EXAMINING THE RELATIONSHIP BETWEEN ASSESSED VALUE, REFERENDUMS AND TEACHER SALARIES IN INDIANA 2015-2019: A QUANTIATIVE ANALYSIS

by

Patrick R. McCann

A Dissertation

Submitted to the Faculty of Purdue University

In Partial Fulfillment of the Requirements for the degree of

Doctor of Philosophy

Department of Educational Studies

West Lafayette, Indiana

August 2021

THE PURDUE UNIVERSITY GRADUATE SCHOOL
STATEMENT OF COMMITTEE APPROVAL

Dr. Marilyn A. Hirth, Chair
Department of Educational Studies

Dr. James H. Freeland
Department of Educational Studies

Dr. F. Richard Olenchak
Department of Educational Studies

Dr. Daniel G. Hile
Superintendent at Smith-Green Community Schools

Approved by:
Dr. Janet Alsup

This dissertation is dedicated to Dr. James P. McCann and Christine S. McCann, whose steady support and encouragement were demonstrated by the example shown while raising 5 children and modeling love, dignity, compassion and faith. To my Dad, no better man can serve as a role model of faithfulness, commitment and follow-through. To my Mom, who modeled empathy, understanding and unyielding support. Thank you both for your example, your experience inspired me to aim for a higher vision of what is possible.

ACKNOWLEDGMENTS

I would like to thank my wife Melisa for her unwavering support and steady encouragement during this academic journey. I would like to express my appreciation to Dr. Marilyn Hirth, Chairperson of the Committee, for her guidance and insight in the field of school finance. Her work on the Indiana school funding formula served as a foundation for this study and she provided feedback throughout the process that encouraged critical reflection. I want to acknowledge my dissertation committee members, Dr. James Freeland, Dr. Richard Olenchak and Dr. Daniel Hile. Dr. Freeland has provided great insight, both through coursework and feedback on this project on school finance. Likewise, Dr. Olenchak supported this endeavor from initiation through completion by providing consistent methodology feedback and offering suggestions to refine the design. Dr. Hile served as a bridge between the conceptual and the practical. As a practicing superintendent and school finance expert, his feedback was invaluable. Next, I would like to thank Superintendent Marilyn Hissong, Assistant Superintendent Teresa Knoblauch and Chief Financial Officer, Kirby Stahly. Each of these leaders served as a mentor to me during my studies and their wisdom and continual support have been invaluable to my professional development.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

This study examines the various factors that contribute to the changes in starting teacher salaries in the state of Indiana from 2015 to 2019. In 2009, the funding formula was changed so that locally assessed property values will not contribute to inequitable funding between wealthy districts and less wealthy districts (Hirth & Eiler, 2012). This study examines the relationship between district wealth, Total Tuition Support per student and starting teacher salaries for each of the 289 public school districts in Indiana from 2015-2019. Additionally, the 50 wealthiest districts were compared to the 50 least wealthy districts to determine if there is a statistically significant difference in starting teacher salaries between the two samples. Finally, starting teacher salaries were compared between school districts that have passed a referendum to those districts that attempted, but failed to pass a referendum. Three equity principles were selected to measure the equity within a school funding system, as related to starting teacher salary: fiscal neutrality, horizontal equity, and vertical equity (Berne & Stiefel, 1984). A review of the literature explores the history of school funding in the United States and specifically examines Indiana's funding history. The sample comprised quantitative data from each of Indiana's 289 public school districts and used statistical analysis to determine if changes in the state funding formula, high or low assessed valuation or passing a referendum contributed to differences in starting teacher salaries for the years 2015-2019. The purpose of this quantitative study is to examine the variables that contribute to a range of $17,464.00 for starting teacher salaries in 2019-2020 school year. Superintendents are challenged with recruiting and retaining the most effective teachers in the market. A main factor for teachers in deciding which district to work is the salary schedule (Imazeki, 2005). Additionally, this study will provide insights to the legislature on how money is, or is not spent, after a change in the funding formula.

CHAPTER 1. INTRODUCTION

Dating back to 1949, Indiana has used a Foundation Program to provide funding for public school corporations (Toutkoushian, 2019a). Generally speaking, in a Foundation Program the state guarantees school corporations a specific amount of per-student funding for education, which is known as the foundation level, provided that the school corporations raise a portion of money through local property taxes (Augenblick, 1991). Since the inception, funding disparities have been a source of contention. Indiana has made several changes in its Foundation Program that have produced a significant reduction in the portion of dollars from local sources and increased the portion of dollars from state-level sources. Toutkoushian (2019a) explains that the changes were designed to: a) eliminate the traditional dependence of per-student funding on property wealth per student, b) reduce variability in per-student funding across school corporations, c) increase per-student funding and d) reduce variability in property taxes across schools.

In many states, school funding policy has evolved through a cycle of litigation by school districts against the state, resulting in the legislature adapting a new funding formula to meet the demands of the plaintiffs. Indiana experienced such a policy cycle in 1993. In 1987, The Lake Central School Corporation initiated a lawsuit against the State of Indiana for inequity in the school funding formula (*Lake Central v. State of Indiana*, 1987). This prompted the legislature to adjust the funding formula to increase funding for "at risk" students in 1993 (Toutkoushian, 2019b). Additionally, in 2009, Public Law 146 also shifted school funding from property tax revenues to sales taxes, with the goal of Indiana's public schools no longer needing to rely on revenues generated by the ownership of property (Michael et.al., 2009). Boyland and Jarman (2012) note the objective in this change was to help equalize the amount of funding that could be provided to

the different schools across the state's districts, as property taxes could be extremely variable and unreliable.

Toutkoushian (2019a) stated that in 2015-2016, Indiana ranked 34th in the country in terms of instructional spending per student and 42nd in the country on spending on instructional salaries per students. The report also stated that Indiana ranks lower than its five bordering states (Illinois, Kentucky, Michigan, Ohio and Wisconsin) in terms of both public education funding and teacher salaries. Within the state of Indiana, starting salaries ranged from $30,325 to $47,789 in the 2019-2020 school year (IEERB, 2021). The perceived disparities led to half of Indiana's school districts closing on November 19th, 2019 as more than 15,000 teachers rallied in front of the state house to demand more competitive wages (Slaby, 2019).

Indiana's funding formula has been examined through the frameworks of equity and adequacy for many years (Holscher,1990; Hirth & Eiler, 2012; Sugimoto, 2016; Bowling et al., 2019). P.L. 146-2008 eliminated school funding from property taxes so that property wealth would not contribute to inequitable funding across the state. Districts that serve students from low socioeconomic status are compensated through the Complexity Grant (Toutkoushian, 2019b). These changes were intended to bring a higher quality of education to students regardless of student background. One of the main ingredients in effective schools is the hiring and retaining of highly effective teachers. Once districts get the distribution of funds from the state, how are superintendents adjusting the teacher compensation scale? Is the funding distribution equitable? What is the relationship between the wealth of a district and starting teacher salaries? If a district passes a referendum, are salaries likely to increase? This study examined each of these questions in detail.

Statement of the Problem

School funding formulas represent policy decisions on how resources should be distributed to schools across the state. The design of Indiana's funding formula over the past four decades has gone through multiple modifications as a result of threatened litigation and legislation. The trend in Indiana, like those in many other states, has been for legal action by school districts against the state to precede legislative solutions to address inequity and inadequacy. Changes in the manner of how school districts are funded are constantly threatened by pending litigation. School funding formulas in their most accurate form will increase equity to all taxpayers and students with the goal of providing an education that is not dependent on the wealth of any particular school district (Odden & Picus, 2019). School districts get their money from a "foundation program" which specifies how much money will come from the state and how much will come through local taxes. Total funding in this formula is driven by enrollments; however, additional funding for schools that educate at-risk students, special education and specific programs also contribute to the formula. According to Berne and Stiefel (1999), wide differences in property values exist, which often lead to inequities in finance, and educational success is still often related to socioeconomic status, race, ethnicity and gender.

The problem this study explores is the inequality that exists among and between Indiana school districts in the amount of money they are able to generate for starting teacher compensation. Over the years, a variety of adjustments have been made that have impacted the way school funds have been collected and distributed (Michael et. al., 2009; Toutoushian & Michael, 2008). Many of these changes have been made to increase the overall equity and adequacy across the state, however it is unclear how the changes affect teacher pay. As Indiana has transitioned from one funding formula to another, the need remains to evaluate the extent to which the changes result in changes in teacher salaries. Most of the research on school funding in Indiana has focused on the

various reforms that have occurred over the past 65 years (Bowling et al., 2017; Gentry, 2016; Johnson & Lehnen, 1993; Michael et al., 2009). While this research provides a strong base of knowledge of the history behind Indiana's past and current funding formulas, little research has been conducted that focuses on the effects on teacher salaries. Between 2009 and 2016, Indiana's rankings fell by 11 places in the country on funding per student, 17 places on funding per capita, and 16 places on funding per $1,000 personal income (Toutkoushian, 2019a). To have high quality instruction, a district must be able to attract high quality educators. Districts that are able to provide higher teachers' salaries are likely to attract top talent. This study examines the changes in the funding formula from 2015 to 2019 and uses a quantitative approach to analyze the equity within the changes and the relationship between a district's wealth and each school corporation's ability to increase the starting base salary for teacher pay. Additionally, school districts that have passed a referendum are compared to those who attempted, and did not pass a referendum, to determine if there is difference between the two groups. Further analysis would be beneficial to policy analysts who seek to understand the equity in the school funding formula. It also provides insights to teachers entering the profession on the characteristics of districts that compensate the best within the state. Finally, it will provide insights to Superintendents who wish to pass a referendum and quantify the effects on starting teacher salaries from the years of this study.

Significance of the Study

This study is important in Indiana because of the double messages given to legislatures regarding the school funding formula. The Equity Analyses of the 2015-2017 Indiana School Funding Formula concluded there were substantial changes to the formula from 2009 to 2017 (Sugimoto, 2016). According to the study, Total Tuition Support and Basic Funding have increased since 2009 and horizontal equity and vertical equity have been improved. These findings

are contrasted when it comes to teacher compensation. Toutkoushian (2019a) concludes that in 2015, Indiana ranked 42nd in the country on instructional salaries per student and this ranking has decreased in the last 10 years. During the same period district requirements, including Public Law 192-2018 and Every Student Succeeds Act-2015, have led to many districts hiring non-instructional staff including social-emotional coaches, career coaches and high ability coaches to meet the change in requirements. The findings on teacher compensation described in Toutkoushian (2019a) were posted on the Indiana State Teachers Association's website in March 2019 and used to initiate Indiana teacher protests for more money in *The Red for Ed Action Day* in November 2019 (Slaby, 2019). The current study will provide insights to support legislatures, superintendents and teachers entering the profession, in determining how money is used by districts after funding formula revisions have been made between the period of 2015 and 2019.

This quantitative study will examine the overall equity of the funding formula between 2015-2019. The assessed value of each district will be used to compare high wealth districts to low wealth districts, regarding starting teacher salaries. The use of regression analysis will be used to compare the differences in the funding formula as it relates to starting teacher salaries throughout the state. Specific attention will compare the difference in starting teacher salaries for districts that have passed and failed a referendum initiative. The purpose of this study is to examine the factors that most significantly impact starting teacher salaries in the state from 2015-2019. This will provide context to superintendents who are negotiating a salary schedule after a change in the state funding formula or passing a referendum. Additionally, it will provide insights to the legislature on how money is, or is not spent, after a change in the funding formula.

Multiple regression analysis will also examine how districts with different student populations compensate their teachers, with specific attention given to the proportion of students

from less wealthy households. The Complexity Grant increases the funds for students who have been identified as “at risk” based upon socioeconomic status. With the additional funds provided, superintendents have the option of increasing salaries. The statistical analysis will analyze the impact of each categorical grant within the funding formula to examine the correlation between revenue received and starting teacher salaries for the given years.

This study extends the body of literature through its analysis of the equity of funds needed to ensure all students are meeting the changes in the performance standards. According to Rebell (2009), legislatures and education departments put tremendous resources into developing performance standards, but substantially less effort in ensuring that districts have the resources to meet the increase in demands. Multiple regression analysis in this study examines the relationship between the assessed value of each district, the proportion of students receiving additional funds through vertical equity funds and starting teacher salaries between 2015 and 2019.

Research Questions

1. To what extent does the existing state funding allocation system meet the standard for fiscal neutrality, horizontal equity and vertical equity related to starting teacher salaries from 2015-2019?
2. Is there a statistically significant difference in starting teacher salaries between school districts with high district wealth and districts with low district wealth from 2015-2019?
3. Is there a statistically significant difference in starting teacher salaries for districts who have passed a referendum compared to those districts who failed to pass a referendum?

Limitations

This study is limited to Indiana schools from 2015-2016 to 2019-2020 and may not be generalized to other states or other school years; however, other states will be interested in these results from Indiana due to its similar funding mechanisms. Private and charter schools are not included as the study is centered on traditional public-school districts (K-12). Financial data were limited to the information reported by the Indiana Department of Education's Office (IDOE) of Finance and the Department of Local Government Finance (DLGF) and the Indiana Education Employment Relations Board (IEERB). Revenue associated with the state funding formula and the success of a referendum initiative are used in this study. The amount of the referendum is not accounted for in this study. Federal funds were excluded from the analysis. Interviews with legislatures or district leaders were not used in this study. The assumption is made that districts are appropriately and efficiently spending the funding they receive. This study did not examine how schools are allocating and using the funds provided. It is possible that a district is receiving sufficient funding but is spending it inefficiently.

Definitions

Assessed Valuation: Value of property determined by the county assessor based on classification of residential, commercial, agricultural, or personal (DLGF, 2021).

Average Daily Membership (ADM): is the count of students enrolled and expected to be in attendance for kindergarten through grade 12 in Indiana public school corporations (IDOE, 2021).

Basic Grant: the base amount per student, which consisted of the foundation amount plus a transition to foundation amount (IDOE, 2021).

Career and Technical Grant: provides additional funding for career and technical courses. Grants were based on the number of students, number of credit hours, and the rating given to the course (IDOE, 2021).

Coefficient of Variation: The standard deviation divided by the mean expressed in either decimal or percent form (Oden & Picus, 2019).

Complexity Grant: Indiana's vertical equity formula that takes into account the percentages in a school district of people who met certain criteria as described. In 2015, complexity funding was based on the percentage of students eligible for free textbooks in fiscal year 2014. In 2016 & 2017, it was based on the percentage of students who qualified for Supplemental Nutrition Assistance Program (SNAP), Temporary Assistance for Needy Families (TANF) or who received foster care services in fiscal year 2017 as of October 1, 2014. Fiscal years 2018 and 2019 used October 1, 2016 data for the disbursement (IDOE, 2021).

Equity: The fair distribution of financial resources across districts (Oden & Picus, 2019).

Fiscal Neutrality: Fiscal neutrality is a school finance equity concept which specifies that no relationship should exist between the education of children and the property wealth in that particular district that supports the public funding of that education (Berne & Stiefel, 1999).

Honor's Grant: is based on the number of students in the previous school year who received an Academic Honor's diploma or a Core 40 diploma with Technical Honors (IDOE, 2021).

Horizontal Equity: School districts that are considered to be similar to each other along dimensions that relate to the cost of providing a basic education, such as wealth, size, and socioeconomic status, should have comparable levels of funding (Toutkoushian & Michael, 2007b).

McLoone Index: The ratio of the sum of the values of all observations below the median to the sum of these observations if they had the value of the median (Odden & Picus, 2019).

Referendum: a ballot initiative that school corporations may use to seek funds in addition to those provided by state tuition dollars and are not limited by tax caps (Hiller & Spradlin, 2010).

Special Education Grant: is based on the number of special education students being served on December 1. Categories receive different disbursements based on severe disabilities, mild and moderate disabilities, homebound programs and preschool programs (IDOE, 2021).

Total Tuition Support (TTS): is the sum of all the grants, the Basic Grant, the Complexity Grant, the Honors Diploma Grant, the Career & Technical Education Grant, and the Special Education Grant (IDOE, 2021).

Vertical Equity: For education funding to be equitable, school districts with higher costs to educate student populations should receive more funding than their counterparts to compensate for the difference (Toutkoushian & Michael, 2007a).

Organization of Study

Chapter One provides the background, context, and variables selected to assess the health of school funding mechanisms in Indiana. This chapter also identified the problem statement, significance of the study, research questions, hypothesis, and limitations of the study. Chapter Two provides an in-depth examination of school finance over the past 40 years. The literature review looks into the question "Does money matter in education?" The chapter examines prominent court cases that have impacted funding formulas across the country as well as within the state of Indiana. Major changes in the Indiana state funding formula are reviewed as well as the measurements typically used to evaluate the equity in state funding formulas. Last, the factors that contribute to

teacher salaries and a brief overview of referendums in Indiana are reviewed in Chapter Two. Chapter Three focuses on the methodology used in the research study. The rationale, research questions, design, population, and analysis of data for the research study are presented in Chapter Three. Chapter Four provides the analysis of results utilizing established statistical methods to measure the degree of fiscal neutrality and equity of the school finance funding system. Analysis includes comparing starting teacher salaries between the most-wealthy districts and the least wealthy districts as well as districts who have and have not successfully passed a referendum. Chapter Five summarizes the results of the study as determined by the three research questions. Findings are compared to the literature review and recommendations and implications for future research are included in Chapter Five.

CHAPTER 2. REVIEW OF THE LITERATURE

This chapter contains a review of literature that describes the evolution of school finance in Indiana. The chapter begins by examining the literature on the impact of school funding on student success. Following this discussion, a review of the relevant historic school finance litigation cases will be covered to provide insight into why funding formulas have changed over time. The chapter will then review the theoretical frameworks often used to assess the intended functions of school finance systems. More specifically, the funding formula in Indiana will be analyzed within the context of national and state court decisions. Factors involved in determining teacher salaries are presented as well as the literature on teacher salaries in Indiana. The chapter concludes by examining the referendum history in Indiana and the relationship with teacher salaries.

The Impact of Money on Education

In 1966, the U.S. Government published a study titled *Equality of Educational Opportunity*. The study was mandated in the Civil Rights Act of 1964 and was directed by sociologist James Coleman. The purpose of the study was to identify the influence of socioeconomic, personal, and family dynamics on the success of students in school (Coleman, 1968). The Coleman Report famously concluded that variation in academic performance was strongly linked to children's family environment, but not strongly linked to per student expenditures or other measurable school characteristics. Since the issuance of the Coleman Report, there has been a continuing debate among researchers, policymakers, and in the courts about whether increased expenditures for schools have a significant impact on educational opportunity and educational outcomes (Rebell, 2017). After analyzing more than a dozen recent studies, Baker

(2016) concludes that there is significant evidence that school resources, including smaller class sizes, and more competitive teacher compensation, are positively associated with student outcomes. Hyman (2017) points out that increases in spending improve the likelihood of enrolling in college and earning a postsecondary degree. Baker (2017) also shows that student outcomes are affected by financial resources, schooling resources that cost money and sustained improvements in the level and distribution of student outcomes.

In 1986, 20 years after the Coleman Report, Eric Hanushek published a paper that would arguably become the most widely cited source for the claim that money simply doesn't matter when it comes to improving school quality and student outcomes. The study examined the effect that teacher education, experience and teacher salaries have on student achievement and concluded "*There appears to be no strong or systematic relationship between school expenditures and student performance*" (Hanushek, 1986, p. 1162). Baker (2016) describes this conclusion as evolving into a mantra for many politicians and advocates in the halls of state and federal courthouses where school funding is deliberated.

Greenwald et al. (1996) responded to Hanushek's findings and conducted a meta-analysis study to assess the relationships of a variety of school inputs, including teacher salary, and their effects on student achievement. The analysis found that a relationship between Per Student Expenditures and teacher salaries is strong enough to have important implications for policy. The general conclusion of the study found a range of resources were positively related to student outcomes and that school resources are systematically related to student achievement.

Wenglinsky (1997) also found that spending patterns affect student achievement in two ways. First, instructional spending influences the number of teachers hired per student. Second, they found that spending on central office administration leads to hiring of more teachers, with the

same consequences as for instructional spending. Kyriakides et al. (2019) also investigated the relationship between educational expenditures and student learning outcomes. The study echoed Wenglinsky's results and found expenditures are significantly linked to learning outcomes. Furthermore, the analysis concluded educational investment has a stronger effect on the least effective schools and promotes equity in education.

Teacher Salaries and Student Achievement

Hanushek's 1986 and 1997 studies conclude that teacher wage effects have mostly failed to provide evidence that teacher wages matter. Only nine of the sixty teacher salary studies in his 1986 article produced wage coefficient estimates that were both positive and statistically significant. However, a sizable collection of literature has accumulated to validate the conclusion that teacher's wages affect the quality of those who choose to enter the teaching profession and whether or not they stay in it (Rickman et al., 2017; Ingersoll et al., 2019).

Murnane and Olson (1989) found that salaries and opportunity costs have important influences on how long teachers stay in teaching. The study used 7,800 Michigan teachers and concluded that the length of time teachers stay in teaching is dependent on salaries and opportunity costs. Figlio (1997, 2002) concluded that higher salaries are associated with more qualified teachers, while Carver-Thomas and Darling-Hammond (2017) determined that higher salaries were associated with lower teacher attrition and increased commitment to teaching. While salaries are not the only factor, they do affect the quality of the workforce, which affects student outcomes (Baker, 2016).

Teacher salaries are also integral to improving the equity of student outcomes. Carver-Thomas and Darling-Hammond (2017) showed that teachers are more likely to leave schools where there are more students of color, more low-income students and where teacher salaries are

lower. Given that higher salaries are associated with more qualified teachers, relative teacher salaries may influence the distribution of teaching quality. For example, Ondrich et al. (2008) found that when teachers have higher salaries compared to non-teaching salaries, they are less likely to leave teaching. The study also concluded that teachers are less likely to transfer to another district if the salaries are lower than their current position.

Teacher compensation is also a factor in how long teachers stay in the profession and is a determinant in recruiting and retaining highly qualified teachers (Ingersoll et al., 2019). It has shown to influence the number of people entering the profession and might help to recruit top talent in high need schools (Geiger & Pivovarova, 2018). Schools with more money have a greater ability to provide a higher quality education than schools with less money. Baker (2016) asserts that more money by itself is not the solution for school quality. Money with the proper appropriation on instruction is the solution. Money can be spent effectively on instruction or ineffectively and not improve school quality. The money spent well can have a substantive and positive impact on promoting a quality education.

History of School Funding Litigation

After the Coleman Report was published in 1966, the battle over school resources became commonplace in courts across the United States. In August 1971, the California State Supreme Court handed down the landmark decision of *Serrano v. Priest* (1971) ruling that a state system of school finance that allows district spending to be dependent on district wealth is unconstitutional (Scribner et al., 1973). The California Supreme Court determined that divergent local property tax bases led to constitutionally unacceptable variations in school budgets, namely that poorer school districts are not able to supply the same resources as wealthier districts. Goldstein (1971) points out that California's school finance system is similar in effect to the systems used in 49 of the 50

states. Given the similarities among states, court cases began surfacing throughout the country in multiple states during this same time.

Hill and Kiewiet (2015) attribute *Serrano v. Priest* (1971) as having the largest equity-based decision on school funding rendered by a state supreme court. *Serrano v. Priest* refers to three court cases regarding the financing of public schools in California that were decided by the California Supreme Court. Serrano I was passed in 1971, Serrano II was passed in 1976 and Serrano III was passed in 1977. The case was initiated in 1968 in the Superior Court of Los Angeles County. John Serrano was a parent of one of several Los Angeles Unified School District students. Ivy Baker Priest was the California State Treasurer at the time. Scribner et al. (1973) states the suit asked that California's school finance system be declared unconstitutional and that the court grant an injunctive relief requiring school officials to reallocate school finance funds. This case takes on special significance because it was the first court decision to declare education as a fundamental right or interest. Scribner et al. (1973) explains that "legally" this places education in the same category as other fundamental rights including the right to vote and the right to due process of law. Other cases, including *Brown v. Board of Education*, implicitly referred to the salience of education for society, but did not formally describe it as a "fundamental right" (Scribner et al., 1973).

Shortly after *Serrano v. Priest*, a similar case from the United States Supreme Court was made on the issue of school finance in *San Antonio Independent School District v. Rodriguez* (1973). Rodriguez, the father of four children enrolled in the Edgewood district, was frustrated that the schools were dramatically underfunded and marred by dilapidated facilities and weak instruction (Orozco, 2013). Rodriguez joined 15 other parents who sued the state for an inequitable system of financing public schools based on the Fourteenth Amendment. Their complaint featured

two theories of unconstitutionality. The first was premised on the notion that education is a fundamental right. The second was premised on the notion that wealth is a suspect class (Sutton, 2008).

San Antonio Independent School District v. Rodriguez advanced through the court system, providing a victory to the parents until it reached the Supreme Court in 1972. The Supreme Court of the United States held that San Antonio Independent School District's finance system, which was based on local property taxes, was not an unconstitutional violation of the Fourteenth Amendment's equal protection clause (Rodriguez, 1973). Tractenberg (1974) maintains that the Court rejected the Serrano rationale and declined to give education the status of a "fundamental right." The United States Supreme Court found that the right to be educated was neither "explicitly or implicitly" textually found anywhere in the U.S. Constitution and was not protected by the Constitution (Rodriguez, 1973). Furthermore, The Supreme Court concluded that Texas's school finance "system represented a rational accommodation of the interest in local and administrative control of schools and the desire to provide a basic education for each child" (Tractenburg, 1974, p.13).

The United States Supreme Court put an end to one method for school finance reform with the *San Antonio v. Rodriguez* decision however, less than two weeks later a second ruling was conveyed by the New Jersey Supreme Court in *Robinson v. Cahill* (Tractenberg, 1974). The court ordered the New Jersey legislature to replace the existing system of financing public schools with a system that assures every New Jersey child is equipped for their role as a citizen and as a competitor in the labor market (Robinson v. Cahill, 1973). Sutton (2008) declares that this disparity continued to generate a large number of state-court lawsuits from 1973 to 1989. As in *Rodriguez,* the plaintiffs chose to target the gap in funding between rich and poor school districts, emphasizing

the difficulties property-poor districts faced in closing the student achievement gaps. Instead of relying on the United States Constitution, the lawsuits used "equal-protection" clauses or other guarantees found within their State's constitution (Sutton, 2008).

School finance lawsuits in the 1970s did not yield an equitable outcome between wealthy and poor school districts. Carr and Fuhrman (1999) note that the court reforms of the 1970s were not designed to fully equalize per-pupil expenditures or even educational opportunities. The debate, during this time, was focused on reducing property taxes as well as equalizing education expenditures. In states where suits were filed during the 1970's and early 1980's ten out of 31 found their state's school finance system to be unconstitutional (Darling-Hammond, 2015). Between 1973 and 1988, fifteen years after Rodriguez, fifteen of the state supreme courts had denied any relief to the plaintiffs, compared with the seven states in which plaintiffs had prevailed (Rebell, 2009).

The school funding litigation based on "equal protection" and "fiscal neutrality" had limited success in the courts during the 1980s. Berne and Stiefel (1999) attribute the 1983 report, *A Nation at Risk*, from the National Commission of Excellence in Education, as changing the nature of the debate about the goals of public education. The Report focused attention to the perceived crisis of educational quality in the United States compared to other industrialized nations. The goals of public education began to shift from "equity" to concerns about "achievement." As a result of this shift, governors and legislators began to change their attention from school finance equity issues to issues of standards, graduation requirements, teacher certification, and compensation (Carr & Fuhrman, 1999). With this transition came a change in school finance lawsuits as well.

Starting with the 1989 *Rose v. Council for Better Education* ruling in Kentucky, plaintiffs began challenging the constitutionality of state school financing systems based on adequacy grounds. Condron (2017) explains that this new wave of school finance litigation seeks to obtain additional funding by targeting the state constitution's education clauses. These clauses generally have language that allows underfunded districts to argue that inequalities in revenue are unconstitutional. For example, New Jersey's constitution affirms that the state is to provide a "thorough and efficient system of free public schools" (Murray et al.,1998). "Lawsuits in the current wave of litigation often are called "adequacy" suits because their overall goal is to establish that states' school finance systems fail to provide all children with an adequate education and need reform in order to do so" (Cordron, 2017, p. 2). This new focus differs from previous suits before 1989, which were generally called "equity" suits because they targeted federal or state equal protection clauses (Cordon, 2017). Lockridge and Maiden (2014) reported that between the years 1989 and 2007, adequacy suits had been filed in 44 of the 50 states with 24 resulting in a plaintiff victory. Plaintiffs in these cases are of the opinion that it is the state's responsibility to provide an adequate level of funding so that all students are able to attain the state's minimum threshold for proficiency on various academic and non-academic outcomes (Candelaria and Shores, 2019). According to Rebell (2018), civil rights lawyers changed their focus from equal protection claims based on disparities among school districts in the level of educational funding to claims based on opportunities for a basic level of education guaranteed by specific state constitutions.

Identifying a student's right to adequate education under the Kentucky Constitution, the *Rose v. Council for Better Education* court held:

> "A child's right to an adequate education is a fundamental one under our Constitution. *The General Assembly must protect and advance that right.* We concur with the trial court that an efficient system of education must have as its goal to provide each and every child with at least the seven following capacities:

> (i) sufficient oral and written communication skills to enable students to function in a complex and rapidly changing civilization.
>
> (ii) sufficient knowledge of economic, social, and political systems to enable the student to make informed choices.
>
> (iii) sufficient understanding of governmental processes to enable the student to understand the issues that affect his or her community, state, and nation.
>
> (iv) sufficient self-knowledge and knowledge of his or her mental and physical wellness; (v) sufficient grounding in the arts to enable each student to appreciate his or her cultural and historical heritage.
>
> (vi) sufficient training or preparation for advanced training in either academic or vocational fields so as to enable each child to choose and pursue life work intelligently; and
>
> (vii) sufficient levels of academic or vocational skills to enable public school students to compete favorably with their counterparts in surrounding states, in academics or in 37 the job market" (Rose, 1989 p. 37).

The Court concluded that the children who live in the poor districts and rich districts must be given the same opportunity and access to an adequate education. This obligation cannot be shifted to local counties and local school districts (Rose, 1989). A majority of state courts, following *Rose*, struck down the educational funding system on the grounds that they do not provide sufficient funding for an "adequate" education and have ordered state legislatures to make up the shortfall (Hanushek & Lindseth, 2009).

Walker (2005) identified several factors for the shift from equity to adequacy. First, the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983) began a movement that American students were not learning enough compared to other countries in the world. Second, the creation of accountability through the use of student achievement tests could be used to measure if students were meeting performance measures. Rebell (1999) explains that these standards allowed courts to make judgements as to the core constitutional concepts of adequacy. Furthermore, Rebell (2009) clarifies that standards-based performance measures

assume that all students can meet these high expectations if given adequate opportunities and resources.

Following the *Rose* decision in Kentucky, many states revised the school funding plans and some states began to phase out local property taxes (McDonald et al., 2004). In 2005-2008 state courts delivered a number of disappointing decisions to adequacy plaintiffs. "While those courts have articulated a variety of state-specific rationales for rejecting adequacy claims, their opinions reveal a common concern with the boundaries between their judicial role and the prerogatives of the legislature" (Simon-Kerr & Sturm, 2010, p. 84). Despite the slowdown of victories for plaintiffs during this time, adequacy cases continue to be the primary argument to reform state school finance systems. In 2018, the Kansas Supreme Court in *Gannon v. State* (Gannon, 2018) found the state's school finance system inadequate and unconstitutional. Similarly, that same year the trial court in *Martinez v. State of New Mexico* and *Yazzie v. State* (Martinez, 2018) found the school funding system inadequate and unconstitutional. The New Mexico court ordered a remedy by April of 2019, directing the Legislature to take immediate steps to ensure that New Mexico schools have the resources necessary to give at-risk students the opportunity to obtain a uniform and sufficient education that prepares them for college and career (Martinez, 2018). In response, the Governor and Legislature agreed on reforms that included increasing teacher salaries, extending instructional time for all students and increasing the spending on low-income students (Yared, 2019).

History of School Funding Litigation in Indiana

Article I, section 23 of the Indiana Constitution reads: "The General Assembly shall not grant to any citizen, or class of citizens, privileges or immunities, which, upon the same terms, shall not equally belong to all citizens." This clause is commonly referred to as Indiana's equal

protection clause, but is very different, in origin, from the Federal Equal Protection Clause. Holscher (1990) states:

> "The Indiana clause reflects the framers' concern that no individual enjoy any special rights or privileges and focuses on prohibiting special privileges rather than guaranteeing equal rights'. Despite the differences in wording and purpose between the Indiana and federal equal protection clauses, Article I, section 23 of the Indiana Constitution has been interpreted to grant protection substantially identical to that provided under the fourteenth amendment of the United States Constitution" (p. 295).

It was this clause in the state constitution that was used in Indiana's first school finance litigation case. In 1987, Lake Central School Corporation threatened, filed and withdrew the suit to permit the legislature to redress the funding formula defects (Thompson & Crampton, 2002). The plaintiffs in this case claimed that under the Indiana equal protection and education clauses, Indiana fails to provide a uniform system of schools and that the existing funding system requires a school district to tax its residents at a rate far above the state average and to spend less than the state average per pupil is discriminatory. Furthermore, the plaintiffs also argued that disparities in funding affect the quality of education in Lake Central (Holscher, 1990).

The state concluded that per pupil expenditures do not reflect educational opportunity, and that disparity among school districts does not prove denial of equal protection. The state argued that equality of funding is not required and that differences in school districts are justified by the state interest in local control (Holscher, 1990). In 1993, an agreement was reached between the plaintiffs and the governor. A change in the funding formula was promised by the governor if the plaintiffs dropped the litigation (Hirth & Eiler, 2012). Indiana avoided the lawsuit by changing the school funding formula to attempt to address the charge that the current formula allowed property-rich school corporations to generate more revenue than property poor school corporations (Theobald et al., 1997).

In 2009, the Indiana Supreme Court ruled on its first "adequacy claim" in favor of the State in *Bonner et al. v. Daniels et al*. In Bonner v. Daniels, the plaintiffs contended that the State's school funding formula provided an inadequate education to all students and is thus in violation of the Education Clause (Article 8, Section 1), the Due Course of Law Clause (Article 1, Section 12), and the Equal Privileges and Immunities Clause (Article 1, Section 23) of the State Constitution (Michael et al., 2009). The case was rejected in trial court, overturned in the Court of Appeals and made its way to the Indiana Supreme Court (Bonner v. Daniels, 2009) where the Court granted the defendants' motion to dismiss.

Shortly after *Bonner et al. v. Daniels et al*. was filed, three suburban school corporations also filed a lawsuit against the state on the grounds that the state funding formula disproportionately affected their school corporations and favored urban districts, thereby denying students a uniform education as required by the state constitution (Hamilton Southeastern et al. v. Daniels, 2010). This case evolved before the ruling in *Bonner et al. v. Daniels et al*. and was short lived. Hirth and Eiler (2012) explain that the plaintiffs in this new case decided to drop the lawsuit in May 2011 in response to changes in the school funding formula made by the state legislature at that time.

The change in focus from equity lawsuits to adequacy lawsuits required courts to accept different methods in assessing adequacy in school funding. Taylor et al. (2005) describe four methods used to assess adequacy: Professional Judgement Method, Evidence Based Method, Cost Function Method, and Successful District Method. The methods for defining the adequate level of funding varies between each state and for the purpose of this study will not be used. Instead, traditional methods for assessing school equity will be examined in this study.

Methods used to Assess Equity in School Funding

The methods used to assess equity within school finance literature examine resource allocation that represent multiple viewpoints on how to achieve fairness between school districts. Fairness, according to the principle of fiscal neutrality, is intended to minimize the relationship between the wealth of a school community and the funding its students are entitled to receive (Berne & Stiefel, 1999; Coons et al., 1970). Fairness, according to the principle of horizontal equity means that students who are alike should be treated in the same way (Odden & Picus, 2019). The vertical equity principle acknowledges that some student groups will require additional money than others to achieve fairness (Berne & Stiefel, 1984).

Hirth and Eiler (2005) discuss the importance in differentiating between equity and equality. In school finance terms, equitable refers to funding based on the needs of students within a school. Alternatively, spending the same number of dollars on each student is a form of equality, but it may not be equitable because of the differentiated needs of students. *The Coleman Report* (1966) identified the influence of socioeconomic, personal, and family dynamics on the success of students in school, acknowledging that certain students need more support than others. This need for differentiating expenditures on students has been expounded since the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983). King et al. (2005) note that policy makers and courts have generally recognized that equal distribution of resources will not close the achievement gap among various subgroups. For this reason, equitable funding based on the different needs of students is measured as vertical equity, while the proportionate distribution of funds between districts is measured as horizontal equity.

Fiscal Neutrality

As Berne and Stiefel (1999) write: "Wealth neutrality as a school finance equity concept specifies that no relationship should exist between the education of children and the property wealth (or other fiscal capacity) that supports the public funding of education" (p. 16). This concept holds that there should not be a relationship between the wealth of a community and the amount of money spent on public education in that community (Glenn et al., 2015). The notion relates to the idea that all children deserve a high-quality education regardless of where they live. Fiscal neutrality can be measured in at least two different ways, the correlation coefficient and the coefficient of determination (Glenn et al., 2015).

One approach is the correlation coefficient, this indicates the degree to which there is a linear relationship between two variables. Glenn et al. (2015) describe how the correlation coefficient is used to assess fiscal neutrality. An increase in one variable is associated with an increase in the other variable, or vice versa. The coefficient ranges in value between negative 1.0 and positive 1.0, with a value close to positive 1.0 indicating a strong positive relationship. In school finance, for example, as property wealth increases, per pupil revenues also tend to increase- a strong positive relationship. A correlation coefficient close to zero indicates that there is little or no linear relationship between two variables. For fiscal neutrality, the ideal value of the correlation coefficient is zero, but the generally accepted standard for this statistic is 0.5 or less. (p. 2)

Ogle (2007) explains that a funding formula may rate highly in terms of fiscal neutrality and still not provide equity in resources due to the wide range of local choices in property tax rates. While fiscal neutrality measures are valuable in the overall discussion of equity, more specific equity goals are seldom met when considering fiscal neutrality alone (Monsees, 2012). Horizontal and Vertical equity measures commonly supplement fiscal neutrality measures (Berne & Stiefel, 1984; Odden & Picus, 2019; Toutkoushian & Michael, 2007b).

Horizontal Equity

Most researchers use the measures described by Berne and Stiefel (1984) to assess horizontal equity in school funding. These horizontal equity 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 & Stiefel, 1984, p. 18). Toutkoushian and Michael (2007b) explain that reductions in dispersion are then interpreted as movements toward horizontal equity. This would result in similar school districts related to the cost of providing basic education, wealth, size and socioeconomic status, having comparable levels of funding.

Methods to assess horizontal equity were summarized in the seminal work of Berne and Stiefel (1984) and have more recently been outlined by Odden and Picus (2019). Most horizontal equity statistics are descriptive in nature and commonly include the range, restricted range, variance and mean (Toutkoushian & Michael, 2007b). Odden and Picus (2019) explain that while these statistics are of value, inflation makes them less useful when comparing numbers across multiple years. The Coefficient of Variation, Gini Coefficient, McLoone Index and Verstegen Index are immune to inflation and have been favored in the literature (Hirth & Eiler, 2005, Odden & Picus, 2019, Toutkoushian & Michael, 2007b). A summary of these horizontal equity indexes are discussed in the following paragraphs.

The Federal Range Ratio is defined as the restricted range, which is the difference between the 95th and 5th percentile of revenues per pupil, divided by the observation at the 5th percentile (Odden & Picus, 2019). The measure examines the difference between per pupil financial variables at the 95th and 5th percentiles arranged in ascending order of per pupil values divided by the per pupil at the 5th percentile. The Federal range ratio has a long tradition of being used to define disparity (Berne & Stiefel, 1984, Odden & Picus, 2019). It's limitation is that it only focuses on

two points to define an entire distribution. The ratio has a minimum value of zero with increasing values indicating a higher disparity (Hussar, 2000).

The Coefficient of Variation is an equity measure that expresses the standard deviation in per-pupil revenues divided by the mean of per-pupil revenues (Toutkoushian & Michael, 2007b). The importance of this measure is that it incorporates the most basic statistical measures available, the standard deviation and the mean, and is frequently used by statisticians and school finance researchers (Hirth & Eiler, 2005, Berne & Stiefel, 1999, Glenn et al., 2015). The coefficient of variation has been used in congressionally mandated legislation as an equity measure for Title 1 legislation (Hussar, 2000). The coefficient of variation has a minimum value of zero, and increasing values mean increasing disparity (Berne & Stiefel, 1984).

The Gini Coefficient is an equity measurement of a given revenue distribution. This assessment measures how close the distribution is to providing similar groups of students with equal proportions of revenue (Hussar, 2000). The Gini Coefficient is standardized with a range from zero to one. The lower Gini Coefficients are associated with increased fiscal equity in a distribution. Odden and Picus (2019) explain that values in school finance are in the .1 and .2 range with a value of less than .05 being most desirable. The first 1% of individuals should receive 1% of funding, the 2% of individuals should receive 2% of funding and continues proportionately (Peterson, 2011).

The McLoone Index measures equity for a given revenue distribution below the median and is designed to identify the relative frequency of potentially underfunded districts (Hime & Maiden, 2017). This measure removes the effects of disparity in per pupil instructional expenditures that are caused by districts that may spend considerably more than what might be considered necessary to provide adequate educational services (Hussar, 2000). It is calculated by

dividing the mean per pupil spending value for the lower half of the distribution by the median spending in the state. If the same amount were spent on every child, the McLoone Index would have a value of 1.0, with the standard being 0.95 (Glenn et al., 2015). The McLoone index ranges from 0 to 1, with an increased McLoone Index is associated with a higher level of equity below the distribution median (Hime & Maiden, 2017). The numerator is the sum of all instructional expenditures of the school districts below the state median of expenditures per pupil. The denominator is the sum of pupils in school districts below the state median of expenditures per pupil multiplied by the state median per pupil instructional expenditure (Hussar, 2000).

The Verstegen Index is similar to the McLoone Index but examines the top half of the revenue or spending distribution. The Verstegen Index is calculated by dividing the mean per pupil spending value of the upper half of the distribution by the median spending in the state. Similar to the McLoone Index, if the same amount was spent on every student, those figures would be equal, so the ideal value of the Verstegen Index is 1.0 and the standard is 1.05 (Oden & Picus, 2019). The McLoone and Verstegen Indices should be interpreted together to determine the overall level of equity in both the top and bottom halves of the funding distribution. Hussar (2000) explains that the McLoone Index is often closer to the standard than the Verstegen Index because many states focus more on raising the revenues of low wealth districts than on equalizing wealthier districts.

Vertical Equity

A second equity principal, vertical equity, states that for education funding to be equitable, school districts with higher costs to educate student populations should receive more funding to make up the difference (Toutkoushian & Michael, 2007a). Students from low socioeconomic backgrounds, those with disabilities, and those with limited English proficiency are generally considered in need of additional educational resources (Odden & Picus, 2019). “The phrase

(vertical equity) raises two key questions: 1. Who is unequal...and 2. What constitutes appropriately unequal treatment (e.g., how unequal is unequal enough)?" (Baker & Friedman-Nimz, 2003, p. 525).

Odden and Picus (2019) explain that traditional measures in assessing vertical equity in school finance consist of univariate statistics such as weighted dispersion measures and ratio analysis. Weighted dispersion is where observations are weighted based on the inverse of the characteristic used in vertical equity. Ratio Analysis is the ratio of per pupil revenue in two groups of districts (e.g., low vs. high wealth is calculated. Both of these metrics cannot be adjusted for multiple vertical equity factors and cannot be adjusted for effects of non-vertical equity factors (Toutkoushian & Michael, 2007a).

Correlation metrics are commonly used to measure bivariate approaches to vertical equity (Odden & Picus, 2019). These metrics are used to determine the degree to which per-pupil revenues are linearly related to the characteristic under consideration. This metric cannot be adjusted for multiple vertical equity factors and cannot be adjusted for non-vertical equity factors (Toutkoushian & Michael , 2007a).

Statistical approaches that include Bivariate or multivariate analysis include regression slope and elasticity. Regression slope is calculated by examining the effect of a one -unit change in a characteristic on a one-unit change in per-pupil revenues in a school district. Elasticity is the percentage effect of a 1% change in the characteristic under consideration on per-pupil revenues in the school district is calculated. Both of these statistics can be adjusted for multiple vertical equity factors and also non-vertical equity factors (Odden & Picus, 2019).

In the review of relevant literature and empirical assessments of equity in school finance, state systems have for many years utilized two key mechanisms that reflected vertical equity

considerations: (a) the use of pupil weights and (b) the use of targeted or categorical funding (Toutkoushian & Michael, 2007a). Berne and Stiefel (1984) demonstrated that state funding mechanisms typically support vertical equity for student need characteristics through the use of pupil weights or the use of categorical funding. Pupil weighting allows for the adjustment of pupil counts by providing additional weighting to the funding formula. Most commonly, students are weighted based on their eligibility for special education, Title I (compensatory education), or English as a second language (ESL) instruction (Augenblick et al., 1997). Per pupil weighting and the specific weights assigned to each category can vary dramatically from state to state (Monsees, 2012).

Rodriguez (2004) explains that categorical funding is another approach to funding based on student needs. Rather than weighting the student count, categorical funds are targeted to specific students and programs based on census counts or particular program goals. The use of categorical funds allows for particular equity goals to be established for students whose backgrounds warrant additional financial resources to improve learning. These funds are "targeted" to a particular "category" of students (Special Education, English Language Learner, etc.).

When examining vertical equity in Indiana, Hirth and Eiler (2005) analyzed the additional funding districts received for English Language Learners and those that qualified based on socioeconomic measures. Toutkoushian and Michael (2007a) explain that Indiana has provided additional funding to districts for five separate vertical equity factors reflecting income, educational attainment, marital status of families and the English proficiency of students. Efforts to provide additional funding for at-risk students in Indiana can be traced back to the 1987 A+ school reform law (P.L. 390-1987, Section 26). Over the past 30 years there have been several modifications in the funding formula with the last major change in vertical equity occurring in

2016 (Toutkoushian, 2019b). The following section provides an overview in the changes to the state funding formula in Indiana.

History of Funding Formulas in Indiana

State funding for school districts relied on local property tax and state supplemented revenue generated from a per pupil flat tax from 1949-1973 in Indiana (Toutkoushian, 2019b). During this time, state funding was set equal to the difference between the minimum funding level for each corporation based on enrollments, and what corporations can raise through local property taxes. This system was similar to other states at the time and resulted in wealthier districts being able to provide more money for students than less wealthier districts. There were no provisions regarding the socioeconomic status of the student populations during this time.

In the early 1970s, equity lawsuits, including Serrano 1 (1971) and Rodriguez (1973) played a part in influencing the Indiana legislature to modify the funding formula in 1973. The change effectively set the funding as the previous year's funding level, plus a guaranteed per pupil increase from the state (Toutkoushian, 2019b). Wood et al. (1990) explain that this change limited school districts from increasing the local property tax beyond the 1973 limit and placed the majority of the burden of increased educational expenses on the state. There were no provisions to differentiate funding levels for students based on socioeconomic status at this time.

In 1987, Lake Central School Corporation filed a lawsuit against the state claiming the funding system was unconstitutional due to inequities in funding across the state. That same year, the governor signed P.L. 390-1987 which included a provision in section 26 that would allocate additional funds for students that were considered "at-risk" (Ellis, 2010). Toutkoushian (2019b) describes the At-Risk Index, which was used after P.L. 390-1987, to determine which students qualify for the additional money being the weighted average of 3 factors: 1) The proportion of

adults over 25 without a high school diploma; 2) The proportion of single parent families; 3) The proportion of families with dependent children under 18 and living below the poverty income.

The At-Risk Index was modified ten years later in 2003 and renamed the Complexity Index (Toutkoushian & Michael, 2004). The Complexity Index included the three variables used in the At-Risk Index but added two more. Students eligible for free and reduced lunch and students with limited English proficiency were also included in the Complexity Index, which was implemented in 2004 (Toutkoushian & Michael, 2007a). "These five variables were intended to represent wealth, educational attainment, family status, and English language proficiency of students within the corporation" (Toutkoushian & Michael, 2004, p. 19).

In 2009, the Complexity Index was simplified to one factor, the percentage of students eligible for free or reduced lunch. This occurred about the same time the state legislature passed Public Law 146, which eliminated property tax levies as a general fund revenue source for school districts and used sales tax revenue instead as the primary source of funding for schools (Hirth & Eiler, 2012). Toutkoushian (2019b) explains the formula changed to a one factor variable because almost all of the correlation between ISTEP+ pass rates and the Complexity Index was attributable to the proportion of students receiving free or reduced-price lunches.

Three additional changes occurred in the funding formula in 2014, 2015 and 2016. In 2014, the state replaced the weighted per pupil formula with a categorical grant. The new Complexity "grant" calculated the additional funding for at-risk students by multiplying the Complexity Index by the designated per-student dollar adjustment and the number of students in the school corporation (Toutkoushian, 2019b). In 2015, the formula changed to consider the percentage of students receiving textbook assistance instead of those receiving free or reduced-priced lunches. The change took place because families could self-report their free and reduced lunch

status and the state could not verify the accuracy of the claims (Toutkoushian, 2019b). This model was short lived and was replaced the following year. In 2016, the formula changed again to include a grant based on the proportion of students who were enrolled in either the Supplemental Nutrition Assistance Program (SNAP), the Temporary Assistance for Needy Families program (TANF), or were receiving foster care assistance (Toutkoushian, 2019b). That same year, provisions were also made to adjust the Complexity Index for school corporations that have more than 25% English language learners and those districts that experience 10% or more declines in the Complexity Index from the preceding year. This model is the version of the Complexity Index used in 2019.

Teacher Compensation

Teacher compensation can be divided into salary and benefits. In most states, salaries for public school teachers are determined by a single salary schedule (Toutkoushian, 2019a). Hanushek (2016) explains that there is some variation amongst school districts, but within a district there is no distinction between elementary teachers and high school teachers. Similarly, there is no distinction between physical education teachers and calculus teachers or between highly effective teachers or ineffective teachers. Toutkoushian (2019a) explains the salary schedules are based on teacher's years of experience and educational attainment. Hanushek (2016) describes the process as a publicly political process where everything including the outcome of bargaining is available to the public. For this reason, it is difficult for state politicians to say they have decided on large wage increases for teachers because, in most cases, it differs across each district (Hanushek, 2016). Guthrie & Rothstein (1999) state that in a typical school district, teacher salaries account for at least half of a district's expenditures. "Salary schedules are updated annually to take into account the changing economic conditions, the age distributions of teachers and the state's willingness to fund teacher salaries" (Toutkoushian, 2019a, p. 29).

Benefits of Increasing Teacher Salaries

Advocates of increasing teacher salaries generally point to three reasons: the best teachers are woefully underpaid in comparison to the economic impact they have on their students, high salaries attract the best potential candidates and higher salaries encourage the retention of the best teachers (Hanushek, 2016). Many studies have noted the effect higher starting salaries will have on college graduates deciding to work as a teacher or another occupation (Figlio, 1997; Imazeki, 2005; Hanushek, 2016; Toutkoushian, 2019a). Raising teacher salaries may have a long-term impact on the quality of teachers that states attract and retain and, ultimately on student outcome (Katz et al., 2018). Increasing salaries for new teachers can help reduce high attrition rates out of districts that may lose teachers to other districts, such as rural districts, but the response may depend on whether the increase is relative to surrounding districts (Imazeki, 2005). Similarly, salary and benefits can vary considerably across states and influence where new teachers decide to work (Toutkoushian, 2019a).

Research related to improving the retention of teachers has suggested that increasing the high end of the salary schedule is a powerful incentive to retain teachers (Dolton & Klaauw, 1999). Higher relative wages may make it more likely that a teacher who leaves a particular district will exit teaching altogether rather than transferring to neighboring districts (Imazeki, 2005). Beyond attracting and retaining highly effective teachers, there is strong empirical evidence linking teacher quality to improved student achievement and focusing on policies related to teachers as key levers to improve efficiency, equity and productivity in public education (Borman & Dowling, 2008).

Problems of Increasing Teacher Salaries

Critics of teacher salary schedules often point to the idiosyncrasies of a single salary scale that depends on years of experience and education. Clotfelter et al. (2010) points out that there is

no relationship between graduate degrees and performance in the classroom as measured by student achievement. Additionally, except for the first few years of teaching, performance does not systemically improve with each year of experience (Rice, 2013). Lankford and Wyckoff (1997) show that the majority of teacher salary increases over multiple decades have gone to experienced teachers at the top of the salary scale. This does little to improve the quality of the teaching force because these changes matter little to those entering the profession at the beginning of their career. Hanushek (2016) calls for a merit pay system that links salary increases to student achievement because a single salary scale holds down the salaries of the most effective teachers and raises the salaries for the least effective teachers. This sets up incentives to keep teachers who should not be retained and lose teachers to other professions that should be retained (Jacob et al., 2012). But merit pay has been tried by a large number of districts and most abandoned bonuses designed to reward merit after a fairly short time (Murnane and Cohen, 1986). The explanation that often accompanies this is that teachers are not responsive to extrinsic incentives, but are teachers because of their sense of mission, love of children and other intrinsic incentives (Kohn, 1999). This disconnect between salary and performance makes it politically difficult to raise the salaries of the best teachers to the appropriate level (Hanushek, 2016).

Teacher Salaries in Indiana

In Indiana, each school corporation sets its own salary schedule, while some other states such as Georgia have a statewide salary schedule for teachers (Toutkoushian, 2019a). Lehnen and Minick (1994) found low introductory pay has created a lack of high-quality educators from entering the profession. Toutkoushian (2019a) found that starting salaries in Indiana have fallen, relative to other states, between 2012-13 to 2016-17. The authority for school corporations to establish initial salary levels on an individual basis was determined through a recent Indiana

Supreme Court decision (*Jay Classroom Teachers Association v Jay School Corporation and Indiana Education Employment Relations Board*, 2016). IBJ (2016) stated that granting school administration the ability to establish salary levels, will allow competitive salaries to be offered to high quality applicants.

Stevens (2020) used average teacher salary, average earnings, teacher salary % and change since 2010 and 2018 to rank teacher salaries by state. According to the report, Indiana ranked 37th with an average teacher salary of $50,937, which is 11.3% below the national average. The report found salary percentage change since 2010 has decreased by -12.8%. Finally, the report showed a decrease of 1.4% since 2018 in teacher salaries. These results echoed Toutkoushian (2019a) findings, which found that Indiana teacher's salaries are below average for the nation and lower than most neighboring states. His study also concluded that Indiana has lost substantial ground in comparison to other states over the last 10-15 years in terms of education funding and teacher pay.

Referendums in Indiana

In Indiana, school funding referenda have only begun since 2008. Hiller and Spralin (2010) explain that before 2008, school funding referenda were rare and construction petition and remonstrance process, which is used to finance construction projects greater than two million dollars, often went unopposed. Beginning in 2009, the state began funding 100% of costs for the general fund. Gentry (2016) states that the changes in P.L. 146, to include property tax caps, has moved the responsibility from politicians to the school district to campaign and justify each district's budget to the public in the form of general (operating) or construction referenda.

Since 2009, property taxes are no longer used to support education-related operating purposes of Indiana's public-school districts, except for a referendum tax levy that is approved by voters. Indiana's Department of Local Government Finance (DLGF, 2021) defines a referendum

as “a public question placed on a ballot by a local unit.” The purpose of referenda has been used for construction projects and operating needs, which include raising teacher salaries. Property taxes that are approved in a referendum are not subject to the property tax caps associated with P.L. 146, and if passed, will increase the levy beyond the existing tax caps. Currently, the tax caps are set at 1% of assessed value for homesteads of owner-occupied residents, 2% for other residential properties and farmland, and 3% for all other property (DLGF, 2021).

The Referendum Tax Levy Fund was established by the 2002 Indiana General Assembly as a separate fund (IDOE, 2021). Indiana law (I.C. 20-40-3) states that money used in this fund may be used for any lawful expense. Reasons for a referendum tax levy include 1) a school district determines that it cannot carry out its public education duties unless it imposes a referendum tax levy; 2) A public school district determines that a referendum tax levy is necessary to replace property tax revenues that the corporation will not receive because of the application of the circuit breaker credit under Indiana Code 6-1.1-20.6.

Hile (2019) explains that in Indiana, current law allows school districts to propose a maximum tax rate increase for up to eight years to their local taxpayers. Voters then decide whether to approve or deny the request through a referendum on the ballot. If passed, the school district will be able to raise the additional funds with property tax increase up to the maximum rate specified on the ballot. If failed, the school corporation will not receive additional funding and work with the existing budget from the state. Table 1 depicts all general fund referenda in the state of Indiana from April 2009 through May 2019.

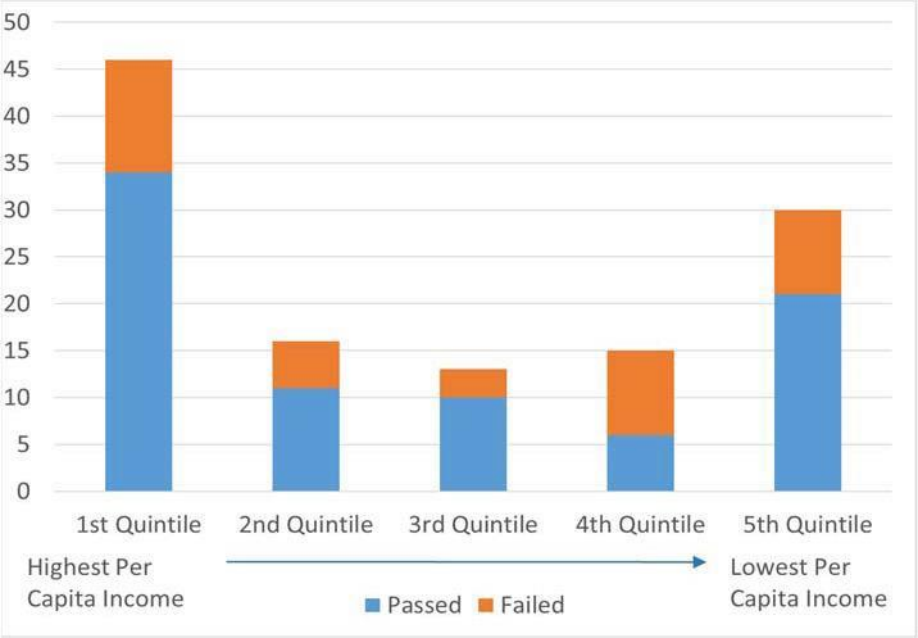
Table 1: ***All General Fund Referenda from April 2009 through May 2019***

	Total Number of Referenda	Total Referenda Passed	Percentage Passed	Total Referenda Failed	Percentage Failed
Rural	38	27	71.10%	11	28.90%
Town	12	5	41.70%	7	58.30%
Suburb	41	32	78.00%	9	22.00%
City	29	18	62.10%	11	37.90%
Total	120	82	68.30%	38	31.70%

(Hile, 2019) and (Hiller, 2019)

In 2019 the Legislative Services Agency was asked to examine how referenda impacted teacher pay (Lusan & Spears, (2019). There are three types of referendums available to schools in Indiana. One for construction projects, one for safety features and one for day-to-day operational costs. Only operational referendums, which last for up to eight years, can be used to increase teacher salaries. The analysis did not focus on construction referendums, rather those intended for operating expenses.

The first half of the study examined operating referenda passed and attempted by per capita quintiles. Lusan and Spears (2019) found that districts in wealthy areas-with per capita incomes in the top 20% of the state attempted and passed the most referendums. Districts with per capita income in the bottom 20% have attempted and passed the second largest amount of referendums in the state, and nearly double the number that have been passed in areas that fall into the middle-income brackets. Higher income school corporations may need to make up for relatively low state funding due to their low complexity index. Low-income school corporations may find it challenging to pay teachers due to declining enrollment and tax cap losses. Table 1 depicts referenda by income quintiles.



Source: Lusan & Spears (2019)

Figure 1: ***Operating Referenda Passed and Attempted by Per Capita Income Quintiles***

Since 2014, teachers in districts that passed referendum specifically to attract or retain teachers saw larger salary increases than teachers at districts that didn't attempt a referendum, according to the LSA report. Teachers in those districts also started with a higher average salary before the referendum. Two years after their districts passed the referendum, teachers saw their combined average salary increase by 3.7%, jumping to $53,563 from $51,441. Teachers in districts without a referendum comparatively saw their combined average salary increase by 1.8% during the same two years rising to $50,059. Table 2 analyzes the differences of average salaries between districts that passed and failed referenda.

Table 2: ***Average Salary Changes Between Corporations With and Without Referenda***

Measure	Attract Retain Referenda	School Corporations Without a Referendum	Difference
Average Salary: 2 Years Before Base Year	$51,441	$49,089	$2,352
Average Salary: Base Year	$51,666	$49,150	$2,516
Average Salary: 2 Years After Base Year	$53,563	$50,059	$3,504
Average Salary Growth: 2 Years Before Base Year to Base Year	$225	$62	$164
Average Salary Growth: Base Year to Two Years After Base Year	$1,897	$909	$988
% Growth in Average Salary 2 Years Before Base Year to Base Year	0.4%	0.1%	0.3%
% Growth In Average Salary Base Year to 2 Years After Base Year	3.7%	1.8%	1.8%
% Growth in Total Salaries: 2 Years Before Base Year to Base Year	-0.7%	-0.8%	0.1%
% Growth in Total Salaries: Base Year to 2 Years After Base Year	5.3%	2.7%	2.6%

Source: Lusan & Spears (2019).

Conclusion

The review of literature revealed a gap in empirical research that assessed the relationship between school funding in Indiana since 2009 and teacher salaries. The information presented in this chapter illustrated the evolution and history of how litigation affected current methods of funding to enable all students with equitable opportunities. The analysis of lawsuits highlighted key components of school finance systems believed to be ineffective at meeting its constitutional obligation and illustrated dramatic differences between school districts in the amount of funding they receive. Changes in Indiana's formula used a variety of methods to stipulate categorical grants for various student needs within the formula. These changes affected the level of funds distributed to school districts, and along with referendums, affected how superintendents were able to leverage

a teacher salary level. Further research is required to determine the relationship between changes in the funding formula and the ability for superintendents to attract and retain highly effective teachers by way of a competitive teacher salary.

CHAPTER 3. METHODS

In 2008, the Indiana legislature passed, and the governor signed into law House Enrolled Act No. 1001, now referred to as Public Law 146-2008, which capped Indiana school districts' ability to raise revenues from the local property tax without local voter approval (Hirth & Lagoni, 2014). This law eliminated tax levies as a general fund revenue source for school districts. Instead, sales tax revenue is the principal source of funding for schools (Hirth & Eiler, 2012). Over the next decade, the school funding formula was revised in each year with changes in the complexity grant in 2014, 2015 and 2016 (IDOE, 2021). The development of a school funding formula is a political process. For a new model to be developed, compromise is often necessary irrespective of the potential impact the change may have on measures of equity (Monsees, 2012). There are three principles utilized to assess equity with school finance systems: fiscal neutrality, horizontal equity, and vertical equity (Odden & Picus, 2019). This study attempted to evaluate school funding formulas in Indiana against common measures found in the literature. More specifically, this chapter attempted to evaluate the relationship between changes in the funding formula, district wealth and starting teacher salaries from all school districts across the state from 2015-2019. Additionally, samples were gathered between high wealth districts and low wealth districts to compare starting teacher salaries through the years of this study. Finally, samples were compared between districts that have passed a referendum and those who failed to pass a referendum to determine if there was a difference in starting teacher salaries between the two samples. This chapter includes a rational of the study, followed by the research questions. After a statement of the research questions, the population sample, data collection method, data collection analysis and a chapter summary are identified.

Rationale of the Study

The selection of a particular mode of research must be guided by the nature of the research questions. Quantitative research is the systemic empirical investigation of observable phenomena via statistical, mathematical, or computational techniques (Given, 2008). A quantitative approach is often utilized to develop models explaining the relationship between variables. Studies of this type seek to answer questions of how much or how many, with attention in prediction or correlation. This study focused on evaluating the level of equity in the distribution of public-school funding in Indiana, attempting to examine the relationship between district wealth, successful referendums and starting teacher salaries. Evaluations of funding formulas appear to be best suited to be addressed by quantitative measures that can provide direct information on how each school district is affected by a particular formula. Quantitative statistical methods were selected to complete this study for their ability to support the concepts of each theoretical framework (fiscal neutrality, horizontal equity, and vertical equity) chosen for inclusion in this study. These theoretical frameworks are also referred to as equity principles (Odden & Picus, 2019). The advantages of selecting a quantitative method in the study of school funding formulas in Indiana are supported by the potential utilization of the research findings. Policy makers in this arena tend to focus on the use of objective criteria with a universally applied rule to establish the number of resources each school is entitled to (Organization for Economic Co-operation and Development, 2017). Appropriate instrumentation and statistical treatment improve the validity of quantitative data analysis (Cohen et al., 2007). To ensure validity in the design, the selected methodologies are appropriate for the research questions. The statistical methods selected for inclusion in this study are prevailing methods (correlation coefficient, range, restricted range, coefficient of variation, Gini Coefficient, McLoone Index, Verstegen Index, and multiple regression analysis) in assessing the equity principles of fiscal neutrality, horizontal equity, and vertical equity (Odden & Picus,

2019). The two independent samples t-test is used to compare means between high and low wealth districts. Descriptive statistics are used to compare districts that have and have not passed a referendum.

Research Questions

The research questions for this study are:

1. To what extent does the existing state funding allocation system meet the standard for fiscal neutrality, horizontal equity and vertical equity related to starting teacher salaries from 2015-2019?
2. Is there a statistically significant difference in starting teacher salaries between school districts with high district wealth and districts with low district wealth from 2015-2019?
3. Is there a statistically significant difference in starting teacher salaries for districts that have passed a referendum compared to those districts who failed to pass a referendum?

Research Design

Fiscal Neutrality

Fiscal neutrality is used to describe the state when taxes and government spending are equal (Berne & Stiefel, 1999). The idea of a fiscally neutral policy is one that creates a condition in which demand is neither stimulated nor diminished by taxation and government spending. In other words, a policy that displays fiscal neutrality means there is no economic behavior that the government is trying to incentivize through it. In school finance, fiscal neutrality holds that the level of spending for a child's education may not be a function of wealth other than the wealth of the State as a whole. Fiscal neutrality states that there should not be a relationship between the wealth of a community and the amount of money spent on public education in that community.

Given that Public Law 146-2008 eliminated tax levies as a general fund revenue source for school districts and relies on sales tax revenue as the principal source of funding for schools, allotments should be fiscally neutral. This concept relates to the idea that all children deserve a high-quality education no matter where they live. However, analyses have shown that wealthier communities still tend to spend more money on education than less wealthy communities (Glenn et al., 2015). Since local property tax is no longer a source of general fund support, many schools have had to seek additional revenue through general fund referenda in an attempt to prevent staff lay-offs, maintain current programming, and prevent an increase in class sizes (McInerny, 2015). In fact, the property tax caps have impacted school districts as a whole, preventing Indiana school districts from collecting more than 245 million dollars in local property tax revenue since the funding changes in 2009 (Stokes, 2014). In Indiana, funds for capital improvements in school districts are even more closely tied to district wealth than are funds for instructional expenses (Gentry & Hirth, 2017). In an analysis of fiscal neutrality, the stronger the relationship between measures of fiscal capacity and levels of revenues or expenditures, the less fiscal neutrality and, therefore, the more inequality present in the system.

Odden and Picus (2019) explain that assessing the degree of fiscal neutrality involves analyzing the relationship between two variables 1.) the object chosen and 2.) the variable identified as something that should not be linked to resource differences. Traditional fiscal neutrality analysis assesses the relationship between state revenues per student and property wealth per student. Analyzing fiscal neutrality differs from analyzing horizontal or vertical equity, because the former requires at least two variables, whereas the latter requires only one variable.

To measure the degree of fiscal neutrality of the school finance system in Indiana, quantitative statistical methods were utilized to determine if a relationship existed between 3

different models. Model 1 examines the relationship between Total Tuition Support and Property Wealth per Student. Model 2 examines the Property Wealth per student and starting teacher salary. Model 3 examines the relationship between Total Tuition Support and starting teacher salary. To measure the degree of fiscal neutrality, statistics that indicate the relationship between two variables are needed. The correlation coefficient has become common in school finance (Glenn et al., 2015). The correlation coefficient states that an increase in one variable is associated with an increase in the other variable, or vice versa. The coefficient ranges in value between negative 1.0 and positive 1.0, with a value close to positive 1.0 indicating a strong positive relationship. In this study, model one examines the independent variable of Property Wealth per student and dependent variable of Total Tuition Support. Model 2 examines the independent variable of Property Wealth per student and dependent variable of starting teacher salary. Model 3 examines the Total Tuition Support as the independent variable and starting teacher salary as the dependent variable.

In this study, each of the 289 public school districts were selected and represent the population during the years of this study. The population correlation coefficient uses σx and σy as the population standard deviations, and σxy as the population covariance.

$$r = \frac{(\sigma x)(\sigma y)}{\sigma xy}$$

The simple correlation is a statistic that indicates the degree to which there is a linear relationship between two variables (i.e., whether as one variable increases the other increases or decreases). In school finance, for example, as property wealth increases and starting teacher salaries also tend to increase, this would indicate a positive relationship. It ranges in value between minus 1.0 and plus 1.0. A value of 1.0 or close to 1.0 indicates a strong positive relationship (i.e., as property wealth increases so does expenditures per pupil). A negative correlation indicates that

as one variable increases, the other decreases and indicates there is an inverse relationship between the variables. For example, as property wealth increases, starting teacher salaries decrease. Odden and Picus (2019) state that in school finance, there is usually a negative correlation between state aid per pupil and property wealth per student, indicating that state aid is inversely related to wealth, that the poorer the district, the greater the state aid. A correlation coefficient of zero indicates that there is no linear relationship between the two variables.

While correlation coefficient indicates whether or not there is a linear relationship between two variables, the coefficient of determination explains to what extent the variance of one variable can explain the variance in a second variable. The correlation coefficient R is squared to get the coefficient of determination. R-squared is a statistical measure of how close the data are to the fitted regression line. This correlation is known as the "goodness of fit," and is represented as a value between 0.0 and 1.0. 0% indicates that a model explains none of the variability of the response data around its mean. The R^2 formula is:

$$1-= \frac{\text{RSS}}{\text{TSS}}$$

RSS = sum of squares of residuals

TSS = total sum of squares

Ogle (2007) explains that a funding formula may rate highly in terms of fiscal neutrality and still not provide equity in resources due to the wide range of local choices in property tax rates. While fiscal neutrality measures are valuable in the overall discussion of equity, more specific equity goals are seldom met when considering fiscal neutrality alone (Monsees, 2012). Horizontal and Vertical equity measures commonly supplement fiscal neutrality measures (Berne & Stiefel, 1984; Odden & Picus, 2019; Toutkoushian & Michael, 2007b).

Horizontal Equity

Horizontal equity measures the degree upon which school finance systems distribute funds in an equitable manner. The school finance framework of horizontal equity provides that students who are alike should be treated the same and receive equal portions of state and local revenue per student (Odden & Picus, 2019). According to Toutkoushian and Michael (2007b), school districts similar to each other along characteristics that relate to the cost of providing an education, such as wealth, size, or the numbers of low socioeconomic students, should receive similar levels of funding. Berne and Stiefel (1999) state that "horizontal equity is a useful concept if it is measured correctly, as intra-group equality, with equally situated groups identified and separated in an analysis" (p. 19). Odden and Picus (2019) have identified several methods and their corresponding properties for measuring the degree of dispersion (inequality) within school funding mechanisms. The following methods were selected for inclusion in this research study.

The first measure of horizontal equity in school finance is the *range*. This is the difference between the value of the largest and smallest observation. The larger the range, the greater the inequality. The calculation of range is a univariate measure that does not remove equity and nonequity factors on a per-pupil funding (Toutkoushian & Michael, 2007b). This statistic indicates the maximum difference in the distribution for a single variable, such as a starting teacher salary or the difference between the highest and lowest revenue per student. Because there are outlying districts in every state: some very poor, some very rich or others with a high or low student enrollment, these districts do not reflect most districts in a state.

Because the range does not indicate the degree of equality or inequality, it is a poor indicator for assessing equity in a school finance system. Odden and Picus (2019) explain that the range increases with inflation. As inflation occurs, and all other variables remain the same, the range will increase. Since range does not remove equity and nonequity factors specific for school

districts who receive excessively low or high funding due to a particular situation, range is ineffective as a standalone measurement. Despite this negative feature, range is still utilized by researchers to illustrate the maximum degree of inequality in a system (Odden & Picus, 2019). The equation for the calculation of range utilized is as follows: Range = Yi (Max) – Yi(Min)

Yi = Starting teacher salary

The second horizontal equity statistic is the *Restricted range*, which is the difference between an observation close to the top of a distribution and an observation close to the bottom of the distribution. To control for outliers in sampling, restricted range excludes these outliers by taking the difference between the 5^{th} and the 95^{th} percentile in a distribution. Odden and Picus (2018) explain that while outliers are avoided in the restricted range, it still measures the difference between 2 observations and measures the equity of the overall system. The restricted range also is influenced by inflation and is preferred to the range because it omits outliers. The calculation of restricted range, when utilized in combination with additional horizontal equity measures, provides data for determining the health of school finance funding methods. The equation for the calculation of restricted range utilized is as follows: Restricted Range = Yi (P95) – Yi (P5)

Yi(P95) = Starting Teacher Salaries at the 95^{th} percentile

Yi(P5) = Starting Teacher Salaries at the 5^{th} percentile

The third horizontal equity statistic is the *coefficient of variation* (CV). This is based on the standard deviation in starting teacher salaries for each given year divided by the mean of starting teacher salaries per year to determine the percent variation in the distribution of starting teacher salaries across the state (Odden & Picus, 2019). Its value usually varies between zero and one. A coefficient of variation of zero shows that the object is distributed regularly among children.

The CV indicates the percent variation about the mean. For example, a coefficient variation of .1 indicates that two-thirds of the observations have a value within one standard deviation of the mean (i.e., 10 percent above or below the value of the average). According to Odden and Picus (2019) if the average expenditure for starting teacher salaries is $35,000 and the CV is 10 percent, it means two thirds of all districts have an expenditure of starting teacher salaries between $31,500 ($35,000 minus 10 percent) and $38,500 ($35,000 plus 10 percent).

Unlike the range, the coefficient of variation includes all observations and does not change with inflation. This would allow a school finance system with constant structural properties to endure inflation and still have an unchanged coefficient of variation. This would indicate that the equity in a school finance system has not changed. The equation for the coefficient of variation (*CV*) utilized is as follows:

$$CV = \frac{\sigma \mathrm{Xi}}{\mu Xi}$$

Xi = Starting teacher salary per year

The Gini Coefficient is a statistic that measures income inequality. The Gini Coefficient focuses on the distribution of the data and is selected for use when the policy goal is a more equal distribution of education resources for all students (Addonizio, 2003). The Gini coefficient analyzes how far the distribution of per student objects is from providing each percentage of students with an equal percentage of object (Stiefel & Berne, 1984). The Gini Coefficient is a unique numerical value used as a measure of the index of inequality (Lows, 1984). Gini Coefficient values range from 0 to 1.0 and values in school finance are in the .1 to .2 range with a value less than .05 being most desirable (Odden & Picus, 2019). The first 1% of individuals should receive 1% of funding; the first 2% of individuals should receive 2% of funding and continues

accordingly (Peterson, 2011). This horizontal equity formula will be used to analyze starting teacher salaries. The equation for the Gini Coefficient utilized is as follows:

$$G = \frac{\sum_{i=1}^{n} (2i - n - 1)x'i}{n2\mu}$$

Where:

i = School district's order number.

n = Number of school districts

x'_i = school district starting teacher

μ = Mean starting teacher salary per year

The fifth measure of horizontal equity is the *McLoone Index***.** This statistic is different from the aforementioned methods in that it measures equity in the bottom 50% of the distribution to measure the degree of equality only for observations below the 50th percentile. According to Addonizio (2003), the McLoone Index "is a ratio of the actual total expenditure in all districts below or at the median expenditure to what the expenditures would be if all districts spent at exactly the median level" (p. 468). For this study, the unit of analysis will be starting teacher salaries for each school district in Indiana below or at the median level excluding charter and private schools. The McLoone Index portrays a quantitative analysis from those school districts most affected by an inequitable school finance system (Odden & Picus, 2019). According to Peterson (2010), the closer the index is to 1.0 the greater the equity within a system with a value of .95 considered as the standard. The equation for the McLoone Index utilized is as follows:

$$\frac{\sum PiXi}{\sum Pi(med)}$$

Where:

i = Districts below the state median in starting teacher salaries

Pi = Student enrollment in school district i

Xi = Starting teacher salary for school district i

med = Median teacher salary per year

The *Verstegen Index* is the sixth horizontal equity measure. This statistic is the converse of the McLoone Index for it measures variation in revenue in the top half of the distribution (Odden & Picus, 2019). The Verstegen Index statistic when utilized in combination with the McLoone Index assesses the disparity in revenues by determining the nature of the distribution of revenues in the top and bottom half. The Verstegen Index has a standard value of 1.0 or greater (Odden & Picus, 2019). The equation for the Verstegen Index utilized is as follows:

$$\frac{\sum PiXi}{\sum Pi(med)}$$

i = Districts above the state median in starting teacher salaries

Pi = Student enrollment in school district i

Xi = Starting teacher salary for school district i

med = Median teacher salary per year

When measuring horizontal equity, Odden and Picus (2019) state it is best to calculate the Coefficient of Variation, McLoone and the Verstegen Indices, and determine whether overall disparities have improved (a lower CV), whether differences below the median have improved (a higher McLoone), and whether differences in the top half have improved (a lower Verstegen).

Vertical Equity

According to Odden and Picus (2019) the definition of adequacy include vertical equity adjustments to ensure all students meet high standards because these students need additional

resources to meet these standards. “Vertical equity specifically recognizes differences among children and addresses the education imperative that some students deserve or need more services than others” (p. 69). “Unequal treatment of unequals” has been a public finance way of expressing vertical equity. A key step in vertical equity is to identify the characteristics that legitimately can be used as a basis for distributing more resources to districts.

Indiana has identified vertical equity components and targeted additional resources for each of those factors. According to the IDOE Tuition Support report for 2019, the Complexity Grant utilizes demographic factors to provide additional funding based on the school corporation’s percentage of students who met certain criteria as described for fiscal years 2015 – 2017 (IDOE, 2021). In fiscal year 2015, complexity funding was based on the percentage of students eligible for free textbooks in fiscal year 2014, with an additional augmentation for those school corporations with a percentage of at least 25 percent. The complexity index for fiscal years 2016 and 2017 used the sum of the following data based on October 1, 2014 data while fiscal years 2018 and 2019 use October 1, 2016 data based on the following: a. The percentage of students who qualified for Supplemental Nutrition Assistance Program (SNAP), Temporary Assistance for Needy Families (TANF), or who received foster care services in fiscal year 2017, plus b. An augmentation for traditional public-school corporations whose complexity percentage decreased by more 45% from the fiscal year 2017 complexity index and whose fiscal year 2017 percentage of English Language Learners was at least 18 percent (IDOE, 2021). The calculation results were multiplied by $3,489 to determine the fiscal year 2016 complexity grant and by $3,539 to determine the fiscal year 2017 through 2019 complexity grant.

Beginning in fiscal year 2018, the percentage of students who qualified for Supplemental Nutrition Assistance Program (SNAP), Temporary Assistance for Needy Families (TANF), or who

received foster care services in fiscal year 2017 was used in the calculation and the multiplier continued at $3,539 and remained so through fiscal year 2019. The Complexity Grant also looks at the percentage change in the complexity factor from one year to the next as well as the percentage of English Language Learner students to determine if an additional adjustment will be performed. This piece has comprised a part the FY 2016 through FY 2019 calculations. For FY 2018 and FY 2019, if a school corporation is eligible for the adjustment, additional funding at $128 per average daily membership is provided. The complexity grant reconciliation occurres at the same time as the reconciliation of the basic grant (IDOE, 2021).

Outside of the Complexity Grant, the Honors Diploma Grant was used to supplement corporations based on the number of students in the previous school year who received an Academic Honors diploma or a Core 40 diploma with Technical honors. The money is intended to be used for staff training, program development, equipment and supply expenditures or other expenses related to the school's honor diploma program or for high ability students (IDOE, 2021). In fiscal year 2017, the grant provided $1,000 to students who qualified and were not recipients of the Complexity Grant. In fiscal year 2018, the grant increased to $1,500 who qualified for the Honor's grant and Complexity Grant. In fiscal year 2019, funding was raised to $1,100 for student who qualified for the Honor's grant, but not the Complexity Grant.

The Special Education Grant was based on the number of special education students being served on December 1. The Grant provide $8,800 for students with severe disabilities in 2016 and 2017. $2,300 was given for students in programs for mild and moderate disabilities in both of those years. $500 was designated for homebound services and $2,750 was given to students in special education preschool in 2016 and 2017. In 2018, funding for severe disabilities increased to $8,976 and in 2019, the amount increased to $9,156.

The Career and Technical Grant provided additional funding for career and technical courses. Grants were based on the number of students, number of credit hours and the rating given to the courses. Programs were divided into high value programs, moderate value programs and less than moderate value programs. In 2020, districts received $680 for students enrolled in high value programs, $400 for students enrolled in moderate value programs and $200 for students enrolled in less than moderate programs. $300 was disbursed for students enrolled in introductory career and technology courses.

Traditional measures in assessing vertical equity provisions in school finance consist of univariate or bivariate statistical approaches, such as weighted dispersion, ratio analysis, and correlations (Odden & Picus, 2019). These methods do not account for multiple vertical equity factors. Multiple regression analysis is useful in that it can take in a range of variables and determine effect on the dependent variable (Gall et al., 2007). The use of regression as a statistical method allows a researcher to isolate progress toward multiple goals while simultaneously measuring the partial effects of the vertical equity factors on funding (Toutkoushian & Michael, 2007b).

Multiple regression analysis has the ability to utilize multiple variables and measure their effect on the dependent variable, teacher salaries; however, a researcher must exercise caution if the variables are intercorrelated, thus causing multicollinearity (Cohen et al., 2007). The goal of selecting predictor variables is to select variables that are highly correlated to the dependent variable but have low correlations among themselves (Hinkle et al., 2003). Regression analysis is used in this study to measure the relationship between predictor variables within the funding formula and to measure the effects of each predictor variable on starting teacher salaries.

Regression analysis techniques allow for the inclusion of school district characteristics in examining each of the vertical equity grants and their relationship to starting teacher salaries.

Population and Sample

The population in this study included all of school districts in the State of Indiana for the 2015-2016 through 2019-2020 school years. 289 public school districts were established within the given school years. This study excluded schools classified as a private or charter school. In 2019, there were 76 Charter schools and 3 virtual schools for a total of 368 Local Education Agencies that received money from the Indiana Department of Education. Private and charter schools do not rely on local property wealth and referendums to generate revenue. Additionally, the number of charter schools fluctuate yearly based on the number of applications approved by the IDOE. To provide a complete and accurate analysis of the research questions, 289 school districts were included in the overall sample, representing 100% of the traditional public-school districts. The inclusion of all public-school districts presented a universe of data rather than a limited sample and provided the opportunity for summative totals for the entire state. The number of students was represented by Average Daily Membership (ADM). The total ADM increased in Indiana from 2015 to 2019 by 39,530.29 or 4% (IDOE, 2019).

The validity of quantitative data is improved by careful sampling and appropriate instrumentation and statistical treatment of the data (Cohen et al., 2007). For the assessment of fiscal neutrality, horizontal equity and vertical equity, the preceding methods will be used, with respect to the research questions among school districts in Indiana. This study obtained data of net assessed value of each school district per ADM, starting teacher salaries for each district, money raised through a referendum and categorical funding through the funding formula. Each of these pieces of data describe the similarities and differences between districts within the sample.

Data Collection Method

Primary data on the population for 2015-2016 through 2019-2020 school years were obtained through the Department of Local Government Finance and Indiana Department of Education for this study. The first research question states: To what extent does the existing state funding allocation system meet the standard for fiscal neutrality, horizontal equity and vertical equity related to starting teacher salaries from 2015-2019? The second research question states: Is there a statistically significant difference in starting teacher salaries between school districts with high district wealth and districts with low district wealth from 2015-2019? The dependent variable, teacher salaries for both of these questions, was obtained from school corporation teacher contracts from the Indiana Education Employment Relations Board for the years stated above. The property wealth, net assessed value, was obtained from the Department of Local Government Finance for each of the years being analyzed and categorical grant information was obtained through the Indiana Department of Education.

The third research question states: Is there a statistically significant difference in starting teacher salaries for districts who have passed a referendum compared to those districts who failed to pass a referendum? To obtain data to answer this question, information on referendums was gathered from Indiana University's Center for Evaluation, Policy & Research. The starting teacher salary data was obtained from the Indiana Education Employment Relations Board.

Data Analysis

The extent to which extraneous variables have been controlled by the research is termed internal validity (Gall et al., 2007). The validation of data analysis occurred by selecting appropriate statistical treatments during the design process and controlling for extraneous variables which minimize the equating of correlations and causes. Data analysis was performed through the

use of spreadsheets (Microsoft Excel) and the statistical software program IBM SPSS Statistics 26. All data required for the assessment of the research questions were downloaded into a Microsoft Excel workbooks. The software program IBM SPSS Statistic 26 was selected and utilized to analyze data obtained in relation to each of the research questions. SPSS is a powerful instrument that has the ability to perform any type of data analysis utilized in the social sciences (George & Mallery, 2010). With respect to research question #1, SPSS and Microsoft Excel assisted in the calculation of range, restricted range, correlation of variation, Gini Coefficient, McLoone Index, Verstegen Index and regression analysis. Additionally, SPSS was utilized to perform 2 sample independent t tests for research question 2.

Chapter Summary

Descriptive statistics of mean, standard deviation, minimum, and maximum were calculated for key variables. For research question 1, fiscal neutrality was calculated by examining the Pearson Correlation Coefficient and the Coefficient of Determination for each of the 3 models. Model 1 examined the relationship between Property Wealth per student and Total Tuition Support. Model 2 examined Property Wealth per Student and starting teacher salary. Model 3 examined the relationship between Total Tuition Support and starting teacher salary.

To examine horizontal equity in research question 1, six measures were used to analyze the disbursement of starting teacher salaries for the years of the study. Range and restricted range, coefficient of variation, Gini Coefficient, The McLoone and Verstegen Index are all used to assess horizontal equity. Multiple Regression Analysis was used to disaggregate the funding formula to assess vertical equity, as related to starting teacher salaries. The analysis determined the correlation between the predictor variables and the criterion variable as well as display the relationship between predictor variables.

2 Sample Independent T-Tests were used to compare means in research question 2. For research question 2, samples were obtained by grouping the 50 school districts with the highest net assessed value and the 50 school districts with the lowest net assessed values. Once grouped, starting teacher salaries were examined to determine if there is a statistical difference between groups.

For research question 3, samples were taken from school districts that passed a referendum and districts that attempted to pass a referendum but failed to pass it for each of the years of the study. Comparisons are made between all schools and each group of schools that had referendums. Salary changes between each group were also compared to examine the effect of the referendum on starting teacher salaries.

The sample of school districts and their corresponding data were identified for collection through the Indiana Department of Education website, Indiana Education Employment Relations Board and Department of Local Government Finance. Microsoft Excel and IBM SPSS Statistics 26 were discussed as the primary tools for statistical analysis. The findings generated from these methods will be presented in Chapter Four. An interpretation of the findings and a discussion of how those findings connect to relevant literature and future study will be provided in Chapter Five.

CHAPTER 4. RESULTS

The purpose of this study was to analyze the current methods through which financial resources are allocated to school districts in Indiana and compare how the different allocations effect teacher salaries between districts. Specifically, this study analyzed school finance structures as impacted by school finance reform since 2009 and the effect on the concepts of fiscal neutrality, horizontal equity and vertical equity. This study used established statistical methods to measure the degree of equity and fiscal neutrality of the school finance system among the 289 traditional public-school districts between the years 2015-2016 through 2019-2020 in Indiana (Berne & Stiefel, 1984; Toutkoushian & Michael, 2008; Sugimoto, 2016; Odden & Picus, 2019). The researcher sought to enhance the overall understanding of the components that contribute to differences in starting teacher salaries in Indiana.

The first section of the chapter discusses the measures of fiscal neutrality among school districts in Indiana for the years 2015 through 2019 as reported by the Indiana Department of Education. For the analysis of fiscal neutrality, data taken from the Indiana Department of Education included 3 models. Model 1 examined the relationship between Property Wealth per student and Total Tuition Support. Model 2 examined Property Wealth per Student and starting teacher salary. Model 3 examined the relationship between Total Tuition Support and starting teacher salary. The Pearson Correlation Coefficient and Coefficient of Determination were used to analyze this data. The intent of the analysis were 1: to compare the 5 years of data to determine if a trend in Indiana has been toward a more or less equitable funding allocation system during the 5 years of the study as it pertains to fiscal neutrality, and 2: analyze the data from 2015 to 2019 to determine to what extent the current funding formula meets the standard of equity as determined by the statistical measures utilized for measuring fiscal neutrality.

The second section of the chapter includes the analysis of horizontal equity measures. Horizontal equity statistical measures assess the degree upon which school finance systems distribute funds in an equitable manner. The horizontal equity metrics in this section include range, restricted range, coefficient of variation, Gini Coefficient, McLoone Index, and Verstegen Index. The analysis of horizontal equity metrics utilized a school district's revenue per ADM for 2015-2016 through 2019-2020. The intent of this analysis was to compare the revenue school districts were able to generate from the changes in Public Law 146-2008 to determine if the school finance system has contributed to a more or less equitable funding mechanism and how these changes have impacted teacher salaries across the state. Additionally, the multiple measures of horizontal equity analysis as described in detail in Chapter Three determine what extent the school finance system in Indiana meets the established standards of equity.

The third section of this chapter discusses the analysis of vertical equity for the years 2015-2016 through 2019-2020. The analysis of school finance equalization measures and their effect on starting teacher salaries is included in this section. Inputs were adjusted for the Basic Grant, Complexity Grant, Honor's Grant, Career and Technical Education Grant and Special Education Grant. Regression analysis techniques were utilized as they allowed for the inclusion of school district characteristics and the effect on starting teacher salaries. Each of the first three sections of this chapter are aimed at addressing research question 1: To what extent does the existing state funding allocation system meet the standard for fiscal neutrality, horizontal equity and vertical equity related to starting teacher salaries from 2015-2019? The intent of the analysis were 1: to compare the 5 years of data to determine if a trend in Indiana has been toward a more or less equitable funding allocation system during the 5 years of the study and 2: analyze the data from 2015 to 2019 to determine to what extent the current funding formula meets the standard of equity

as determined by the statistical measures utilized for measuring fiscal neutrality, horizontal equity and vertical equity.

The fourth section of the chapter discusses the descriptive statistics which examine the overall assessed valuation and starting teacher salaries of school districts within the state from 2015-2019. Districts are then divided into 2 samples consisting of the districts in the bottom 50 assessed values and the districts with the top 50 assessed values of the distribution. Samples are then used in a Two Sample Independent T Test to compare the means of the two samples. The null hypothesis states there is not a difference in teacher salaries between districts with high valuation compared to districts with low valuation. H_0: $\mu_1 = \mu_2$ The alternative hypothesis states that districts with a high assessed value will have a statistically significant larger mean starting salary than districts with a low assessed value. H_1: $\mu_1 > \mu_2$

The fifth section of the chapter discusses the descriptive statistics which examine the school districts that have passed referendums in the years 2015-2019. Districts are divided into 2 samples consisting of those districts who have passed a referendum and those who have attempted but failed to pass a referendum. Starting teacher salaries are compared between each sample through examining descriptive statistics average mean starting salaries. Average increase in starting teacher salary between each year of the study is also examined. Increases between years is compared between all districts in the state, districts that passed a referendum and districts that attempted, but failed to pass a referendum. The intent of this analysis is to examine how districts that pass an operating referendum have used the funds to support teacher salaries during the years of the study.

Research Question Number 1

The following measures will use statistical methods to address research question 1. Research question states “To what extent does the existing state funding allocation system meet

the standard for fiscal neutrality, horizontal equity and vertical equity related to starting teacher salaries from 2015-2019?" This section will review the methods and results associated with fiscal neutrality, horizontal equity and vertical equity regarding the relationships between property wealth per student, the funding formula and starting teacher salaries.

Fiscal Neutrality

Berne and Stifel (1999) state that fiscal neutrality implies that "no relationship should exist between the education of children and the property wealth (or other fiscal capacity) that supports the public funding of education" (p. 16). To determine if there is a relationship between per-pupil expenditures in a funding system and certain wealth related characteristics, 2 measures were used: Pearson Correlation Coefficient and the Coefficient of Determination. Three relationships will be examined to assess the fiscal neutrality between the years 2015-2016 and 2019-2020 in Indiana. Model 1 includes analysis between Total Tuition Support from the Indiana Department of Education and school district property wealth per student. District property wealth was measured using the school district's net assessed valued divided by the average daily membership (ADM) for each given year. Model 2 includes an analysis between district property wealth per student and starting teacher salaries of that given year. Model 3 examines the relationship between total tuition support and starting teacher salaries for each of the 289 public school districts for each of the years between 2015-2016 and 2019-2020.

The Pearson Correlation Coefficient measures the degree to which a linear relationship exists between 2 variables. Because each of the 289 school districts was included, the data reflect the population correlation and is represented by the symbol *p*. The correlation coefficient ranges between -1.0 to +1.0. A coefficient of "0" indicates the most equitable relationship and suggests that no relationship exists between total tuition support and property wealth. A correlation of "1.0"

indicates the most inequitable relationship, demonstrating a positive correlation of wealthier districts receiving more funding and less wealthy districts receiving less funding. A "-1.0" indicates an inverse relationship between property wealth and funding. This would indicate that wealthier districts throughout the state would receive less funding than less wealthy districts within the state. When it comes to school finance policy, a negative correlation would be a positive finding since equalization formulas attempt to establish an inverse relationship between district wealth and state funding.

Model 1: Total Tuition Support and Property Wealth per Pupil

Table 3 displays the correlation between total tuition support per student and property wealth per pupil in each of the years between 2015 and 2019. Overall, there is a weak correlation between per pupil wealth and the amount of money spent on each student. The Pearson Correlation Coefficients for the 5 years were: -.08 for 2015, .07 for 2016 and 2017, -.05 for 2018 and -.10 for 2019. In other words, there was a weak correlation between per pupil wealth and total tuition support per student.

Table 3: ***Model 1 Summary of Total Tuition Support and Property Wealth per Pupil***

2015-2016 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	-.08		289
Total Tuition Support/ADM	-.08	0.16	289
2016-2017 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	-.07		289
Total Tuition Support/ADM	-.07	0.22	289
2017-2018 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	-.07		289
Total Tuition Support/ADM	-.07	0.21	289
2018-2019 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	-.05		289
Total Tuition Support/ADM	-.05	0.45	289
2019-2020 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	-.10		289
Total Tuition Support/ADM	-.10	.08	289

A correlation coefficient ranges from "-1" to "+1". To compute proportion of variance as an estimate of effect size, the correlation coefficient "r", for a sample, or "p" for a population is squared. The value of p^2 is called the coefficient of determination for the population of public-school districts in Indiana. The result of this calculation is a value between "0" and "+1". In table 5, the proportion of variance in total tuition support that can be explained by property wealth per student. The coefficient of determination for the data is displayed in table 5, under the column p^2.

P^2 measures the proportion of variability in the criterion variable that is accounted for by the predictor (Privitera, 2018). P^2 expressed as a percentage represents the percent of variation in the outcome explained by the model and as p^2 increases it provides a measure of the substantive size of the relationship (Privitera, 2018). P2 values exceeding 80% indicate a strong relationship and p2 values less than 50% are generally considered to indicate a weak relationship (Barton, 2012).

The Coefficient of Determination statistics show that the variance in Total Tuition Support per student cannot be explained by wealth. Coefficient of Determination calculations for the five years are summarized in Table 5. In 2019 the Coefficient of Determination was .010. In other words, 10% of the variance in Total Tuition Support per student could be explained by district wealth.

Table 4: ***Model 1 Summary of Total Tuition Support per student and property wealth per pupil***

2015-2016 Linear Regression Analysis for all schools	**Mean**	**SD**	**p^2 (coefficient of determination)**
Wealth/ADM (IND)	292,782.37	124,922.69	-.08
Total Tuition Support/ADM	6,557.67	500.15	-.08
2016-2017 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
Wealth/ADM (IND)	288,543.38	126,863.36	-.07
Total Tuition Support/ADM	6,412.47	383.960	-.07
2017-2018 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
Wealth/ADM (IND)	296,502.59	131,966.57	-.07
Total Tuition Support/ADM	6,529.96	416.1	-.07
2018-2019 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
Wealth/ADM (IND)	299,207.74	134,093.11	-.05
Total Tuition Support/ADM	6,646.2	430.02	-.05
2019-2020 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
Wealth/ADM (IND)	305,517.01	136,262.31	-.10
Total Tuition Support/ADM	6,740.82	385.04	-.10

Model 2: Property Wealth per Student and Starting Teacher Salary

Model 2 examines the Pearson Correlation Coefficient between Property Wealth per Student and starting teacher salary for the years 2015-2019. Calculations ranged from -.05 in 2016-2017 to .02 in 2018-2019. The results of the 289 school districts do not show a strong correlation between Property Wealth and starting teacher salary between the years 2015-2016 and 2019-2020. The Sig (2-tailed) p value, which explains if the correlation was significant at the .05 alpha level

shows that the correlation is not significant. If the p value < .05, then the correlation is significant, these data ranged from .40 to .78. .

Table 5: ***Model 2 Summary of Property Wealth per Student and Starting Salary***

2015-2016 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	-0.04		289
Starting Salary	-0.04	0.52	289
2016-2017 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	-0.05		289
Starting Salary	-0.05	0.4	289
2017-2018 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	-.05		289
Starting Salary	-.05	0.44	289
2018-2019 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	.02		289
Starting Salary	.02	0.7	289
2019-2020 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Wealth/ADM (IND)	-.02		289
Starting Salary	-.02	0.78	289

Table 6 examines the coefficient of determination for the variables of property wealth per student and starting teacher salary. The Coefficient of Determination shows that the variance in starting teacher salary cannot be explained by property wealth per student. The Coefficient of Determination *p*2 was consistent at .00 for the years 2015-2016 through 2019-2020. In other

words, at most, there is less than a .005% of variance in starting teacher salaries that can be explained by district wealth per student.

Table 6: ***Model 2 Summary of Property Wealth per Student and Starting Salary***

2015-2016 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
Wealth/ADM (IND)	292,782.37	124,922.69	0.00
Avg. Starting Salary	34,190.08	2,188.01	0.00
2016-2017 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
Wealth/ADM (IND)	288,543.38	126,863.36	0.00
Avg. Starting Salary	34,772.77	2,328.76	0.00
2017-2018 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
Wealth/ADM (IND)	296,502.59	131,966.57	0.00
Avg. Starting Salary	35,438.04	2,466.13	0.00
2018-2019 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
Wealth/ADM (IND)	299,207.74	134,093.11	0.00
Avg. Starting Salary	36,215.13	2,531.78	0.00
2019-2020 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
Wealth/ADM (IND)	305,517.01	136,262.37	0.00
Avg. Starting Salary	36,629.25	2,589.37	0.00

Model 3: Total Tuition Support per Student and Starting Teacher Salary

Model 3 examines the relationship between Total Tuition Support per student and Starting teacher salaries between the years 2015-2016 and 2019-2020 in Indiana. Calculations ranged from .09 in 2015-2016 to -.00 in 2019-2020. The results of the 289 school districts do not show a strong correlation between Total Tuition Support and Starting Teacher salary. Similar to Model 2, the p value on a 95% confidence interval on a 2 tailed test was very high. The p value reached a .98

value in 2018-2019 and remained well above the .05 level of significance for all 5 years of the study. Table 7 summarizes the Pearson Correlation Coefficient for the given variables.

Table 7: Model 3 Summary of Total Tuition Support per Student and Starting Salary

2015-2016 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Total Tuition Support/ADM	0.09		289
Starting Salary	0.09	0.14	289
2016-2017 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Total Tuition Support/ADM	0.03		289
Starting Salary	0.03	0.58	289
2017-2018 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Total Tuition Support/ADM	0.02		289
Starting Salary	0.02	0.72	289
2018-2019 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Total Tuition Support/ADM	0.01		289
Starting Salary	0.01	0.92	289
2019-2020 Pearson Correlation	**p (population correlation)**	**Sig (2 tailed)**	**N**
Total Tuition Support/ADM	0.00		289
Starting Salary	0.00	0.98	289

Table 8 examines the coefficient of determination for the variables of total tuition support and starting teacher salary. The Coefficient of Determination shows that the variance of starting teacher salary cannot be explained by Total Tuition Support per student in each of the 289 districts in Indiana from 2015-2016 to 2019-2020. The Coefficient of Determination p2 was consistent at .0 for the years 2015-2016 to 2019-2020. In other words, at most, there is a .005% of variance in starting teacher salaries that can be explained by the total tuition support each district received during the years of this study.

Table 8: ***Model 3 Summary of Total Tuition Support per Student and Starting Salary***

2015-2016 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
TTS/ADM	6,557.67	500.15	0.01
Starting Salary	34,190.08	2,188.01	0.01
2016-2017 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
TTS/ADM (IND)	6,412.47	383.95	.00
Starting Salary	34,772.77	2,328.76	.00
2017-2018 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
TTS/ADM (IND)	6,529.96	416.10	.00
Starting Salary	35,438.04	2,466.13	.00
2018-2019 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
TTS/ADM (IND)	6,646.20	430.02	.00
Starting Salary	36,215.13	2,531.78	.00
2019-2020 Linear Regression Analysis for all schools	**Mean**	**SD**	**R^2 (coefficient of determination)**
TTS/ADM (IND)	6,740.82	385.04	.00
Starting Salary	36,629.25	2,589.37	.00

Summary of Fiscal Neutrality

Fiscal neutrality was examined using 3 models for the years of this study. In all 3 models, the Pearson Correlation Coefficient did not show a strong correlation. This is the intent of fiscal neutrality as defined by Berne and Stiefel (1999), fiscal neutrality specifies that no relationship should exist within a school district between the education of students and the property wealth where the students reside. In each of the preceding 3 fiscal neutrality models, the Pearson Correlation Coefficient and the coefficient of determination showed a value close to 0, which

indicates that a relationship between the predictor variable and criterion variable is almost non-existent, which indicates that fiscal neutrality is upheld throughout the years of this study.

Horizontal Equity

The analysis of horizontal equity utilized standard statistical dispersion methods as discussed in Chapter Three. A school district's starting teacher salary was the primary unit of analysis for each of the statistical methods. A five-year trend analysis (2015-2016 through 2019-2020) is included for each statistical method in this section. Starting teacher salaries were measured each year independently to identify possible trends and comparisons between years.

Table 9: ***Mean and Median for Starting Teacher Salaries***

	2015-2016 N=289	2016-2017 N=289	2017-2018 N=289	2018-2019 N=289	2019-2020 N=289
Mean	$34,190.08 (SD=2,188)	$34,772.77 (SD =2,328.76)	$35,438.04 (SD =2,466.13)	$36,215.13 (SD =2,531.78)	$36,629.25 (SD=2,589.37)
Median	$34,238.00	$34,606.00	$35,223.00	$36,000.00	$36,078.00

Between the years of 2015-2016 through 2019-2020 the mean for starting teacher salaries remained relatively stable with an overall increase of 6.7%. The average mean salary for the 289 school districts studied increased from $34,190.08 to $36,629.25 for an average growth of $2,439.29 over the 5-year span. Median salaries were included in Table 10 to represent the statistic utilized in the calculation of the McLoone Index and Verstegen Index. For the years from 2015-2016 to 2019-2020, the median salary remained relatively stable at $34,238 in 2015-2016 and $36,078 in 2019-2020, for a total increase of $1,840, or about 5%.

Range, Restricted Range and Federal Range Ratio

The first equity calculation of range measured the difference between highest and lowest starting teacher salaries from the 289 districts sampled. As reflected in Table 11, the range of starting teacher salaries increased by 30% from 2015-2016 to 2019-2020, with a substantial increase from $12,369.04 in 2015-2016 to $17,464 in 2019-2020. In 2015-2016, the highest recorded salary was $41,584 compared to $47,789 in 2019-2020. Accordingly, the lowest salary in 2015-2016 for Indiana school districts was $29,214.96, as compared to $30,325 in 2019-2020. As demonstrated by these examples, range data is susceptible to the effects of outlier data.

The restricted range measures the difference in starting teacher salaries at the 5th percentile and the 95th percentile of school districts. The removal of outliers through the exclusion of salaries below the 5th percentile and above the 95th percentile for restricted range reduced the salary gap between school districts as compared to the range. For the years 2015-2016 to 2019-2020, the restricted range increased 20%. The restricted range increased from $7,058.50 in 2015-2016 to $8,792 in 2019-2020.

The federal range ratio is the restricted range divided by the observation at the 5th percentile. This statistic eliminates the inflation problem and does not increase with inflation. A lower value represents better horizontal equity, with a value of .25 or less considered equitable (Odden & Picus, 2019).

Table 10: ***Summary of the Range, Restricted Range and Federal Range Ratio for all School Districts***

	2015-2016 N=289	2016-2017 N=289	2017-2018 N=289	2018-2019 N=289	2019-2020 N=289
Range	$12,369.04	$13,564.78	$14,252	$16,852	$17,464
Restricted Range	$7,058.50	$8,424	$8,025	$8,636	$8,792
Federal Range Ratio	0.4	0.43	0.45	0.52	0.53

Coefficient of Variation and Gini Coefficient

The coefficient of variation equity statistic is determined by taking the standard deviation of the starting teacher salaries divided by the mean teacher salary to determine the percent in variation in the distribution of salaries. The coefficient of variation ranges from zero to 1.0. The lower the coefficient, the more equitable the distribution. A score of .1 or less is the research standard for equity (Peterson, 2011). The analysis of the coefficient of variation in Table 11 displays a consistent and equitable distribution, under the value of .1, for the years between 2015-2016 and 2019-2020.

Table 11: ***Summary of the Coefficient of Variation and Gini Coefficient for School Districts***

	2015-2016 N=289	2016-2017 N=289	2017-2018 N=289	2018-2019 N=289	2019-2020 N=289
Coefficient of Variation	0.06	0.07	0.07	0.07	0.07
Gini Coefficient	0.01	0.01	0.01	0.01	0.01

The Gini Coefficient was calculated by creating a matrix which allowed for a comparison of each district's starting teacher salary relative to the total salaries expended in the given school year. The Gini Coefficient is a numerical value used as a measure of the index of inequality which values range from 0 to 1.0. According to Odden and Picus (2019), most values in school finance

range between .1 and .2. The Gini coefficient is not influenced by inflation and a value of .05 is most desirable for an equitable distribution (Odden & Picus, 2019). The Gini Coefficient remained consistent for the years of the study with an overall value of .01 during each year. The bottom 20 percentile was distributed at 18% of total salaries and the top 20th percentile was distributed as 22% of total salaries. The middle 60% of the distribution remained perfectly consistent with 10% of the salaries being distributed at each decile of the distribution.

McLoone Index and Verstegen Index

The McLoone Index was calculated by finding the median starting salary for the years of the study, then creating a ratio of the sum of the salaries below the median to the amount that would exist if each district paid the median salary. The ratio created a range from 0 to 1.0. The closer the score is to 1.0, the greater the equity. Odden and Picus (2019) state that most school finance data sets are in the .7 to .9 range or higher, but a .95 is a desirable statistic. The McLoone Index is consistent for the years of the study and slightly increased in 2019-2020. Each of the statistics fall within the desirable range of .95 or higher and demonstrate an equitable dispersion of starting teacher salaries among the lower half of the distribution for the years of 2015-2016 through 2019-2020 in Indiana.

Table 12*: Summary of the McLoone Index and Verstegen Index for School Districts*

	2015-2016 N=289	2016-2017 N=289	2017-2018 N=289	2018-2019 N=289	2019-2020 N=289
McLoone Index	0.95	0.95	0.95	0.95	0.96
Verstegen Index	1.05	1.06	1.06	1.06	1.07

The Verstegen Index is the opposite of the McLoone Index, and measures inequity and disparity in the top half of the distribution. The Verstegen Index is calculated by the median salary

for the years of the study, then creating a ratio of the sum of the salaries above the median to the amount that would exist if each district received the median salary for the given year. This statistics has a value of 1.0 or higher, and like the McLoone Index, does not increase with inflation (Odden & Picus, 2019). The statistic will increase with disparities in the top half of the distribution and a value of 1.05 is considered acceptable for the Verstegen Index (Peterson, 2010). Each of the statistics, shown in Table 13, are at or near the 1.05 value for the given years of the study. The distribution of starting salaries for the upper half of the distribution are equitable in these years.

Summary of Horizontal Equity

The analysis of horizontal equity measures of starting teacher salaries has met the established standards of equity for the years of 2015-2016 through 2019-2020 in Indiana. Public Law 146-2008, which was authorized in 2009 removed district wealth as a factor in school funding and used sales tax instead of property wealth. The horizontal equity metrics of range show a $17,464 difference in starting teacher salaries in the year 2019-2020. Outliers are removed with the restricted range and the overall difference in dispersion is reduced from $7,058.50 in 2015-2016 to $8,792 in 2019-2020, much less variation than in the range. The coefficient of variation remained under .1 for each of the years studied, representing an ideal equitable distribution. The Gini Coefficient also demonstrated near perfect equity with values no higher than .01 for the years of the study. Finally, the McLoone Index and Verstegen Index both revealed ideal dispersions for the lower half and upper half of the distribution of teacher salaries for the years of this study. Overall, the horizontal equity measures indicate that Indiana's starting teacher salary distribution across the state demonstrate an equitable distribution for the years 2015-2016 through 2019-2020.

Vertical Equity

Hierarchical regression analysis was utilized to determine which independent variables (school district characteristics) contributed to the prediction of the dependent variable (starting teacher salaries). Hierarchical regression as a statistical method isolated the partial effects of school district characteristics simultaneously to determine their ability to predict starting teacher salaries. The independent variables of total Basic Tuition Grant, Complexity Grant, Special Education Grant, Career and Technology Grant, Honor's grant, Total Tuition Support and Assessed value per Average Daily Membership were each entered as blocks for predictor variables in SPSS 26. Secondary linear regression analysis was conducted and did not reveal stronger relationships. Hierarchical regression allowed for the assessment of each predictor variable in terms of its ability to predict the dependent variable.

Statistical Mean for all Vertical Equity Variables

The characteristics of vertical equity variables from 2015-2016 are displayed in Table 13. Basic Grant per ADM has increased each year for a total of $2,439.17, or about 7 percent for the years of the study. The Complexity Grant per ADM, which provides additional money to low-income families, decreased incrementally each year for a total of $418.63, or about 39% from 2015-2016 to 2019-2020. The Special Education Grant per ADM decreased significantly from 2015-2016 and made small increases from 2016-2017 to 2019-2020 for a total decrease of $232 per student, or about 31% for the years of the study. The Career and Technical Grant per ADM, which is intended to support Career and Technical programs in high schools, increased slightly each year of the study from 114.96 to 140.93 per student, for a total increase of about 18%. The Honor's Grant, which supports Honor's programs in high schools increased in the years of this

study from 24.98 to 30.70, with a slight decreased in the years from 2016-2017 to 2017-2018. The total increase for the Honor's grant during the years of the study was about 19%.

Overall, Total Tuition Support per ADM increased from $6,567.67 to $6,740.82 from 2015-2016 to 2019-2020 with a slight decrease from 2015-2016 to 2016-2017. Despite the changes in the different vertical equity grants, the overall increase in Total Tuition Support per student increased by only $173.15 per student, or a 2.5%. increase. Mean starting teacher salaries increased incrementally each year from $34,190.08 to $36,629.25 for a total increase of $2,439.17, or about 7%. Similarly, district wealth, measured by net assessed value per ADM also increased in each year of the study from $522,299.31 per student to $664,544.12 for a total increase of about 21% for the years of this study.

Table 13: ***Statistical Mean for Variables included in Regression Analysis***

	2015-2016 N =289	2016-2017 N=289	2017-2018 N =289	2018-2019 N=289	2019-2020 N=289
Starting Salary	34190.08	34772.77	35438.04	36215.13	36629.25
Basic Grant per ADM	4639.17	4956.73	5079.35	5273	5352
Complexity per ADM	1078.61	792.76	774.88	662.69	659.98
SPED per ADM	810.56	514.46	522.74	542.1	557.56
Career per ADM	114.96	123.66	127.36	131.37	140.93
Honors per ADM	24.98	24.85	25.64	29.73	30.7
Total Tuition per ADM	6567.67	6412.47	6529.96	6646.2	6740.82
Assessed value per ADM	522299.31	532204.55	569631.71	604754.57	664544.12

Correlations between Predictor Variables and Criterion Variable

The objective of regression analysis is used to test a hypothesis for one or more predictor variables to determine whether the regression equation can be used to predict values of the criterion variable, teacher salaries. The correlations among starting teacher salaries and the vertical equity variables (Basic Tuition per ADM, Complexity Grant per ADM, Career and Technical Grant per ADM, Honor's Grant per ADM and Total Tuition Support per ADM) were selected for regression analysis were examined and presented in Table 14. Correlation coefficients whose magnitude are between 0.5 and 0.7 indicate variables which can be considered moderately correlated and correlation coefficients whose magnitude are between 0.3 and 0.5 indicate variables have a low correlation (Privitera, 2017).

Table 14: ***Summary of Regression Correlation for Vertical Equity Factors on Starting Teacher Salaries 2015-2016 through 2019-2020***

	2015-2016 N=289	2016-2017 N=289	2017-2018 N=289	2018-2019 N=289	2019-2020 N=289
Basic Tuition	-0.03	0.14	0.14	0.16	0.03
Complexity Grant	0.09	0.02	0.02	0.01	0.03
Special Ed. Grant	0.15	0.11	0.08	0.00	0.03
Career & Tech Grant	-0.14	-0.22	-0.25	-0.23	-0.22
Honors Grant	-0.04	0.05	0.00	0.02	0.03
Total Tuition Support	0.09	0.03	0.02	0.01	-0.00
Assessed value per ADM	-0.04	-0.05	-0.05	0.02	-0.02

Of seven predictor variables in Table 14, no variable was strongly correlated to starting teacher salaries. Basic Tuition was not strongly correlated with starting teacher salary with a high

of .16 in 2018-2019. The Complexity Grant statistically had a low correlation to starting teacher salary with a correlation value ranging from .09 to .01 for the years of the study. The Special Education Grant was also not strongly correlated to starting teacher salaries, with values ranging from .15 to .00. The Career and Technical Grant was negatively correlated with starting teacher salaries with a range in values between -14. and -.25. The Honor's grant had a correlation value between -0.04 and 0.05 and Total Tuition support had a value between .09 and -.00. Assessed value per ADM showed a small negative correlation with starting teacher salaries ranging from -.02 to -.05.

Correlations between the Predictor Variables

Correlation between predictor variables was weak for Basic Tuition and each of the four grants in the funding formula. Over the five-year span of the study, the Complexity Grant was correlated with the Basic Grant at a value of .46 in 2018-2019 and -.01 in 2019-20. The Special Education was not strongly correlated to the Basic Grant with Correlation values ranging from -.06 to .17. The Career and Technical Grant and Honors Grant were also both negatively correlated with the Basic Grant with values peaking at .01 and -.05 respectively.

Table 15: ***Regression Correlation for all Predictor Variables 2015-2016 through 2019-2020***

Variables	Year	Basic	Complexity	Special Ed.	Career & Tech	Honors
Basic Tuition	2015-2016	1	0.25	0.12	0.01	-0.09
	2016-2017	1	0.21	0.13	-0.08	-0.09
	2017-2018	1	0.32	0.13	-0.07	-0.15
	2018-2019	1	0.46	0.17	-0.11	-0.18
	2019-2020	1	-0.01	-0.06	-0.00	-0.05

Summary of Vertical Equity

Statistical means for the study showed a general increase between 2015-2016 to 2019-2020 with starting teacher salaries, Basic Grant, Career and Technical Grant and assessed value per ADM all increasing incrementally for each year of the study. The Complexity Grant and Special Education Grant both decreased significantly from 2015-2016 and the Honors Grant dropped and then rebounded in from 2016-2017 to 2017-2018. Regression analysis revealed specific characteristics of the funding formula account for little variability in starting teacher salaries for the years 2015-2016 through 2019-2010. The r values for each of the models were not high for the Basic grant with the r value peaking at .16. Among the predictor variables, relationships between Basic Tuition and Complexity Grant were the strongest, although moderate, ranging from -.01 to .46. There were not strong correlations between the predictor values during the years of this study and the predictor variables only showed a slight correlation to the criterion variable.

Research Question Number 2

The following measures employed statistical methods to address research question 2. Research question 2 states "Is there a statistically significant difference in starting teacher salaries between school districts with high district wealth and districts with low district wealth from 2015-2019?" This section reviews the methods and results associated with district wealth and starting teacher salaries. Analysis will include assessed valuation and starting teacher salaries for all public-school districts between 2015-2019 as well as the subgroups of the 50 districts with the lowest wealth and the 50 districts with the highest wealth, as measured by net assessed valuation.

Descriptive Statistics for All Districts

The descriptive statistics for Assessed Value for all districts are reported in Table 16. The reported values include mean assessed value, the standard deviation, the minimum value and the maximum value for the years 2015-2019. Mean assessed value continued to grow each year of the study for a total growth of $94,291,029.54. The maximum value for assessed value was Indianapolis Public Schools. The maximum assessed value increased over the 5 years of study from $9,745,667,423.00 in 2015 to an assessed value of $11,382,348,145.00 in 2019. The minimum assessed value was Cannelton City School Corporation and its value decreased from 2015-2016 at $24,065,592.00 to $19,226,236.00 in 2019-2020.

Table 16: ***Descriptive Statistics of Net Assessed Value for All Districts***

Year	Mean AV	SD	Minimum	Maximum
2015-2016	$950,225,011.95	$1,247,216,206.52	$24,065,592.00	$9,745,667,423.00
2016-2017	$966,265,018.89	$1,264,699.97	$22,317,925.00	$9,667,203,109.00
2017-2018	$988,393,016.88	$1,298,448,001.81	$21,850,405.00	$10,045,427,309.00
2018-2019	$1,011,523,804.65	$1,352,273,354.03	$19,861,225.00	$10,738,720,168.00
2019-2020	$1,044,516,041.49	$1,418,878,314.60	$19,226,236.00	$11,382,348,145.00

The standard deviation in assessed value for all public-school districts was reported to be $1,247,216,206.52 in 2015-2016. During the years studied, the standard deviation increased each year to a peak value of $1,418,878,314.60 in 2019-2020. Overall, the standard deviation grew a total of $171,662,108.08 between the years of 2015-2016 to 2019-2020 for all school districts.

The descriptive statistics for teacher salaries for all districts are reported in Table 17. The reported values included the mean salary, the standard deviation, the minimum value and the maximum value. During the years studied, the mean salary for school districts increased each year

from $34,190.08 in 2015-2016 to $36,629.25 in 2019-2020. The overall growth in mean starting salary was $2.439, or 7%, for the years of this study.

The standard deviation in starting teacher salaries was reported to be $2,188.01 in 2015-2016. During the years of the study, the standard deviation for starting teacher salaries reached its peak in 2019-2020 at $2,589.37. Overall, the standard deviation for all starting teacher salaries increased each year of the study.

Table 17: ***Summary of Descriptive Statistics for Starting Teacher Salaries for All Districts***

Year	Mean Salary	SD	Minimum	Maximum
2015-2016	$34,190.08	$2,188.01	$29,214.96	$41,584.00
2016-2017	$34,772.77	$2,328.76	$29,819.22	$43,384.00
2017-2018	$35,438.04	$2,466.13	$30,000.00	$44,252.00
2018-2019	$36,215.13	$2,531.78	$30,000.00	$46,852.00
2019-2020	$36,629.25	$2,589.37	$30,325.00	$47,789.00

Descriptive Statistics for 50 Districts with the lowest Assessed Value

The descriptive statistics for the 50 districts with the lowest assessed value are represented in Table 18. The reported values include mean assessed value, the standard deviation, minimum value, maximum value and range. During the 5 years studied, the mean assessed value dropped from $169,834,184.92l in 2015-2016 to $166,984,258.62 in 2016-2017 in 2016-2017 and then increased to $171,984,146.50 in 2019-2020. Both the minimum and maximum values decreased from 2015-2016 to 2019-2020. The range also increased during this time, from $202,656,300.00 in 2015-2016 to $207,000,012.00 in 2019-2020, with a drop to $203,521,202.00 in 2018-2019.

Table 18: ***Summary of Descriptive Statistics for 50 Districts with Lowest AV***

Year	Mean Assessed Value	SD	Minimum	Maximum
2015-2016	$169,834,184.92	$52,638,972.11	$24,065,592.00	$226,721,892.00
2016-2017	$166,984,258.62	$52,283,933.50	$22,317,925.00	$228,703,322.00
2017-2018	$171,086,788.34	$53,512,724.34	$21,850,405.00	$228,781,540.00
2018-2019	$169,421,406.28	$52,428,314.86	$19,861,225.00	$223,382,427.00
2019-2020	$171,984,146.50	$50,507,687.69	$19,226,236.00	$226,226,248.00

The salaries for the 50 districts with the lowest assessed value are represented in Table 19. The reported values include the mean starting salary, standard deviation, minimum starting salary, maximum starting salary and range. During the 5 years studied, the mean starting salary increased each year from $33,137.92 to $35,285.74. Similarly, the minimum starting salary also increased from $29,214.96 in 2015-2016 to $30,325.00 in 2019-2020. The maximum starting salary also increased for the 50 districts with the lowest assessed value from $38,500.00 in 2015-2016 to $40,500.00 in 2019-2020. Overall, the range in starting salaries for this group increased from $9,286 to $10,175 from 2015-2016 to 2019-2020.

Table 19: ***Summary of Descriptive Statistics of Starting Salaries for 50 Districts with Lowest AV***

Year	Mean Salary	SD	Minimum	Maximum
2015-2016	$33,137.92	$1,798.80	$29,214.96	$38,500.00
2016-2017	$33,479.13	$1,850.41	$29,819.22	$39,500.00
2017-2018	$33,953.96	$1,830.29	$30,000.00	$39,500.00
2018-2019	$34,721.51	$1,975.06	$30,000.00	$40,500.00
2019-2020	$35,285.74	$2,121.71	$30,325.00	$40,500.00

Descriptive Statistics for 50 Districts with the Highest Assessed Value.

The descriptive statistics for the 50 districts with the highest assessed value are represented in Table 20. The reported values include mean assessed value, the standard deviation, minimum value and maximum value. During the 5 years studied, the mean assessed value increased each year from $3,085,211,692.86 in 2015-2016 to $3,479,358,122.86 in 2019-2020. Both the minimum and maximum values also increased during the years of the study. The range also increased during this time, from $8,298,520,541.00 in 2015-2016 to $9,854,398,167.00 in 2019-2020.

Table 20: ***Summary of Descriptive Statistics for 50 Districts with Highest AV***

Year	Mean Assessed Value	SD	Minimum	Maximum
2015-2016	$3,085,211,692.86	$1,738,315,675.00	$1,447,146,882.00	$9,745,667,423.00
2016-2017	$3,143,439,425.92	$1,738,147,878.56	$1,484,513,408.00	$9,667,203,109.00
2017-2018	$3,221,235,573.06	$1,788,198,025.00	$1,483,437,757.00	$10,045,427,309.00
2018-2019	$3,329,564,206.34	$1,879,222,412.00	$1,502,357,435.00	$10,738,720,168.00
2019-2020	$3,479,358,122.86	$1,971,908,423.00	$1,527,949,978.00	$11,382,348,145.00

The salaries for the 50 districts with the highest assessed value are represented in Table 21. The reported values include the mean starting salary, standard deviation, minimum starting salary, and maximum starting salary. During the 5 years studied, the mean starting salary increased each year from $35,724.72 to $38,730.84. Similarly, the minimum starting salary for this group also increased each year from $30,912.00 in 2015-2016 to $32,833.00 in 2019-2020. The maximum starting salary also increased for the 50 districts with the highest assessed value from $41,112.00 in 2015-2016 to $44,000.00 in 2019-2020. Overall, the range in starting salaries increased slightly from $9,837.00 to $10,000.00.

Table 21: ***Summary of Descriptive Statistics of Salaries for 50 Districts with Highest AV***

Year	Mean Salary	SD	Minimum	Maximum
2015-2016	$35,724.72	$2,560.32	$30,912.00	$41,112.00
2016-2017	$36,524.92	$2,803.18	$31,500.00	$41,112.00
2017-2018	$37,546.68	$2,898.24	$31,326.00	$42,363.00
2018-2019	$38,205.20	$2,922.63	$32,083.00	$43,210.00
2019-2020	$38,730.84	$2,855.70	$32,833.00	$44,000.00

Two-Independent-Sample t test

The two-independent-sample t test is a statistical procedure used to compare the mean difference between two independent groups. This test is specifically used to test hypotheses concerning the difference between two population means where the variance in one or both populations is unknown (Privitera, 2017). In this study, mean salary for the 50 districts with lowest assessed value are compared with the mean salary for the 50 districts with the highest assessed value for the years 2015-2016 to 2019-2020. The null hypothesis states that there is no difference between the two groups. The level of significance for this two tailed test is .05. The degrees of freedom for this two-independent-sample t test is 498.

Table 22: Descriptive Statistics for Two-Independent Sample test ***2015-2019***

Group	n	Mean Salary	SD	Std. Error Mean
Low AV	250	$34,115.65	$2,061.67	130.52
High AV	250	$37,346.47	$2,996.60	189.52

The Low Assessed Value Group, for the years 2015-2019, (n=250) was associated with starting salaries M = $34,115.65 (SD =$2,061.67). By comparison, the High Assessed Value Group (n=250) was associated with starting salaries M = $37,346.47 (SD = $2,996.60). An Independent samples t-test was performed to test the hypothesis that there is no difference in starting salaries between low assessed value and high assessed value districts. Table 23 indicates

the variances are significantly different, with the p-value < .001. Additionally, the assumption of homogeneity of variances was tested and satisfied via Levene's F test, F(498) = 52.64, p = < .05. The independent samples t-test was associated with a statistically significant effect, t(498) = 14.04, p < .001. Additional t tests were computed for each group by each individual year and the p value was < .001 in each year. Thus, the high assessed value districts were associated with a statistically significantly larger mean starting salary than the low assessed value districts group.

Table 23: ***Independent Samples Test***

	Levene's Test		t-test for Equality of Means					95% Confidence Interval	
	F	Sig.	T	Df	Sig (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	52.64	.0	14.04	498	.0	3,230.82	230.04	2,778.8	3,682.8
Equal variances not assumed			14.04	441.6	.0	3,230.8	230.04	2,778.7	3,682.9

Summary of High Wealth and Low Wealth Districts

The descriptive statistics for assessed valuation for all districts are reported in Table 17. Mean assessed value continued to grow each year of the study for a total growth of $94,291,029.54. The descriptive statistics for teacher salaries for all districts are reported in Table 17. During the years studied, the mean starting salary for school districts increased each year from $34,190.08 in 2015-2016 to $36,629.25 in 2019-2020. The overall growth in mean starting salary was $2,439.17 for the years of this study. The descriptive statistics for the 50 districts with the lowest assessed value are represented in Table 18. The mean assessed value for the 50 districts with the lowest assessed value increased by $2,149,961.58. Mean salaries also increased for the 50 districts with the lowest assessed value by an average of $2,147.82 for the 5 years and are represented in Table 19. Table 20 displays the assessed value for the 50 districts with the highest assessed value in the state of Indiana. The group average increased assessed valuation by $394,416,430. Salaries also

increased for this group by an average of $3,006.12 and are represented in Table 21. The two-independent-sample t test compared the starting salaries between the 50 districts with the lowest assessed value with the 50 districts with the highest assessed value between the years 2015-2016 to 2019-2020. The independent samples t-test was associated with a statistically significant effect, $t(498) = 14.04$, $p < .001$. Thus, the high assessed value districts were associated with a statistically significantly larger mean starting salary than the low assessed value districts group.

Research Question Number 3

The following measures were statistical methods to address research question 3. Research question 3 states "Is there a statistically significant difference in starting teacher salaries for districts who have passed a referendum compared to those districts who failed to pass a referendum?" This section reviews methods and results associated with districts that have passed a referendum and the association with starting teacher salaries. Table 24 includes the average starting teacher salary for all districts, districts that attempted, but failed a referendum and districts that attempted and passed a referendum for the years of this study. In all cases districts that pass and districts that attempted a referendum but failed had a greater average of starting teacher salaries than the mean of all 289 districts for each given year of the study.

Table 24:*Average Starting Salaries of Pass and Failed Referendums*

Year	2015	2016	2017	2018	2019
All Districts n=289	34,190.00	34,722.00	35,438.00	36,215.00	36,629.00
Failed n=16	34,825.00	35,013.00	35,896.00	36,601.00	36,978.00
Passed n=51	35,137.00	36,201.00	37,018.00	37,964.00	38,581.00
Failed compared to all	635.00	291.00	458.00	386.00	349.00
Pass compared to all	947.00	1,479.00	1,580.00	1,749.00	1,952.00

Data on referendums was gathered from Indiana University's Center for Evaluation, Policy, & Research. Included are the data for all districts that attempted to pass a referendum between May 2014 and November 2019. 2014 was chosen because the effects of a passed referendum could influence the 2015-2016 starting teacher salary. Groups were determined by whether or not a district passed or failed a referendum. Because Construction referendums do not contribute to teacher salaries, they were omitted from the analysis. There were 81 districts that attempted to pass a referendum from the dates established above. Some districts attempted multiple referendums in the years of the study. If a district passed a referendum in any of the years, it was counted in the "passed" group, despite whether it may have failed an attempt in another year of the study. Overall, there were 51 school districts that successfully passed operating referendums from May 2014 to November 2019. There were 16 school districts that attempted to pass but failed to pass an operating referendum during the years of this study. The mean was computed for the average change in teacher salaries between years for the 289 school districts as well as the subgroups of districts who successfully passed a referendum and those who failed to pass a referendum. The findings are presented in Table 25.

Table 25: ***Mean change in starting teacher salary comparing districts that have passed a referendum***

Group	2015 to 2016	2016-2017	2017 to 2018	2018 to 2019
All School Districts (N = 289)	$582	$665.27	$777.09	$414.12
Passed Referendum (n = 51)	$1,064.20	$816.37	$946.24	$614.49
Failed Referendum (n = 16)	$188.38	$883.06	$705.44	$377.00

Because the sample sizes are unequal, comparing means with a two-sample independent t test will increase the likelihood of an error in analyzing the variance. Table 26 shows the average

change in salaries for all districts and districts that attempted to pass a referendum for the years 2015 to 2016, 2016 to 2017, 2017 to 2018 and 2018 to 2019. Changes between the 2015 to 2016 teacher contracts saw an average of $582 for the state, with 10 districts decreasing salaries during this period and 138 districts not changing the starting teacher salary and 141 districts increasing the salary from a range of $.09 to $6,492. Of the group that passed a referendum, salaries increased an average of $1,085.48 with changes ranging from $-500 and $6,492 between 2015 and 2016. Of the group that failed to pass a referendum, only 3 of the 16 districts changed starting salaries during the 2015 to 2016 contracts for a mean average of $188.38. The amount ranged from an increase of $571.00 to $1,500.00 for districts that failed to pass a referendum between 2015 and 2016..

For the change in teacher contracts between the years 2016 and 2017, all schools increased an average of $665.27 with salary changes ranging from $-1,461 to $6,572. The average change for districts who have passed a referendum during the period of this study was $816.37. Of the 51 districts who passed a referendum, 26 increased starting salaries from 2016 to 2017. The range of changes was the same as all schools with changes ranging from $1,461 to $6,572. 8 of the 16 districts increased salaries for the districts that have failed to pass a referendum. The average increase was $883.06. This average was influenced by The School City of East Chicago, who increased starting teacher salaries by $5,330. The median change for this subgroup was $104.50 during the 2016 to 2017 school years.

Between the 2017 and 2018 school years, average starting teacher salaries increased by $777.09 for all districts. The group who passed a referendum had an average increase of $946.24, with changes ranging from $1,100 to $5,000. This was the same range for all school districts during this time. The group who failed to pass a referendum had an average increase of $705.44, with a range of $-20 and $3,080.

Teacher contracts between 2018 and 2019 had an average increase of $414.12 in the state. The group of districts that passed a referendum had an average increase of $614.49 with changes ranging from $-1,640 to $3,000. The group of districts that failed to pass a referendum had an average increase of $377.00. Starting teacher salary changes during this time period ranged from $-3,000 to $5,000 for the districts that failed to pass a referendum.

Summary of Districts that Passed and Failed a Referendum.

Data was examined from May 2014 to November 2019 to group districts in one of 2 subgroups, those who have passed a referendum and those who have failed to pass a referendum. In each of the 4 periods examined, districts that passed a referendum had higher average starting salaries than all districts in the state. Districts that failed to pass a referendum also had an overall higher average in staring teacher salaries than all the districts in the state, but less than the subgroup of districts that passed a referendum. Growth in starting teacher salaries was highest in the districts that passed a referendum and exceeded the state average. Districts that failed to pass a referendum had lower growth than the state average in 3 of the 4 periods. For the period between 2016 and 2017, there was an outlier increase of $5,330, which skewed the data for districts that did not pass a referendum. The median increase during this time for districts that failed to increase was $104.50. Because the sample sizes were different with n = 51 for districts who have passed a referendum and n = 16 for districts who failed to pass a referendum, a 2-sample independent t test was not used to compare means, instead descriptive statistics in Table 24 and Table 25 are displayed.

Chapter Summary

The analysis of fiscal neutrality, horizontal equity, and vertical equity utilized commonly accepted methods of statistical analysis to assess the health of school funding mechanisms in

Indiana from 2015-2016 to 2019-2020. Overall results confirm that fiscal neutrality, horizontal equity and vertical equity standards are being met with the current funding formula. The assessment of two independent sample t test disaggregated school districts between the 50 districts with the lowest assessed value and the 50 districts with the highest assessed value. This measure resulted in a statistically significant difference in starting salaries between each group sampled. Descriptive statistics were used to compare the 50 districts with the greatest wealth with the 50 districts with the least wealth. Similarly, districts were grouped based on the success or failure of passing a referendum between the years 2015 and 2019. Descriptive statistics resulted in a mean overall higher starting salary for districts who have recently passed a referendum compared to the overall population and districts who failed to pass a referendum.

CHAPTER 5. INTERPRETATIONS AND RECOMMENDATIONS

Introduction

The purpose of this study was the assessment of the equitable funding of schools and its impact on starting teacher salaries by analyze the funding formula between the years of 2015 and 2019. Berne and Stiefel (1984) proposed three principles to determine the equity within a school funding system: fiscal neutrality, horizontal equity and vertical equity. Specifically, this study examines the relationship between district wealth and starting teacher salary by comparing starting teacher salaries from districts with high wealth to starting teacher salaries with low wealth. Furthermore, districts that passed a referendum are compared to districts that did not pass a referendum to determine the effect operating referendums have on starting teacher salaries. This study utilized established statistical methods to examine fiscal neutrality and the equity of the distribution of starting teacher salaries (Berne & Stiefel, 1984; Odden & Picus, 2019). Independent sample t tests were utilized to determine the significance of the relationship between district wealth and starting teacher salaries and descriptive statistics were used in examining starting teacher salaries between districts that have passed a referendum and those who attempted but failed.

Fiscal neutrality used three models to determine if there is a relationship between student expenditures and certain wealth characteristics. Total Tuition Support was compared to Property Wealth per Pupil, Property wealth per student was compared to starting teacher salaries and Total Tuition Support was also compared to starting teacher salaries. The Pearson Correlation Coefficient and Coefficient of Determination was used to establish the strength of the relationship between each of these variables stated above. As outlined by Odden and Picus (2019), commonly accepted statistical dispersion methods evaluated equity of starting teacher salaries between the

years of 2015-2019. Regression analysis was utilized to examine each of the grants in the funding formula and the impact on starting teacher salaries.

The current school funding mechanisms used in Indiana are a result of Public Law 146, which shifted school funding from property tax revenues to sales taxes, with the goal of Indiana's public schools not depending on revenues generated by property ownership (Michael et al.,2009). Despite the changes in the funding formula, the range and federal range ratio increased during each year of this study resulting in a difference of $17,464 in starting teacher salaries within the state for the 2019-2020 school year. The prevailing position of this study was examining other factors, including district wealth and referendums to determine which factors are associated with higher starting teacher salaries throughout the state of Indiana.

Summary of Research Questions

Research Question #1

To what extent does the existing state funding allocation system meet the standard for fiscal neutrality, horizontal equity and vertical equity related to starting teacher salaries from 2015-2019?

Upon review of the common equity measurements used to examine the state funding formula and the relationships between district wealth and starting teacher salary, fiscal neutrality, horizontal equity and vertical equity are upheld and have created an equitable system of school finance. This is largely due to the changes in Public Law 146, which removed property value as a primary source of revenue for school districts. Property wealth per ADM is a measure of school district wealth based on the assessed valuation of property divided by the average daily membership count of each school district. To assess the degree of fiscal neutrality, Pearson Correlation and Coefficient of Determination determined there is not a statistically significant relationship between Total Tuition Support and property wealth per student. Additional models

also concluded there was not a statistically significant relationship between property wealth per student and Total Tuition Support and starting teacher salaries. If a state is fiscally neutral, then there should not be a relationship between a district's state revenue and the property wealth of the school district (Odden & Picus, 2019). This principle was upheld with correlation between variables ranging from -.10 to .08, a nearly perfect relationship to uphold fiscal neutrality. Similarly, the coefficient of determination ranged from .00 to .01 resulting in a weak relationship between each of the variables in the 3 models examined and upholding the principle of fiscal neutrality.

The analysis of horizontal equity determines the degree upon which school finance systems distribute funds in an equitable manner. An equitable school funding mechanism would provide equal and identical levels of per student funding to all school districts within the state (Odden & Picus, 2019). Seven measures of horizontal equity were used to measure the degree of dispersion (inequity) within the distribution of starting teacher salaries for each public school district within the state. Despite the consistent increase in range and range ratio between starting teacher salaries, all horizontal equity metrics resulted in statistically equitable distributions. The coefficient of variation equity statistic is the standard deviation divided by the mean to determine the percent in variation. This statistic ranges from zero to 1.0, with a lower score attributed to a more equitable distribution. Results of the coefficient of variation for the 5 years ranged from .06 to .07. Similarly, the Gini Coefficient measures the inequality by comparing each district's starting teacher salaries relative to total salaries expended within the state for a given year. The ideal score for the Gini Coefficient is .05 (Odden & Picus, 2019). Results in this study were consistent at .01 for each year of the study, meaning that starting teacher salaries, relative to total salaries expended for the year were equally distributed and not influenced by inflation.

The McLoone Index and Verstegen Index analyze the bottom half of the salary distribution and the top half of salary distribution and compare it theoretically to if each district received the median salary. The ideal statistical range for the McLoone Index is .7 to .9, with a .95 being most desirable and 1.05 for the Verstegen Index (Odden & Picus, 2019). McLoone Index scores ranged from .95 to .96 during the study and Verstegen Index scores ranged from 1.05 to 1.07, both calculations resulting in statistically equitable distributions for the lower and upper half of the teacher salary distribution.

The analysis of vertical equity addresses the differences among school districts in Indiana and is comprised of various grants that are intended to more accurately meet each district's needs. Specifically, districts are compensated differently based upon the number of low-income students that attend (Complexity Grant), the number of students that qualify for special education services, the number of students enrolled in specific career and technical courses and the number of students in the previous school year who received an Academic Honor's diploma or Core 40 diploma with Technical Honors (IDOE, 2021). Trends for the 5-years showed the Basic Grant per ADM, Career and Technical Grant, Honor's Grant and Total Tuition Support increasing each year of the study. Complexity Grant per ADM and Special Education Grants both decreased during the years of the study by $418.63 per student and $253 per student respectively. Regression correlation comparing each grant to starting teacher salary showed a weak relationship with correlational values ranging from .15 to -.22. Alternately , correlation between each of the grants was weak to moderate, ranging from .46 to -.11. The Basic Grant and the Complexity Grant had the strongest relationship within the funding formula ranging from -.01 to .46.

Collectively, fiscal neutrality, horizontal equity and vertical equity metrics were used to make a comprehensive assessment of whether or not the current funding formula was providing

equitable resources to school districts between 2015-2016 and 2019-2020. Because Public Law 146 removed local property taxes as a source primary revenue for school districts, fiscal neutrality and equity were met in each metric. One statistic that stood out was the increase in range between starting teacher salaries within the state, which grew each year of the study and resulted in a difference of more than 50% of the starting teacher salary at the lowest end of the distribution. This difference led to a comparison of subgroups of the 50 wealthiest districts and the 50 least wealthy districts in the state to determine if there is a statistically significant difference in how teachers are compensated. This is addressed in research question 2.

Research Question #2

Is there a statistically significant difference in starting teacher salaries between school districts with high district wealth and districts with low district wealth from 2015-2019?

289 school districts were evaluated and compared on the basis of assessed valuation and starting teacher salaries. Districts were ranked in order with the district with the highest assessed valuation being number one and the district with the least assessed valuation being 289. From the distribution, the top 50 were grouped as high assessed value, or a wealthy district. The bottom 50 districts were also grouped as low assessed value or a non-wealthy district. A two-independent sample t test was used to compare the mean starting salary between the high and low assessed value groups for each of the five years of the study. For the years 2015-2016 to 2019-2020, there was a noticeable difference in starting salary between the two groups. The Low assessed valued group had a mean starting salary of $34,115.65 and the high assessed valued group had a mean starting salary of $37,346.67, a difference of about $3,231 between the two groups. The null hypothesis stated that there is no difference between the two groups. The results of the t test yielded a t score of 14.04 and a p value < .001, concluding that higher assessed valued districts are

associated with a statistically significant larger mean starting salary than the low assessed valued group.

The results to research question 1 indicate a near perfect distribution of teacher salaries across the state for the years of this study. Although the dispersion is equitable, the range of starting teacher salaries has continued to expand. When disaggregated, a closer look reveals there is a statistically significant difference between wealthy districts and non-wealthy districts regarding starting teacher salary. Heuer and Stullich (2011) examined nationwide data and determined schools serving low-income students spend fewer state and local dollars on teacher salaries than schools serving higher-income students. The findings of this study echoed the literature and concluded that starting salaries are significantly different between high and low wealth school districts.

Outside of the state funding formula, the successful passage of an operating fund referendum is the only way to increase local taxes with the opportunity to increase teacher salaries. Hile (2019) states that communities with a higher property value can generate additional funding with a lower direct tax impact on its residents, due to how the mil is calculated in Indiana. In his study, some superintendents did not propose operational referendum because of the increasing poverty in the district. This finding supports the predictor variables that Lentz (1999) used in predicting school referenda outcomes: educational culture, tax revolt indicators, capacity to pay indicators and voter turnout indicators. Previous studies have concluded that districts with a higher proportion of college graduates are more likely to pass referendums (Clubb & Traugott, 1972). Similarly, the literature reports high income groups associated with referenda support and low-income districts associated with negative referenda support (Alexander & Bass, 1974). This is not always the case however as Rasinski and Rosenbaum (1987) concluded there was no association

between income and referendum outcomes. Other indicators such as economic recessions and rapidly changing student enrollments in districts (Lentz, 1999). These studies are what lead Cauhorn (2015) to conclude that "The Most Important Number in Education: The Zip Code."

As stated earlier, referendums are relatively new in Indiana, since 2009, and can be used for operational costs or construction projects. The literature review included the 2019 Indiana Legislative Services Agency report, which revealed that average higher teacher salaries are associated with the wealthiest and poorest districts in the state that are able to successfully pass an operational referendum. The third research question differs from the above study, in that it examines starting teacher salaries instead of average teacher salaries.

Research Question #3

Is there a statistically significant difference in starting teacher salaries for districts who have passed a referendum compared to those districts who failed to pass a referendum?

Starting teacher salaries were analyzed during the five years of this study, with a comparison between districts that have successfully passed a referendum and districts that attempted but failed to pass a referendum. In each year districts that passed a referendum had an average starting salary above all districts in the state and districts that failed to pass a referendum. Further analysis examined the change from one school year to the next and compared the change in starting salaries between years. The overall trend shows districts that passed a referendum within the five years of the study, on average, were able to increase starting teacher salaries beyond the average increase of all 289 districts. Districts that attempted, but failed to pass a referendum, were unable, in 3 of the 4 years to match the average increase in starting teacher salaries of the 289 districts.

Compared to the all-district mean, districts that attempted referendums, whether they passed or failed them, had higher teacher salaries. The 5-year trend showed that districts that failed to pass a referendum had a salary of about $423 more than the state average. Within the years of the study, districts that failed to pass a referendum surpassed the overall state average by $635 in 2015 and only $291 in 2016. Districts that passed a referendum also averaged a higher starting salary of $1,541 for the span of the study. In 2015, these districts averaged $947 above the state average and in 2019, this amount grew to $1,952. These finding align with Lusan and Spears (2019) conclusion that districts with referendums have an average higher salary of about $2,300 to $3,500 compared to districts that do not have a referendum.

Hile (2019) states that the current funding formula and property tax caps, that took effect with Public Law 146 in 2008 has created insufficient funding for many districts. Gentry & Hirth (2017) point that the solution to this dilemma is a growing number of Indiana districts turning to an operational referendum as a solution. Both of these insights are reflected in the findings of research question 3. Superintendents that attempt to pass a referendum must hold the political belief that it will pass in an election. Some superintendents do not possess this belief and therefore do not attempt a referendum with their tax base. Current economy, number of household with children attending public school, number of out of district transfer students are all extraneous variables that determine the success or failure of a referendum. It is possible that having favorable indicators from the above variables produce enough confidence in Superintendents to promote a referendum and also increase starting teacher salaries above the state average. Similarly, those districts that do attempt and pass a referendum not only have the belief in the community, but also the resources to institute an increase in starting salaries. Conversely, districts that do not even attempt a referendum, may not have the belief or resources to increase starting teacher salaries.

Sargent (2014) examined the relationship between wealthy districts and the likelihood of passing a referendum. In his study, he concluded that of the 45 districts in Indiana that attempted a referendum after P.L. 146, two-thirds of the districts attempting to pass a referendum had lower than 40% free and reduced lunch. Consequently, wealthier districts had a 55% success rate compared to 44% success rate of non-wealthy districts in his study. This implies districts that attempt a referendum may have the financial resources to ask for a tax hike at the ballot compared to districts that are less wealthy. This implication can be applied to the current study and may explain why there are higher starting teacher salaries in wealthier districts, despite having equitable funding distributions from the state.

Implications of Findings Compared to Literature Review

Research Question 1

The presence of equity in each of the three theoretical frameworks, fiscal neutrality, horizontal equity and vertical equity supports recent equity studies on Indiana's funding formula (Hirth & Eiler, 2012; Sugimoto, 2016; Toutkoushian, 2019). With equity measures met, there is still a statistically significant difference between starting salaries in the 50 wealthiest districts compared to the 50 least wealthy districts. Furthermore, districts that attempt to pass a referendum are associated with higher-than-average starting salaries, with districts that pass a referendum resulting in the significantly higher salaries than those who do not pass a referendum. The implications of this study's findings are meaningful for superintendents, school boards, teachers entering the profession, community members, legislators, and those involved in school finance litigation.

P.L. 146 changed the method of school funding from relying on local property taxes to using state sales tax to finance school districts within the state. Fiscal neutrality asserts that there

should not be a relationship between the education of children and the property wealth that supports the public funding of education (Berne & Stifel, 1999). This study used 3 models comparing the association between variables. Model 1 used the traditional variables of Total Tuition Support and Property Wealth per student. Wood, Honeyman and Bryers (1990) used school operating expenditure per student as the dependent variable and assessed valuation per student as the independent variable while assessing Indiana's fiscal neutrality. The study concluded that with these variables, Indiana had a more fiscally neutral funding formula in 1972-1973 than it did in 1985-1986. Toutkoushian (2008) presented multiple adjustments to Indiana's funding formula to explain the impact on Indiana's fiscal neutrality. Toutkoushian used per-student revenue and assessed valuation per student to measure fiscal neutrality and found correlation levels existing at -.329 with no overlay provisions. The study was based on Indiana's 2004 funding formula which existed before P.L. 146. The findings of the current study resulted in a correlation coefficient ranging from -.058 to .084, using the variables of wealth per student and tuition support per student. 2 additional models examined the relationship between wealth per student and starting teacher salary and also total tuition support per student and starting teacher salary. Both of these resulted in correlation coefficients close to zero, demonstrating a fiscally neutral relationship in each model.

Hirth and Eiler (2012) examined the horizontal equity on the formula distribution before and after P.L. 146 and compared differences in 2001 and 2009. Standard dispersion measures, including mean, median, range, restricted range, federal range ratio, coefficient of variation, Gini Coefficient and McLoone Index were used. The study concluded that the distribution formula before and after the changes of P.L. 146 displayed horizontally equitable statistics on the measures used. Sugimoto (2016) examined the changes in the funding formula for the years 2015-2017 and

concluded that during the years of the study, horizontal equity measures had improved. While the current study examines the spread of teacher salaries across the 289 public school districts using identical dispersion measures, horizontal equity distribution was within the parameters of equitable statistics for all measures.

Vertical equity improved throughout the state during both periods of reductions and increases in the Basic grant and Total Tuition in the years 2009 to 2016 (Sugimoto, 2016). Despite the changes in how students qualify for the Complexity Grant (2014-number of students on free and reduced lunch, 2015-percentage of students receiving free textbooks and 2016-proportion of students enrolled in SNAP, TANF or FCare), vertical equity has improved from the weighted-student approach to a categorical grant approach because it clarifies exactly how much additional funding is being provided for each "at-risk" student (Toutkoushian, 2019b).

The statistical mean was examined in each of the grants within the funding formula and numerical trends echoed the work in the literature (Hirth & Eiler, 2012; Sugimoto, 2016; and Toutkoushian, 2019b). Basic Grant per student increased from $4,639 in 2015 to $5,352 in 2019, but there were sharp decreases in the Complexity grant and Special Education Grant for the years of the study. One reason for the decline in funds per student is the different methods used to classify at-risk students. Regression correlation for vertical equity grants and starting teacher salary were not strong enough to show a strong association. The implication from this assessment is that districts with a high number of "at-risk" students are unable to use the additional funds to increase starting teacher salaries.

Research Question 2

Huer and Stullich (2011) examined 13,225 districts and compared salary expenditures per student in Title 1 schools and non-Title 1 schools. Title 1 schools were representative of student

from lower socioeconomic status. The study concluded that Title 1 elementary schools had teacher salary expenditures that were below the average of non-Title 1 schools in the same district. Patterns in the study were similar for middle school and high school expenditures and echoed previous results. Chamber et al. (2000) examined the disparities in school resources between districts in 1997-98 and concluded that low revenue districts yielded 9% lower teacher salaries than in non-Title 1 schools in the same district ($33,047 vs. $36,163). In high-revenue districts, average teacher salaries were similar in both Title 1 and non-Title 1 schools ($47,438 and $47,855, respectively). Both Title 1 schools and non-Title in high-revenue districts yielded 32% to 43% higher average salaries than in low-revenue districts.

Results in the current study were similar to those obtained by both Chambers (2000) and Huer and Stullich (2011). The average starting salary, when comparing the lowest assessed valued districts with the highest assessed value districts, yielded a difference between $2,586.80 and $3,445.10 between the years of 2015-2016 and 2019-2020. Chambers et al. (2000) examined the intra-district disparities between Title 1 schools and non-Title 1 schools in both low-revenue districts and high revenue districts and noted average salaries between low-revenue districts averaging about $36,163 while high-revenue districts yielding an average of $47,855 in the 1997-1998 school year. The current study did not examine average salaries for districts, rather starting teacher salaries and also found disparities ranging from 7% to 9% between districts with low assessed value compared to districts with high assessed value.

Parrish, T. (1996) analyzed the difference in spending between high-income districts and low-income districts. Among the conclusions, the student-teacher ratios were lowest in districts serving students with the highest and lowest household incomes for the study. Low-income districts in the study were found to have average education “buying power” of $3,782 per students

compared to the average of $5,138 per student in districts with the highest income. Despite the difference in "buying power", districts at both the lowest and highest levels of income had the lowest student/teacher ratios. The implication from these results suggests that both the wealthiest and the least wealthy schools purchase student/teacher ratios very similar, but low-income districts have considerably less "buying power" than high-income districts.

The implications of Parrish (1996) may also hold true in the current study. While Total Tuition Support may meet the horizontal and vertical equity measures, it does not take into consideration how districts might spend the funds differently. Given the value of low student/teacher ratio that low-income districts showed in the Parrish (1996) study, spending decisions in low wealth districts may focus on the quantity of teachers rather than the salary level. Administrators have the option of using their funds to decrease the student teacher ratio, increase salaries or to purchase instructional resources to supplement instruction. Given the limited resources and unlimited wants districts with different student populations will have a different opportunity cost.

Research Question 3

In 2019, there were 3,175 new to teaching hires in the state of Indiana (IEERB, 2020). When comparing starting teacher salaries for districts who have passed operating referendums, compared to those that attempted and failed during the years of 2015-2016 to 2019-2020, both districts that attempted and those who passed had a higher average starting salary. Districts that attempted but failed averaged from $291 to $635 above the state average, while districts who passed a referendum in the 5-year span of the study averaged between $947 to $1,952 above the state average. The focus of this study examined starting teacher salaries but complemented the results of the Lusan and Spears (2019), which concluded that school corporations that have higher

average teacher salaries were found in the wealthiest and poorest areas of the state. Their findings assert that during the 2013-2017 school years, school corporations which passed an operating referendum had higher average teacher salaries than those who did not pass operating referendums. The difference between the two groups had districts which passed a referendum having higher salaries of $2,768 to $3,846 above the average salaries of districts that did not pass an operating referendum.

Comparing the growth in salaries between districts that passed an operating referendum and those who did not, Lusan and Spears (2019) found that districts that passed an operating referendum saw average salaries increases by 1% to 4.2% higher than districts that did not pass an operating referendum. In the current study, districts that passed an operating referendum had a positive difference of 1.8 to 1.4 above the average increase of all districts in the state (n =289). Reasons wealthier districts may find it necessary to pass a referendum is the relatively low state funding due to their low complexity grant (Lusan & Spears, 2019). Even though the complexity grant is the second largest grant in state tuition, the correlation between starting teacher salaries and complexity index was not strong. When analyzing the relationship between the complexity index and starting teacher salaries in the current study, correlation coefficients ranged from .01 to .09 in the years of this study. Less wealthy districts do receive more funds from the complexity grant, however decreasing ADM and higher tax cap losses may affect the ability to increase teacher salaries (Lusan & Spears, 2019).

Policy Implications and Recommendations

The statistical outcome of data analysis for the equity of Indiana's education funding formula and the relationship between district wealth, referenda and starting teacher salaries support several recommendations for Indiana policy and practice in funding the public schools. It is

recommended that the Indiana Legislature provide for a comprehensive review of the funding formula that would include analysis of the equity of the formula and the indicators used in qualifying for the complexity grant. Categorical grant funding should remain instead of weighted formulas to determine at-risk funding for students qualifying based on socioeconomic status. The current formula is fiscally neutral and meets both horizontal and vertical equity standards. A suggestion would be to change the qualifications from students that qualify from TANF/SNAP or are foster care to students who participate in the National Lunch Program. The majority of the states use a lunch program qualification and in 2019, only 3 states used TANF/SNAP as a metric for at-risk funding (Toutkoushian, 2019b). Indiana did use lunch programs to qualify students in 2009 but changed it in 2014 when the funding formula changed from weighted to categorical. Maintaining categorical funding with a metric of a national lunch program would allow cross state comparisons for future research.

Outside of changing the qualifications of receiving at-risk funding to a metric that is more universal, it is recommended that the proportion of at-risk funding remain proportionate to the students that qualify. At risk funding made up 16.4% of total funding in 2015, or about $1,077 per student in Indiana. That percentage decreased to 9.8% in 2019 and only about $660 per student. Maintaining a consistent proportion of dollars reserved for at risk students will aid administrators in determining future costs and hiring decisions. State funding is typically used to hire more teachers, reduce the class size, raise teacher salaries and add support services. When the percentage of funding decreases by more than 35% in aid per student, calculating revenue forecasting is much more difficult when the numbers are not based on students who qualify.

Since wide differences in property values affect a school district's ability to generate revenue through a referendum, the funding formula must be adjusted to reflect these differences.

Currently there are no provisions for the Cost-of-Living Index in each district. The Indiana Department of Education should update current statistics to account for the cost of living in each district within the state. Horizontal equity increased each year of the study and was nearly perfect in 2019. The variation between cost of living between districts is currently not considered and results in misleading indicators, namely that each district is getting an equal basic grant despite large differences in property wealth and Cost-of-Living between districts. It is recommended that every two years, an independent analysis of the cost of living be compared to the distribution of the funding formula. The purpose of this would be to keep the funding system updated to understand how current salary schedules compare to the Cost-of-Living Index to ensure that funds required for attracting and retaining highly qualified teachers are commiserate with the cost of living in each district.

Lusan and Spears (2019) revealed that districts with the highest wealth and lowest wealth had the greatest success in passing a referendum throughout the state. Some districts do not even attempt to promote a referendum because of declining enrollment or poverty factors (Hile, 2019). As shown in this study, districts that attempt referendums have higher than average starting salaries than the rest of the state, with districts that pass a referendum having the highest starting salaries in the comparison. To encourage districts that need additional money but have not attempted or have not succeeded in passing a referendum, additional aid should be considered for districts that have attempted and failed to pass a referendum.

Indiana has a relatively high ratio of students to teacher and a relatively low ratio of students to non-teachers (Toutkoushian, 2019b). To encourage districts to promote higher salaries instead of additional staff, bonuses could be established for districts who have failed to pass a referendum two consecutive years in a row within a 5-year window. Funds would be designated

for instructional staff and increased salaries for instructional staff. This would provide support to many of the districts that realize a referendum is required to meet financial needs but is not supported by voters.

Suggestions for Future Research

The analysis of the school funding formulas in Indiana in this research study revealed current distributions meet the standard of fiscal neutrality, horizontal equity and vertical equity in starting teacher salaries. A notable difference was seen when districts with the highest wealth were compared to the districts with the lowest wealth. Starting teacher salaries were significantly higher in high wealth districts within the state. What was not considered was the relationship between high assessed value and cost of living. Future research should assess to determine if a correlation exists between the Cost-of-Living Index of each district and the starting salary. Understanding the relationship between Cost-of-Living and teacher salaries will provide a more accurate depiction of the needs of future school funding.

School referenda also proved to positively increase starting teacher salaries in this study. Lusan and Spear (2019) confirmed that the greatest and least wealthy districts initiated and passed the most referendums. The current study complemented the findings and found that not only average teacher salaries increased, but starting teacher salaries also took a positive jump when operating referendums were passed. Future research should inquire into the reasons a referendum has been attempted in less than half the state's counties. With the passage of P.L. 146, the burden to acquire additional funds through a referendum has been placed on school superintendents. Understanding the barriers, the superintendents face from school boards and voters will bring

greater clarity to the legislature on the realities of expecting districts to be responsible for providing funds beyond the tuition support to finance construction and operating expenses.

Summary

The purpose of this study was to assess the funding formula in Indiana through the framework of fiscal neutrality, horizontal equity and vertical equity when examining how teacher salaries are distributed throughout the state. Additional analysis examined the relationship between the wealthiest districts and the least wealthy districts with regards to starting teacher salary. Fiscal neutrality states that there should not be a relationship between the education of children and the property wealth in that particular district. P.L. 146 removed property tax as a source of funding for school districts and placed the burden on the state through sales tax. While this change led to fiscally neutral statistics, a closer look reveals significant differences in starting teacher salaries between the wealthiest districts compared to the least wealthy districts. One possible explanation for this difference is the historic success of wealthy districts being able to pass an operating referendum (Lusan & Spear, 2019). Districts that passed a referendum are able to have significantly higher starting salaries than the state average. Furthermore, the current funding formula does not show any strong correlations between assessed value or categorical grants and starting teacher salaries. More research is needed to determine why districts with high wealth are able to successfully pass referendums more frequently than other school districts with less wealth. Consideration from the legislature on additional aid to districts who cannot pass a local referendum is necessary, with specific provisions on adjusting the salary relative to the Cost-of Living Index for the district.

REFERENCES

Addonizio, M.F. (2003). School finance reform, education adequacy, and urban public schools. *School Business Affairs*, 69(5), 11-18. https://eric.ed.gov/?id=EJ666101

Alexander, A. J., & Bass-Golod, G. V. (1974). Schools, taxes, and voter behavior: An analysis of school district property tax elections. *RAND Corporation*. https://www.rand.org/pubs/reports/R1465.html

Augenblick, J. (1991). School finance: a primer. A practical guide to the structural components of, alternative approaches to, and policy questions about state school finance systems. https://eric.ed.gov/?id=ED342132

Augenblick, J. G., Myers, J. L., & Anderson, A. B. (1997). Equity and adequacy in school funding. *The Future of Children*, 63-78. https://www.jstor.org/stable/1602446

Baker, B. D., & Friedman-Nimz, R. (2003). Gifted children, vertical equity, and state school finance policies and practices. *Journal of Education Finance*, *28*(4), 523-555. https://www.jstor.org/stable/40704183

Baker, Bruce D. (2016). Does money matter in education? *Albert Shanker Institute.* https://files.eric.ed.gov/fulltext/ED563793.pdf

Baker, B. D. (2017). How money matters for schools. *Palo Alto, CA: Learning Policy Institute*. https://learningpolicyinstitute.org/sites/default/files/product-files/How_Money_Matters_REPORT.pdf

Barton, D. (2013). An assessment of Texas school finance reform: The health of school funding since 2006. *Doctoral Dissertation*. https://ttu-ir.tdl.org/bitstream/handle/2346/50716/Barton_Dustin_Diss.pdf;sequence=1

Berne, R., & Stiefel, L. (1984). The measurement of equity in school finance: Conceptual, methodological, and empirical dimensions. *Johns Hopkins University Press.* https://www.sciencedirect.com/science/article/abs/pii/027277578690097X

Berne, R., & Stiefel, L. (1999). Concepts of school finance equity: 1970 to the present. *Equity and adequacy in education finance: Issues and perspectives*, 7-33. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.950.6135&rep=rep1&type=pdf#page=18

Bonner ex. Rel. Bonner v. Daniels 907 N.E. 2d 516 (Ind. 2009). https://casetext.com/case/bonner-ex-rel-bonner-v-daniels

Borman, G. D., & Dowling, N. M. (2008). Teacher attrition and retention: A meta-analytic and narrative review of the research. *Review of Educational Research, 78*(3), 367-409. https://www.jstor.org/stable/40071133

Bowling, S. J., Boyland, L. G., & Kirkeby, K. M. (2019). Property tax cap policy in Indiana and implications for public school funding equity. *International Journal of Education Policy and Leadership*, *15*(9). https://doi.org/10.22230/ijepl.2019v15n9a881

Boyland, L. G., & Jarman, D. (2012). The impacts of budget reductions on Indiana's public schools. *Current Issues in Education,* 14(2), 1-11. https://pdfs.semanticscholar.org/9f6e/14d15f5b7d253d1a21563814cf7e7da907f2.pdf

Candelaria, C. A., & Shores, K. A. (2019). Court-ordered finance reforms in the adequacy era: Heterogeneous causal effects and sensitivity. *Education Finance and Policy, 14*(1), 31-60. https://cepa.stanford.edu/sites/default/files/cofr-efp.pdf

Carr, M. C., & Fuhrman, S. H. (1999). The politics of school finance in the 1990s. *Equity and Adequacy in Education Finance: Issues and Perspectives*, 136-174. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.950.6135&rep=rep1&type=pdf#page=147

Carver-Thomas, D., & Darling-Hammond, L. (2017). Teacher turnover: Why it matters and what we can do about it. https://healthyplacesindex.org/wp-content/uploads/2017/12/2017_learning_policy_inst_teacher_turnover.pdf

Cauhorn, J. J. (2015). The search for the magic formula: History of Illinois school funding reform. *University of Pennsylvania Journal of Law and Social Change, 18*(3), 209-250. https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1181&context=jlasc

Chambers, J., Lieberman, J., Parrish, T., Kaleba, D., Van Campen, J., & Stullich, S. (2000). Study of education resources and federal funding: Final report 2000 Washington. U.S. *Department of Education, Planning and Evaluation Service.* https://files.eric.ed.gov/fulltext/ED445177.pdf

Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2010). Teacher credentials and student achievement in high school a cross-subject analysis with student fixed effects. *Journal of Human Resources, 45*(3), 655-681. https://www.nber.org/papers/w13617.pdf

Clubb, J. M., & Traugott, M. W. (1972). National patterns of referenda voting: The 1968 election. *People and Politics in Urban Society*, *6*, 137-169.

Cohen, L., Manion, L. & Morrison, K. (2007). Research methods in education. *Routledge.* **https://doi.org/10.1111/j.1467-8527.2007.00388_4.x**

Coleman, J. (1968). The concept of equality of educational opportunity. *Harvard Educational Review*, 38(1), 7-22. https://files.eric.ed.gov/fulltext/ED015157.pdf

Condron, D. J. (2017). The waning impact of school finance litigation on inequality in per student revenue during the adequacy era. *Journal of Education Finance*, *43*(1), 1-20. https://muse.jhu.edu/article/678325

Coons, J. E., Clune, W. H., III, & Sugarman, S. D. (1970). Private wealth and public education. *Cambridge, MA: Harvard University Press*. https://agris.fao.org/agris-search/search.do?recordID=US201300462523

Darling-Hammond, L. (2015). The flat world and education: How America's commitment to equity will determine our future. *Teachers College Press*. https://www.aasa.org/uploadedFiles/Publications/Journals/AASA_Journal_of_Scholarship_and_Practice/Summer2012_JSPFINAL_v2.pdf#page=33

DLGF. (2021). Department of local government finance. https://www.in.gov/dlgf/

Dolton, P., & Klaauw, W. V. D. (1999). The turnover of teachers: A competing risks explanation. *Review of Economics and Statistics*, *81*(3), 543-550. https://ideas.repec.org/a/tpr/restat/v81y1999i3p543-550.html

Ellis, L. D. (2010). A call to leadership: The first fifty years of the Indiana association of public-school superintendents. *Purdue University Press.* https://books.google.com/books?hl=en&lr=&id=GYcM52u1BWsC&oi=fnd&pg=PR9&dq=Ellis,+L.+D.+(2010).+A+Call+to+Leadership:+The+First+Fifty+Years+of+&ots=GyxinIqk_d&sig=82QjcX9NupduNwkM3ncqDwdHE6Q#v=onepage&q&f=false

Figlio, D. N. (1997). Teacher salaries and teacher quality. *Economics Letters*, *55*(2), 267-271. https://doi.org/10.1016/S0165-1765(97)00070-0

Figlio, D. N. (2002). Can public schools buy better-qualified teachers? *ILR Review*, *55*(4), 686-699. https://www.jstor.org/stable/3270629

Gall, M.D., Gall, J.P., & Borg, W.R. (2007). An introduction to educational design research. *East*, *129*. https://www.pearson.com/us/higher-education/program/Gall-Educational-Research-An-Introduction-8th-Edition/PGM63179.html?tab=overview

Gannon v. State, 420 P .3d 477 (2018). https://law.justia.com/cases/kansas/supreme-court/2019/113267.html

Geiger, T., & Pivovarova, M. (2018). The effects of working conditions on teacher retention. *Teachers and Teaching*, *24*(6), 604-625. https://doi.org/10.1080/13540602.2018.1457524

Gentry, P. L. (2016). A new reality: Funding formula changes and property tax caps and their effects on the role of the school superintendent in the state of Indiana. https://docs.lib.purdue.edu/open_access_dissertations/651

Gentry, P. L. & Hirth, M.A. (2017). How property tax caps and funding formulas have changed the role of the school superintendent in Indiana. *Education Leadership Review of Doctoral Research*, 4, 17-30. https://eric.ed.gov/?id=EJ1144779

George, D. and Mallery, P. (2010) SPSS for windows step by step: A simple guide and reference 17.0 update. *10th Edition, Pearson, Boston.* https://wps.ablongman.com/wps/media/objects/385/394732/george4answers.pdf

Given, L. M. (2008). The Sage encyclopedia of qualitative research methods. *Sage publications.* DOI: http://dx.doi.org/10.4135/9781412963909.n329

Glenn, W. J., Griffith, M., Picus, L. O., Odden, A., & Odden, P. (2015). Analysis of school finance equity and local wealth measures in Maryland. *Augenblick, Palaich & Associates*, 22. http://www.marylandpublicschools.org/Documents/adequacystudy/APA-POA-MarylandWealthEquityReport-Rev121115.pdf

Goldstein, S. R. (1971). Interdistrict inequalities in school financing: A critical analysis of Serrano v. Priest and its progeny. *U. Pa. L. Rev., 120*, 504. https://heinonline.org/HOL/LandingPage?handle=hein.journals/pnlr120&div=27&id=&page=

Greenwald, R., Hedges, L. V., & Laine, R. D. (1996). The effect of school resources on student achievement. *Review of Educational Research, 66*(3), 361-396. https://doi.org/10.3102%2F00346543066003361

Guthrie, J. W., & Rothstein, R. (1999). Enabling 'adequacy' to achieve reality: Translating adequacy into state school finance distribution arrangements. *Equity and Adequacy in Education Finance: Issues and Perspectives*, 209-259. https://books.google.com/books?hl=en&lr=&id=eczNFJ-2OocC&oi=fnd&pg=PA209&dq=Guthrie,+J.+W.,+%26+Rothstein,+R.+(1999).+Enabling+%E2%80%98adequacy%E2%80%99+to+achieve+&ots=c2utVkF7Nf&sig=-f5T2NQ3-LYLwPlE43PxzS8Q4o4#v=onepage&q&f=false

Hamilton, L. S., Stecher, B. M., & Yuan, K. (2009). Standards-based reform in the United States: History, research, and future directions. In *Santa Monica, CA: RAND Corporation, RP-1384. As of June*. https://apps.dtic.mil/dtic/tr/fulltext/u2/a496750.pdf

Hamilton Southeastern Schools et al. v. Daniels, Hamilton Superior Court Cause No. 29 DOI 1002 PL 198, filed February 10, 2010.

Hanushek, E. A. (1986). The economics of schooling: Production and efficiency in public schools. *Journal of Economic Literature*, *24*(3), 1141-1177. https://www.jstor.org/stable/2725865

Hanushek, E. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis*, *19*(2), 141-164. https://doi.org/10.3102%2F01623737019002141

Hanushek, E. A., & Lindseth, A. A. (2009). Schoolhouses, courthouses, and statehouses: Solving the funding-achievement puzzle in America's public schools. *Princeton University Press.* https://www.worldcat.org/title/schoolhouses-courthouses-and-statehouses-solving-the-funding-achievement-puzzle-in-americas-public-schools/oclc/1034974868

Hanushek, E. A. (2016). School human capital and teacher salary policies. *Journal of Professional Capital and Community,* 1(1), 23-40. http://dx.doi.org/10.1108/JPCC-07-2015-0002

Heuer, R., Stullich, S. (2011). Comparability of state and local expenditures among schools within districts a report from the study of school-level expenditures. *ERIC Clearinghouse*. https://www2.ed.gov/rschstat/eval/title-i/school-level-expenditures/school-level-expenditures.pdf

Hile, D.G. (2019). Superintendent perceptions of the effects of the Indiana school funding formula on Indiana's small, rural school districts. https://scholar.googleusercontent.com/scholar?q=cache:3grf3vAuPRIJ:scholar.google.com/+superintendent+perceptions+of+the+effects+on+the+Indiana&hl=en&as_sdt=0,15

Hill, S.A., & Kiewiet, D. R. (2015). The impact of state supreme court decisions on public school finance. *The Journal of Law, Economics, & Organization*, 31(1), 61-92. https://www.jstor.org/stable/pdf/43774402

Hiller, S.C., & Spradlin, T.E. (2010). School referenda in Indiana. *Center for Evaluation and Policy, 8(2).* https://scholarworks.iu.edu/dspace/bitstream/handle/2022/23250/PB_V8N2_Summer_2010_EPB.pdf?sequence=1

Hiller, S.C. (2019, May 16). Database of Indiana school referenda. *Center for Evaluation, Policy, & Research.* https://cepr.indiana.edu/disr.html

Hime, S., & Maiden, J. (2017). An examination of the fiscal equity of current, capital, and crossover educational expenditures in Oklahoma school districts. http://www.educationfinance.us/assets/Hime-and-Maiden-Full-Report.pdf

Hinkle, D.E., Wiersma, W., & Jurs, S.G. (2003). Rule of thumb for interpreting the size of a correlation coefficient. *Applied Statistics for the Behavioral Sciences*, 5.

Hirth, M. A., & Eiler, E. (2005). Horizontal and vertical equity analysis of Indiana's 2001 reward-for-effort formula. *Journal of Education Finance*, *30*(4), 382-398. https://www.jstor.org/stable/40704242

Hirth, M.A., & Eiler, E. (2012). Indiana's formula revisions and Bonner v Daniels: An analysis of equity and implications for school funding. *Educational Considerations*, *39*(2), 38-43. DOI:10.4148/0146-9282.1112

Hirth, M.A., & Lagoni, C. (2014). A demographic analysis of the impact of property tax caps on Indiana school districts. *In Selected National Education Finance 2013 Conference Papers* (p. 8). https://doi.org/10.4148/0146-9282.1067

Holscher, M. R. (1990). Funding Indiana's public schools: A question of equal and adequate educational opportunity. *Val. UL Rev.*, *25*, 273-310. https://scholar.valpo.edu/vulr/vol25/iss2/5/

Hussar, W. J. (2000). Trends in disparities in school district level expenditures per pupil. *DIANE Publishing*. https://books.google.com/books?hl=en&lr=&id=_5EAAAAYAAJ&oi=fnd&pg=PA1&dq=Hussar,+W.+J.+(2000).+Trends+in+disparities&ots=gLDCbHpp89&sig=8de22JvdfxebjPMgVQSfCavaYnU#v=onepage&q&f=false

Hyman, J. (2017). Does money matter in the long run? Effects of school spending on educational attainment. *American Economic Journal: Economic Policy*, *9*(4), 256-80. https://www.aeaweb.org/articles?id=10.1257/pol.20150249

IBJ. (2016). Let supply/demand shape teacher pay: STEM educators should earn more. *Indianapolis Business Journal*, 36(5), 12. https://www.ibj.com/articles/57064-editorial-let-supplydemand-shape-teacher-pay

IDOE. (2021). Indiana department of education. https://www.doe.in.gov/finance.

IEERB. (2020). Indiana teacher compensation: Report for the 2019-20 school year. Indiana Education Employment Relations Board. (2020). https://www.in.gov/ieerb/files/Indiana%20Teacher%20Compensation%20Report%20for%20the%202019_20%20School%20Year.pdf

IEERB. (2021). Indiana education employment relations board. https://www.in.gov/ieerb/

Imazeki, J. (2005). Teacher salaries and teacher attrition. *Economics of Education Review*, *24*(4), 431-449. https://doi.org/10.1016/j.econedurev.2004.07.014

Ingersoll, R. M., May, H., & Collins, G. (2019). Recruitment, employment, retention and the minority teacher shortage. *Education Policy Analysis Archives*, *27*(37). https://doi.org/10.14507/epaa.27.3714

Jacob, A., Vidyarthi, E., & Carroll, K. (2012). The irreplaceables: Understanding the real retention crisis in America's urban schools. *TNTP*. https://files.eric.ed.gov/fulltext/ED533959.pdf

Jarman, D. W., & Boyland, L. G. (2011). The impacts of budget reductions on Indiana's public schools: The impact of budget changes on student achievement, personnel, and class size for public school corporations in the state of Indiana. *Current Issues in Education*, *14*(2). https://scholar.google.com/scholar?hl=en&as_sdt=0%2C15&q=Jarman%2C+D.+W.%2C+%26+Boyland%2C+L.+G.+%282011%29.+The+Impacts+of+Budget+Reductions+&btnG=

Jay Classroom Teachers Association v. Jay School Corporation and Indiana Education Employment Relations Board, 49S05-1603-PL-113 *Indiana Supreme Court* (2016). https://caselaw.findlaw.com/in-supreme-court/1743354.html

Johnson, C. E., & Lehnen, R. G. (1993). Reforming Indiana's school finance formula, 1973-1990: A case of unanticipated outcomes. *Journal of Education Finance*, *18*(3), 264-280. https://www.jstor.org/stable/40703806

Katz, N., Apfelbaum, K. W., Frank, S., & Miles, K. H. (2018). Low teacher salaries 101. *Education Resource Strategies.* https://www.erstrategies.org/cms/files/3990-low-teacher-salaries-101-final-updated-621.pdf

King, R. A., Swanson, A. D., & Sweetland, S. R. (2005). Designing finance structures to satisfy equity and adequacy goals. *Education Policy Analysis Archives, 13*, 1-26. https://epaa.asu.edu/ojs/article/viewFile/120/246

Kohn, A. (1999). Punished by rewards: The trouble with gold stars, incentive plans, a's, praise, and other bribes. *Houghton Mifflin Harcourt.* https://www.alfiekohn.org/punished-rewards/

Kyriakides, L., Stylianou, A., & Menon, M. E. (2019). The link between educational expenditures and student learning outcomes: Evidence from Cyprus. *International Journal of Educational Development, 70*, 102081. https://doi.org/10.1016/j.ijedudev.2019.102081

Lagoni, C., & Purdue University. Educational Studies. (2011). The effects of property tax caps in public law 146-2008 on Indiana school corporations based on demographics. *Dissertation Abstracts International* 73-01A. https://www-proquest-com.ezproxy.lib.purdue.edu/docview/901113913

Lake Central v State of Indiana, 56 COL 8703 CP 8 (1987).

Lankford, H., & Wyckoff, J. (1997). The changing structure of teacher compensation, 1970–1994. *Economics of Education Review, 16*(4), 371-384. https://doi.org/10.1016/S0272-7757(96)00066-0

Lehnen, R. G., & Minick, M. B. (1994). Differing perspectives on teacher pay in Indiana: Toward social equity for women and children. *Public Administration Quarterly, 18,* 279–297. https://www.jstor.org/stable/40861627

Lentz, C. (1999). Predicting school referenda outcomes: Answers from Illinois. *Journal of Education Finance,* 24(4), 459-482. https://www.jstor.org/stable/40704078

Lockridge, C., & Maiden, J. (2014). The tangible impact of school finance litigation. *Journal of Education Finance*, 39(4), 344-369. https://www.jstor.org/stable/24459267

Lows, R. L. (1984). Measurement of inequality: The gini coefficient and school finance studies. *Journal of Education Finance*, 10(1), 83-94.

Lusan, D., & Spears, A. (2019). Interim study committee on education. *Legislative Services Agency*. http://iga.in.gov/documents/bac298d6

Martinez v. State of New Mexico (2018). 1st Dist. Court of New Mexico, D-101-CV-2014-00793 https://www.maldef.org/wp-content/uploads/2018/11/2018-07-20d-101-cv-2014-00793_Decision_and_Order-1.pdf

McDonald, J. D., Hughes, M. F., & Ritter, G. W. (2004). School finance litigation and adequacy studies. *UALR L. Rev.*, *27*, 69. https://heinonline.org/HOL/LandingPage?handle=hein.journals/ualr27&div=11&id=&page=

McInerny, C. (2015, April 9). Changes to funding formula still leaving many districts in the red. State Impact Indiana. Retrieved from https://indianapublicmedia.org/stateimpact/2015/03/04/funding-formula-leave-districts-red/

Michael, R. S., Spradlin, T. E., & Carson, F. R. (2009). Changes in Indiana school funding. education policy brief. *Center for Evaluation and Education Policy, Indiana University 7(2)*. https://eric.ed.gov/?id=ED507076

Monsees, K. (2012). Equity measures of the Missouri SB287 school funding formula (*Doctoral dissertation, University of Missouri--Columbia*). https://doi.org/10.32469/10355/33090

Murnane, R., & Cohen, D. (1986). Merit pay and the evaluation problem: Why most merit pay plans fail and a few survive. *Harvard Educational Review*, *56*(1), 1-18. https://doi.org/10.17763/haer.56.1.l8q2334243271116

Murnane, R. J., & Olsen, R. J. (1989). The effect of salaries and opportunity costs on duration in teaching: Evidence from Michigan. *The Review of Economics and Statistics*, 347-352. https://www.jstor.org/stable/1926983

Murphy, G. J. (2012). Evidence-based adequacy model for school funding: Success rates in Illinois schools that meet targets. *Illinois State University*. https://search.proquest.com/openview/5737fab5c8f42e0661d4f03bb2bf4d91/1?pq-origsite=gscholar&cbl=18750&diss=y

Murray, S. E., Evans, W. N., & Schwab, R. M. (1998). Education-finance reform and the distribution of education resources. *American Economic Review*, 88(4), 789-812. https://www.jstor.org/stable/117006

National Commission on Excellence in Education. (1983). A nation at risk: The imperative for educational reform. *The Elementary School Journal*, *84*(2), 113-130. https://www.jstor.org/stable/20442569

Odden, A. (2003). Equity and adequacy in school finance today. *Phi Delta Kappan*, *85*(2), 120-125. https://doi.org/10.1177%2F003172170308500206

Odden, A., & Picus, L. (2019). School finance: A policy perspective (6th ed.). *McGraw-Hill Education*. https://www.mheducation.com/highered/product/school-finance-policy-perspective-odden-picus/M9781259922312.html

OECD (2017). The funding of school education: Connecting resources and learning. *OECD Reviews of School Resources, OECD* Publishing. https://doi.org/10.1787/9789264276147-en.

Ogle, G. S. (2007). Historical review of financial equity in Missouri: 1993 foundation formula and amendments (*Doctoral dissertation, University of Missouri--Columbia*). https://doi.org/10.32469/10355/4660

Ondrich, J., Pas, E., & Yinger, J. (2008). The determinants of teacher attrition in upstate New York. *Public Finance Review*, *36*(1), 112-144. https://doi.org/10.1177/1091142106294716

OECD. (2017). The funding of school education: Connecting resources and learning. *Organization for Economic Co-operation and Development Publishing*. https://doi.org/10.1787/9789264276147-en.

Orozco, C. E. (2013). Rodriguez v. San Antonio ISD. *Handbook of Texas Online*. https://www.tshaonline.org/handbook/entries/rodriguez-v-san-antonio-isd

Parrish, T. (1996). Do rich and poor districts spend alike? *National Center for Education Statistics*, ,97(916). https://files.eric.ed.gov/fulltext/ED402696.pdf

Peterson, G. (2010). An analysis of the equity of Utah's public school funding system. http://dx.doi.org/10.34917/2206005

Picus, L. O., Odden, A., & Fermanich, M. (2004). Assessing the equity of Kentucky's SEEK formula: A 10-year analysis. *Journal of Education Finance*, *29*(4), 315-335. https://www.jstor.org/stable/40704213\

Privitera, G. J. (2017). Statistics for the behavioral sciences. *Sage Publications.* https://us.sagepub.com/en-us/nam/statistics-for-the-behavioral-sciences/book255138

Rasinski, K. A., & Rosenbaum, S. M. (1987). Predicting citizen support of tax increases for education: A comparison of two social psychological perspectives. *Journal of Applied Social Psychology*, *17*(11), 990-1006. **https://doi.org/10.1111/j.1559-1816.1987.tb00302.x**

Rebell, M. A. (1999). Fiscal equity litigation and the democratic imperative. *Equity & Excellence*, *32*(3), 5-18. https://doi.org/10.1080/1066568990320302

Rebell, M. A. (2009). Courts and kids: Pursuing educational equity through the state courts. *University of Chicago Press.* https://www.journals.uchicago.edu/doi/10.1086/660759

Rebell, M. A. (2017). The courts' consensus: Money does matter for educational opportunity. *The ANNALS of the American Academy of Political and Social Science*, *674*(1), 184–198. https://doi.org/10.1177/0002716217732311

Rebell, M. A. (2018). School funding: The role of the courts. *State Education Standard, 18*(3), 5-10. https://eric.ed.gov/?id=EJ1191858

Rice, J. K. (2013). Learning from experience? Evidence on the impact and distribution of teacher experience and the implications for teacher policy. *Education Finance and Policy*, *8*(3), 332-348. https://eric.ed.gov/?id=EJ666101

Rickman, D. S., Wang, H., & Winters, J. V. (2017). Relative teacher salaries and the decision to teach. *Contemporary Economic Policy*, *35*(3), 542-550. https://doi-org.ezproxy.lib.purdue.edu/10.1111/coep.12195

Robinson v. Cahill, 303 A. 2d 297 (1973). https://law.justia.com/cases/new-jersey/supreme-court/1973/62-n-j-473-0.html

Rodriguez, G. M. (2004). Vertical equity in school finance and the potential for increasing school responsiveness to student and staff needs. *Peabody Journal of Education*, *79*(3), 7-30. https://doi.org/10.1207/s15327930pje7903_2

Rose v. Council for Better Educ., Inc., 790 S.W.2d 186, 212 (Ky. 1989). https://www.courtlistener.com/opinion/1577303/rose-v-council-for-better-educ-inc/

San Antonio Independent School District v. Rodriguez, 411 U.S. 1 (1973). https://supreme.justia.com/cases/federal/us/411/1/

Sargent, A.C. (2014). Factors that affect the outcome of a general fund referendum in Indiana. *Open Access Dissertations.* 357. https://docs.lib.purdue.edu/open_access_dissertations/357

Scribner, J. D., Chu, M., & Milne, M. (1973). School finance reform: The aftermath of Serrano v. Priest. *Education and Urban Society*, *5*(2), 133-148. https://doi.org/10.1177/001312457300500202

Serrano v. Priest, 487 P.2d 1241(1971). [Serrano I] https://law.justia.com/cases/california/supreme-court/3d/18/728.html

Simon-Kerr, J. A., & Sturm, R. K. (2010). Justiciability and the role of courts in adequacy litigation: Preserving the constitutional right to education. *Stan. JCR & CL*, *6*, 83. https://heinonline.org/HOL/LandingPage?handle=hein.journals/stjcrcl6&div=6&id=&page=

Slaby, A. (2019, November 19). 'We will fight': Thousands of red for ed teachers rallied inside and outside Statehouse. https://www.indystar.com/story/news/education/2019/11/19/red-for-ed-action-day-march-indiana-statehouse/4178392002/

Stevens, C. (2020, August 10). Best states for teacher pay in 2020. https://www.business.org/hr/employees/best-us-states-for-teachers/

Stokes, K. (2014). How Indiana's property tax caps impact school district's bottom line. State impact Indiana. Retrieved from https://indianapublicmedia.org/stateimpact/2014/02/04/video-indianas-property-tax-caps-impact-school-districts-bottom-lines/

Sugimoto, T. (2016). Equity analyses of the 2015-2017 Indiana school funding formula. *Center for Evaluation & Education Policy.* https://www.in.gov/sboe/files/CEEP%20School%20Finance%20Report%20(2015-17%20Biennium).pdf

Sutton, J. S. (2008). San Antonio independent school district v. Rodriguez and its aftermath. *Virginia Law Review*, 94(8), 1963-1986. https://www.jstor.org/stable/25470608

Taylor, L. L., Baker, B. D., & Vedlitz, A. (2005). Measuring educational adequacy in public schools. *The Bush School of Government & Public Service, Texas A&M University*. https://www.academia.edu/17668467/Measuring_educational_adequacy_in_public_schools

Teacher pay: Find the average salary in every Indiana school district. (2018). https://databases.usatodaynetwork.com/indystar/indiana-teachers-pay

Theobald, N. D., Bull, B., & Vesper, N. (1997). Indiana's reward-for-effort school funding formula: Issues and options. *Educational Considerations, 25*(1), 10. https://eric.ed.gov/?id=EJ596967

Thompson, D.C., & Crampton, F. E. (2002). The impact of school finance litigation: A long view. *Journal of Education Finance, 28*(1), 133-172. www.jstor.org/stable/40704161

Toutkoushian, R. K., & Michael, R. S. (2004). Indiana's foundation program: A conceptual introduction. *Center for Evaluation and Education Policy, Indiana University*. https://files.eric.ed.gov/fulltext/ED488907.pdf

Toutkoushian, R. K., & Michael, R. S. (2007a). What is the complexity index? *Center for Evaluation and Education Policy, Indiana University*. https://www.semanticscholar.org/paper/What-is-the-Complexity-Index-Toutkoushian-Michael/d5fae334181a99e863550777b7d615c7e97f14e4?p2df

Toutkoushian, R. K., & Michael, R. S. (2007b). An alternative approach to measuring horizontal and vertical equity in school funding. *Journal of Education Finance*, 32(4), 395-421. https://www.jstor.org/stable/40704304

Toutkoushian, R. K., & Michael, R. S. (2008). The impacts of school funding formula modifications on equity, fiscal neutrality, and adequacy. *Journal of Education Finance*, 33(4), 352-380. https://www.jstor.org/stable/pdf/40704336.pdf

Toutkoushian, R. K. (2019a). Education funding and teacher compensation in Indiana: Evaluation and recommendations. https://www.ista-in.org/uploads/Indiana-Report-on-Funding-for-K-12-Education.pdf

Toutkoushian, R. K. (2019b). Funding for at-risk students in Indiana: Issues and recommendations. https://cdn.ymaws.com/www.indiana-asbo.org/resource/resmgr/pdf/indiana_complexity_index_rep.pdf

Tractenberg, P. L. (1974). New Jersey: Robinson v. Cahill: The "thorough and efficient" clause. *Law and Contemporary Problems*, *38*(3), 312-332. https://www.jstor.org/stable/1191041

Walker, E. M. (2005). *Educational adequacy and the courts: A reference handbook*. Abc-clio. https://search.library.uq.edu.au/permalink/f/l3gdeh/61UQ_ALMA2186213020003131

Wenglinsky, H. (1997). How money matters: The effect of school district spending on academic achievement. *Sociology of Education*, 70(3), 221-237. https://www.jstor.org/stable/2673210

Wood, R. C., Honeyman, D. S., & Bryers, V. (1990). Equity in Indiana school finance: A decade of local levy property tax restrictions. *Journal of Education Finance*, *16*(1), 83-92. https://www.jstor.org/stable/40703759

Yared, A. B. (2019). The Washington education budget after McCleary: A longitudinal study of court-ordered education finance reform. https://digital.lib.washington.edu/researchworks/handle/1773/44500