by Source 51

3.5: Oklahoma School Funding Formula: Horizontal Equity 53

3.6: Capital Revenue: Inequity Example 57

4.1: Descriptive Statistics Research Question 1 69

4.2: Test of Homogeneity of Variances 70

4.3: Adjusted Analysis of Variances 71

4.4: Post Hoc Analysis for Teacher Salaries 72

4.5: Resource Accessibility Current Expenditures per Pupil 75

4.6: Resource Accessibility Capital Expenditures per Pupil 77

4.7: Resource Accessibility Crossover Expenditures per Pupil 79

4.8: Resource Accessibility Current plus Crossover Expenditures per Pupil 81

4.9: Resource Accessibility Averages 83

4.10: Wealth Neutrality Capital Expenditures per Pupil 85

4.11: Wealth Neutrality Capital Expenditures per Pupil 87

4.12: Wealth Neutrality Crossover Expenditures per Pupil 88

4.13: Wealth Neutrality Current plus Crossover Expenditures per Pupil 89

5.1: Capital Revenue: Inequity Example 102

LIST OF FIGURES

Figure Page #

1.1: Percentage of School Construction Funded by State 3

ABSTRACT

The purpose for conducting this study was to examine the extent to which students in districts that have moderate or significant levels of capital funding through building and bond funds are placed at a relative resource advantage compared to students in districts with fewer funds from these two sources. Additionally, the study examines the extent to which crossover funding impacts the equity of current education fiscal support. To accomplish this purpose three research questions were considered:

The first research question asked, were there statistically significant differences in resources among Oklahoma school districts with low, moderate, or high levels of capital revenues derived from building fund and bond yields during fiscal year 2016? An Analysis of Variance (ANOVA) was used to answer research question 1. The conclusions from question 1 include:

- the ability to support capital expenditures appears to have a meaningful effect on current expenditure levels and
- districts that are able to support relatively higher levels of capital expenditures are able to support significantly higher levels of average teacher salaries.

The second research question asked, what were the effects of crossover funding on the resource accessibility of the Oklahoma education finance system during fiscal years 2012-2016? The conclusions for research question 2 include:

- current expenditures maintained a relatively high level of resource accessibility among districts and

- capital expenditures demonstrated a relatively low level of resource accessibility throughout the distribution.

Research question 3 asked, what were the effects of crossover funding on the wealth neutrality of the Oklahoma education finance system during fiscal years 2012-2016? The Gini Coefficient, McLoone Index, and Coefficient of Determination were used to ascertain the level of wealth neutrality of the indicated data. The conclusions for research question 3 include:

- Current expenditures were highly wealth neutral, again indicating that the state funding formula is functioning accordingly and
- capital expenditures were not wealth neutral, across the distribution of school districts.

CHAPTER ONE

INTRODUCTION

Background to the Problem

The United States constitution is silent on methods of designing and funding America's public schools. As a result, the task of creating a free public education that becomes the responsibility for state lawmakers. Consequently, there are now 51 unique educational funding systems in the United States. The fact there are different funding systems for each state and the District of Columbia has created a long history of debate and litigation at the national and state levels focusing on what is adequate and equitable funding.

The equity reform movement in school finance focuses on strategies for closing the gap between districts' abilities to raise revenue for their schools. Because local funds are commonly based on property taxes, less wealthy communities are unable to raise as much money for schools as wealthier districts, possibly leaving their children at a disadvantage (Stearns 2007). The higher the percentage of school funding that comes from the state, the better the chances of increased equity.

Oklahoma

Oklahoma has largely avoided the legal challenges over school funding equity because the state aid funding formula has been shown to equalize state-appropriated, local ad valorem (real and personal property) and state-dedicated revenue available for current educational expenses (Deering and Maiden 1999, Maiden 1998). The Oklahoma state aid funding formula has consistently been found to equitably distribute Oklahoma's school revenue earmarked for current educational

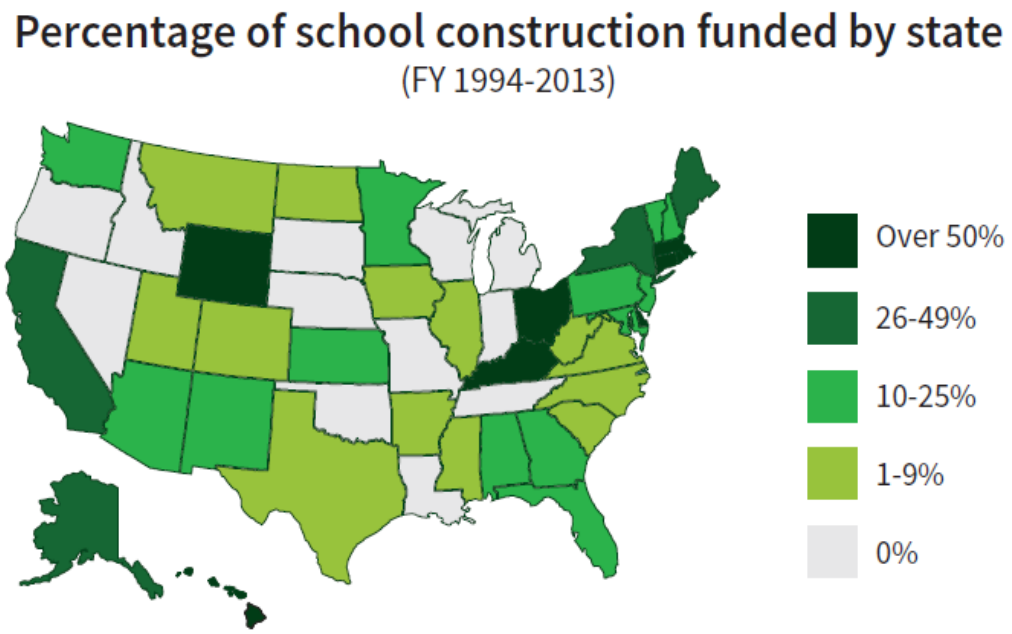
expenses (Deering 1997, Maiden 1998, Hancock 2015). Oklahoma's discrepancy in capital improvement revenue is based upon vast differences in property wealth among the 516 public education school districts in the state (Stearns and Maiden 2007). The Oklahoma state constitution calls for local property taxes to be the primary capital improvement revenue source for Oklahoma's common education schools.

Oklahoma capital improvement revenue.

Oklahoma school districts have access to capital revenue through building fund derived from a five-mill levy on all real and personal property located within the boundaries of the school district that is subject to taxation (O.S. §70-1-118). Oklahoma's 516 public school districts had an ad valorem value between $2,500 per student and $600,000 per student during the 2014-2015 school year (OCAS 2015). This wide range in local school tax base creates a significant discrepancy in the possible revenue for capital improvement needs. Oklahoma is one of only 4 states nationwide that does not have a state-dedicated source of capital improvement revenue for public schools to help offset this type of inequity (TLC 2006). This fact does not automatically translate into a deficiency in the level of instruction offered by districts with a lower ad-valorem base. However, inequitable capital improvement revenue creates a system where poorly funded schools have a difficult time maintaining adequate facilities that support student learning (Maiden and Stearns 2007). According to Lackney there is considerable research indicating that a quality educational environment can have a significant impact on student learning. Students who are in well-maintained classrooms tend to perform better than their counterparts

in less adequate facilities (Lackney 1997). This study will attempt to ascertain if the inequity in capital improvement revenue also creates an inequity in revenue available for current educational expenditures.

Figure 1.1: Percentage of School Construction Funded by State



The Impact of Funding on Educational Outcomes

Does money really matter? That question is often asked in regard to offering a high-quality education for students. There is an extensive amount of research that has consistently identified the classroom teacher as the most important school based factor in student achievement. The impact of a high-quality teacher along with the fact that teacher salaries are overwhelmingly the largest expenditure category for America's schools (NCES 2016) leads most discussion about the impact of school revenue on educational outcomes to center on teacher inputs. The impact of class size on student achievement has been studied by many researchers with findings that

it has a positive impact in several areas including more time to cover curriculum, more student teacher interaction and fewer discipline problems. Smaller class size has also been linked to improved student achievement, especially in the area of mathematics (Grubb 2008). Grubb also found that simple resources are likely to be necessary but not sufficient. Instead, what may be more effective are compound resources, where two or more resources are jointly necessary. This includes teachers with experience with a greater repertoire of teaching methods; class size reduction, and adequate teacher preparation, coupled with professional development that enhances instruction. All of these teachers driven factors that have been found to improve educational outcomes have the commonality of requiring adequate revenue for implementation. In Ohio, for example research also found that schools identified as successful on average spent more money on instruction than other districts in the state (Sweetland 2015).

Discrete Mechanisms for Funding Capital Outlay

Nationally, the primary local revenue source for school capital improvement projects are local ad valorem taxes. Most public schools across America are relegated to relying on local voters to pass a bond referendum to undertake any significant capital improvement project. While the primary method for funding capital improvement projects continues to be local bond referendums, states have increasingly taken a greater role in helping local districts pay for public school buildings. Nebraska, Nevada, South Dakota and Oklahoma are currently the only 4 states that do not have a state funded mechanism to help local schools fund facility projects (TLC 2006). The other 46 states use a variety of funding mechanisms to

help fund public facilities for local school districts. Nineteen states use state level bond proceeds; six states used dedicated lottery revenue; three states use sales tax revenue while the remaining fourteen states use a variety of other revenue sources, including gaming revenue, cigarette taxes, and tobacco settlement fund revenue (TLC 2006).

Crossover Funds

Oklahoma's public school constitutional or statutory funds have specific parameters regarding the type of expenditures that may be made with the available funds. While certain expenditures are tied exclusively to a specific revenue source, there are a number of common expenditures that can be made from more than one of funds used by Oklahoma's public schools. Specifically, school boards have some discretion in choosing whether certain expenses are paid from general, building or bond funds. For the purpose of this study, I am going to classify these expenditures as "crossover funds." The crossover funds pertinent to this study would be those that are dedicated to a school's building fund or bond funds. These funds may be used to offset general fund expenditures for which Oklahoma's state aid funding formula is designed to create equity among Oklahoma's 516 public schools.

Crossover Funds: Building Fund

Pursuant to Oklahoma State Statutes, "A school's building fund may be used for erecting, remodeling, repairing, or maintaining school buildings, for purchasing furniture, equipment and computer software to be used on or for school district property, for repairing and maintaining computer systems and equipment, for paying energy and utility costs, for purchasing telecommunications utilities and services, for

paying fire and casualty insurance premiums for school facilities, for purchasing security systems, for paying salaries of security personnel, or for one or more, or all, of such purposes." O.S. §70-1-118. There are a few types of expenditures that may be paid from a school district's building fund that may be paid for from their general fund. The crossover expenditures from the building fund include a school's utility bills, custodial, maintenance and security salaries, furniture, and insurance premiums (OCAS 2016).

Crossover Funds: Bond Funds

According to Oklahoma State Statutes, "Equipment purchase - Bonds. Any school district may become indebted for the purpose of purchasing equipment and may issue its bonds, as provided for by law, in any amount not exceeding, with existing indebtedness, ten percent (10%) of the valuation of the taxable property within the school district, as shown by the last incurring of indebtedness. The bonds shall be made to mature within a period not to exceed five (5) years from their date. It is hereby declared that the use of the word "equipment" in Section 26, Article X of the Oklahoma Constitution was intended to include: library books, textbooks, school-owned uniforms, computer software, electronic media content, perpetual or continuous district software license agreements and web-based software subscriptions with a term of more than one (1) year but not more than five (5) years, the acquisition of telecommunications devices and components to be used to enhance classroom instruction and maintenance/service contracts which are included as a part of the equipment purchase price and any associated hardware and software necessary for implementation and training and any maintenance agreements." (O.S. §70-15-

106.1). The Oklahoma State Legislature added the language defining equipment that may be purchased with bond funds in 1995 and amended the language again in 2004 and 2010. This section of law provides flexibility for school districts by expanding the use of bond funds beyond capital improvement and land acquisition.

Statement of the Problem

While there has been a significant amount of research on just about every aspect of the adequacy and equity of school finance in America's schools, there is virtually no research on the impact of the equity of one restricted revenue area on another restricted revenue area. In chapter two I will discuss the extensive number of court cases that have been litigated across America based on the adequacy or equity of current educational expenses or capital outlay revenue. Forty-five states have had at least one court case involving the state education finance system since *Commonwealth v. Dedham* in 1819 (Olsen 2004). It was impossible to find one of these cases that included arguments about the possible impact of crossover funds on current education funding equity.

The Oklahoma formula for current education funding has consistently been found to be equitable (Maiden 1998). Deering and Maiden concluded that the Oklahoma state aid funding formula distributes revenue equitably (Deering and Maiden 1999).

Conversely, Oklahoma schools rely solely on local ad valorem valuation to generate capital outlay funding. This can be problematic given Oklahoma's 516 public school districts had an ad valorem value between $2,500 per student and $600,000 per student during the 2014-2015 school year (OCAS 2015). This wide

range in local school tax bases creates a significant discrepancy in the revenue for capital improvement needs. Oklahoma is one of only four states nationwide that does not have a state-dedicated source of capital improvement revenue for public schools to help offset this type of inequity (TLC 2006). These data make it easy to see why Maiden and Stearns found that average Oklahoma school capital expenditures showed far greater inequity than average current expenditures (Maiden and Stearns 2007).

Purpose Statement

The primary purpose of this study is to determine if having a deficiency in capital improvement revenue has an impact on the revenue available for current operations of a school district. If so, there is a possibility that this inequity mitigates the equity effects of the formulas that have been developed to ensure that schools have fair and equal funding for the education of students in America's public schools. This quantitative ex post facto study will examine the expenses Oklahoma schools can legally pay with their General, Building, and Bond Funds and what expenses can be paid with more than one fund. For the purpose of this study, the expenses that can be used for more than one fund will be called "crossover funds". Based on this information, the study will examine the possible inequity created when schools with higher local property wealth are able to use their revenue earmarked for capital improvement as crossover funds for current educational expenses while schools with less local wealth must use revenue from the state aid equity formula for similar expenditures.

Research Questions

The study is guided by the following research questions:

1. Were there statistically significant differences in resources among Oklahoma school districts with low, moderate, or high levels of capital revenues derived from building fund and bond yields during fiscal year 2016?
2. What were the effects of crossover funding on the resource accessibility of the Oklahoma education finance system during fiscal years 2012-2016?
3. What were the effects of crossover funding on the wealth neutrality of the Oklahoma education finance system during fiscal years 2012-2016?

Significance of the Study

Over the past decade, due to a faltering state budget and the state's school population growing by over 48,000 students Oklahoma school districts have increasingly faced significant reduction in per pupil state aid formula. The result of Oklahoma's school funding woes has led to the state falling further behind peer states in its ability to fund the common education system. Oklahoma now trails its contiguous states in total per pupil expenditures by over $2,000 per student (NCES 2016). This has led Oklahoma lawmakers and other policymakers to look for new ways to adequately fund Oklahoma public schools. Many of the proposals to increase Oklahoma school funding include "home rule" provisions that would allow local communities to increase their crossover fund revenue which could further increase any inequity currently experienced by Oklahoma public schools.

Limitations

- The study was based on one state and may have limited generalizability to other states.
- The revenue and expenditure information used in this study was limited to the five fiscal years between 2012 and 2016.
- The use of the OCAS system is dependent upon Oklahoma educational leaders understanding the coding system and accurately coding their expenditures.
- The OCAS data used capital outlay did not include grants, donations, or expenditures provided by outside entities that are not included in OCAS reporting.

Definitions

Ad Valorem Taxes – The tax levied on the assessed value of the real and personal property within the boundaries of a school district. The amount generated by the tax is determined by the tax rate (mill rate) levied by various entities multiplied by the assessed value of the property.

Mill -One mill is equal to $1 for each $1,000 of assessed value, or .001.

Average Daily Membership(ADM) – total number of days all students are enrolled in a school district during a certain period divided by the number of days the school was actually in session during the same time period. For funding purposes the state of Oklahoma uses a school districts average daily membership from the first nine weeks and full year. This information is reported by schools to the Oklahoma

State Department of Education as part of the First Quarter Statistical Report (FQSR) and the Annual Statically Report(ASR) (OTAD 2016).

Bond Fund - Each school district in Oklahoma is authorized to borrow money up to an amount that does not exceed 10 percent of its total assessed valuation. Money is borrowed through the issuance of bonds after the bond issue has been approved by the voters. School bond issues in Oklahoma require a supermajority, meaning the issue does not carry unless 60 percent of those voting in the election vote yes. Oklahoma is one of only 14 states that requires a supermajority to pass a school bond issue.

Building Fund - Each district receives an annual five mill levy deposited in its building fund. The state Constitution provides that each school district shall levy five mills for the purpose of erecting, remodeling, and repairing school buildings, or for purchasing furniture. Early in Oklahoma's history it was believed that the five mills would be sufficient to provide the money necessary for building facilities for school districts. However, it long ago became unrealistic for most districts to provide for capital needs while relying on this source of revenue (OTAD 2016).
Through various legal interpretations, the use of money in the building fund levy has been liberalized so it can be used not only for maintenance but also for the purchase of equipment. In some cases, it is used for operational expenses. The Oklahoma Attorney General has ruled that payment of property and casualty insurance can be made from this fund.

Capital Improvement Revenue – Oklahoma public school capital outlay revenue is primarily relegated to building fund and bond fund revenue. Building fund

and bond fund capital outlay revenue is generated by local ad valorem taxes pursuant to Article X, Section 9 of the Oklahoma Constitution and deposited in the building or bond fund of the school district.

Crossover Funds - For the purpose of this study, the expenses that can be used for more than one fund will be called "crossover funds." The crossover funds used for this study were bond derived instructional expenditures.

Current Educational Expenditures – Current expenditures for education can also be expressed in terms of the percentage of funds going toward salaries, benefits, purchased services, or supplies or any expense that is not for a long-term debt or equipment costing in excess $2,500(National Center for Educational Statistics). For the purpose of this study current education expenditures per pupil will be based on a district's general fund expenditures divided by their weighted average daily membership.

Horizontal Equity – Horizontal equity is the ideal that similar school districts should receive similar amounts of money per student. This is often called the "equal treatment of equals" in school finance literature. Berne and Steifel stated that horizontal measures are "statistics that capture the spread, or dispersion, in a distribution. Perfect equity would exist when every pupil in the distribution receives the same object, and the horizontal-equity measures assess how far the distribution is from perfect equality" (Berne and Steifel 1984).

Vertical Equity – Vertical equity in school finance is the principle that students who bring certain educational needs to the classroom require additional resources to address those needs within the educational process. To the degree that

vertical equity can comprehensively cover the intricacies of the teaching and learning processes in schools, it carries considerable potential to assess school responsiveness to diverse student and staff needs and facilitate improved educational outcomes (Rodriguez 2004).

Oklahoma Cost Accounting System(OCAS) - Oklahoma's statutorily mandated system for schools to code and report revenue and expenditures by function, object, subject, class, and job codes. The financial accounting mechanisms used in Oklahoma common education school districts consist of multiple classifications as required by Oklahoma Administrative Code (OAC) 210:25-7-1, "School district accounting systems shall be organized and operated on a basis that assures legal compliance by the recording and summarizing of financial transactions within funds, each of which is completely independent of any other. Each fund shall account for and continually maintain the identity of its revenues and expenditures. Financial transactions for purposes of this regulation and as referenced in 70 O.S. 2001, § 5-135.2 shall be defined as a detailed reporting of revenue within the source of revenue dimension (OCAS 2016)".

Wealth Neutrality - Wealth neutrality is when the financial support for students is not related to the local wealth of the school district. Wealth neutrality is achieved when a school district with lower per student wealth can provide the students of their district with the same level of education that a high local wealth district can provide.

Weighted Average Daily Membership (WADM). - The weighted average daily membership (WADM) is comprised of the average daily enrollment plus the

sum of nine additional possible weights delineated in Title 70 Section 18 of the Oklahoma State Statutes. The funding formula uses student and district-level weights to create vertical equity.

CHAPTER TWO

School Funding Equity and Adequacy of Current and Capital Education Funding

Chapter two includes a review of the relevant literature related to education equity research that informs this study. The current study compares the differences in Oklahoma school district per pupil revenue used for capital outlay expenditures and per pupil expenditures used for current educational expenses. The literature review includes several areas of school finance literature, including funding equity and adequacy, litigation, and the impact of capital outlay on educational achievement.

This chapter begins with an overview of the literature on fiscal equity for schools in the United States. Following fiscal equity issues is a summary discussion about school equity litigation. In order to better understand fiscal equity issues, chapter two also touches on the importance fiscal adequacy. A deeper look at Oklahoma School finance is next. Finally, chapter two includes an overview of public school capital improvement funding.

Fiscal Equity

Local revenue for public schools has historically been primarily based on local property taxes. This method of funding has often resulted in less affluent communities being unable to raise as much money for schools as wealthier districts, possibly leaving many schools and their students at a disadvantage. To overcome this possible disadvantage, states legislatures across the nation have devised school funding formulas in attempts to equalize state and local funding for all children educated in their respective states. Most state funding formulas use a combination of

state and local revenues to fund schools. School districts also receive supplemental revenue for current educational expenses from the federal government. The most recent national data from school year 2011- 2012 show the state funding share at 46.5%, the local share at 44.4 %, and the federal share at 9.1% (NCES 2015).

Vertical equity is based on the belief that students who bring certain educational needs to the classroom require additional resources that would address those needs within the educational process. Some of the student categories states have commonly used for vertical equity are economically disadvantaged, English as a second language, special education and gifted categories. Grade levels are also used as a factor to determine vertical equity. Vertical equity is useful as a method to envision school financial needs for their overall student population. To the degree that vertical equity can comprehensively cover the intricacies of the teaching and learning processes in schools, it carries considerable potential to assess school responsiveness to diverse student and staff needs and facilitate improved educational outcomes (Rodriguez 2004).

Schools in less affluent communities already serve a disproportionate share of children who are deemed at-risk. Funding policies that rely on local property wealth to support education, and therefore inadequately fund property-poor districts, serve to compound disadvantages for at-risk children. Based on where children live, advocates for these children seek to remedy the disadvantaged educational circumstances in which these children are forced to live. Failing to achieve reform through the legislative process, advocates for equitable public school funding practices have turned to federal and state constitutions and the assistance of courts to

obtain relief. Efforts to obtain relief under the U.S. Constitution have been unsuccessful. In *San Antonio v. Rodriguez (411 U.S. 1 (1973),* the U.S. Supreme Court upheld the Texas system of public school funding. Even though the Texas system of funding public schools had substantial funding disparities, the U.S. Supreme Court allowed for local control of the public education system (Dayton 1995).

School funding equity advocates have achieved some success in litigation based on individual state constitutional provisions. School boards and other stakeholders have challenged school funding equity in many states with mixed results. The state supreme courts in 28 states have ruled on the merits of constitutional challenges to equity of their states' school funding systems. Fourteen state supreme courts have upheld their systems of public education funding as constitutional while the high court in the other fourteen states declared school funding systems unconstitutional (Dayton 1995).

Many school leaders continue to turn to their state courts seeking a judicial solution to existing funding systems that allow for local wealth to influence the ability of their school district to offer a high-quality education for all students. Their hope is a favorable judicial decision will create significant legislative changes to their state's school funding system. Even in states where the courts have forced changes in school funding to account for local wealth, there has often been a tendency towards deterioration of equity gains over time. (Dayton 1995)

In the end, the real issue is quality schools. If there is not a relationship between school revenue and student achievement, should we worry about how much

revenue a school receives in comparison to their peers? Some argue that differences in education spending result largely from different communities' appetites for education, and that beyond a minimal effort to ensure taxpayer equity, there is no compelling reason to equalize spending among school districts. The counterargument is that money buys important "inputs" to the education process and that these inputs will influence academic achievement. Some suggest that the use of compound resources is far more important than simply increasing revenue. Money is “necessary but not sufficient” (Grubb 2008). Advocates for school finance reform argue that the equitable distribution of funds for education is essential to improving the quality of education for all children, not just those lucky enough to be from the right zip code.

Two research articles that reviewed the Netherlands use of a weighted student funding formula to create equitable school funding produced interesting findings. The Netherlands place a high priority on vertical equity in their school funding system. They use a weighted pupil funding formula similar to what is used by some U.S states to try and address equity issues between different populations of students (Owings, Kaplan and Volman 2015). The Dutch education funding system provides weighting for students based primarily on their family background and parents education attainment level instead of focusing on the individual student’s personal characteristics. The Netherlands’ system for weighting student funding is much more generous towards disadvantaged students than most U.S states. In many cases a Dutch student with disadvantages may generate almost twice as much funding as their non-disadvantaged counterpart. This large discrepancy in funding gives schools with a high percentage of disadvantaged students a significantly larger pool of

resources to educate their students (Ladd and Fisk 2011). Based on international test scores from Progress in International Reading Literacy Study (PIRLS), Trends in International Mathematics and Science Study (TIMSS), Programme for International Student Assessment (PISA) Owings, Kaplan and Volkmann found that the Netherlands vertical equity formula using student weights appears to provide a better education for the money than the education funding systems provided collectively by the fifty U.S. states (Owings, Kaplan and Volman 2015). These researchers noted that the United States and the Netherlands have significant differences in demographics and the Dutch educational system use of a student academic tracking system to direct students to different education pathways is different than the American system of educating all students in the same system.

State Funding Systems and Equity

The school funding systems in many states have been examined to determine the degree of fiscal equity across districts. Nevada, Massachusetts and Pennsylvania are examples of the significant differences in state funding systems and the variance found in state equity research.

Nevada school funding has evolved from the 1865 standard of being based on the census of school aged children. The current Nevada school funding system includes a basic state aid guarantee with adjustment factors for local school district size, wealth and transportation. The 2011 guaranteed funding per student was $5,192. The state aid guarantee includes local and state contributions (Verstegen 2013). Verstegen's *Quantitative Analysis of Nevada's Public Education Finance System* found significant inequity in the state's funding formula. The study found a

coefficient of variance where almost two-thirds of Nevada's students are within a range of 32% to 38% of average funding per student. This far exceeds the 5% target range (Verstegen 2013). On the basis of local wealth, Verstegen's regression analysis also showed that Nevada school funding could be predicted almost 88% of the time. The inequity of Nevada's school funding system appears to have the greatest negative impact on the state's largest cities. Eighty-nine percent of Nevada's students reside in the state's largest districts while those districts receive the least amount of funding per-pupil (Verstehen 2013).

Massachusetts on the other hand, has a school funding system that has a required local contribution and a formula that counts a municipalities local property values and income as equal weights when calculating the target contributions. This system was modified in 2007 as a reaction to dissatisfaction with the previous state mandated school funding system. Between 2007 and 2010 the state phased in part of the new system by reducing the requirements of those districts that contributed amounts in excess of the required targets (Fahy 2012). Each Massachusetts school district must contribute a portion of its own foundation aid while the state provides additional revenue to make up the schools total required spending (Fahy 2011). Fahy finds that "The downside to the legislatures emphasis on taxpayer equity has been the lack of attention paid to the important (and potentially expensive) questions surrounding the adequacy of funding in the wake of updated curriculum and testing standards. Equity in contributions across districts is an important goal in its own right. Its achievement will allow the state to refocus its energies on other matters related to public education.

Equity Litigation

Since one of the reasons for this review is to demonstrate the effects of financial equity on school funding policies it is important to analyze and review the court cases that have shaped our nations many state school funding systems. With at least forty-five states having undergone at least one court case involving school funding issues I would be remiss for not thoroughly reviewing those cases and how they have helped shape the nations' current school funding systems. More importantly research has found that just the filing of an adequacy lawsuit can provide a focus on adequate funding that contributes to improving student academic achievement. An even more important finding is that minority students can see an increase in academic achievement when the plaintiff wins an adequacy lawsuit (Lockridge & Maiden, 2014)

Our nation's first court battle over financial equity in public schools came as early as 1819 with *Commonwealth v. Dedham* in Massachusetts. The question in that case and many cases over the past 200 years was, should a child's quality of education be determined by the wealth of the school district where he or she lives? This issue is as basic as asking if the quality of education a student receives should be dependent upon his or her race or family wealth. By being silent on the issue of education, the U.S Constitution has made equity in education the responsibility of the states. How they are handling that responsibility is far from settled. Forty-five states have had or are currently involved in litigation to determine if their state's method of funding public schools is either equitable or adequate (Olsen 2004). Funding policies

that rely on local property wealth to support education make many children already at risk, the recipients of an inadequately funded education that compounds their other disadvantages. Advocates for these children seek to remedy the disadvantaged educational circumstances in which the children are forced to live. Proponents of reforming public school funding practices have failed to achieve success through the legislative process. Instead, they have turned to federal and state constitutions and the assistance of courts to obtain relief. Efforts to improve equity under the U.S. Constitution have been unsuccessful. In *San Antonio v. Rodriguez*, the U.S. Supreme Court upheld the Texas system of public *school* funding. Even though the Texas system of funding public schools had substantial funding disparities, the U.S. Supreme Court allowed for local control of the public education system.

In many states, school boards and other stakeholders have challenged their states' school funding equity with mixed results. The state supreme courts in 28 states have ruled on the merits of constitutional challenges to the equity of their states' school funding systems. Fourteen state supreme courts upheld their systems of public *education* funding as constitutional while the high court in 14 states declared *school* funding systems unconstitutional. When challenged on the basis of individual state constitutional provisions, school funding equity advocates have achieved significantly more success in litigation.

Many school leaders continue to turn to their state courts seeking a judicial solution to existing funding systems that would allow for local wealth to influence the ability for their school to offer a high-quality education for all students. Their hope is that a favorable judicial decision will serve as a catalyst for significant

legislative changes to their state's school funding system. Even in states where the courts have forced changes in school funding to account for local wealth, deterioration of equity gains over time is not unusual.

The ultimate issue is quality schools. If there is no relationship between spending and student achievement, should we worry about the relationship between spending and wealth? Indeed, some argue that differences in education spending are largely the result of different communities' appetites for education, and that beyond a minimal effort to ensure taxpayer equity, no compelling reason exists to equalize spending among school districts. The counterargument is that money buys important "inputs" to the education process and these inputs influence student achievement. After all, teacher pay is deemed a current educational expense as are costs for a wide variety of academic programs, including expenses related to offering early childhood programs and advanced coursework. Some suggest that the use of compound resources is far more important than simply increasing revenue. Money is "necessary but not sufficient" (Grubb 2008). Advocates for school finance reform argue that the equitable distribution of funds for education is essential to improving the quality of education. They ask the following question: If money does not matter, why do some communities spend so much more on education?

Fiscal Adequacy

Although the current study is not based on fiscal adequacy, a brief overview of this area of scholarship is instructive to better understand the impact of fiscal inequities. The federal government's 2001 reauthorization of the Elementary and Secondary Education Act (ESEA) -- better known as No Child Left Behind (NCLB,

P.L. 107-110) -- has greatly increased the requirements and accountability of schools in the United States. The Congressional requirement for higher standards for school and student performance has financial implications. Many argue there is a need for reciprocal accountability; that is, higher standards must be matched with the resources schools and students need to meet these higher expectations. Some school reform advocates say it is unjust to hold schools and students accountable for meeting higher standards if they do not have access to the necessary resources. In many states, this realization is leading to a fundamental shift in the way courts, researchers, state policy makers, and educators think about school finance.

As some of the more recent school finance legal cases emphasize, the courts are beginning to look more directly at what that money buys: instructional materials and equipment, smaller classes, more highly trained teachers, laboratories, and media centers. The basis for school finance litigation is shifting to a school's ability to meet state and federal mandates. This shift is occurring because states are continuing to add mandates to local school districts. To meet state requirements, schools are forced to add courses, implement remediation programs, reduce class size, and contend with other factors that increase the financial needs of school districts (McMahon 2004).

Adequacy does not have a universally accepted definition in the arena of school finance. Many state courts have used some measurable standard for adequate or sufficient education when ruling on cases where inadequacy is the basis for the complaint. More specifically, courts tend to focus on issues such as what it takes to develop citizens who are capable of making democratic decisions as well as being able to compete in the workforce. The first case in the United States where the

decision was based on adequacy of funding was the 1989 Kentucky Supreme Court decision in Rose vs. The Council for Better Education. The Kentucky Supreme Court offered a very distinct definition of adequacy by stating that it was the ability to offer Kentucky children the opportunity to achieve sufficient capacity in the following six areas (Lefkowits 2004):

- Oral Communication Skills
- Written Communication Skills
- Knowledge of Economics
- Social Systems
- Political Systems
- Understanding of Governmental Processes

One of the most recent court rulings comes from the state of Kansas. On December 30, 2015, the Third Judicial Court ruled that current education funding for Kansas public schools is "inadequate from any rational perspective." This is the latest decision from a Kansas court in a long-running battle between school leaders and state budget makers (Ujifusa 2014).

Oklahoma School Finance

Oklahoma's state aid formula includes a two-tiered equalization formula that was implemented in 1981 (Maiden 2000). Oklahoma's funding formula has a foundation aid component and a salary incentive aid component. Both components fund districts based on the district's weighted average daily membership. The raw student accounts for approximately two-thirds of the total weights with the other one-third coming from weighted factors such as special education, economically

disadvantaged, and gifted. The state aid formula uses local wealth as a chargeable in the foundation aid component by reducing the amount of state-appropriated money that school districts receive based on the amount of the district's local and state-dedicated revenue. Specifically, the foundation aid formula uses:

- 15 of the 35 mills from local property values assessed for the general fund.
- 75% of the district's county 4-mill revenue, and
- the state-dedicated revenue sources of gross production, school land earnings, motor vehicle collections, and rural electrification association taxes

as chargeables or deductions. Article X, section 9 of the Oklahoma state constitution limits the ad valorem chargeable amounts to 15 of the 35 local mills and to 75% of the actual collections from the county 4-mill. The salary incentive aid component then uses the other 20 mills of local ad valorem revenue as a chargeable through what has been labeled a "power equalization formula." The result of the two components of the Oklahoma state aid formula is to take the sum of all of these revenue sources statewide and for each school district to receive the same dollar amount per weighted student from these combined sources. For the 2016 fiscal year, this is $3,053.60 per weighted student.

The state aid formula accounted for almost 76% of Oklahoma's state appropriations for common education in fiscal year 2016. That number is down from 81% just a decade earlier. The purpose of the formula is to ensure equity in the revenue a district receives for the purpose of educating students. As more line-item

mandates are added to the education budget, a smaller percentage of the funding is made available for the day-to-day operations of local school districts.

In 2003, the Oklahoma Legislature commissioned Augenblick, Palaich and Associates of Denver, Colo., to perform two financial adequacy studies for Oklahoma schools. For the purpose of these reports, the term "adequacy" or "adequate revenues" means: sufficient funding so that school districts have a reasonable chance to meet state and federal student performance expectations. These performance expectations are reflected in Oklahoma's state education accountability system, the federal government's No Child Left Behind (NCLB) Act of 2001 and the Individuals with Disabilities Education Act (IDEA) (Augenblick, 2005).

The first study was released in November 2004. This study used the "successful school district approach" to estimate adequate revenue levels. The "successful school district approach" uses a base per-student cost determined by identifying and studying expenditures of school districts that were meeting state and federal student performance guidelines. This study gives a good indication of the cost of meeting current educational mandates but does not attempt to factor in future costs nor does it take into account cost adjustments for special education, English language learners, and at-risk students (Augenblick 2005).

The second report was released in April 2005. This report used the "professional judgment approach." This approach relies on panels of experienced educators and educational service providers to specify the resources needed for a group of different size schools and districts to succeed. This report differs from the first in that it attempts to identify future costs associated with meeting state and

federal mandates as well as including additional expenditures for special education, English language learners, and at-risk students.

On January 11, 2006, the Oklahoma Education Association, along with Jenks Public School, Foyil Public Schools and Western Heights Public Schools, filed suit against the State of Oklahoma on the basis of inadequate funding. The suit claimed "the right to an adequate and proper free public education which is a guarantee by the Oklahoma Constitution to all children of school age in the State of Oklahoma." The plaintiffs claim that the three districts involved in the suit, along with the other 537 Oklahoma school districts, have a constitutional obligation to give every school-age child that resides within their school district boundaries an opportunity for a proper and adequate education. The suit goes on to claim that Oklahoma school districts cannot adequately educate the state's children without the needed -- and what they claim to be constitutionally mandated -- appropriations from the state legislature (OEA vs Oklahoma, 2006).

The Oklahoma Education Association (OEA) commissioned cost analysis studies to determine how much Oklahoma education was under funded. The first study cited in the lawsuit was performed by the National Education Association, the parent entity for the OEA. The National Education Association performed a costing-out study in June 2005 and reported that the Oklahoma Legislature had underfunded common education by $908 million annually. *OEA v. Oklahoma* (2006) cites a second study performed for the OEA by Augenblick and Associates which also reported an underfunding amount of $908 million for educational services and $3 billion for capital improvement needs. The study also cites a deficiency of $3 billion

in capital improvement needs -- an astronomical need for Oklahoma schools that is equivalent to almost one-half of Oklahoma's 2007 state budget. The Oklahoma Supreme Court dismissed this case, citing that educational funding is a legislative function not a function of the courts (OEA vs Oklahoma, 2006).

Capital Improvement Funding

While revenue across the country for current education expenses has increased significantly over the last few decades, capital outlay revenue has not kept pace (NCES, 2016). States have battled over the equity and adequacy debate in relation to public school finance for more than a century, the need for equitable and adequate educational facilities has, for the most part, been overlooked. Most state court decisions have revolved around the revenue available for the day-to-day education of students. Rarely have the courts taken into consideration the educational facilities used for student instruction. Recently, educational scholars have taken a closer look at the role of the educational environment. Research has found that a quality educational environment can have a significant impact on student learning. Students who are in well-maintained classrooms tend to perform better than their counterparts in less adequate facilities (Lackney 1997).

School facilities are not just a place students go to learn; they have a greater impact on education outputs than most people believe. Factors such as lighting, dependable heat and air systems, and layout play a significant role in a student's educational experience and academic success. The layout and design of a facility contributes to the experience of students, educators, and community members. Depending on the quality of its design and management, the facility can contribute to

a sense of ownership, safety and security, personalization, privacy as well as sociality, and spaciousness or crowdedness (Lackney 2000). While studying Milwaukee Public Schools, Lewis (2001) noted that "Decaying environmental conditions such as peeling paint, crumbling plaster, nonfunctioning toilets, poor lighting, inadequate ventilation, and inoperative heating and cooling systems can affect learning as well as health and morale of staff and students."

Research shows school climate issues can have a negative impact on educational outcomes as defined by test scores, educational progress, and completion indicators (Grubb 2008). Specific results from a study of the District of Columbia schools show students in school buildings with poor conditions had achievement that was 6% below schools in fair condition and 11% below schools in excellent condition, as measured by standardized achievement tests (USDE 2000).

Similar studies in Virginia by Cash (1993) and Hines (1996) indicated that the condition of school facilities have a significant impact on student achievement as measured by the standardized tests administered by the state of Virginia. In her study, Dr. Cash used the outcome of mean test scores (adjusted for socioeconomic status) on the Virginia Test of Academic Proficiency to study the relationship between building conditions in small Virginia high schools and academic outcomes. She developed a survey and rated school infrastructure as substandard, standard, and above standard. Her results indicated a correlation between building conditions and test scores. She concluded that "building condition is more than a static condition; it is a physical representation of a public message about the value of education." Hines (1996) followed up with a study of urban high schools in Virginia with similar

methods to those used by Cash three years earlier. The findings of his study also concluded that the physical condition of school buildings impacted student achievement. He found that students in "substandard buildings" scored 14 percentage points lower than their peers in above standard buildings, scoring at the 66th percentile as compared to the 52nd percentile. Like the Cash study, Hines used the Virginia Test of Academic Achievement.

In 2007, Bullock conducted a third study of the relationship between school building conditions and academic achievement in Virginia schools. The data showed a positive relationship between school building condition and student achievement as measured by the Standards of Learning Assessment at the middle school level in the Commonwealth of Virginia. The Bullock study also showed that some aspects of building conditions have a greater impact on student achievement than others. Overall building condition, effective climate control, and natural light in the instructional areas were all positively related to student achievement. Student achievement as measured by the Virginia state assessment system was higher in English, mathematics, and science in higher quality buildings. The largest difference in percentage of students passing was in English at 6.10 percentage points (Bullock 2007). These findings should cause us to ask more questions about the link between the value placed on education by local communities and local schools' performance. Research shows a parent's expectations about education plays a significant role in the educational progress of their children (Grubb 2008). There does not appear to be as much research linking or measuring a community's level of value placed on education other than a willingness to finance projects. Is the correlation specific to

certain building conditions or to the more intrinsic issues caused by building inadequacies?

Sources of Capital Improvement Funding

Local communities have historically carried the burden for financing all aspects of their educational programs. This burden includes maintaining and building new school facilities. Forty-five states have had or are currently involved in litigation about the way in which they fund public schools (Olsen 2004). This litigation has often increased the funding for the day-to-day education of students known as current educational expenses. It has not, for the most part, translated into an increase in or equalization in funding for capital outlay. Many more recent lawsuits including the one filed by Oklahoma's teachers' union have also focused on the inadequacy of revenue available for facility maintenance and new construction (OEA 2006). This shift toward facility revenue should make all stakeholders question if equity and adequacy should extend to facilities as well as current educational expenditures.

Oklahoma Capital Improvement Funding

Oklahoma's capital improvement equity issue is based on vast differences in property wealth among the 516 public school districts. Capital improvement revenue for schools in Oklahoma is generated solely by local property taxes. Oklahoma's 516 public school districts had an ad valorem (property tax) base between $2,500 per student and $600,000 per student during the 2014-2015 school year (OCAS 2015). This wide range in tax bases creates a significant discrepancy in the possible revenue for capital improvement needs. Oklahoma is one of only four states in the country

that does not have a state-dedicated source of capital improvement revenue for public schools to help offset this type of inequity (TLC 2006).

The lack of a dedicated revenue source for capital improvements comes at great cost. As part of its school funding lawsuit against the state, the Oklahoma Education Association commissioned Augenblick and Associates to study the state's education funding structure. While the study found the state underfunded educational services by $908 million, perhaps the most eye-opening finding related to facilities. The study found the state was underfunding capital improvement needs by $3 billion (OEA v. Oklahoma, 2006). That was equivalent to almost one-half of Oklahoma's 2007 state budget (Senate Journal 2007). The Oklahoma Supreme Court dismissed this case, citing that educational funding is a legislative function and not a function of the courts.

Rising construction costs that are outpacing growth in the assessed value for most school districts are magnifying the inequity issue in capital improvement revenue for schools. The *Turner Construction Report* indicates that construction costs have increased by over 20% in the last two years. This, coupled with the fact that Oklahoma has a constitutional limit of 5% on the increase in assessed value of real property, creates a significant issue for school districts that do not have growth and new construction in their district. These school districts have no other legal means by which to generate these funds.

These districts and similar districts are relying on creative finance to overcome their lower-than-average capital improvement revenue. However, they may be creating a much larger problem with practices that could have a detrimental

impact on future capital improvement needs and also create a deficiency in their current instructional capabilities. The practice of passing series bonds that are not paid off for 20 to 30 years may take care of an immediate need, but in the long run, districts are unable to address any future capital needs until the bonds are paid in full. This in turn causes a more severe deficit in maintaining and improving other areas of district infrastructure. The series bond approach often requires the district to enter into lease-purchase agreements to complete their construction projects all at one time. The interest paid toward the lease-purchase agreement must be paid from non-bond revenue and therefore further reduces revenue available for current educational expenses. Districts must then wait several years until the bonds are paid off in order to make other needed repairs or start any new construction projects.

The forced use of current revenue to cover required capital costs creates an ongoing instructional deficit by diverting revenue that could be used in the classroom and for teacher salaries and other instructional costs. This deficit brings me to the conclusion that the inequity in capital improvement revenue also causes an inequity in revenue available for instructional purposes. An inequity in instructional revenue ultimately impacts the quality of educational services offered to the students of the impacted district.

One possible solution for this inequity would be for the Oklahoma State Legislature to enact legislation that would create a capital improvement funding equalization formula. The formula could mirror the state aid formula currently in place for day-to-day expenses of educating students. This would require the state to designate a revenue stream to either offset the lack of revenue received by school

districts with an ad valorem base less than the state average or establish a sliding scale that would completely equalize funding to a specific per-pupil level. By providing schools with the revenue needed to properly maintain their infrastructure, schools would then be able to use the revenue generated for current educational services for teacher salaries and other day-to-day education related expenses instead of being forced to utilize a portion of it to take care of facilities.

Even though each state has a unique funding mechanism for schools, many are facing a similar issue of underfunded facility maintenance and new construction. The historical aspect of local control and local responsibility for capital outlay funding is well documented and even held as sacred by many educators. The harsh reality is that many school districts are facing variables that make it virtually impossible to maintain educational facilities to a minimal standard. Many rural and urban districts are facing the daunting task of maintaining old buildings amid an ever-declining tax base. The recent national decline in home values will cause this problem to be felt by even more school districts. Suburban districts have, for the most part, had the good fortune to maintain enough growth in property value to have up-to-date buildings and diversify their capital outlay revenue into areas of current educational expenses. This discrepancy has led many states to create a stand-alone funding system, an equalization formula, or a combination of the two in order to offset and inequity or inadequacy. Currently, 42 states offer at least some financial assistance for capital improvement projects (Crampton 2004).

Summary

This chapter reviewed the relevant literature on the history of school adequacy and equity funding litigation in our country as well as the expansion of school funding adequacy and equity litigation based on capital improvement needs. The impact of adequate and equitable school facilities on student achievement was also examined. The totality of this research forms the basis for the development of this study. Due to the wide variety of state funding mechanisms for current educational expenses and capital improvement projects, this study will focus on Oklahoma's 516 school districts. The study will further narrow that focus to the possible impact of disproportional capital improvement revenue on the equity of current educational revenue.

CHAPTER THREE

DESIGN OF THE STUDY

This study is an attempt to provide a better understanding of the impact of the inequity in capital improvement revenue for public schools on the equity in revenue available to support current educational expenditures. Because all 50 states have a unique system of financing public education, it is impractical to try to conduct such a study on a national scale. Oklahoma was selected as the source of data for the quantitative study because of the state's total reliance on local ad valorem wealth to fund capital improvement needs while having a funding formula for current educational expenses that is generally regarded as one of the most equitable in the nation (Deering 1997, Maiden 1998)

Research Design

The primary pupose of this study was to determine if having a deficiency in capital improvement revenue has an impact on the revenue available for the day to day operations of a school district. If so, there is a possibility this inequity nullifies the formulas that have been developed to ensure that schools have fair and equal funding for the education of students in America's public schools. This quantitative ex post facto study examined the expenses Oklahoma schools can legally pay with their General, Building, and Bond Funds and what expenses can be paid with more than one fund. For the purpose of this study, the expenses that can be used for more than one fund were called "crossover funds." Based on this information, the study examined the possible inequity created when schools with higher local property wealth are able to use their revenue earmarked for capital improvement as crossover

funds for current educational expenses that schools with less local wealth must use revenue from the state aid equity formula for similar expenditures. The study focused on district level revenue data rather than student level or school site level data, predicated on the fact that Oklahoma's education funding system is solely based on district-wide data and allocated on a district basis. The components of district level revenue and student count data analyzed were:

- Current educational revenue from the school districts general fund. This data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 11.
- Building fund revenue generated by the 5-mill ad valorum assessment. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 21.
- Total Bond fund expenditures. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 31-39 object total.
- Bond fund expenditures for instructional materials. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 31-39 instruction.
- Total district ad valoral valuation
- Full year district weighted average daily membership (WADM)
- Median District Salary

Research Questions

The study was guided by the following research questions:

1. Were there statistically significant differences in resources among Oklahoma school districts with low, moderate, or high levels of capital revenues derived from building fund and bond yields during fiscal year 2016?

2. What were the effects of crossover funding on the resource accessibility of the Oklahoma education finance system during fiscal years 2012-2016?

3. What were the effects of crossover funding on the wealth neutrality of the Oklahoma education finance system during fiscal years 2012-2016?

Overview of Oklahoma's School Funding System

Revenue

Oklahoma common education funding is comprised of four categories of revenue sources. Those revenue sources are local and county, state dedicated, state appropriated and federal sources of revenue. During the 2014-2015 school year, Oklahoma public schools received $5,243,100,688 in revenue (OTAD 2016).

Local and county common education revenue is comprised of seven different ad valorem tax levies. In Oklahoma, ad valorem tax levies for public schools are based on mills -- a tax levy of one mill equals one dollar per $1,000 dollars of assessed property valuation subject to taxation. These levies are assessed pursuant to Article X of the Oklahoma Constitution. Oklahoma school ad valorem taxes are levied on the basis of the value of real, personal and public service property located within the geographic boundaries of a school district or county (OTAD 2016).

State-dedicated revenue for Oklahoma's public schools is derived from four revenue sources apportioned to common schools as authorized by state statute. Oklahoma's state-dedicated revenue for public schools includes a portion of Oklahoma's motor vehicle taxes, gross production taxes, rural electric cooperative corporation taxes, and revenue apportioned to Oklahoma schools from the common school land fund (O.S. §70-18-201.1).

State-appropriated money allocated to Oklahoma schools is solely based on the annual appropriations certified by the Oklahoma State Board of Equalization and subsequently appropriated by the Oklahoma legislature and governor. Total fiscal year 2015 state appropriations for common education was $2,486,854,082. Seventy-five percent of the 2014-2015 appropriations for public education were earmarked for the state aid formula, with the remaining appropriations going to specific line items such as employee health insurance benefits, instructional materials, and professional development (Senate Journal 2015).

Revenue Funds

Oklahoma schools are required to code all revenue received based on the source of revenue and the statutory or constitutional requirements for spending that revenue. Each revenue source must be deposited in the fund designated by the Article X of the Oklahoma Constitution or Title 70 of the Oklahoma State Statutes. The system used for coding all Oklahoma school revenue and expenditures is the Oklahoma Cost Accounting System (OCAS 2015).

General Fund

Pursuant to Oklahoma Statutes, "the general fund of any school district is hereby defined as a current expense fund." (O.S. §70-1-117). The general fund is comprised of the 35 mills levied pursuant to Article X, Section 9 of the Oklahoma Constitution, all state-appropriated revenue, all state-dedicated revenue, local and county revenue not earmarked for capital improvement purposes, federal revenue and any revenue donated to the school for current educational expenses. For the 2014-2015 school year, the general fund revenue for Oklahoma schools was derived from:

Table 3.1

Oklahoma Public School General Fund Revenue by Source

Revenue Source	Revenue	Percent of General Fund
Local and County	$1,314,254,6444	28.37%
State	$2,840,796,023	61.33%
Federal	$476,692,426	10.29%
General Fund Total	$4,631,743,093	

School boards can only authorize non-capital current expenses to be paid from a school district's general fund (O.S. §70-1-117). Oklahoma State Statute defines a capital expenditure as "an expenditure which results in the acquisition of fixed assets or additions to fixed assets. Capital expenditures shall include, but shall

not be limited to, purchases of land or existing buildings, purchases of real property, improvements of grounds and sites for construction purposes."

The general fund is the sole revenue source for paying teacher-related current education expenses such as teacher compensation, professional development and health benefits. The general fund is also the primary revenue source for paying all other current education expenses.

Building Fund

Article X, Section 10 of the Oklahoma Constitution directs schools to deposit all revenue produced by the annual five mill building fund levy into the school district's building fund. Title 70 Section 1-118 of Oklahoma State Statutes also mandates all revenue derived from donations directed to capital improvements and any appropriations received from the legislature from the State Public School Equalization Fund be deposited into the district's building fund.

According to Oklahoma Statutes, , building fund money may be used for "erecting, remodeling, repairing, or maintaining school buildings, for purchasing furniture, equipment and computer software to be used on or for school district property, for repairing and maintaining computer systems and equipment, for paying energy and utility costs, for purchasing telecommunications utilities and services, for paying fire and casualty insurance premiums for school facilities, for purchasing security systems, for paying salaries of security personnel, or for one or more, or all, of such purposes." (OS 70-18-118).

Bond Fund

Article X, Section 27 of the Oklahoma Constitution authorizes school districts to incur indebtedness up to 10 percent of their total assessed property valuation. A school district can incur debt through the issuance of bonds only after voters who live in the boundaries of the school district approve the bonds. For a common education bond issue to pass, it must receive 60% approval by those voting. The Oklahoma Constitution limits the use of bond funds to "the purpose of acquiring or improving school sites, constructing, repairing, remodeling or equipping buildings, or acquiring school furniture, fixtures or equipment."

Sinking Fund

Article X, Section 26 of the Oklahoma Constitution creates the sinking fund for Oklahoma schools to use to pay the principal and interest on any voter-approved bond issue or a court judgement against the school district. The sinking fund is the only fund that a public school district may use to retire long-term debt created by the passage of bond issues (2002 OK AG 14). The sinking fund is very much like a mortgage payment account. Oklahoma school districts use the revenue generated by selling bonds to financial institutions to pay the expenses associated with construction and purchases approved by the voters in the bond election. The ad valorem levy revenue generated to pay principal and interest is deposited into the district's sinking fund and then used to pay back the financial institution that financed the bond issue for the district. The millage assessed for the Oklahoma school sinking funds varies widely due because the amount of money levied for the sinking fund is based upon the school district's amount of debt, total district

valuation, and length of the approved debt. This variation occurs even among schools in the same county. In Oklahoma County, Bethany and Crooked Oak public schools have sinking fund levies in excess of 35 mills while Luther and Millwood have levies of less than 15 mills each. There are 122 of Oklahoma's 516 school districts with no sinking fund levy, including 11 of 12 Adair County school districts. (SDE Annual Report 2014).

Crossover Funds

Each one of Oklahoma public schools' constitutional or statutory funds has specific parameters for what type of expenditures may be made with the available funds. While certain expenditures are tied exclusively to a specific revenue source, there are quite a few common expenditures that may be made from more than one of an Oklahoma public school's funds. Specifically, school boards have some discretion in choosing whether certain expenses are paid from general, building or bond funds. For the purpose of this study, I am going to classify these expenditures as "crossover funds," those that are dedicated to a school's building fund or bond funds. These funds may be used to offset general fund expenditures.

State Aid Funding Formula

The Oklahoma State Aid equalization formula was first implemented in 1981. Since then, the formula has been amended several times, including the latest change in 2006, when Senate Bill 982 amended O.S §70-18-200.1 to add a full-day kindergarten weight to the student grade level weights in statute. The common education state aid funding formula is comprised of seven revenue sources and is distributed to schools based on the district's weighted average daily membership

(WADM). The weighted average daily membership is comprised of the average daily enrollment plus the sum of nine additional possible weights delineated in Title 70 Section 18 of Oklahoma State Statutes. The funding formula uses student- and district-level weights to create vertical equity. The principle of vertical equity is the unequal treatment of unequals -- meaning that some students and district-level factors require more resources than others. The Oklahoma funding formula weights are allocated based on identified differences in students, teachers, and district factors that affect the cost to educate students.

The vertical equity of the formula begins with the average daily membership (ADM) for a school district. Average daily membership is the average number of students enrolled in a school district over a specified period. Based on the perceived cost for differences in student populations, there are six student categorical weights used to enhance revenue for schools. The student categorical weights include a weight for student grade level, special education based on disability, gifted students, bilingual students, students who receive summer special education services, and students who are identified as economically disadvantaged. The formula also includes a teacher index weight which provides a school district additional revenue based on the experience and advanced degree level of the school's certified staff if it is higher than the average of all Oklahoma districts. There are two district-level weights possible for Oklahoma schools to receive. A school district may be eligible for the small school or isolation weight. This is based on the number of students enrolled or the density of their student population in relation to square miles within the school district's boundaries.

Table 3.2

Financial Impact of Weights: FY2016 Initial Allocation

Weight	**Total Weights**	**Money**	**% of Total**
ADM	678,860	$2,090,617,256	62.36%
Grade Weight	131,393	$404,637,883	12.07%
Special Education	98,895	$304,557,042	9.08%
Gifted Weight	28,384	$87,411,366	2.61%
Bilingual Weight	19038	$58,629,425	1.75%
Summer Program	323	$994,711	.03%
Economically Disadvantaged	105,448	$324,737,6614	9.69%
Small School	4,130	$12,718,748	.38%
Isolation Weight	12,389	$38,153,164	1.14%
Teacher Index	9,773	$30,096,931	.90%
Total	**1,088,633**	**$3,352,554,187**	**100%**

Table 3.3

Average Weight Per Student

Average Daily Membership (ADM)	Weighted Average Daily Membership (WADM)	Average Weight Per Student
678,860	**1,088,633**	**1.6**

Formula Revenue

The State Aid Formula for funding is comprised of eight common education revenue sources. Formula revenue includes local and county, state-dedicated, and state-appropriated revenue. Local and county revenue is derived from ad valorem taxes authorized by Article X, Section 9 of the Oklahoma Constitution. This includes 35 mills from local property valuation and a county four-mill that is allocated to schools within the county. It is based on average daily attendance. The 35 mills from local property valuation is generated by four different constitutional levies. The first 15 mills are levied pursuant to paragraph (c) which states: "*Upon certification of a need therefor by the board of education of any school district an additional tax of not to exceed fifteen (15) mills on the dollar valuation of all taxable property in the district shall be levied for the benefit of the schools of such district."* The 15-mill levy is used as an equalization factor as part of the foundation portion of the State Aid Formula (70 O.S. § 18-200.1).

The remaining 20 mills are used as part of the salary incentive portion of the State Aid Formula. They consist of a local 10-mill support levy, a county-wide five-mill levy and a five-mill emergency levy. Article X, Section 9 of the Oklahoma

Constitution was amended by a legislative referendum that called for State Question 690 to be voted on during the general election held November 7, 2000. The referendum passed, adding paragraph (d-2): *"A school district may upon approval by a majority of the electors of the district voting on the question make the ad valorem levy for emergency levy and local support levy under (d) and (d-1) of this section permanent."* This provision allowed local voters to decide if they wanted to vote annually for the constitutionally authorized ad valorem levies or make them permanent. By the end of the 2014-2015 school year, all 516 school districts had voted to make their mill levies permanent.

State Dedicated Revenue

School Land Fund

Article XI, Section 3 of the Oklahoma Constitution created the Oklahoma School Land Fund and dedicated the monies collected to be "apportioned among and between all the several common school districts of the State in proportion to the school population of the several districts, and no part of the fund shall ever be diverted from this purpose, or used for any other purpose than the support and maintenance of common schools for the equal benefit of all the people of the State." O.S. §70-10-104 directs the School Land Commission to apportion the money authorized by Article XI, Section 3 to school districts based upon the average daily attendance of the district.

Gross Production Taxes

O.S. §68-1001 dedicates a portion of all gross production revenue to common education schools. The Oklahoma Tax Commission apportions the gross production

revenue dedicated to common education to the state in which it was produced. Each county then allocates the money to each independent school district based on the district's average daily attendance. Elementary school districts and charter schools in Oklahoma do not receive any state-dedicated gross production tax revenue (O.S. §68-1004).

Motor Vehicle Taxes

Title 47, Section 1104 of Oklahoma State Statute dedicates 36.2% of all revenue generated by the taxes and fees assessed on motor vehicles to Oklahoma public schools. This section of Oklahoma Statute was amended in 2015 by House Bill 2244 to cap the amount of money Oklahoma schools receive from motor vehicle collections to the total received in fiscal year 2015. Any revenue generated above the 2015 cap threshold is deposited in the state's general revenue fund. Motor vehicle tax revenue is apportioned to all of Oklahoma's independent school districts on a statewide basis. Oklahoma statute also contains a guarantee provision which states that *"except as otherwise provided in this subparagraph, each district shall receive the same amount of funds as such district received from the taxes and fees provided in this title in the corresponding month of the preceding year."* Oklahoma's 110 elementary school districts and 31 charter schools do not receive state dedicated motor vehicle taxes.

Rural Electrification Association Cooperative Tax

Pursuant to Title 68, Section 1806 of Oklahoma State Statutes Rural Electrification Association cooperatives (R.E.A) are assessed taxes based on property valuation.

The R.E.A. taxes collected are then distributed to Oklahoma public schools based upon the number of miles of transmission line within each district.

State Appropriations

The largest single source of revenue for the state aid formula comes from state legislative appropriations. The legislature and governor annually approve the budget for the State of Oklahoma. As part of Oklahoma's annual budget, the legislature designates the majority of Oklahoma's education appropriations to Oklahoma public schools via the designation of "financial support of schools." The state legislature depends on four dedicated sources and one discretionary source of revenue to annually fund the state-appropriated portion of the Oklahoma state aid funding formula. The dedicated revenue sources are comprised of the education reform revolving fund, the common education technology fund, mineral leasing revenue, and the Oklahoma lottery trust. The state legislature's discretionary revenue source included in the state appropriation for the financial support of public schools is the state's general revenue fund.

Table 3.4

State Aid Revenue by Source

Revenue Source	Amount	Percentage
County 4-Mill	$91,678,550.25	3%
School Land	97,500,003	3%
Gross Production	83,688,215	2%
Ad valorem - 35 Mills	$1,004,969,001.95	29%
Motor Vehicle	261,403,102	8%
Rural Electrification Tax	42,066,545	1%
State Aid Appropriation	$1,826,404,722	54%
Total State Aid Revenue	$3,407,710,139	

Source: Oklahoma State Department FY2016 form B17004WX

State Aid Formula Funding: Horizontal Equity

Oklahoma Statutes delineate seven sources of revenue as the revenue sources comprising the Oklahoma state aid funding formula (O.S. §70-18-200.1). The state aid funding formula uses these seven sources of revenue in conjunction with the school districts' weighted average daily membership to provide current operating revenue to Oklahoma schools with the intent of providing horizontal equity. The state's method for creating horizontal and vertical equity is to calculate the state aid factor which indicates the amount of money each school district will receive for each weighted student represented by their weighted average daily membership.

The state aid funding formula uses a two-tiered system to determine the state aid received by Oklahoma school districts. The top tier, known as the foundation aid

section, uses the school district's revenue from county four-mill, school land earnings, gross production, motor vehicle, rural electrification association taxes, and the 15-mill local levy as chargeables. The bottom tier is known as the salary incentive aid section of the formula. The salary incentive aid section uses a formula to add the remaining 20 mills of general fund ad valorem revenue to the total. The state aid appropriation portion of the formula is used as the balancing or equalization portion of the formula to provide school districts with the amount equal to the overall state aid factor.

Table 3.5

Oklahoma School Funding Formula: Horizontal Equity

Revenue Source	**District A**	**District B**	**Difference**
County 4-Mill	$75,000	$75,000	$0
School Land	$25,000	$25,000	$0
Gross Production	$50,000	$50,000	$0
State Aid	$1,050,800	$1,365,800	($315,000)
Foundation Aid 15 Mills	$150,000	$15,000	$135,000
Incentive Aid 20 Mills	$200,000	$20,000	$180,000
Motor Vehicle	$25,000	$25,000	$0
REA Tax	$0	$0	$0
Totals	**$1,575,800**	**$1,575,800**	**$0**

Capital Improvement Revenue and Expenditures

Oklahoma public schools receive almost 100 percent of their capital improvement revenue from local ad valorem tax levies (OCAS 2015). The two ad valorem revenue sources from which Oklahoma schools are able take care of their capital improvement needs are their annual five-mill building fund (Article X, Section 21*)* and bond funds (Article X, Section 27). these must be approved by 60% of the electorate. Revenue generated for these two funds is not restricted solely to capital expenditure projects. There are also "crossover expenditures" that may be made from bond or building fund revenue that are considered current expenditures (NCES 2016).

Crossover Funds

Crossover Funds: Building Fund

Pursuant to O.S. §70-1-118: "A school's building fund may be used for erecting, remodeling, repairing, or maintaining school buildings, for purchasing furniture, equipment and computer software to be used on or for school district property, for repairing and maintaining computer systems and equipment, for paying energy and utility costs, for purchasing telecommunications utilities and services, for

paying fire and casualty insurance premiums for school facilities, for purchasing security systems, for paying salaries of security personnel, or for one or more, or all, of such purposes." There are several items that may be paid for from a school district's building fund that may also be paid for from their general fund. The crossover expenditures from the building fund include a school's utility bills, custodial, maintenance and security salaries, furniture, and insurance premiums (OCAS 2016).

Crossover Funds: Bond Funds

Pursuant to O.S. §70-15-106.1: "Equipment purchase - Bonds. Any school district may become indebted for the purpose of purchasing equipment and may issue its bonds, as provided for by law, in any amount not exceeding, with existing indebtedness, ten percent (10%) of the valuation of the taxable property within the school district, as shown by the last incurring of indebtedness. The bonds shall be made to mature within a period not to exceed five (5) years from their date. It is hereby declared that the use of the word "equipment" in Section 26, Article X of the Oklahoma Constitution was intended to include: library books, textbooks, school-owned uniforms, computer software, electronic media content, perpetual or continuous district software license agreements and web-based software subscriptions with a term of more than one (1) year but not more than five (5) years, the acquisition of telecommunications devices and components to be used to enhance classroom instruction and maintenance/service contracts which are included as a part of the equipment purchase price and any associated hardware and software necessary for implementation and training and any maintenance agreements." The Oklahoma

State Legislature added the language defining equipment that may be purchased with bond funds in 1995 and amended the language again in 2004 and 2010. This section of the law provides flexibility for school districts by expanding the use of bond funds beyond capital improvement and land acquisition.

Crossover Funds: Equity Concerns

There are no statutory or constitutional provisions that attempt to create equity among Oklahoma schools when it comes to capital improvement revenue. A school receives a five-mill building fund and may bond up to 10% of their total property valuation even if it is double that of a similar sized school. Oklahoma is one of only 4 states nationwide that does not have a state-dedicated source of capital improvement revenue for public schools to help offset this type of inequity. Maiden and Stearns found that average Oklahoma school capital expenditures showed far greater inequity than average current expenditures (Maiden and Stearns 2007). The example below uses Oklahoma school districts Enid and Stillwater to show the district revenue disparity between very similar Oklahoma school districts. In 2016, Enid Public Schools had 12,811.64 weighted average daily membership and a total district valuation of almost $275 million while Stillwater Public Schools had a weighted average daily membership of 9,618.59 and a total district valuation of over $364 million. This disparity created a per-capita difference of $16,430 (OSDE 2016). The building fund revenue difference was $447,512 and a bond issue of 30 mills would generate a difference of $2,685,074 annually. Stillwater also utilized $797,433 worth of bond funds for instruction (crossover funds). The property value difference results in Stillwater Public Schools having an advantage of over $3 million annually

in building fund and bond fund revenue. This revenue can be used for traditional capital outlay projects or crossover expenditures which would free up general fund revenue for additional current expense items.

Table 3.6

Capital Revenue: Inequity Example

District	Valuation	Building Fund (5 mills)	Bond Fund (30 mills)	Instructional Bond Funds	Total Ad Valorem Revenue
Enid	$274,971,464	$1,374,857	$8,249,144	$0.00	$9,624,001
Stillwater	$364,473,944	$1,822,369	$10,934,218	$797,433	$13,554,021
Annual Difference		$447,512	$2,685,074	$797,433	$3,930,020

Data Collection

Data for this study were collected from the Oklahoma State Department of Education Financial Services Division. The study will use all 516 Oklahoma school districts in Oklahoma for fiscal years 2012 through 2016. The data used were each district's weighted average daily membership used in the annual final allocation for the state aid formula (form B17004WX), total district property valuation, building fund (OCAS fund 21) revenue, General Fund expenditures (Fund 11) total bond fund expenditures (Fund 31-39) and bond fund expenditures for instructional materials (Fund 31-39 instruction).

Assumptions

This study assumes that the Oklahoma state aid formula is both horizontally and vertically equitable (Maiden 1998). The horizontal equity is created by each district receiving the same amount of money per weighted student from the eight dedicated state aid formula revenue sources collectively. Another assumption of this study is that the membership and state aid data provided by the Oklahoma Department of Education are accurate. The study also assumes that the Oklahoma Cost Accounting System (OCAS) revenue and expenditure reports are statistically accurate. All student and financial data are self-reported by Oklahoma school districts to the department of education via the states online reporting system.

Data Analysis

The primary thrust of this quantitative ex post facto study was to examine the extent to which students in districts that have moderate or significant levels of capital funding through building and bond funds are placed at a relative resource advantage

compared to students in districts with fewer funds from these two sources. Additionally, the study examines the extent to which crossover funding impacts the equity of current education expenses.

Research Question 1:

1. Were there statistically significant differences in resources among Oklahoma school districts with low, moderate, or high levels of capital revenues derived from building fund and bond yields during fiscal year 2016?

This question was intended to examine whether districts that are able to generate more substantial capital revenue streams are able to more fully take advantage of crossover funding, compared to districts with more modest capital revenue streams. To address this question, Oklahoma school districts were divided into three groups based on the districts capital revenue per pupil:

(Low) The districts in the bottom third of the per pupil capital revenue distribution;

(Moderate) The districts in the middle of the per pupil capital revenue distribution; and,

(High) The districts in the top third of the per pupil capital revenue distribution.

A series of Analyses of Variance (ANOVAs) were utilized to address the research question; each ANOVA included the capital revenue grouping as independent variable. Three ANOVAS were used, including the following dependent variables:

- Current expenditures per pupil
- Current expenditures plus bond derived Instructional expenditures per pupil

- Median District Teacher Salary

Crossover funds per pupil were not included in the analysis because nearly 96 percent of the data points in the 'Low' group were zero.

Robustness checks were used to determine ANOVA model fit. A post hoc test was employed to determine the specific within group differences, if any. The 3 group ANOVA was employed (as opposed to linear regression or path analysis) because of the ease of interpretably. The researcher believes policy makers will be better informed by exploring differences among high, moderate, and low levels of ability.

Research Question 2: What were the effects of crossover funding on the resource accessibility of the Oklahoma education finance system during fiscal years 2012-2016?

- Current expenditures without crossover;
- Current expenditures with crossover added;
- Crossover expenditures; and,
- Capital expenditures.

Standard resource accessibility descriptive statistics (mean, variance, standard deviation, coefficient of variance, and federal range ratio) were used to ascertain the level of horizontal equity in the distribution (Berne and Steifel, 1984; Maiden, 1998; Maiden and Stearns, 2007). The federal range ratio is the difference between the per pupil revenue of the restricted range divided by the value at the 5th percentile. As the federal range ratio decreases, equity increases. The formula used to determine the federal range ratio was:

$$\frac{\mathbf{RR}}{\mathbf{Xi \text{ at the } 5^{th} \text{ percentile}}}$$

RR= restricted range

Xi = expenditures per pupil

The Coefficient of Variation, also known as the relative standard deviation is the standard deviation of a distribution divided by the mean, expressed as a percentage. The Coefficient of Variation measures variability in expenditure distribution around the observed mean. As the Coefficient of Variation decreases, equity increases. The formula used to calculate the coefficient of variation was:

$$\frac{\mathbf{SD}}{\boldsymbol{Xp}} \mathbf{*100}$$

SD = Standard Deviation

Xp = Mean

Resource accessibility statistics were calculated for each fiscal year 2012 through 2016, to allow comparisons across time. The following distributions were included in the calculations:

- Current expenditures per pupil;
- Capital expenditures per pupil;
- Crossover expenditures per pupil; and,
- Current plus crossover expenditures per pupil.

Research Question 3: What were the effects of crossover funding on the wealth neutrality of the Oklahoma education finance system during fiscal years 2012-2016? Wealth Neutrality is a measure of the extent a local school districts wealth is a determining factor on a student's educational opportunity (Berne and Steifel, 1984;

Maiden and Wood, 1995; Maiden and Stearns 2007). This study examined the extent to which crossover expenditures, capital funding, bond funding and current education funding are related to local wealth, representing a school districts ability to provide financial resources to educate their students. Wealth Neutrality will be used to show what effects crossover funding has on wealth neutrality.

The Coefficient of Determination, Gini Coefficient, and McLoone Index were used to ascertain and chart the level of wealth neutrality of the distributions. Wealth neutrality statistics were calculated for each fiscal year 2012 through 2016, to allow comparisons across time.

The coefficient of determination (regression R^2), estimates the amount of variance in pupil support explained by district fiscal ability. For the current study, the independent variable was district assessed value per WADM and the dependent variables include:

- Current expenditures per pupil;
- Capital expenditures per pupil;
- Crossover expenditures per pupil; and,
- Current plus crossover expenditures per pupil.

Gini Coefficient: The Gini coefficient is a measure of the equity of revenue distribution. It measures how close the distribution is to providing like groups of students with equal proportions of revenue. The index measures the ratio with range from zero to one. Lower Gini Coefficients are associated with increased fiscal equity in a distribution. The formula to calculate the Gini coefficient is

$$\mathbf{G = \sum_i \sum_j P_i P_j (X_i - X_j) / 2(\sum_i P_j)^2 X_p}$$

where ∑ is the sum for all students in districts i and j, Pi was the number of pupils in district i, Pj is the number of pupils in district j, Xi is the expenditure per-pupil in district i, Xj is the expenditure per-pupil in district j, and Xp is the mean expenditure per-pupil for all districts

McLoone Index: The McLoone index measures equity for the revenue distribution below the median. It is expressed as a ratio of the actual revenue in the bottom half of the distribution relative to the total revenue that would be received if the group studied were at the median revenue the entire group being studied. The McLoone index ranges from 0 to 1. An increased McLoone Index is associated with a higher level of equity below the distribution median. The formula to calculate the McLoone Index is

$$\sum(\text{ i...j})\ P_i X_i \,/\, M_p \sum(\text{i . . . j }) P_i$$

where ∑ is the sum of pupils in all districts i to j, P_i is the number of pupils in district i, X_i is the expenditure per-pupil in district i and M_p is the median per pupil revenue or expenditure for all districts.

A Gini Coefficient and McLoone Index were calculated for each fiscal year 2012 through 2016, for each of these variables:

- Current expenditures per pupil;
- Capital expenditures per pupil;
- Crossover expenditures per pupil; and,
- Current plus crossover expenditures per pupil.

Summary

Chapter three provided an overview of the rationale for the study followed by an in-depth review of the Oklahoma common education funding system. It would be unwise to attempt to study the equity of any portion of the complex funding system without understanding the interdependency and crossover impact. It is also very important to have a deep understanding of all the nuances of Oklahoma's multiple funding sources and the method for determining the allocation of revenue from each source. The third section of this chapter addressed the methodologies used for equity analysis. These measurement tools will be used to determine the possible equity impact capital outlay funds have on current operating expenditures in Oklahoma public schools.

CHAPTER FOUR

Descriptive and Visual Representation of the Results

Chapter three provided an overview of the study design and variables used to assess the impact of capital improvement revenue and crossover revenue on the equity of current education expenses. Chapter four begins with a review of the methodology used in the study followed by a presentation of the results of the data analysis. Each research question is discussed in detail, including tables and descriptive details of the various results.

The purpose of this study was to examine the extent to which students in districts that have moderate or significant levels of capital funding through building and bond funds are placed at a relative resource advantage compared to students in districts with fewer funds from these two sources. Additionally, the study examines the extent to which crossover funding impacts the equity of current education fiscal support. To accomplish this purpose three research questions were considered:

1. Were there statistically significant differences in resources among Oklahoma school districts with low, moderate, or high levels of capital revenues derived from building fund and bond yields during fiscal year 2016?
2. What were the effects of crossover funding on the resource accessibility of the Oklahoma education finance system during fiscal years 2012-2016?
3. What were the effects of crossover funding on the wealth neutrality of the Oklahoma education finance system during fiscal years 2012-2016?

Data used for this study were collected from the Oklahoma Cost accounting system for fiscal years 2012 through 2016. The following data were used for this study:

- Current educational revenue from the school districts general fund. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 11.
- Building fund revenue generated by the 5-mill ad valorum assessment. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 21.
- Total Bond fund expenditures. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 31-39 object total.
- Bond fund expenditures for instructional materials. This data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 31-39 instruction.
- Total district ad valoral valuation
- Full year district weighted average daily membership (WADM)
- Median District Salary

Research Question 1: Were there statistically significant differences in resources among Oklahoma school districts with low, moderate, or high levels of capital revenues derived from building fund and bond yields during fiscal year 2016? The following yields (which served as dependent variables) were utilized in the analysis:

- Current expenditures per pupil
- Current expenditures plus bond derived Instructional expenditures per pupil
- Median district teacher salary

Oklahoma school districts were divided into three groups (the independent variable) based on the districts per pupil capital revenue:

Low: The districts in the bottom third of the per pupil capital revenue distribution;

Moderate: The districts in the middle of the per pupil capital revenue distribution; and,

High: The districts in the top third of the per pupil capital revenue distribution.

A series of three Analyses of Variance (ANOVA) was used to answer research question 1. A multivariate Analysis of Variance (MANOVA) was contemplated; however, robustness tests revealed there was a strong violation of the assumption of moderate multicollinearity of the dependent variables (none of the three outcome variables were moderately correlated to each other). The researcher is aware that the current and the current+crossover outcomes are strongly related. However, a goal of the study was to determine the extent to which the addition of crossover funding disturbed the equity of the distribution, given the baseline stand alone current expenditures.

Descriptive statistics for the first research question are include in Table 4.1 The first variable analyzed was the fiscal year 2016 current expenditures per weighted average daily membership (WADM). The mean for current expenditures of Oklahoma's 516 school districts in FY2016 was $4,613.31. The mean current expenditure per pupil of the High group was $4,598.61, while the mean for the moderate group was $4,503.50 (actually slightly lower than the Low group). The High group mean was calculated at $4,739.74. The High group also had the highest

average per pupil revenue for current expenditures. In fact, the High group had a 3% higher mean per pupil than group 1 and a 5.2% higher average than group 2.

The standard deviation for per pupil current expenditures for the Low group $728.16. The Moderate group had the lowest standard deviation at $711.50, while the High group had the highest standard deviation for current education expenditures at $1319.54. The High group had the highest average per pupil capital improvement revenue and highest mean per pupil current revenue. The High group also contained the district with the highest per pupil current expenditures with Reydon Public Schools spending $14,450.20 per pupil in fiscal year 2016.

The descriptive statistics for current plus crossover per pupil expenditures do not vary much from current expenditures. The mean for per pupil current plus crossover expenditures of Oklahoma's 516 school districts in FY2016 was $4,621.46 (only $8.15 more per pupil than current education expenditures alone). The mean for the Low group was $4,599.50, while the mean for the Moderate group was$4,507.28. The High group, with the highest per pupil capital improvement revenue and per pupil current revenue, also had the highest average per pupil revenue for current plus crossover expenditures at $4,759.60

The median teacher salary offered for bachelor level teachers was also analyzed. The average median teacher salary among the groups increases with the level of capital funding per pupil. The mean for median teacher salary of Oklahoma's 516 school districts in FY2016 was $37,926.57. The Low group had a mean teacher salary of $37,583.40. The mean for median teacher salary of the moderate group was $37,783. Group 3, with the highest per pupil capital

improvement revenue and per pupil current revenue also had the highest average median teacher salary for at $38,417.55.

Table 4.1

Descriptive Statistics Research Question 1

		N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Current Expenditures per WADM	Low	171	4598.615809	728.1628687	55.6840063	3538.3218	7917.9183
	Moderate	174	4503.503922	711.5083420	53.9393082	3553.0964	7612.1045
	High	171	4739.739651	1319.5417490	100.9078795	3576.6145	14450.1976
	Total	516	4613.310981	964.0010178	42.4377785	3538.3218	14450.1976
Current + Crossover per WADM	Low	171	4599.5033510	727.50334430	55.63357121	3538.32177	7917.91833
	Moderate	174	4507.2788570	710.23571220	53.84283039	3553.09636	7612.10449
	High	171	4759.6036600	1315.42146800	100.59279380	3634.04334	14450.19760
	Total	516	4621.4608910	962.41258820	42.36785178	3538.32177	14450.19760
Teacher Salary	Low	173	37583.40	1010.89	76.857	35100	43350
	Moderate	172	37783.62	1111.08	84.719	37225	42527
	High	171	38417.55	1886.65	144.276	37225	444700
	Total	516	37926.57	1432.6847490	63.0704293	35100.0000	44700.0000

Analysis of Variance robustness checks were used to determine the viability of the univariate ANOVA tests. The Levene test (see Table 4.2) indicated significant levels of heteroscedasticity among the groups for all three dependent variables. Accordingly, both the Welch and the Brown-Forsyth corrections were used in the analysis to account for the unequal group variances.

Table 4.2

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Current Expenditures per WADM	8.782	2	513	.000
Current + Crossover per WADM	8.554	2	513	.000
Teacher Salary	46.791	2	513	.000

Table 4.3 includes the results of the analysis using both the Welch and Brown-Forsyth adjustments for the three variables. As expected, there was no statistically significant differences in current expenditure among the three groups, using the Bonferroni adjustment to account for three ANOVAs. Current expenditures are fundamentally a function of a two-tiered equity formula, and any connection between current expenditures and the ability to raise capital revenue would be unexpected.

There was a substantial difference in current plus crossover funding among the groups, although this difference was statistically insignificant. It should be noted although the amount of additive dollars provided by crossover funding was quite modest, the differences among groups was still substantial. As indicated in Table 4.1 there was smaller than $100 per pupil difference in current+crossover between the moderate and low groups (the low group actually having the slightly higher mean). However, the high group was more than $250 per pupil higher than either of the other two groups. Again, the differences were substantial but statistically insignificant.

Table 4.3

Adjusted Analysis of Variance

		Statistic[a]	df1	df2	Sig.
Current Expenditures per WADM	Welch	2.296	2	325.807	.102
	Brown-Forsythe	2.626	2	367.227	.074
Current + Crossover per WADM	Welch	2.562	2	325.858	.079
	Brown-Forsythe	3.043	2	367.812	.049
Teacher Salary	Welch	13.003	2	325.983	.000
	Brown-Forsythe	16.771	2	377.156	.000

a. Asymptotically F distributed.

There were statistically significant differences in median district teacher salaries among the three groups, both using the Welch and the Brown-Forsyth tests (Table 4.3). A modest but significant effect size of just over 6% was calculated (η^2 = .062), indicating that roughly 6 percent of the variance in median district teacher salaries was attributed to high, moderate, or low levels of capital funding per pupil. The post-hoc analysis for teacher salaries is included in Table 4.4 (the Games-Howell test was used because of the violation of the homoscedasticity assumption). The findings of the Games-Howell test indicate that the High group districts had significantly higher median teacher salaries than both the Moderate and the Low

group, while there was no statistically significant difference in median teacher salaries between the Moderate and the Low group.

Table 4.4

Post Hoc Analysis for Teacher Salaries

Multiple Comparisons

Dependent Variable: Teacher Salary
Games-Howell

(I) Capital Group	(J) Capital Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Low	Moderate	-200.212	114.387	.188	-469.48	69.06
	High	-834.145*	163.470	.000	-1219.48	-448.81
Moderate	Low	200.212	114.387	.188	-69.06	469.48
	High	-633.933*	167.310	.001	-1028.20	-239.67
High	Low	834.145*	163.470	.000	448.81	1219.48
	Moderate	633.933*	167.310	.001	239.67	1028.20

*. The mean difference is significant at the 0.05 level.

Resource Accessibility Results

Research Question 2: What were the effects of crossover funding on the resource accessibility of the Oklahoma education finance system during fiscal years 2012-2016? The following data distributions were used in the analysis:

- Current expenditures without crossover
- Current expenditures with crossover added
- Crossover expenditures
- Capital expenditures

The mean, variance, standard deviation, coefficient of variance, and federal range ratio were used to ascertain and chart the level of horizontal equity of the indicated data for the 5-year period between 2012 and 2016. Table 4.5 shows the resource accessibility statistics for per pupil current education expenditures.

Resource Accessibility: Current Expenditures

The fiscal year 2012 mean current educational expenditures for the 516 public schools in Oklahoma was $4,615.60 per pupil. The 2013 mean current educational expenditures increased to $4,719.76 per pupil. The mean per pupil current educational expenditures increased again in 2014 to $4,724.34. Oklahoma's current expenditures per pupil decreased by $120.62 in 2015 to $4,603.72. The 2016 mean current expenditure per pupil was $4,613.31 (nearly the same as the mean for fiscal year 2013).

Variance statistics are helpful when analyzing data over multiple years. There were significant shifts in per pupil current education expenditures over the 5-year period between 2012 and 2016. The 2012 variance for per pupil current expenditures was 1,185,961.25. The 2013 variance dropped to 980,290.04 and the next year it dramatically increased by 2,260,174 to 3,240,464.04, then decreased to 761,556.02 in 2015. The variance for current education expenditures was 929,297.96 in fiscal year 2016.

The standard deviation (the square root of the variance) indicates the average deviation of the data points from the mean. The standard deviation for per pupil current education expenditures in 2012 was $1,089.02. The 2013 standard deviation for per pupil current expenditures dropped to $990.10. Similar to the changes that occurred with the mean and variance, the standard deviation soared in 2014 to $1,802.90 per pupil. The 2015 standard deviation decreased by 52% to $872.67. The 2016 standard deviation for current education expenses per pupil was $964.00.

The coefficient of variation, also known as the relative standard deviation is the standard deviation of a distribution divided by the mean, expressed as a percentage. The coefficient of variation measures variability in expenditure distribution around the observed mean. As the coefficient of variation decreases, equity increases.

The coefficient of variation for per pupil current education expenditures in 2012 was 0.24. The 2013 coefficient of variation for per pupil current expenditures dropped to 0.21. The coefficient of variation increased in 2014 to 0.38 per pupil before dropping to 0.19 in 2015. The 2016 coefficient of variation for current education expenses per pupil was 0.21.

The federal range ratio is the difference between the per pupil revenue of the range between the 95^{th} percentile and the 5^{th} percentile divided by the value at the 5^{th} percentile. As the federal range ratio decreases, equity increases. The federal range ratio for Oklahoma public school current expenditures per pupil was between 0.59 and 0.69 during the 5-year period between 2012 and 2016.

The fiscal year 2012 federal range ratio for per pupil current education expenditures for the 516 public schools in Oklahoma was 0.60. The 2013 federal range ratio for current expenditures per pupil decreased slightly to 0.56, then increased to 0.59 in 2014. Oklahoma's federal range ration for current expenditures per pupil in 2015 was 0.60, then grew to 0.69 in 2016.

Table 4.5

Resource Accessibility Current Expenditures per pupil

Year	Mean	Variance	Standard Deviation	Coefficient of Variation	Federal Range Ratio
2012	$4,615.60	1,185,961.25	$1089.02	0.24	0.60
2013	$4,719.76	980,290.04	$990.10	0.21	0.56
2014	$4,724.34	3,240,464.04	$1,802.90	0.38	0.59
2015	$4,603.72	761,556.02	$872.67	0.19	0.60
2016	$4,613.31	929,297.96	$964.00	0.21	0.69
average	$4,655.35	1,419,513.86	$1,143.74	0.25	0.61

Resource Accessibility: Capital Expenditures

The resource accessibility statistics for capital expenditures per pupil are shown in Table 4.6. Capital expenditures used are limited to revenue derived from building fund and bond fund yields. The average capital expenditures per pupil increased for each year between 2012 and 2016.

The fiscal year 2012 capital expenditures mean for the 516 public schools in Oklahoma was $395.14 per pupil. The 2013 mean capital expenditures increased to $396.81 per pupil. The mean per pupil capital expenditures increased again in 2014 to $443.29. Oklahoma's capital expenditures per pupil in 2015 was $538.18, while

the 2016 mean capital expenditures per pupil was $556.47. The average annual per pupil capital expenditures increased by 41% from 2012 to 2016.

The 2012 variance for per pupil capital expenditures was 251,397.10. The 2013 variance dropped to 214,652.25 and the next year it increased slightly to 219,849.03. The 2015 variance increased by 243,086.02 to 462,935.05. The variance for capital expenditures was 405,097.92 in fiscal year 2016.

The standard deviation for per pupil capital expenditures in 2012 was $501.40and then dropped to $463.31 in 2013. The standard deviation for per pupil capital expenditures was $468.88 in 2014, then increased by $211.51 to $680.39 in 2015. The 2016 standard deviation for capital expenditures per pupil was $636.47.

The coefficient of variation for per pupil capital expenditures in 2012 was 1.27. The 2013 coefficient of variation for per pupil capital expenditures dropped to 1.17. The coefficient of variation decreased again 2014 to 1.06 before increasing to 1.26 in 2015. The 2016 coefficient of variation for capital expenditures per pupil was 1.14.

The fiscal year 2012 federal range ratio for per pupil capital expenditures for the 516 public schools in Oklahoma was 28.96. The 2013 federal range ratio for capital expenditures per pupil increased slightly to 29.10. The federal range ratio per pupil capital expenditures in 2014 was 28.42. Oklahoma's federal range ration for capital expenditures per pupil in 2015 was 36.27. The 2016 federal range ratio for capital expenditures per pupil was 34.88

Table 4.6

Resource Accessibility Capital Expenditures per pupil

Year	Mean	Variance	Standard Deviation	Coefficient of Variation	Federal Range Ratio
2012	$395.14	251,397.10	$501.40	1.27	28.96
2013	$396.81	214,652.25	$463.31	1.17	29.10
2014	$443.29	219,849.03	$468.88	1.06	28.42
2015	$538.18	462,935.05	$680.39	1.26	36.27
2016	$556.47	405,097.92	$636.47	1.14	34.88
average	$465.98	310,786.27	$550.09	1.18	31.53

Resource Accessibility: Crossover Expenditures

The resource accessibility statistics for crossover expenditures per pupil are shown in Table 4.7. crossover expenditures used are limited to bond derived Instructional expenditures per pupil. The average crossover expenditures per pupil increased for each year between 2012 and 2015, with a decrease in 2016.

The fiscal year 2012 crossover expenditures mean for the 516 public schools in Oklahoma was $1.67 per pupil. The 2013 mean crossover expenditures increased to $5.58 per pupil. The mean per pupil crossover expenditures increased again in 2014 to $7.57. Oklahoma's average crossover expenditures per pupil in 2015 was $12.41. The 2016 mean crossover expenditures per pupil decreased by $4.26 to $8.15 per pupil. In 2016, 417 Oklahoma school districts did not expend any bond revenue for instructional purposes.

The 2012 variance for per pupil crossover expenditures was 96.97. The 2013 variance increased to 448.27 and the next year it soared to 1028.47. The 2015

variance increased by 7,449.87 to 8,478.34. The variance for crossover expenditures per pupil was 750.93 in fiscal year 2016.

The standard deviation for per pupil crossover expenditures in 2012 was $9.85. The 2013 standard deviation for per pupil crossover expenditures increased to $21.17. The standard deviation for per pupil crossover expenditures was $32.07 in 2014. The 2015 standard deviation increased by $60.01 to $92.08. The 2016 standard deviation for crossover expenditures per pupil was $27.40.

The coefficient of variation for per pupil crossover expenditures in 2012 was 5.89. The 2013 coefficient of variation for per pupil crossover expenditures dropped to 3.79. The coefficient of variation increased in 2014 to 4.24. The 2015 coefficient of variation was 7.42. The 2016 coefficient of variation for crossover expenditures per pupil was 3.36. The federal range ratio for crossover expenditures was none for all five years due to the crossover expenditures per student being $0.00 for the school at the 5th percentile for each year.

Table 4.7

Resource Accessibility Crossover Expenditures per pupil

Year	Mean	Variance	Standard Deviation	Coefficient of Variation	Federal Range Ratio
2012	$1.67	96.97	$9.85	5.89	None
2013	$5.58	448.27	$21.17	3.79	None
2014	$7.57	1,028.47	$32.07	4.24	None
2015	$12.41	8478.34	$92.08	7.42	None
2016	$8.15	750.93	$27.40	3.36	None
average	$7.08	2,160.60	$36.51	4.94	None

Resource Accessibility: Current Plus Crossover Expenditures

The resource accessibility statistics for current plus crossover expenditures per pupil are shown in Table 4.8. The fiscal year 2012 mean current plus crossover expenditures for the 516 public schools in Oklahoma was $4,621.18 per pupil. The 2013 mean current plus crossover expenditures increased to $4,725.35 per pupil. The mean per pupil current plus crossover expenditures increased again in 2014 to $4,731.90. Oklahoma's current plus crossover expenditures per pupil decreased by $115.28 in 2015 to $4,616.12. The 2016 mean current plus crossover expenditure per pupil was $4,621.46.

There were significant shifts in per pupil current plus crossover expenditures over the 5-year period between 2012 and 2016. The 2012 variance for per pupil current expenditures plus crossover was 1,185160.41. The 2013 variance dropped to 976,833.26 and the next year it dramatically increased by 2,273,552.45 to 3,250,385.71 The 2015 variance decreased to 760,771.36. The variance for current plus crossover expenditures was 926,237.99 in fiscal year 2016.

The standard deviation for per pupil current plus crossover education expenditures in 2012 was $1,088.65. The 2013 standard deviation for per pupil current plus crossover expenditures dropped to $988.35. Similar to the changes that occurred with the mean and variance, the standard deviation increased significantly in 2014 to $1,802.88 per pupil. The 2015 standard deviation decreased by 52% to $872.22. The 2016 standard deviation for current plus crossover education expenses per pupil was $962.41.

The coefficient of variation for per pupil current plus crossover expenditures in 2012 was 0.24. The 2013 coefficient of variation for per pupil current plus crossover expenditures dropped to 0.21. The coefficient of variation increased in 2014 to 0.38 before dropping to 0.19 in 2015. The 2016 coefficient of variation for current education plus crossover expenses per pupil was 0.21.

The federal range ratio is the difference between the per pupil revenue of the range between the 95^{th} percentile and the 5^{th} percentile divided by the value at the 5^{th} percentile. As the federal range ratio decreases, equity increases. The federal range ratio for Oklahoma public school current expenditures per pupil was between 0.59 and 0.69 during the 5-year period between 2012 and 2016.

The fiscal year 2012 federal range ratio for per pupil current education plus crossover expenditures for the 516 public schools in Oklahoma was 0.60. The 2013 federal range ratio for current plus crossover expenditures per pupil decreased slightly to 0.56. The federal range ratio for per pupil current plus crossover expenditures in 2014 was 0.58. Oklahoma's federal range ratio for current plus

crossover expenditures per pupil in 2015 was 0.60. The 2016 federal range ratio for current plus crossover expenditure per pupil was 0.68.

Table 4.8

Resource Accessibility Current plus Crossover Expenditures per pupil

Year	Mean	Variance	Standard Deviation	Coefficient of Variation	Federal Range Ratio
2012	$4,621.18	1,185,160.41	$1,088.65	0.24	0.60
2013	$4,725.35	976,833.26	$988.35	0.21	0.56
2014	$4,731.90	3,250,385.71	$1,802.88	0.38	0.58
2015	$4,616.12	760,771.36	$872.22	0.19	0.60
2016	$4,621.46	926,237.99	$962.41	0.21	0.68
average	$4,663.20	1,419,877.75	$1,142.90	0.25	0.60

Resource Accessibility: Comparison

The five-year average for the resource accessibility statistics of current expenditures, capital expenditures, current plus crossover, and crossover expenditures independently are shown in Table 4.9. The five year mean current per pupil expenditures for the 516 public schools in Oklahoma was $4,655.35 per pupil. The five-year average for per pupil capital expenditures was $465.98. Oklahoma's mean crossover expenditures from 2012 to 2016 was $7.08 per pupil. The 2016 mean crossover expenditures per pupil decreased by $4.26 to $8.15 per pupil. The average current per pupil for Oklahoma schools was almost ten times the amount spent per pupil for capital outlay.

The coefficient of variation measures variability in expenditure distribution around the observed mean. As the coefficient of variation approaches zero, equity increases. The coefficient of variation for current education expenditures

per pupil was 0.25 or 25%. The average capital outlay coefficient of variation was 97% higher than the coefficient of variation for current education expenses at 1.18. The large degree of inequity for Oklahoma public school capital revenue is attributable to the significant differences in local wealth. Crossover expenditures had a coefficient of variation of 4.94. The coefficient of variation for current plus crossover expenditures was the same as current expenditures per pupil alone due to the average per pupil expenditure for crossover funds being insignificantly low at 0.15% of the average current expenditure per pupil.

The federal range ratio is the difference between the per pupil revenue of the range between the 95th percentile and the 5th percentile divided by the value at the 5th percentile. As the federal range ratio decreases, equity increases. The federal range ratio for Oklahoma public school current education expenditures per pupil between 2012 and 2016 was 0.61. The federal range ratio also indicated that current education expenditures had a far greater degree of equity than capital outlay expenditures. The five-year average federal range ratio for per pupil capital outlay expenditures was 31.53. The federal range ratio for crossover expenditures was none for all five years due to the crossover expenditures per pupil being $0.00 for the school at the 5th percentile for each year.

Table 4.9

Resource Accessibility Averages

Year	Mean	Variance	Standard Deviation	Coefficient of Variation	Federal Range Ratio
Current	$4,655.35	1,419,513.86	$1,143.74	0.25	0.61
Capital	$465.98	310,786.27	$550.09	1.18	31.53
Current +Crossover	$4,663.20	1,419,877.75	$1,142.90	0.25	0.60
Crossover	$7.08	2,160.60	$36.51	4.94	None

Wealth Neutrality

Research Question 3: What were the effects of crossover funding on the wealth neutrality of the Oklahoma education finance system during fiscal years 2012-2016?

Wealth Neutrality is a measure of the extent a local school districts wealth is a determining factor on a student's educational opportunity (Berne and Steifel, 1984; Maiden and Stearns 2007). This study examined the extent to which crossover expenditures, capital funding, bond funding and current education funding are related to local wealth, representing a school districts ability to provide financial resources to educate their students. Wealth Neutrality will be used to show what effects crossover funding has on wealth neutrality. The tables and discussion in this section provide the results of the wealth neutrality analysis. The Gini Coefficient, McLoone Index, and Coefficient of Determination were used to ascertain and chart the level of wealth neutrality of the indicated data in the following tables.

Wealth Neutrality: Current Expenditures

The Gini coefficient is a measure of the equity of revenue distribution, estimating how close the distribution is to providing like groups of students with

equal proportions of revenue. The index measures the ratio with range from zero to one. As the Gini index decreases, equity increases. The Gini coefficient for Oklahoma public school current expenditures per pupil indicated a high level of equity for all five years studied. Between fiscal year 2012 and fiscal year 2016 the Gini coefficient only varied by 0.0139. The Gini coefficient for current expenditures per pupil in 2012 was 0.0833. The 2013 Gini coefficient was 0.0831. In 2014, the Gini coefficient reached the high for the five-year period at 0.0967 and decreased again in 2015 to 0.0828. The Gini coefficient for current per pupil expenditures was .0905 in fiscal year 2016.

The McLoone index measures equity for the revenue distribution below the median. It is expressed as a ratio of the actual revenue in the bottom half of the distribution relative to the total revenue that would be received if the group studied were at the median revenue the entire group being studied. The McLoone index ranges from from zero to one. As the McLoone index approaches one, equity for the lower half of the distribution increases.

The McLoone index for Oklahoma's public schools' current expenditures per pupil indicated a high level of equity for schools below the median for per pupil current expenditures all five years studied. Between fiscal year 2012 and fiscal year 2016 the McLoone index was at least 0.9361 and only varied by 0.0063. The McLoone index for current expenditures per pupil in 2012 was 0.9392. The 2013 McLoone index was 0.9361. In 2014, the McLoone index reached the high for the five-year period at 0.96424 and decreased slightly in 2015 to 0.9416. The McLoone index for current per pupil expenditures was .9414 in fiscal year 2016.

The coefficient of determination (regression R-squared), estimates the amount of variance in pupil support explained by district fiscal ability. The coefficient of determination ranges between zero and one. The closer the value is to one, the higher the relationship between the current education expenditures per pupil and a school's local wealth.

The coefficient of determination for current expenditures per pupil for the five-year period between fiscal year 2012 and fiscal year 2016 was between 0.038 and 0.373. The 2012 R-squared value was 0.038. The 2013 value increased to 0.122. The coefficient dropped in 2014 to 0.065. The 2015 R-squared value was 0.373. In 2016, the relationship between local wealth and current education expenses per pupil as measured by the coefficient of determination remained consistent at 0.351.

Table 4.10

Wealth Neutrality Current Expenditures per pupil

Year	Gini Coefficient	McLoone Index	Coefficient of Determination
2012	0.0833	0.9392	0.038
2013	0.0831	0.9361	0.122
2014	0.0967	0.9424	0.065
2015	0.0828	0.9416	0.373
2016	0.0905	0.9414	0.351

Wealth Neutrality: Capital Expenditures

The Gini coefficient for Oklahoma public school capital expenditures per pupil indicated a consistent level of equity for all five years studied. Between fiscal year 2012 and fiscal year 2016 the Gini coefficient only varied by 0.0244. The Gini coefficient over the five-year period studied indicated that capital expenditures per

pupil were significantly less equitable than current education expenditures. The Gini coefficient for capital expenditures per pupil in 2012 was 0.5252. The 2013 Gini coefficient was 0.5496. In 2014, the Gini coefficient decreased slightly to 0.5274 and increased slightly in 2015 to 0.5437. The Gini coefficient for capital per pupil expenditures was .5349 in fiscal year 2016.

The McLoone index for Oklahoma's public school capital expenditures per pupil indicated a low level of equity for the schools below the median in revenue for all five years studied. Between fiscal year 2012 and fiscal year 2016 the McLoone index was never higher than 0.4766 and only varied by 0.0756. The McLoone index for capital expenditures per pupil in 2012 was 0.4626. The 2013 McLoone index was 0.4766. In 2014, the McLoone index decreased slightly to 0.5274 and increased slightly in 2015 to 0.4129. The McLoone index for capital per pupil expenditures was .4010 in fiscal year 2016.

The 2012 relationship between local wealth and capital education expenses per pupil as measured by the coefficient of determination was relatively high at 0.877. The 2013 R-squared value plummeted to 0.165. In 2014, the coefficient was 0.198. The 2015 R-squared value was 0.230. In 2016, the relationship between local wealth and capital expenditures per pupil as measured by the coefficient of determination remained low at 0.211.

Table 4.11

Wealth Neutrality Capital Expenditures per pupil

Year	Gini Coefficient	McLoone Index	Coefficient of Determination
2012	0.5252	0.4626	0.877
2013	0.5496	0.4766	0.165
2014	0.5274	0.4575	0.198
2015	0.5437	0.4129	0.230
2016	0.5349	0.4010	0.211

Wealth Neutrality: Crossover Expenditures

The Gini coefficient for Oklahoma public school crossover expenditures per pupil indicated a low level of equity for all five years studied. Between fiscal year 2012 and fiscal year 2016 the Gini coefficient only varied by 0.0692. The Gini coefficient over the five-year period studied indicated that crossover expenditures per pupil were significantly less equitable than current education expenditures. The Gini coefficient for crossover expenditures per pupil in 2012 was 0.9708. The 2013 Gini coefficient was 0.9372. In 2014 the Gini coefficient increased slightly to 0.9895 and decreased slightly in 2015 to 0.9374. The Gini coefficient for per pupil crossover expenditures was .9203 in fiscal year 2016.The McLoone index for Oklahoma's public school crossover expenditures per pupil was incalculable for all five years between 2012 and 2015, the result of more than half of the schools in Oklahoma having $0.00 in crossover expenditures for the years studied.

For fiscal years 2012 and 2013, the relationship between local wealth and crossover expenditures per pupil as measured by the coefficient of determination was 0.00. In 2014, the coefficient was 0.008. The 2015 R-squared value was 0.001. In

2016, the relationship between local wealth and capital expenditures per pupil as measured by the coefficient of determination remained low at 0.003.

Table 4.12

Wealth Neutrality Crossover Expenditures per pupil

Year	Gini Coefficient	McLoone Index	Coefficient of Determination
2012	0.9708	None	0.000
2013	0.9372	None	0.000
2014	0.9895	None	0.008
2015	0.9374	None	0.001
2016	0.9203	None	0.003

Wealth Neutrality: Current plus Crossover Expenditures

The Gini coefficient for Oklahoma public school current plus crossover expenditures per pupil indicated a high level of equity for all five years studied. Between fiscal year 2012 and fiscal year 2016 the Gini coefficient only varied by 0.0138. The Gini coefficient for current plus crossover expenditures per pupil in 2012 was 0.0832. The 2013 Gini coefficient was 0.0838. In 2014, the Gini coefficient reached the high for the five-year period at 0.0965 and decreased again in 2015 to 0.0827. The Gini coefficient for current plus crossover expenditures per pupil was .09000 in fiscal year 2016.

The McLoone index for Oklahoma's public school current plus crossover expenditures per pupil indicated a high level of equity for schools below the median for per pupil current plus crossover expenditures all five years studied. Between fiscal year 2012 and fiscal year 2016 the McLoone index was at least 0.9375 and only varied by 0.0056. The McLoone index for current plus crossover expenditures

per pupil in 2012 was 0.9415. The 2013 McLoone index was 0.9375. In 2014, the McLoone index reached the high for the five-year period at 0.9431 and decreased slightly in 2015 to 0.9418. The McLoone index for current plus crossover per pupil expenditures was .9415 in fiscal year 2016.

The coefficient of determination for current plus crossover expenditures per pupil for the five-year period between fiscal year 2012 and fiscal year 2016 was between 0.039 and 0.376. The 2012 R-squared value was 0.039. The 2013 value increased to 0.122. The coefficient dropped in 2014 to 0.065. The 2015 R-squared value was 0.376. In 2016, the relationship between local wealth and current plus crossover education expenses per pupil as measured by the coefficient of determination was 0.354.

Table 4.13

Wealth Neutrality Current plus Crossover Expenditures per pupil

Year	Gini Coefficient	McLoone Index	Coefficient of Determination
2012	0.0832	0.9415	0.039
2013	0.0838	0.9375	0.122
2014	0.0965	0.9431	0.065
2015	0.0827	0.9418	0.376
2016	0.0900	0.9415	0.354

Summary

Chapter four provided a review of the methodology used in the study followed by a presentation of the results of the data analysis. Each research question was discussed in detail, including tables and descriptive details of the various findings. The next chapter includes a discussion of these results.

CHAPTER FIVE

Findings, Conclusions, and Recommendations

Chapter four provided a review of the methodology used in the study followed by a presentation of the results of the data analysis. The results for each research question were provided both in tabular and textual form. Chapter five begins with an overview of the study design and variables used to assess the impact of capital improvement revenue and crossover revenue on the equity of current education expenses. The findings provided in chapter four are then summarized and discussed followed by conclusions based on these findings. Finally, implications for policy makers and recommendations for future study for researchers are delineated.

The objective of this study was to determine if having a deficiency in capital improvement revenue had an impact on the revenue available for the day to day operations of a school district. If so, there is a possibility this inequity nullifies the formulas that have been developed to ensure that schools have fair and equal funding for the education of students in America's public schools. This quantitative ex post facto study examined the expenses Oklahoma schools can legally pay with their General, Building, and Bond Funds and what expenses can be paid with more than one fund. For the purpose of this study, the expenses that can be used for more than one fund were called "crossover funds." Based on this information, the study examined the possible inequity created when schools with higher local property wealth can use their revenue earmarked for capital improvement as crossover funds for current educational expenses. Schools with less local wealth must use revenue from the state aid equity formula for similar expenditures. The study focused on

district level revenue data rather than student level or school site level data, predicated on the fact that Oklahoma's education funding system is solely based on district-wide data and allocated on a district basis. The components of district level revenue and student count data analyzed were:

- Current educational revenue from the school districts general fund. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 11.
- Building fund revenue generated by the 5-mill ad valorum assessment. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 21.
- Total Bond fund expenditures. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 31-39 object total.
- Bond fund expenditures for instructional materials. These data were collected from districts reporting Oklahoma Cost Acounting System (OCAS) fund 31-39 instruction.
- Total district ad valoral valuation
- Full year district weighted average daily membership (WADM)
- Median District Salary

These data were then used to examine three reseach questions:

Research Question 1: Were there statistically significant differences in resources among Oklahoma school districts with low, moderate, or high levels of capital

revenues derived from building fund and bond yields during fiscal year 2016? The following yields (which served as dependent variables) were utilized in the analysis:

- Current expenditures per pupil
- Current expenditures plus bond derived Instructional expenditures per pupil
- Median District Salary

Oklahoma school districts were divided into three groups (the independent variable) based on the districts per pupil capital revenue:

Low: The districts in the bottom third of the per pupil capital revenue distribution;

Moderate: The districts in the middle of the per pupil capital revenue distribution; and,

High: The districts in the top third of the per pupil capital revenue distribution.

Research Question 2: What were the effects of crossover funding on the resource accessibility of the Oklahoma education finance system during fiscal years 2012-2016? The following data distributions were used in the analysis:

- Current expenditures without crossover
- Current expenditures with crossover added
- Crossover expenditures
- Capital expenditures

Research Question 3: What were the effects of crossover funding on the wealth neutrality of the Oklahoma education finance system during fiscal years 2012-2016?

Summary of the Study Findings

Research Question 1 Findings Summary

Research question 1 asked, were there statistically significant differences in resources among Oklahoma school districts with low, moderate, or high levels of capital revenues derived from building fund and bond yields during fiscal year 2016?

A series of Analyses of Variance (ANOVA) was used to answer research question 1. A Multivariate Analysis of Variance (MANOVA) was contemplated; however, robustness tests revealed there was a strong violation of the assumption of moderate multicollinearity of the dependent variables (none of the three outcome variables were moderately correlated to each other).

The first variable analyzed was the fiscal year 2016 current expenditures per weighted average daily membership (WADM). The mean for current expenditures of Oklahoma's 516 school districts in FY2016 was $4,613.31. The mean current expenditure per pupil of the Low group was $4,598.61, while the mean for the Moderate group was $4,503.50 (actually slightly lower than the Low group). The High group mean was calculated at $4,739.74. The High group also had the highest average per pupil revenue for current expenditures. In fact, the High group had a 3% higher mean per pupil than the Low group and a 5.2% higher average than the Moderate group.

The standard deviation for per pupil current expenditures for the Low group $728.16. The Moderate group had the lowest standard deviation at $711.50, while the High group had the highest standard deviation for current education expenditures at $1319.54. The High group had the highest average per pupil capital improvement

revenue and highest mean per pupil current revenue. The High group also contained the district with the highest per pupil current expenditures with Reydon Public Schools spending $14,450.20 per pupil in fiscal year 2016.

The descriptive statistics for current plus crossover per pupil expenditures do not vary much from current expenditures. The mean for per pupil current plus crossover expenditures of Oklahoma's 516 school districts in FY2016 was $4,621.46 (only $8.15 more per pupil than current education expenditures alone). The mean for the Low group was $4,599.50, while the mean for the Moderate group was$4,507.28. The High group, with the highest per pupil capital improvement revenue and per pupil current revenue, also had the highest average per pupil revenue for current plus crossover expenditures at $4,759.60

The median teacher salary offered for bachelor level teachers was also analyzed. The average median teacher salary among the groups increases with the level of capital funding per pupil. The mean for median teacher salary of Oklahoma's 516 school districts in FY2016 was $37,926.57. The Low group had a mean teacher salary of $37,583.40. The mean for median teacher salary of the moderate group was $200.22 higher than the Low group at $37,783. Group 3, with the highest per pupil capital improvement revenue and per pupil current revenue also had the highest average median teacher salary for at $38,417.55. The High group had an average median teacher salary was $633.93(1.7%) higher than the moderate group and $834.15 (2.2%) higher than the Low group.

The results of the analysis using both the Welch and Brown-Forsyth adjustments for the three variables were interesting. As expected, there was no

statistically significant differences in current expenditure among the three groups, using the Bonferroni adjustment to account for three ANOVAs. Current expenditures are fundamentally a function of a two-tiered equity formula, and any connection between current expenditures and the ability to raise capital revenue would be unexpected.

There was a substantial difference in current plus crossover funding among the groups, although this difference was statistically insignificant. It should be noted although the amount of additive dollars provided by crossover funding was quite modest, the differences among groups was still substantial. There was smaller than $100 per pupil difference in current+crossover between the moderate and low groups (the low group actually having the slightly higher mean). However, the high group was more than $250 per pupil higher than either of the other two groups. While the Brown-Forsythe test resulted in a statistically significant finding at 0.049, the Welch result of 0.079 did not. The small number of districts availing themselves of bond related crossover funds for instructional materials could have impacted the results. 422 of Oklahoma's 516 school districts had $0.00 crossover expenditures. 60% of the districts with crossover expenditures where in the high group. The moderate group only had 29(31%) of the schools with crossover expenditures. While the low group had only 9 (10%) of the Oklahoma school districts with bond revenue expenditures for instructional materials.

There were statistically significant differences in median district teacher salaries among the three groups, both using the Welch and the Brown-Forsyth tests. A modest but significant effect size of just over 6% was calculated ($\eta^2 = .062$),

indicating that roughly 6 percent of the variance in median district teacher salaries was attributed to high, moderate, or low levels of capital funding per pupil. The findings of the Games-Howell test indicate that the High group districts had significantly higher median teacher salaries than both the Moderate and the Low group, while there was no statistically significant difference in median teacher salaries between the Moderate and the Low group.

Research Question 2 Findings Summary

Research question 2 asked, what were the effects of crossover funding on the resource accessibility of the Oklahoma education finance system during fiscal years 2012-2016? The mean, variance, standard deviation, coefficient of variance, and federal range ratio were used to ascertain and chart the level of horizontal equity of the indicated data for the 5-year period between 2012 and 2016. The five year mean current per pupil expenditures for the 516 public schools in Oklahoma was $4,655.35 per pupil. This represents the average per pupil expenditures from the general fund (fund 11). The 2016 mean per pupil expenditure was $111.03 per student lower than the 2014 five-year high of $4,724.34.

The five-year average for per pupil capital expenditures was $465.98. While current revenue declined over the five-year period studied, capital expenditures per pupil increased every year from 2012 through 2016. In 2012, the mean per pupil capital outlay was $395.14. in 2016, it reached a five-year high of $556.47. Per pupil capital expenditures increased by $161.33 per student from 2012 to 2016. Oklahoma's mean crossover expenditures from 2012 to 2016 was $7.08 per pupil. As a subcategory of bond funds, average crossover funds per pupil also increased

significantly from 2012-2016. Average crossover funds increased by over 300% from $1.67 per student in 2012 to $8.15 in 2016.

The five-year average coefficient of variation for current education expenditures per pupil was 0.25 or 25%. The average capital outlay coefficient of variation was 97% higher than the coefficient of variation for current education expenses at 1.18. The large difference in equity as measured by the coefficient of variation for Oklahoma public school current expenditures contrasted with capital outlay is attributable to the significant differences in local wealth and the fact that Oklahoma is one of four states in the nation without a mechanism to create equity for school capital revenue (TLC 2006). Crossover expenditures had a coefficient of variation of 4.94. The extremely high coefficient of variation can be partially attributed to 422 schools having $0.00 crossover expenditures in 2016.The coefficient of variation for current plus crossover expenditures was the same as current expenditures per pupil alone due to the average per pupil expenditure for crossover funds being insignificantly low at 0.15% of the average current expenditure per pupil.

Interestingly, Maiden and Stearns found the exact same coefficient of variation for current education expenditures per pupil at 0.25 for the nine-year period between 1995 and 2003 (Maiden & Stearns, 2007). The current study used general fund only as current education expenditures while Maiden and Stearns used all current education expenditures with the exception of federal funds. The coefficient of variation for capital outlay changed considerably from Maiden and Stearns findings of 0.54 for the nine-year period leading up to 2003 (Maiden and Stearns 2007). In

contrast, based on the findings of this study the average coefficient of variation was 1.14 for per pupil capital expenditures for the five-year period from 2012 to 2016.

The federal range ratio is the difference between the per pupil revenue of the range between the 95th percentile and the 5th percentile divided by the value at the 5th percentile. As the federal range ratio decreases, equity increases. The average federal range ratio for Oklahoma public school current education expenditures per pupil between 2012 and 2016 was 0.61. From 1995 through 2003, Maiden and Stearns found an average adjusted federal range ration of 0.94. The adjusted federal range ration includes schools below the 5th percentile which could account for the appearance of an increase in equity over time (Maiden and Stearns 2007). The federal range ratio also indicated that current education expenditures had a far greater degree of equity than capital outlay expenditures. The five-year average federal range ratio for per pupil capital outlay expenditures was 31.53. Much like the comparison of the coefficient of variation this study found a much higher federal range ration than Maiden and Stearns found for the nine-year period preceding 2004 (Maiden and Stearns 2007). The federal range ratio for crossover expenditures was none for all five years due to the crossover expenditures per pupil being $0.00 for the school at the 5th percentile for each year.

Research Question 3 Findings Summary

Research question 3 asked, what were the effects of crossover funding on the wealth neutrality of the Oklahoma education finance system during fiscal years 2012-2016? The Gini coefficient is a measure of the equity of revenue distribution, estimating how close the distribution is to providing like groups of students with

equal proportions of revenue. The index measures the ratio with range from zero to one. As the Gini index decreases, equity increases. The Gini coefficient for Oklahoma public school current expenditures per pupil indicated a high level of equity for all five years studied. Between fiscal year 2012 and fiscal year 2016 the Gini coefficient only varied by 0.0139. The average for the five years studied was 0.0878. This indicates a weak relationship between current education expenditures and local wealth. Much like the comparison with the resource accessibility data, Maiden and Stearns finding for the nine-year period from 1995 through 2003 were almost identical for current education expenditures per pupil at 0.10 (Maiden & Stearns, 2007).

The Gini coefficient for Oklahoma public school capital expenditures per pupil indicated a consistent level of equity for all five years studied. Between fiscal year 2012 and fiscal year 2016 the average Gini coefficient was 0.5362. The relationship to local wealth was predictably much higher for capital outlay, which is a derivative of local wealth, than it was for current expenditures. The Gini coefficient over the five-year period studied indicated that capital expenditures per pupil were significantly less equitable than current education expenditures. Stearns found a significantly lower average Gini coefficient of 0.22 for total capital outlay for the nine-year period from 1995 through 2003.

The McLoone index measures equity for the revenue distribution below the median. It is expressed as a ratio of the actual revenue in the bottom half of the distribution relative to the total revenue that would be received if the group studied were at the median revenue the entire group being studied. The McLoone index

ranges from from zero to one. As the McLoone index approaches one, equity for the lower half of the distribution increases.

The McLoone index for Oklahoma's public schools' current expenditures per pupil indicated a high level of equity for schools below the median for per pupil current expenditures all five years studied. Between fiscal year 2012 and fiscal year 2016 the McLoone index was at least 0.9361 and only varied by 0.0063. The average for the five-year period studied was 0.94 or 94%. Perfect equity for schools below the median would be indicated by a McLoone index of 100%. Once again, the results were consistent with the Maiden and Stearns average McLoone index of 0.92 for 1995-2003 (Maiden & Stearns, 2007).

The McLoone index for Oklahoma's public school capital expenditures per pupil indicated a significantly lower level of equity for all five years studied. Between fiscal year 2012 and fiscal year 2016 the McLoone index was never higher than 0.4766 and only varied by 0.0756. The average Mcloone index for the five years studied was 0.44 or 44%. Maiden and Stearns calculated a McLoone index of 0.79 for total capital outlay expenditure per pupil. Once again, his results for capital outlay indicated a higher degree of equity than the current study (Maiden & Stearns 2005).

The coefficient of determination (regression R^2), estimates the amount of variance in pupil support explained by district fiscal ability. The coefficient of determination ranges between zero and one. The closer the value is to one, the higher the relationship between the dependent variable and a school's local wealth.

For the current study, the independent variable was district assessed value per WADM and the dependent variables include:

- Current expenditures per pupil;
- Capital expenditures per pupil;
- Crossover expenditures per pupil; and,
- Current plus crossover expenditures per pupil.

The coefficient of determination for current expenditures per pupil for the five-year period between fiscal year 2012 and fiscal year 2016 was between 0.038 and 0.373. The average R-squared value was 0.1898. The relationship between current educational expenditures and local wealth as indicated by the coefficient of determination was consistently low. The coefficient of determination for current plus crossover expenditures was consistent with current education expenditures for the five-year period studied. The average coefficient of determination for current plus crossover expenditures was 0.19. The coefficient of determination for capital outlay had a high degree of variation from 2012 through 2016. The high was 0.877 in 2012 with a low coefficient of determination in 2013 at 0.165. The average coefficient of determination for per pupil capital outlay was significantly higher than current expenditures at 0.336.

To further exemplify these findings, table 5.1 includes relevant data from the Edmond and Moore districts to demonstrate the revenue disparity between very similar Oklahoma school districts. In 2016, Moore Public Schools had 35,704.95 weighted average daily membership and a total district valuation of $1,027,450,081 while Edmond Public Schools had a weighted average daily membership of

34,381.94 and a total district valuation of $1,749,242,280. The building fund revenue difference was $3,608,961. In 2016, The property value difference results in Edmond Public Schools having an advantage of $31,514,688 annually in building fund and bond fund revenue resulting in $930.41 more per pupil. This revenue can be used for traditional capital outlay projects or crossover expenditures which would free up general fund revenue for additional current expense items.

Table 5.1

Capital Revenue: Inequity Example

District	Valuation	Building Fund (5 mills)	Bond Fund (30 mills)	Instructional Bond Funds	Total Ad Valorem Revenue
Edmond	$1,749,242,280	$8,746,211	$52,477,268	$3,630,830	$64,854,310
Moore	$1,027,450,081	$5,137,250	$30,823,502	$3,300,619	$39,261,372
Annual Difference		$3,608,961	$21,653,766	$330,211	$25,592,938

Conclusions

Research Question 1: Conclusions

The first research question asked if there were statistically significant differences in resources among Oklahoma school districts with low, moderate, or high levels of capital revenues derived from building fund and bond yields during fiscal year 2016? The current plus crossover analysis indicates that although only a small amount of additional crossover money was added to the current expenditures distribution, the modest addition resulted in a substantial (though statistically

insignificant) differences among districts according to ability to support capital funding expenditures. The number of districts utilizing crossover funding to support instruction varied among the groups (60% for the High group, 31% for the Moderate group, and only 10% for the Low group), further indication that the ability to support capital expenditures appears to have a meaningful effect on current expenditure levels. More studies about this phenomenon are warranted.

Districts that are able to support relatively higher levels of capital expenditures are able to support significantly higher levels of average teacher salaries. Given that teacher salaries constitute almost 50% of current expenditures for Oklahoma schools the overall effect on the equity of the current distribution is meaningful.

The second research question asked what were the effects of crossover funding on the resource accessibility of the Oklahoma education finance system during fiscal years 2012-2016? The following data distributions were used in the analysis:

- Current expenditures without crossover
- Current expenditures with crossover added
- Crossover expenditures
- Capital expenditures

Current expenditures maintained a relatively high level of resource accessibility among districts, as is expected given the equity focus of the state funding formula. The addition of crossover expenditures, though these expenditures were quite small as a percentage of overall expenditures, very slightly reduced

overall resource accessibility, mostly in the distribution of districts above the median.

Capital expenditures demonstrated a relatively low level of resource accessibility throughout the distribution (above and below the median), for all years included in the analysis. The study confirms Maiden and Stearns (2007), providing further evidence that state capital funding assistance to local school districts is desperately needed.

Research question 3 asked what were the effects of crossover funding on the wealth neutrality of the Oklahoma education finance system during fiscal years 2012-2016? Current expenditures were highly wealth neutral, again indicating that the state funding formula is functioning accordingly. As with resource accessibility, the addition of small amount of crossover expenditures slightly reduced the amount of wealth neutrality among districts during the years of the study. Not surprisingly, capital expenditures were not wealth neutral, across the distribution of school districts.

Recommendations for Future Research

Possible Future Research

- The current study examined the degree of equity in the distribution of resources. Fiscal adequacy is often coupled with equity, and a strong Oklahoma adequacy study is overdue.
- Certainly, the adequacy of capital funding warrants further investigation. A number of Oklahoma districts are struggling to raise money to support capital expenditure. Oklahoma is one of only a handful of states that does not

provide financial assistance to districts to meet capital needs, and most certainly the lack of funding results in infrastructure inadequacies for many school districts.

- The current study did not examine the extent to which fiscal equity had any effect on academic achievement. More research is needed to explore any impact of crossover funding on student learning.

Future studies might examine more deeply other influential effects of inequities of capital funding, such as school district size and the impact of municipal tax revenue on overall equity.

Implication for Policy and Practice

Obviously, the lack of state funding creates inequities in capital expenditure support among school districts. This lack of state assistance appears to be causing equity issues beyond capital support, including the equity of teacher salaries. Although adequacy was not included in this study, the author interacts regularly with school and school district leaders indicating a great need for additional capital funding support to meet educational infrastructure needs. The Oklahoma Constitution includes a provision for the State Public Common School Building Equalization Fund (OK Const. art X sec 32), which is to be supported by legislative appropriation. Unfortunately, the Legislature does not provide appropriation support for the fund. The results of this study support the need for such support from the state to assist local school districts with capital needs. Such support could subsequently eliminate the need for crossover funding, thereby increasing fiscal equity in the overall funding system.

Summary

Two decades ago Deering and Maiden determined that Oklahoma's school funding formula was equitable (Deering and Maiden, 1999). A decade later Maiden and Stearns concluded that Oklahoma's school finance system had equity for current education expenditures (Maiden and Stearns, 2007). This study concluded that Oklahoma continues to have a school funding system that is equitable when in the area of current expenditures across school districts. The current study also concurred with Maiden and Stearns study that Oklahoma continues to witness significant inequity in access to capital outlay revenue.

The current study also concluded that school districts with access to greater capital improvement revenue had:

- a statistically significant difference in median teacher salaries and
- meaningful access to higher levels of crossover funds to support current expenditures.

This indicates schools with a greater level of capital revenue have an increased ability to support higher teacher salaries and to use funds traditionally designated for capital expenditures for current education expenditures. Clearly, school districts with greater ability to support capital expenditures (based on local wealth) have the ability to provide additional resources to support current education expenditures, including higher teacher salaries. Undoubtedly, this creates equity problems for many of Oklahoma's more than 600,000 school children.

REFERENCES

Addonizio, Michael, (2003). From Fiscal Equity Educational Adequacy Lessons from Michigan. *Journal of Education Finance* 28:457-484.

Alexander, Nicole. (2004). Exploring the Changing Face of Adequacy. *Peabody Journal of Education* 79: 81-103.

Augenblick, Palaich. (2005). Calculating the Cost of an Adequate Education in Oklahoma. *The Legislative Service Bureau of the Oklahoma State Legislature.*

Ballard, Stephen. (2016). *An Examination of Oklahoma Education Funding Adequacy and District Spending Efficiency*. University of Oklahoma, Norman, Oklahoma

Berne, R., and L. Stiefel. (1984). The Measurement of Equity in School Finance: Conceptual, Methodological, and Empirical Dimensions. Baltimore: Johns Hopkins University Press.

Bullock, Calvin C. (2007) *The Relationship between School Building Conditions and Student Achievement at the Middle School Level in the Commonwealth of Virginia. Dissertation.* Virginia Polytechnic Institute, Blacksburg, VA

Burke, Sarah, (1999). An Analysis of Resources Inequality at the State, District, and School Levels. *Journal of Education Finance 24:435-458.*

Carpenter, Tim. (2005, July 6). Back to try again. *The Topeka Capital Journal.*

Cash, Carol (1993) *A Study of the Relationship between School Building Condition and Student Achievement and Behavior.* Dissertation. Virginia Polytechnic Institute, Blacksburg, VA

Crampton, Faith E. (2004). *The Forgotten Side of School Finance: The Role of Infrastructure Funding in Student Success*. NASSP Bulletin 88; 49

Dayton, John. (1995) When All Else Has Failed: Resolving the School Funding Problem, \ BYU Educ. & L.J. 1 (1995) Available at: http://digitalcommons.law.byu.edu/elj/vol1995/iss1/2

Deering, Pam. (1997) *An Examination of the Fiscal Adequacy and Equity Effects of Class Size Mandates Embedded in Extensive Statewide Education Reform*. University of Oklahoma, Norman, Oklahoma

Deering, Pamela Dale and Jeffrey Maiden.(1999) "The Fiscal Effects of State Mandated Class Size Requirements in Oklahoma." Journal of Education Finance, 25, no. 2 (Fall 1999), 195-210.

Donnell-Kay Foundation. (2007). *How Colorado Funds K-12 Capital Construction* [Electronic Version] http://www.dkfoundation.org/PDF/K-12%20Capital%20Construction.pdf

Fahy, Colleen A. (201) Education Funding in Massachusetts: The Effects of Aid Modifications on Vertical and Horizontal Equity Vol. 36, No. 3 (WINTER 2011), pp. 217-243

Fahy, Colleen A. (2012) Fiscal Capacity Measurement and Equity in Local Contributions to Schools: The Effects of Education Finance Reform in Massachusetts, Vol. 37, No. 4 (SPRING 2012), pp. 317-346

Funk, Josh. (2005, July 4). Answers to school funding questions. *The Wichita Eagle.*

Gehring, John, (2003). Court Orders New York Funding Shift. *Education Week,* 22:1-14

Grubb, Norton, (2008). Multiple Resources, Multiple Outcomes: Testing the "Improved" School Finance with NELS88. *American Educational Research Journal 45*; 104.

Gurley, R, (2002). School Capital Funding: Tennessee in a National Context.

Hoppe, Christy & Garrett, Garrett. (2005, June 18). Perry calls veto bold step. *The Dallas Morning News.*

Hughes, Mary F.(2000) Financing in Rural School Districts: Variations among theStates and the Case of Arkansas. In Improving Rural School Facilities:Design, Construction, Finance, and Public Support (pp. 21-39). (ERICDocument Reproduction Service No. ED 445857).

Johnson, Carl. (2008)*:* An Examination of Capital Outlay Funding Mechanisms in Oklahoma

Koski and Levin (2000). Twenty-Five Years after *Rodriguez:* What Have We Learned? *Teachers College Record* 102: 480-513.

Ladd and Fiske (2011). Weighted student funding in the Netherlands: A model for the U.S.? *Policy Analysis and Managernent* 30(3). 470-498.

Lackney, Jeffery A.(1997) The Relationship between Environmental quality of school Facilities and Student Performance. Energy Smart Schools: Opportunities To Save Money, Save Energy and Improve Student Performance. A Congressional Briefing to the U.S. House of Representatives Committee on Science. [on-line]. Available: htttp://www.edi.msstate.edu/performance.html.

Lackney, Jeffrey A. (2000). *Thirty-Three Educational Design Principles for Schools and Community Learning Centers.* Washington, DC: National Clearinghouse for Educational Facilities.

Lewis, M. (2001). Facility conditions and student test performance in the Milwaukee Public Schools. Scottsdale, AZ: Council of Educational Facility Planners International.

Lefkowits, Laura. (2004, March). School Finance: From Equity to Adequacy. *MCREL Policy Brief.*

Lockridge, Courtney and Maiden. (2014) The Tangible Impact of School Finance Litigation, Journal of Education Finance, vol. 39 no. 4 (Spring 2014), 344-369.

Maiden, Jeffrey. (1998) An Examination of Fiscal Effects of Statewide Education Reform on Oklahoma School Districts. The Journal of School Business Management 10, no. 2 p 17-25.

Maiden, Jeffrey. (1998) "Financing Statewide Education Reform in Oklahoma." Educational Considerations XXV, no. 2 (Spring 1998), 57-60.

Maiden and Stearns (2007) "Fiscal Equity Comparisons between Current and Capital Education Expenditures and between Rural and Non-Rural Schools in Oklahoma." Journal of Education Finance, 33, no. 2 p 147-169.

Miles, Howley-Ware, and Roza, (2003). Leveling the Playing Field: Creating Funding Equity through Student-Based Budgeting. *Phi Delta Kappan*, v85 n2 p114-119.

Monk, D. (2006). *An assessment of the quality of educational adequacy of educational facilities and their perceived impact on the learning environment as reported by middle school administrators and teachers in the Humble Independent School District, Humble, Texas.* Dissertation, Department of Education, Texas A&M University, College Station, Tx.

MONTOY v. KANSAS (2005). Kansas Supreme Court decision.

NATIONAL CENTER FOR EDUCATIONAL STATISTICS. (2000). *Condition of America's Public School Facilities: 1999.* Washington, DC: National Center for Educational Statistics.

New Mexico Public School Facility Authority (NPSF). (2006). *Public School Facilities Programs State Benchmark Study.*

OEA v. Oklahoma. Oklahoma County District Court Case No. CV – 2006-2 Oklahoma Department of Education. (2007) 2007 *Oklahoma Cost Accounting System report (OCAS).*

Oklahoma State Constitution (Article X § 26).

Oklahoma State Constitution (Article X § 9).

Oklahoma State Constitution (Article X § 10).

Oklahoma State Constitution (Article X § 3).

Oklahoma Statute (70-1-117).

Oklahoma Statute (70-68-1806).

Oklahoma Statute (70-15-101).

Oklahoma Statute (70-1-118).

Oklahoma Statute (70-10-104).

Oklahoma Statute (70-18-118).

Oklahoma Statute (70-18-200.1).

Oklahoma State Department of Education. (2016). *Oklahoma Technical Assistance Document (OTAD).* Retrieved from Oklahoma State Department of Education Website:http://sde.ok.gov/sde/sites/ok.gov.sde/files/documents/files/FY%202016%20TAD.pdf

Oklahoma State Department of Education. (2011). *Oklahoma Cost Accounting System (OCAS).* Retrieved from Oklahoma State Department of Education Website: http://sde.ok.gov/sde/financial-accounting

Oklahoma State Department of Education. (2012). *Oklahoma Cost Accounting System (OCAS).* Retrieved from Oklahoma State Department of Education Website: http://sde.ok.gov/sde/financial-accounting

Oklahoma State Department of Education. (2013). *Oklahoma Cost Accounting System (OCAS).* Retrieved from Oklahoma State Department of Education Website: http://sde.ok.gov/sde/financial-accounting

Oklahoma State Department of Education. (2014). *Oklahoma Cost Accounting System (OCAS).* Retrieved from Oklahoma State Department of Education Website: http://sde.ok.gov/sde/financial-accounting

Oklahoma State Department of Education. (2015). *Oklahoma Cost Accounting System (OCAS).* Retrieved from Oklahoma State Department of Education Website: http://sde.ok.gov/sde/financial-accounting

Oklahoma State Department of Education. (2016). *Oklahoma Cost Accounting System (OCAS).* Retrieved from Oklahoma State Department of Education Website: http://sde.ok.gov/sde/financial-accounting

Oklahoma State Department of Education. (2014). 2013-2014 *Annual Report.* Retrieved from Oklahoma State Department of Education Website: http://sde.ok.gov/sde/state-aid-annual-report

Oklahoma State Senate. (2015). *FY'15 Appropriations Report.* Retrieved from the Oklahoma State Senate Website: http://www.oksenate.gov/publications.aspx

Oklahoma Attorney General. (2002). Oklahoma Attorney General Opinion #14 (2002 OK AG 14). April 5, 2002.

Oklahoma Watch. (2014). *More Oklahoma Teachers Enter Classrooms Without Certification*. Retrieved from http://oklahomawatch.org/2014/08/27/more-oklahoma-teachers-enter-classrooms-without-certification/.

Olsen, Lynn, (2004). Financial Evolution. *Education Week* 24: 8-12.

Owens and Maiden. (1999) "A Comparison Of Interschool And Interdistrict Funding Equity in Florida." Journal of Education Finance 24, no. 1 (Spring 1999), 503-518.

Owings, Kaplan and Volman. (2015) Education in the U.S. and the Netherlands: An Equity Comparison and a Few Big Questions. Journal of Education Finance Volume 41, Number 2, Fall 2015

Painter, Steve. (2005, July 2). Kansas Supreme Court to consider closing schools. *The Wichita Eagle.*

Painter, Steve. (2005, July 3). Lawmakers are unable to agree on plan, take break until Wednesday. *The Wichita Eagle.*

Picus, Lawrence, (2000). Student-Level Finance Data: Wave of the Future? *The Clearing House.* November/December.

Ritter, G and Lauver, S.C. (2003). School Finance Reform in New Jersey: A Piecemeal Response to a Systemic Problem. *Journal of Education Finance* 28:575-598.

Richard, Alan, (2002). Poor Districts Seen to Face 'Funding Gaps' in Many States. *Education Week 22:26-28.*

Rodriguez, Gloria. (2004). Vertical Equity in School Finance and the Potential for Increasing School Responsiveness to Student and Staff Needs. *Peabody Journal of Education* 79 7-30.

Stearns, Rodney. (2005). *Fiscal Equity Comparison between Current and Capital Education Expenditures and between Rural and Non-Rural Schools in Oklahoma.* University of Oklahoma, Norman, Oklahoma

Strongin, Dana. (2005, July 5). Board may try to skirt court. *The Wichita Eagle.*

Stutz, Terrence. (2005, June 27). Strayhorn labels Perry plan a "mess." *The Dallas Morning News.*

Stutz, Terrence. (2005, June 30). Senate OKs tax cut bill; Robin Hood to remain *The Dallas Morning News.*

Stutz, Terrence. (2005, June 29). House approves school plan. *The Dallas Morning News.*

Stutz, Terrence. (2005, July 5). School financing fought on 2 fronts. *The Dallas Morning News.*

Sweetland, Scott R.(2015). An *Assessment of the Adequacy of Ohio School Funding: New Performance Standards and Alternative Measurements of Adequacy* Volume 41, Number 2, Fall 2015

Scrag, Peter. March, 2001. Defining Adequacy Up. The Nation.

State Capitals Newsletter. February 21, 2005, Vol 59 No 8.

Texas Education Agency. (2007). *Instructional Facilities Allotment (IFA).* Retrieved August 24, 2008, from Texas Education Agency Web site: http://www.tea.state.tx.us/school.finance/facilities/ifa.html

Texas Education Agency. (2007). *New Instructional Facilities Allotment(IFA).* Retrieved August 24, 2008, from Texas Education Agency Web site: http://www.tea.state.tx.us/school.finance/facilities/nifa.html

Texas Legislative Council. (2006) *State Roles in Financing Public School Facilities*. Retrieved from http://www.tlc.state.tx.us/docs/policy/OnlineFinancePubSch.pdf

Ujifusa, Andrew. Kansas School Funding Falls Short of Legal Standard, Court Rules. Ed Week. December 30, 2014.

United States Department of Education. (2000). *Impact of Inadequate School Facilities on Student Learning.* Retrieved September 14, 2008, from USDE web site: http://www.ed.gov/offices/oese/archives/inits/construction/impacts2.html

Victor, Daniel. (2005, July 4). Courts role stalls progress. *The Wichita Eagle.*

Ward, James. (2003). A Case Analysis of Selected Illinois Rural School Districts: Implications for State Rural School Finance Policy. *Journal of Education Finance* Spring 2003: 599-606.