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An Examination of High School Intra-District Funding in Two Virginia School Divisions

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An Examination of High School Intra-District Funding in Two Virginia School Divisions

by

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Requirements for the Degree of

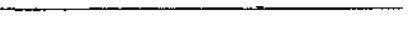
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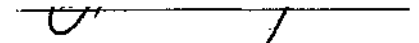
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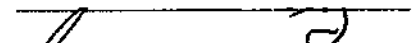
OLD DOMINION UNIVERSITY

AUGUST 2015

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Abstract

An Examination of High School Intra-District Funding in Two Virginia Divisions

Claire R. Le Blanc

Old Dominion University, 2015

Director: William A. Owings

Most states allocate education funds by grant or category at the district level, and most districts distribute funds at the school level.¹ Differences between allocations from the states to the districts and distribution methods from the districts to the schools can lead to unintended consequences in funding equity. This may undermine the purpose of the funding policies developed by state legislatures. Most states use a formula that provides a foundation funding amount to the district for each student. In addition, most states typically provide supplementary categorical funding to the district based on demographic characteristics of students (such as free and reduced lunch eligibility, English language learner, etc.), which, theoretically, increases the level of services needed and, therefore, the cost of educating those students.² The distribution of these

¹ The terms district and division will be used in this paper. Since most U.S. local education agencies (LEAs) are called districts, the term district will be used when addressing LEAs in general. Virginia is the only state education agency (SEA) to name the LEAs as school divisions. When referring to LEAs involved in this study the term school division will be used.

² In this report, both limited English proficient (LEP) and English language learner (ELL) will be used to refer to students whose level of English language proficiency is not at a level where they are able to fully participate in an English-only instructional environment.

categorical funds and tracking of money occur only at the district level, so no evidence exists to show that money is reaching the schools or students who need it most.

This analysis explores intra-district spending and resource distribution within two school divisions in Virginia to determine what, if any, inequities exist. The researcher adapted Berne and Stiefel's (1984) inter-district framework in which three equity concepts were examined: horizontal equity, vertical equity, and equal opportunity. Once the researcher obtained the financial and descriptive information about the two divisions and the high schools within those divisions, the researcher further examined the schools with the highest and the lowest percentage of students living in poverty (indexed by participation in the federal free and reduced-price lunch program). The study found that while average class size varies to some extent among the schools, there are important differences in teacher quality, curriculum, equipment, and supplies.

Even though this study was limited in its sample size, the implications, and the opportunities are far reaching. If low-SES children have the proper support and understanding, financial status does not have to be the ultimate determinant of academic achievement.

Keywords: equity, intra-district funding disparity, intra-district resource allocation

Dedication

This dissertation is lovingly dedicated to my father, Georges E. Le Blanc, Jr. His support, encouragement, and constant love have sustained me throughout my life. Thank you for instilling in me the belief that I can do anything.

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I would like to thank Dr. William Owings for his guidance, support, and perseverance during this extended voyage. With more than enough doctoral candidates to fill his schedule, he still made room for a UVA transplant. His coaching provided me the inspiration, organization, and concrete help necessary to manage this ambitious project.

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Chapter 1: Introduction to the Study

Background

A large body of literature sheds considerable light on resource allocation across school districts. There is, however, a lack of research examining the distribution of public education resources across schools within the same district. This may be due to the scarcity of school-level data (Rubenstein, Schwartz, Stiefel, & Amor, 2007) and the presumption that district-level equity might guarantee the fair distribution across schools within districts (Woo, 2010). Nonetheless, the existing literature consistently documents that the distribution of school resources varies across schools, particularly those within large urban school districts, due to differences in students, teachers, and politics (Iatarola & Stiefel, 2003; Rubenstein, Schwartz, Stiefel, & Amor, 2007; Schwartz & Stiefel, 2004).

Federal and state policies increasingly emphasize the need to educate all students to high academic standards. These policies assume that increased fiscal resources, in particular for those students in most need of academic assistance, are available for meeting this ambitious goal. There is concern that the within-district variation is inequitable, allocating more of some resources to schools that have fewer poor children, fewer minority children, and/or fewer immigrants (Stiefel, Rubenstein, & Schwartz, 2004). Many studies confirm this relationship (Baker, 2012; Condron & Roscigno, 2003; Miller & Rubenstein, 2007; Odden, 1992; Verstegen, 1994). Since schools, rather than districts, provide education, it is imperative to assess accurately the resources reaching students in classrooms and to develop school finance policies that provide resources appropriate to student need (Stiefel, Rubenstein, & Schwartz, 2004).

Relative to other topics within school finance, there have been few intra-district school finance studies conducted over the years (Houck, 2011). However, the growing awareness of the individual school as the focus of accountability efforts, combined with better data availability, has led to increased attention to the delivery of resources at the school level (Schwartz, Rubenstein, & Stiefel, 2009). Determining intra-district resource distributions can be challenging. Primarily, inconsistencies in the reporting of data, such as only reporting a fraction of district expenditures at the school level and using average costs, can mask real resource variations across schools (Miller & Rubenstein, 2007). The studies looking at districts typically find that district-level averages understate the level of disparities that exist across schools within the districts (Hertert, 1995; Owens & Maiden, 1999). For example, the standard practice of reporting the average, rather than actual, teacher salaries by schools can hide substantial resource differences (Rubenstein, Schwartz, & Stiefel, 2006). Roza, Swartz, and Miller (2005) report that in Denver, only 45% of the district's operating budget is reported in school budgets, with the remainder consolidated at the district level. The research revealed that school budgets were not equitably distributed in districts where there was not budget transparency.

School districts produce reams of financial data to check off the appropriate boxes on accounting and compliance reports required by states and the federal government. Typically missing is any financial analysis that follows the money into the school building to the classroom where the conversion of resources into services affects student performance (Roza, 2009). Educators need indicators that tell them whether the basic design and functioning of their high school steers resources in ways that support and raise

the district's academic strategies and priorities. Unfortunately, research suggests that the communication of district financial matters is often poorly handled.

Few districts can quantify with accuracy at any given time the funding available to an individual school. The school budget involves many different individuals and entities across several levels of government, so unanticipated surpluses are possible (Roza & Hill, 2004). Funders often require separate recordkeeping for each program, and their rules of cost accounting differ. For this reason, districts maintain separate accounting systems for funds from different sources, and information is often kept on separate computer systems that do not communicate with one another.

Though the collection of data on inequities in school funding began in the 1970s (Owen, 1972; Summers & Wolfe, 1976), its prevalence increased in the mid-1990s. This previous research primarily focused on comparing schools across and within districts as well as analyzing expenditures versus teacher resources. However, common findings among the varied topics of research emerged. Of note is that even within a single school district, the amount of funding that individual schools receive can vary considerably. For small school districts, this is not, usually, an issue, but in large school districts that operate many schools, differences can be significant (McCann, 2013). A large portion of the disparity relates to the allocation of teachers. Higher paid, more experienced teachers tend to be congregated in low-needs schools whereas fewer experienced teachers end up in high-needs schools (McCann, 2013). While the difference is in teacher allocation, in many school districts, the variance in teacher pay is not a factor in calculations of funding distribution. This skews the picture of true funding and the difference in actual school expenditures is often substantial.

The 1970s marked the beginning of a significant period in the examination of school finance equity, most notably evidenced by the California Supreme Court's ruling against the state in *Serrano v. Priest* (1971). This case was the first in a wave of lawsuits filed on behalf of individuals in low-income districts who argued that their schools were unable to provide a comparable education to students in wealthier districts. Although this class-action suit did not meet its intended goal of accomplishing equality in education, it did launch the debate to the forefront of public opinion (Ladd, Chalk, & Hensen, 1999). Nevertheless, many educators would argue that *Serrano v. Priest* was a well-intentioned step in the right direction and that it played its part in the revision of school finance by prompting researchers to delve into the idea of equity in school finance.

San Antonio Independent School District v. Rodriguez (1971) was a noteworthy case in which a federal district court declared the Texas school finance system unconstitutional. Appellees brought this class action on behalf of school children said to be members of poor families who resided in school districts having a low property tax base. They claimed that the Texas system's reliance on local property taxation favors the affluent and violates equal protection requirements because of substantial inter-district disparities in expenditures resulting from differences in the value of the assessable property among the districts. The case advanced through the court system, providing a victory for the state until it reached the Supreme Court in 1972. In a 5-4 decision, the Supreme Court decided that education was not protected by the Constitution and, therefore, not a fundamental right. They also found that Texas had not created a suspect class related to poverty. These two findings allowed the state to continue its school financing plan as long as it did not infringe the rights of a person under the U.S.

Constitution's Fourteenth Amendment's Equal Protection Clause (*San Antonio Independent School District v. Rodriguez*, 1973).

While early cases show districts have been challenged on the idea of funding equity, there have been other equity suits filed challenging the distribution of staff. Ginsburg and his colleagues (1981) addressed a general version of the intra-district resource distribution problem through a study in which they examined the distribution of staff among elementary schools in all of New York State's school districts. In a creative use of data drawn from two levels of aggregation (the district and the school), these analysts were able to evaluate the difference in the provision of such variables as the number of professionals, median teacher education, median teacher experience, median teacher salary, average teacher salary and paraprofessional staff into among- and within-district components. Ginsburg and his associates attempted to identify the correlates of each school's share of the available staff resources within a given district. As important as these findings are, they need to be interpreted carefully as the results presume that all students within the same school receive an identical supply of resources.

Disparities among schools within the same district continued to be researched through the end of the 20th century. One of the most consistent findings was the lack of vertical equity (Berne & Picus, 1994; Evans, Murray, & Schwab, 1997; Hertert, 1995; Nakib, 1996). Vertical equity focuses on the treatment of "differently situated" students (Iatarola & Stiefel, 2003). This identification is, usually, made by identifying groups of students who differ in their needs for the quality or use of inputs to achieve defined levels of outputs. When inputs are "adjusted" for the costs of educating various groups of children as is often done when vertical equity is measured, the adjustment is meant to

indicate the amount of additional resources needed to bring certain students to given output levels (Berne & Stiefel, 1999). In order to measure vertical equity in spending, districts include categorical revenue with general education operating revenue and specify school and student characteristics that have been identified with higher costs of learning (Iatarola & Stiefel, 2003). These characteristics may include poverty status, limited English proficiency classification, high mobility, and learning disability status (see Coleman, Campbell, Hobson, McPartland, Mood, Weinfeld, & York, 1966, for one of the first studies to document some of these associations and Betts, Rueben, & Dannenberg, 2000, for a more recent study with similar findings). Additionally, studies performed in the 1990s revealed the inequitable dispersal of high-quality teachers across schools. The likely explanation for this is that a uniform pay scale makes it difficult to hire licensed or experienced teachers to work in poorly performing schools (Iatarola & Stiefel, 2003). The localized nature of these intra-district studies and the outcome variables and methodologies make generalizations difficult.

While comparisons of intra-district and inter-district disparities are limited, cross-district analyses of school-level disparities sometimes find greater differences within than among districts (Burke, 1999; Hertert, 1995; Owens & Maiden, 1999). The findings from these studies are often dependent on the methods and data used. For example, if analyses are not weighted by school enrollment, then extremely small schools with unusually high or low resource numbers could have a strong effect on intra-district comparisons, despite serving relatively few students. Additionally, some statistics can make disparities between schools within a district look unusually large because it presents only data on schools at the extremes (Schwartz, Rubenstein, & Stiefel, 2009).

There has not been much research documenting the mechanics of intra-district resource allocation. Within-district allocation formulas typically differ from across district formulas in several fundamental respects. First, the formulas used to allocate funding from states to districts are often well-publicized and are the products of annual budgetary bargaining between state legislatures and governors. School district bureaucracies often produce intra-district formulas, which are subject to little publicity or public debate (Schwartz, Rubenstein, & Stiefel, 2009). Second, the state allocation formulas typically apportion resources in inverse relation to district-level ability-to-pay measures, such as property wealth and income, and they often have equity and adequacy goals (Yinger, 2004). Because the same tax base supports all schools within the district, intra-district formulas do not distribute resources to offset wealth or income differentials across school communities. Third, state funding formulas most commonly focus exclusively on the allocation of dollars across districts, while intra-district formulas may allocate a combination of dollars, personnel position, and other resources (Schwartz, Rubenstein, & Stiefel, 2009).

Given that school spending is limited to total revenues, disparities in school spending may occur because of differences in school revenue sources. The research that exists suggests that there are several factors that contribute to intra-district funding inequities. These include misaligned incentives, local policies about teacher assignments, transparency in spending, state allocation formulas, lack of readily accessible data, patterns of social stratification, and local political dynamics (Owings & Kaplan, 2010).

According to Owings and Kaplan (2010), fiscal disparities within school districts may be the next area "ripe" for litigation. Their research suggests that within-district

disparities may be unfair to high poverty schools. In the study, two high school budgets were examined – one budget from a school drawing from families with above-average socioeconomic status (Alpha High School) and the other drawing from families with low socioeconomic status (Omega High School). As part of the study, Owings and Kaplan compared spending in specific budget categories for each school. While specific budget lines and items vary district to district and state to state, broad general categories that apply to most schools include, but are not limited to: transportation, facilities, energy, instruction, curriculum and staff development, and school leadership and support. Alpha High School had higher per-pupil expenditures than did Omega High School in every category studied.

Roza (2010) has conducted what may be the most recognized work in the area of intra-district funding disparities. Her recent research investigated spending patterns among schools within urban districts and the relationship of that spending to state and federal education spending. The research documents inequities and inefficiencies in district spending practices and identifies budgeting mechanisms for enabling strategic budgeting decisions for districts. While her findings represent only a cross-section of all districts in the country, the work demonstrates how analyzing financial data can reveal the financial implications of the inner workings of individual schools.

In the past few years, numerous studies have begun to explore the effects of funding disparities within school districts, and compelling findings have emerged from the effort. The intra-district differences include resource allocations, classroom accommodations, building quality, and the merit of teachers who serve minority populations (Avilés, 2010; Baker, 2012; Owings & Kaplan, 2010; Woodworth & Ritter,

2012). Thus far, teacher qualifications provide the most impressive inequity. In short, better-funded school districts, schools within those districts, and classrooms within those schools seem to be able to attract teachers with higher levels of education, more experience, and higher scores on competency tests. Subsequently, these teachers tend to generate better achievement scores among students (Biddle & Berliner, 2002). In some cases, large disparities in student achievement arise with these differing levels of teacher qualification (Darling-Hammond, 2000; Darling-Hammond & Post, 2000). In addition, better-funded schools are often able to reduce class sizes, and smaller classes seem to help promote better achievement among students (Biddle & Berliner, 2002).

A few relatively recent publications have described inequities in school funding by race and poverty across states. Bifulco (2005) conducted a longitudinal study of racial disparities in school funding, looking at data from the late 1980s through 2002 across all states. He found that the average black student's funding was approximately 8.5% higher than the average white student's funding, with no adjustments applied. However, when adjusting resources for factors affecting the costs of producing comparable student outcomes (including student need factors such as poverty), he found that the average black student's district had from 3.2% to 15.8% less funding than the average white student's district (Baker & Welner, 2010).

What is not yet known about intra-district funding disparities is whether and how these disparities have changed in recent years, and why districts would continue to have such disparities among their schools. It should not be assumed that school finance reforms directed at resolving resource inequities between school districts will ensure that those resources are equitably distributed among schools and their students.

Statement of the Problem

The existing literature on intra-district resource disparities reveals a pattern of unequal allocations to schools within large districts, particularly the ones that serve tens of thousands of students and spend hundreds of millions of dollars on education (Roza & Miles, 2002). Frequently, those inequities work to the disadvantage of schools serving the low-income and most heavily minority students. Several investigators have reported that, within districts, funds are systematically directed away from needier students toward more advantaged students (Rubenstein, Schwartz, & Stiefel, 2006; Woodworth & Ritter, 2012). While it is certainly possible that disadvantaged students face within-district funding disparities due to the practices by which schools are funded, it is also possible that district officials allocate different types of additional resources to schools serving disadvantaged students.

In most states, school funding is distributed and tracked only to the district level. Differences between distribution from the states to the districts and delivery methods from the districts to the schools can lead to unintended consequences in funding equity. Careful investigations of this potential problem require the analysis of data on funding and spending at the school level. Additionally, detailed research spanning decades and observing performance in many different educational settings provide strong and consistent evidence that those expenditures are not systematically related to student achievement (Biddle & Berliner, 2002). Examining expenditures and student performance in various educational settings will provide further evidence of the impact of intra-district equity in student achievement.

Purpose of the Study

Relatively little research has focused on the processes and patterns of resource allocation across schools within districts. The basic organization of schools is strikingly similar across districts. New resources typically are added outside the regular classroom rather than into it. In most states, schools rarely engage in a major reorganization of school-level resources rather school funding is distributed and tracked only to the district level. Differences between distribution from the states to the districts and delivery methods from the districts to the schools can lead to unintended consequences in funding equity. Too often, the district budget process simply begins where last year's budget process left off. This process assumes that existing programs should continue, and it provides no allowance for shifts in the distribution of resources. District leaders need to articulate priorities and direct spending to support those priorities. Careful investigations of this potential problem require the analysis of data on funding and spending at the school level.

There is evidence that resources vary across schools within larger districts, driven, perhaps, by differences in students, teachers, or politics. Further, there is some concern that the within-district variation is perverse, for example, allocating more of some resources, such as more experienced or educated teachers, to schools with fewer poor children, fewer minority children or fewer immigrants. Understanding the allocation of resources to schools is important to the extent that education is, in fact, produced by schools rather than districts, and the level and quality of resources received by the school itself may be critical to determining student performance.

To date, little regulation exists regarding the means by which districts provide school-level revenue and expenditure data. School-level reporting and the budget building process often lack clarity, preventing school leaders and the community from seeing an accurate picture of resource distribution and use. The results show budget decisions made in a partial vacuum and appropriations that do not match priorities. To make sound choices, now and for the future, it is essential that anyone tasked with making these decisions be equipped with the tools to anticipate all possible outcomes and responses. As educators and policymakers attempt to grapple with increased performance expectations and diminished budgets, they will need to make difficult decisions about when and how to allocate resources to schools. The intra-district analysis may assist these decision makers in finding better ways to distribute district resources. In addition, district policymakers may want to examine how the distribution of students may assist in providing a greater impact for each dollar spent.

This analysis explored intra-district spending and resource distribution within two school divisions in Virginia to determine what, if any, inequities exist. The overarching goal is to amend equity, particularly vertical equity, in the distribution of resources and, ultimately, to improve the efficiency of how resources are adjusted to promote student performance.

Research Questions

The questions that guide this study are:

1. Do differences exist in the availability to and distribution of resources among different high schools within the same division?

2. What is the extent of the differences associated with student characteristics that have been identified with higher costs of learning?
3. Is there a relationship between spending and academic achievement?

The Significance of the Study

Many educators and policymakers believe that providing more resources (that cost money) can directly improve student-learning outcomes. However, there is a lack of consistent evidence on whether education expenditures relate to academic achievement. Despite the lack of consistent findings, prominent academics in the field of school finance acknowledge that the more equitable and adequate distribution of resources to schools may provide a means for improving the equity and adequacy of outcomes. Moving beyond district-level analyses to school-level analyses will more accurately assess the resources available to students in their schools. Additionally, better understanding of current resource allocation can assist in the development of school finance policies that provide resources more appropriately directed to schools in which students have trouble reaching performance goals (Schwartz, Rubenstein, & Stiefel, 2009). Finally, although disparate spending within districts has received little attention in legal cases, litigation has been initiated in a number of districts (Owings & Kaplan, 2010). Ignoring the intra-district distribution of resources may limit the success of these court decisions in improving the adequacy of educational opportunities for students in impoverished schools.

Overview of Methodology

In this study, the researcher utilized school-level expenditure data to examine the funding and resources available to students within two Virginia school divisions and

determine what, if any, disparities exist in the availability to and distribution of resources among different schools within the same division. Additionally, the researcher analyzed the extent to which the differences are associated with student characteristics identified with higher costs of learning, such as students eligible for free or reduced-price lunch and students eligible for bilingual education programs (Iatarola & Stiefel, 2003; Roza, Guin, Gross, & Deburgomaster, 2007).

While there are many ways to conceptualize and measure intra-district equity in school financing, the researcher used a pragmatic approach involving a combination of quantitative and qualitative methods. The mixed method design combined the strength of both quantitative and qualitative research approaches and enabled the researcher to address a wide range of research questions. Additionally, using both qualitative and quantitative data in the study produced a more comprehensive understanding and stronger evidence for a conclusion (Yin, 2006).

The researcher adapted Berne and Stiefel's (1984) inter-district framework in which three equity concepts were examined: horizontal equity, vertical equity, and equal opportunity. Horizontal equity refers to the equal treatment of individuals or groups that are equally situated. Under this principle, each school within a district would receive equal funding per-pupil if the students in each school possessed the same skills, needs, level of preparation, and so forth. Horizontal equity measures capture the dispersion of a distribution and assess how far the distribution is from perfect equality. Horizontal equity has two important limitations. First, the assumption that needs are equal across the board cannot be maintained in practice. Some students simply cost more to educate. Second, numerical equality of funding should not be considered the last word if every

entity receives insufficient funding. For these reasons, horizontal equity principles can be regarded as the starting point for an equitable system, but adjustments are necessary (Glenn, Picus, Odden, & Aportela, 2009). The first research question addressed in this study explored the issue of horizontal equity.

The second research question concentrated on the principle of vertical equity. Vertical equity recognizes that different groups may have different needs and attempts to measure how well the system meets the needs of each group. State legislatures have recognized the importance of providing funding to educate children at risk of academic failure. Such children include those affected by poverty, urbanicity, race, limited English proficiency, and family characteristics such as low parental educational attainment (Vesley & Crampton, 2004). A school finance policy that attempts to meet the needs of vertical equity diverges from horizontal equity, but this is needed in many circumstances. A finance system offers greater vertical equity when it provides additional funds for those students who need them than it would by providing strictly equal per-pupil funding without exception (Glenn, Picus, Odden, & Aportela, 2009).

There are several important limitations to the current approaches for measuring vertical equity. First, some of the vertical equity metrics do not have specific targets that can be used to determine whether vertical equity has been reached. Positive correlations and regression coefficients between vertical equity factors and per-pupil revenues show whether districts with higher need receive more money but do not indicate whether states are allocating too much or too little revenue to meet these needs. A second and more serious limitation of currently used metrics is that they do not account for the effects of multiple dimensions of student and district need. Many states allocate funds for multiple

vertical equity needs at the same time. For example, Indiana provides additional funding to districts for five separate vertical equity factors reflecting the income, educational attainment, and marital status of families and the English proficiency of students. Some states also provide different levels of education funding based on district characteristics unrelated to vertical equity concerns, such as the size of the district, the distribution of students across grade levels, and the cost of living in the community. Such adjustments are relatively common across the United States (Park, 2004).

Although the notions of vertical and horizontal equity are straightforward, constructing valid measures of each proved difficult in a state that makes revenue adjustments for multiple factors. Consequently, in this study the researcher used an unconventional approach to assessing horizontal and vertical equity that addressed this problem. Horizontal equity was examined by looking at variations in resource distribution and per-pupil funding levels between schools within the same division. To measure vertical equity the researcher used categorical revenues to provide funds for extra services and programs. Then an equity analysis was conducted only for general revenues. This approach assessed the degree of equality of the base program for all students, but essentially bypassed analysis of vertical equity.

The third equity concept analyzed in this study deals with the relationship between school expenditures and resources, on the one hand, and student outcomes, on the other. The relationship between expenditures and outcomes can be explored more effectively than earlier studies that had to relate district-level expenditures to different outcome measures. The third research question links school-level expenditures with school-level achievement data.

In order to obtain the information needed to carry out the investigation, data were drawn from sources available in the field such as the state report cards by division, information for the particular localities from the Virginia Department of Revenue, and information obtained from the State Department of Education as well as the National Center for Education Statistics. School-year 2013-2014 data were used to answer the research questions guiding the study. The dataset included information on student performance and demographics, teacher characteristics, school enrollment, and school-based expenditure reports. These reports included the total amount that each division received from the state, separated by the foundation funding amount and the categorical funding additions. The categorical funding amounts included in this study were the supplemental resources for disadvantaged students. Disadvantaged students are those whose family, social, or economic circumstances hinder their ability to learn at school. The reason for focusing on these students is that they are the groups allocated sizeable categorical funding with little oversight to guarantee that they receive those funds.

To obtain the desired information on school expenditures, the researcher contacted division budget offices to schedule meetings with school officials. Only two divisions out of the four solicited agreed to participate in the study. The researcher conducted face-to-face interview sessions with various officials in the two school divisions. The face-to-face interviews were used to request specific information, to clarify answers, and to ask for an interpretation of data provided. Among the school-level data solicited were: instruction expenditures including salaries and benefits of teachers and teaching assistants as well as costs for instructional materials and instructional services; expenditures for student support services, such as guidance and

health personnel; expenditures for instructional staff services, including curriculum development, staff training, libraries, and media and computer centers; expenditures in other categories such as operations and maintenance, administration, and transportation.

Once the researcher obtained the financial and descriptive information about the two divisions and the high schools within those divisions, the researcher further examined the schools with the highest and the lowest percentage of students qualifying for free or reduced-price lunches in each division (students living in poverty are indexed by participation in the federal free and reduced-price lunch program). The researcher used the information to determine: average teacher income (teacher experience indicator); student-to-teacher ratio (class size indicator); percentages of students who passed at the proficient and at the advanced level on the English, mathematics, history, and science End-of-Course (EOC) assessments (academic performance indicators); percentages of students eligible for free or reduced-price lunch (SES indicator).

To answer the study's first two research questions, the researcher used an analysis of variance (ANOVA) for purposes of determining total variability between schools within a data set. If the overall ANOVA was significant, follow-up tests were conducted. These follow-up tests involved a comparison between pairs of group means. The researcher used the General Linear Model procedure to compute an effect size index. The Pearson correlation coefficient is widely used as an effect size when paired quantitative data are available and was used in this study to measure the strength of the relationship between two variables.

The third research question addresses equal opportunity. This concept was examined by comparing data from different student groups in a single school. The data

used included class size, student-teacher ratio, school curriculum (e.g., honors courses, advanced placement courses), teacher credentials, and attendance. The outcome variables used were EOC test scores and on-time graduation rates. The researcher used standardized achievement measures (the Virginia Standards of Learning tests) to assure that scores are in the same metric. This allowed the researcher to interpret the variances as the percentage of difference in student achievement accounted for by the schools.

According to research, understanding spending at the school level is a critical factor in improving student performance (Wenglinsky, 1998). With increased attention focused on policies and data related to resources within schools, it is likely that a new series of equal opportunity issues will surface at the school level. Within many districts, there are concerns about expenditures and outcomes with respect to race and ethnicity. Analyses at the school level are more likely to uncover relationships between inputs and outcomes than those at the district level (Berne & Stiefel, 1994).

Limitations, Assumptions, and Design Controls

- Small sample size.
- School-level spending data are not readily accessible.
- Districts maintain almost no accounting of how variations in central office budgets impact individual schools.
- School budgets reflect only a district-wide average salary figure for teacher costs, so variations due to salaries do not appear in each school's budget.
- Inequities can be hidden in specific kinds of schools, among certain populations, or in particular sectors of the district.

- Determining which students should be targeted and how much funding such students should receive presents some of the most critical challenges.

Definition of Key Terms

Categorical Revenue – Categorical revenues are from federal and state funding programs that are designated for specific purposes. Most categorical programs are designed to increase educational resources for particular student populations in need of supplemental services (Parrish & Hikido, 1998).

Equal Opportunity – Funding all public schools at levels sufficient to provide a rigorous curriculum with a broad range of subject areas, delivered by well-trained teachers, and supported by effective school and district leaders. It also requires sufficient funds for schools serving high numbers of low-income students, English-language learners, and students with other special needs (Baker, Sciarra, & Farrie, 2010).

Equity – In school finance, the term refers to the fair or equal distribution of resources for schooling, taking into account student differences and school district characteristics (Equity Center, 2013).

Horizontal Equity – The fair provision of resources across all units (Iatarola & Stiefel, 2003).

Inequity – Inequity among districts means that children in lower-funded districts do not have access to the same resources as their peers in districts with higher levels of funding (Epstein, 2011).

Intra-district Disparity – School finance inequities among schools within the same district (Rubenstein, Schwartz, & Stiefel, 2006).

Intra-district Resources – The distribution of resources across schools within a district (Owings & Kaplan, 2010).

Intra-state Disparity – School finance inequities within a particular state (Rubenstein, Schwartz, & Stiefel, 2006).

Inter-district Resources – The distribution of resources across districts (Owings & Kaplan, 2010).

Interstate Disparity – School finance inequities between different states (Rubenstein, Schwartz, & Stiefel, 2006).

Ripeness – The mandate contained in Article III of the Constitution that requires an appellate court to consider whether a case has matured into a controversy worthy of adjudication before it can hear the case. The readiness of the case for litigation (Owings & Kaplan, 2010).

Vertical Equity – The differential provision of resources taking into account unique contexts and situations (Iatarola & Stiefel, 2003).

Summary

In this study, the researcher utilized school-level expenditure data to examine the funding and resources available to students within and among high schools in two Virginia school districts and determine what, if any, disparities exist in the availability to and distribution of resources between different schools within the same district. Additionally, the researcher analyzed the extent to which the differences are associated with student characteristics that have been identified with higher costs of learning. This focus is unusual since most analyses of spending have tended to rely on and be constrained by district-level data.

There is ample evidence that funding varies across school districts within the same state. However, prior work in the area of intra-district funding has criticized the difficulty in obtaining relevant data that captures school by school variation in funding (Berne & Stiefel, 1984; Odden & Picus, 2000; Roza, 2005; Stiefel, Rubenstein & Berne, 1998). Despite the difficulty in obtaining school-level data, there is growing evidence of inequality in within-district spending. These inequalities reveal a problem that is significant and educationally meaningful and warrants more attention (Biddle & Berliner, 2002; Darling-Hammond & Post, 2000; Rubenstein, Schwartz, & Stiefel, 2006). The examination of school-level expenditures and other measures by districts will allow for further exploration of within-district allocation dynamics, such as those investigated in this study.

Chapter 2 provides a review of the literature related to inequities in intra-district funding. Chapter 3 explains the quantitative and qualitative research designs, including the population, sampling procedures, data collections process, instruments, and statistical methods that will be used to answer the research questions. Chapter 4 will give an account of the findings. Chapter 5 will contain the discussion of the results, including conclusions, and offer a recommendation for future research and practice related to resource variations among schools within a district.

Chapter 2: Literature Review

Overview of the Chapter

Chapter 2 contains a review of the literature on intra-district resource disparities. The growing emphasis on schools for accountability efforts, combined with better data availability, has led to increased attention to the amount and distribution of resources at the school level (Schwartz, Rubenstein, & Stiefel, 2009). This chapter will draw from the literature on school finance to define intra-district studies within the larger context of education finance, review key studies of intra-district resource allocation, investigate the causes and effects of school funding inequities, and discuss the legal implications of intra-district fiscal disparities.

Introduction

A large body of literature sheds considerable light on resource allocation across school districts. There is, however, a lack of research examining the allocation of public education funding across schools within the same district. This may be due to the scarcity of school-level data (Rubenstein, Schwartz, Stiefel, & Amor, 2007) and the belief that district-level equity guarantees fair distribution across schools within districts (Woo, 2010). Nevertheless, the literature consistently documents the unequal distribution of resources across schools, in particular, within large urban school districts (Betts, Rueben, & Danenberg, 2000; Biddle & Berliner, 2002; Rubenstein, Schwartz, Stiefel, & Amor, 2007; Stiefel, Rubenstein, & Schwartz, 2004). There is concern that districts are allocating more of certain resources to schools with fewer poor children, fewer minority children, and/or fewer immigrants (McClure, Wiener, Roza, & Hill, 2008, Owings & Kaplan, 2010; Stiefel, Rubenstein, & Schwartz, 2004). The differences in students,

teachers, and politics drive this trend (Iatarola & Stiefel, 2003; Owings & Kaplan, 2010; Rubenstein, Schwartz, Stiefel, & Amor, 2007; Schwartz & Stiefel, 2004). The outcome of such a practice is predictable: a further widening of the achievement gap that has become endemic in American schools.

Local school districts account for approximately 50% of all costs for operating public schools nationwide (McCann, 2013). Understanding the allocation of resources in schools is essential to the extent that schools rather than districts produce education, and the amount and type of resources reaching the schools themselves is key to determining student performance (Schwartz, Rubenstein, & Stiefel, 2009). School resources, which cost money, may affect class size, pupil-teacher ratio, and curriculum, all of which have an impact on student achievement. While money alone may not be the answer, the equitable and reasonable distribution of revenues to schools is vital to provide necessary resources for improving student learning outcomes (Baker, 2012). Moving beyond district-level analyses to school-level analyses will more accurately assess the resources available to students in their schools. This can assist in the development of school funding policies that provide resources targeted to schools in which students have trouble reaching performance goals. Additionally, financial disparities within school districts may be the next controversy for the courts to resolve (Owings & Kaplan, 2010). Until now, equity and adequacy litigation has mostly focused on differences in funding across states and among school districts within the same state.

The mere presence of financial disparities within school districts may not be problematic. Resource disparities across schools may be desirable if they direct more resources to students who most need them. Research using a variety of methods has

demonstrated that students with different characteristics may require differing levels of resources to meet performance goals (Schwartz, Rubenstein, & Stiefel, 2009). In particular, students who are poor, disabled, and who have a limited understanding of the English language need more resources (cost more) to educate, although exactly how much more is unclear (see, for example, Duncombe & Yinger, 2000; Picus, Odden, & Fermanich, 2003).

The existing literature on intra-district resource disparities reveals a pattern of unequal resource allocation to schools within large districts. Several researchers have reported that, within districts, funds are systematically directed away from needier students to more advantaged students (Rubenstein, Schwartz, & Stiefel, 2006; Woodworth & Ritter, 2012). While it is certainly possible that disadvantaged students face within-district funding disparities due to the practices by which schools are funded, it is also possible that district officials allocate different types of additional resources to schools serving disadvantaged students.

Nationwide, many schools have reorganized their educational resources to make dramatic improvements in academic achievement among the neediest students. Their programs and funds support the overall school improvement design that is based on a vision of how schools can make more productive use of their resources to improve student achievement. The educators and other adults in the school have an explicit role in supporting student learning, and new staff members fit the needs and culture of the school. The schools provide significant time and funds for professional development and put more resources on prevention than remediation. Technology is integrated into the curriculum. These high-performing schools organize time so teachers can work together

and provide longer blocks of instructional time. Also, the schools organize teaching staff and students to allow for smaller group sizes and more personal attention (Miles, 2000).

Building on an understanding of school needs, districts can realign their resources to support necessary changes and augment promising practices. After existing resources have been changed, districts will be able to argue more forcefully for new resources to support any underfunded initiatives.

Difficulties in Determining Intra-District Funding Inequities

Determining intra-district funding inequities can be difficult. Primarily, the methods of data reporting, such as only revealing a fraction of district expenditures at the school level, centrally-budgeted expenditures and using average costs, often mask real resource disparities across schools. Expenditures for programs such as student support services, bilingual education, gifted education, and some special education programs may be reported centrally, though they provide services directly to students (Rubenstein, Schwartz, & Stiefel, 2006). As an example, Roza, Swartz, and Miller (2005) found that in Denver, only 45% of the district's operating budget appears in school budgets, with the remainder consolidated at the district level. Using data from the Cross-City Campaign for Urban School Reform, Roza, Swartz, and Miller (2005) reported that between 38% and 95% of total district expenditures appear in school level budgets (Rubenstein, Schwartz, & Stiefel, 2006).

One of the most visible inequities that is widespread among schools within the same district is that the schools serving low-income and minority students have fewer experienced teachers (Darling-Hammond, 2010). As teachers gain experience and education, they often transfer to more affluent schools, taking their expertise and higher

salaries with them. According to the reports, teachers working in schools with high numbers of poor and minority students earn significantly less than their counterparts at more affluent schools in the same district. The reports describe gaps in per-teacher spending, and how those gaps stack the deck against the academic success of low-income and minority children. The standard practice of reporting the average, rather than actual, teacher salaries by schools can conceal significant resource differences. Roza and Hill (2004) reported that if all schools received funding for only the average teacher salary for each teacher position, schools above and below the salary average would lose or gain 4-6% of their budgets, with gains of over a half million dollars and losses close to \$1 million for schools at the extremes.

An obstacle to determining funding differences within districts is that districts do not track the dollar value of resources that flow into them (Roza & Hill, 2004). Tracking the money is an enormous challenge for school districts. Their revenues come from many sources (state, local, federal, and philanthropic) at different times. Funders require separate recordkeeping for each program, and their rules of cost accounting differ. For this reason, districts maintain separate accounting systems for funds from different sources. The computer systems that store the information having been bought and programmed at different times do not necessarily communicate with one another (Baker, 2012).

The research on intra-district resource allocations has been mainly confined to the nation's largest districts, such as those in New York City, Chicago, Seattle, and Philadelphia. Much less is known about intra-district resource allocation in the nation's mid-size districts or about the formulas and mechanisms that districts use to allocate

resources to different schools (Miller & Rubenstein, 2007). The available studies on intra-district funding inequities use a variety of methods, approaches, and objects of analysis, making comparisons complicated.

Research on Intra-District School Finance

Relative to other topics within school finance, such as adequacy, the role of the courts, funding methodologies, and the costs for school districts to achieve performance standards, there have been few intra-district school finance studies conducted over the years (Houck, 2011). However, the growing awareness of schools as the focus of accountability efforts, combined with better data availability, has led to increased attention to the allocation of resources at the school level. While a modest amount of research on this topic dates back to the 1970s and 1980s (Ginsburg et al., 1981; Owen, 1972; Summers & Wolfe, 1976), most of the available information has been collected since the mid-1990s.

Studies conducted in the 1990s found significant disparities in resources among schools within the same district. In one study, for example, Hertert (1995) compared expenditures in California across districts, across schools (ignoring districts), and across schools within districts and found that differences among schools in different districts were significantly larger than average spending differences among districts. In another study, Burke (1999) estimated resource distributions at the school level, rather than the district level, and revealed significant intra-district disparities that in some states (Illinois and New York) exceeded inter-district disparities. This result may be due to the size of Chicago and New York City within their state systems. The studies by Hertert and Burke represent the most straightforward measure of the relative magnitude of within- and

among-district resource variations, but both overlook a number of factors addressed in more recent studies, including differences in costs from one district to the next and one school to the next (Baker & Welner, 2010).

A related body of relevant research looks specifically at intra-district spending. Stiefel, Rubenstein, and Berne (1998) analyzed school-level data from four large urban districts (Chicago, Fort Worth, New York City, and Rochester) to determine intra-district inequities in resources. Like Hertert and Burke, they found significant variation in resources across schools within districts. They then looked more closely and found that some of that difference was positively associated with poverty rates across schools. This finding was not systematic across settings or school types. For example, Rochester middle schools showed stronger positive relationships between poverty and resources than Rochester elementary or high schools.

Nakib (1996) used school-level data in Florida to look at patterns of resource allocation across districts and time. His findings did not show a clear difference in either the amount of money available or in the way resources were used. Owens and Maiden (1999) examined the distribution of instructional expenditures across districts and schools in Florida and found significantly larger disparities among schools than among districts. They also found that, at the school level, the higher percentage of black students and students eligible for subsidized or free lunches, the lower the amount of instructional expenditures.

Iatarola and Stiefel (2003) explored the intra-district equity of inputs and outputs, including expenditures, teacher resources, and performance across 840 elementary and middle schools in New York City in 1997-1998. They found that disparities in resources

at the school level were greater than those reported for inter-district studies (particularly in middle schools). Similar to the results in other cities, the researchers also found that elementary schools with higher proportions of students with exceptional needs tended to have more teachers per student, but with lower salaries. Iatarola and Stiefel found comparable results for schools with higher proportions of non-white students in both elementary and middle schools.

Another study based on New York City data measured the effectiveness of schools in producing outputs, such as test scores (Stiefel, Rubenstein, & Schwartz (2004). In their review of the research on intra-district resource allocation, Stiefel and colleagues found a significant positive correlation in 5 of 11 school-level studies examining the relationship between spending and poverty, with significant negative correlations in only two studies. However, these findings came with the caveat that expenditure data alone may hide a tradeoff between quality and quantity of resources.

Texas' intra-district patterns seem to show a difference as well. Ajwad (2006) used data on Texas school-level spending for elementary schools to determine whether districts have targeted greater resources to schools in high-poverty neighborhoods. Using fixed effects expenditure regressions and neighborhood resident population characteristics, he showed that Texas school districts, on average, target additional resources toward elementary schools in high-poverty neighborhoods. Similarly, Baker (2009) focused on intra-district disparities, but Baker applied school-level cost function modeling to determine the additional costs associated with student poverty, competitive wages, optimal school size, and other uncontrollable factors. He examined disparities in the context of other districts sharing the same labor market. Baker found "in some cases,

resource levels in the urban core elementary schools are relatively insufficient for competing with schools in neighboring districts to achieve comparable outcomes” (p. 1). Inter-district disparities may limit the ability of some districts to reduce inequalities, at least for the Texas school districts he examined.

Virtually all of the available research on intra-district resource disparities has focused on large school districts, often comprised of hundreds of schools such as New York City, Los Angeles, Chicago, Baltimore, and Seattle (Betts, Rueben, & Danneberg, 2000; Carr, Gray, & Holley, 2007; Iatarola & Stiefel, 2003; Owens & Maiden, 1999; Roza & Hill, 2004; Rubenstein, 1998; Stiefel, Rubenstein, & Berne, 1998). There are numerous ways to measure intra-district equity in school financing. Much of the research has adapted Berne and Stiefel’s (1984) inter-district framework, which examines the concepts of horizontal equity and vertical equity. Horizontal equity specifies that equally situated students should be treated equally, and in these analyses, researchers study general education operating revenue, separating it from categorical revenue, which is revenue intended to support specific educational needs, such as special education programs. Vertical equity focuses on the treatment of differently situated students, assuming that students require different amounts of resources to achieve set levels of performance (Iatarola & Stiefel, 2003).

In order to assess vertical equity in spending, researchers include categorical revenue with general education operating revenue and identify school and student characteristics associated with higher costs of learning, such as poverty status, limited English proficiency classification, high mobility, and learning disability status (see Coleman et al., 1966, for one of the first studies to document some of these associations

and Betts et al., 2000, for a more recent study with similar findings). In the studies, one of the most consistent findings is the lack of vertical equity. The studies also revealed the unequal distribution of high-quality teachers across schools. The likely explanation for this is that school systems often allocate more teacher resources to schools with needier students, but teachers with seniority typically transfer to desirable schools, which makes it difficult for low-performing schools to retain experienced and licensed teachers. A uniform pay scale also makes it difficult to hire licensed or experienced teachers to work in poorly performing schools (Iatarola & Stiefel, 2003).

Rubenstein (1998) examined the horizontal equity of education resources among elementary schools in Chicago, concluding that school-level distribution is somewhat uneven. After controlling for the district fixed effects, Schwartz (1999) showed that schools in Ohio serving a higher percentage of economically disadvantaged students spend more than schools with wealthier students. Previous research on teacher resources, however, showed mixed results. Rubenstein and his colleagues (2007) showed that schools having higher proportions of disadvantaged students and minority populations have more teachers. However, those teachers are likely to be less-experienced, less-educated, and low-salaried. They explained that it might not be accounted for by purposeful policy decisions, but by sorting of more experienced and educated teachers into schools serving a small percentage of students more difficult to teach.

There has not been much research documenting the mechanics of intra-district resource allocation. Within-district allocation formulas typically differ from across district formulas in several significant ways. First, the formulas used to allocate funding from states to districts are often well-publicized and are the products of annual budgetary

bargaining between state legislatures and governors. The creation of intra-district formulas within school district bureaucracies are subject to little publicity or public debate (Schwartz, Rubenstein, & Stiefel, 2009). Second, the state allocation formulas typically distribute resources in inverse relationship to district-level ability-to-pay measures, such as property wealth and income, and they often have equity and adequacy goals (Yinger, 2004). Because the same tax base supports all schools within the district, intra-district formulas do not allocate resources to offset wealth or income differentials across school communities. Third, state funding formulas most often focus exclusively on the allocation of dollars across districts, while intra-district formulas may allocate a combination of dollars, personnel position, and other resources (Schwartz, Rubenstein, & Stiefel, 2009).

The underlying causes of school-level inequity in resources have yet to be untangled. Prior research focuses on school expenditures, not school revenue sources. According to National Center for Education Statistics (NCES, 2014), the federal government contributes about 6% of the total school budget, and the remainder is split fairly evenly between local contributions raised through property taxes and state contributions raised through income taxes and sales taxes. The method of distributing the state contribution to school districts is complex, often involving some combination of foundation funding and categorical funding. The foundation funding is intended to cover the basic costs of education such as teacher salaries, textbooks, and materials; and the categorical funding is targeted for specific purposes such as reducing class sizes, programs for English language learners, special education, and the National School Lunch Program. This complexity often leads to significant variation from district to

district (and school to school) in the funding received from federal, state, and local sources and wide disparities in the level of support for the educational program.

Roza, Guin, Gross, and Deburgomaster (2007) used Texas school-level expenditure data to examine changes in internal resource allocation from 1994 to 2003. Rather than estimating the statistical relationship between school-level expenditures and cost factors as did Ajwad (2006) and Baker (2009), Roza et al. (2007) adopted an approach that involves calculating a Weighted Student Index (WSI) to track equity levels and changes over time. They began with a comparison of intra-district and inter-district disparities in Texas and then moved to their case: "At least in Texas, funding decisions within districts currently have a greater impact on a school's resources than inequalities in access to resources across school districts" (Roza, Guin, Gross, & Deburgomaster, 2007, p. 70). The first part of their article reported that variations in spending among Texas districts tended to fall within 5% to 10% of mean spending statewide, compared to disparities within large Texas districts that tended to be on the order of 15%. Unfortunately, documentation is lacking concerning the method for calculating the coefficients of variation presented by the researchers that compromise reliability and reproducibility.

Roza et al. (2007) also examined whether variations in their WSI are a function of different factors. The researchers suggested that the goal of their study was determining whether observed resource variation (as measured by the WSI) is a function of "intentional" or unintentional" factors (Baker, 2012). It is difficult to understand how this unplanned mix of outcome measures relates to more traditional sets of factors outside the control of local school officials that affect the costs of achieving any given level of

outcomes (Duncombe & Yinger, 2000). The dependent variable (WSI) measures resource disparity in terms of differences across schools among various student subgroups such as students with disabilities and economically disadvantaged, rather than aggregate resource differences across schools with respect to the total student population. A more straightforward explanation (at least with respect to whether resource variation is a function of uncontrollable cost factors) would be possible from a study that used expenditures as the dependent variable and identified fixed cost factors as independent variables in an expenditure function framework.

A shortcoming of the WSI approach is that it fails to consider differences in resources with respect to the student population variation across schools (Baker & Welner, 2010). Instead, it only measures whether a child in poverty in one school receives the same amount of resources as a child in poverty in another school. Additionally, the WSI approach does not account for the additional federal resources that vary from school to school and district to district for high needs populations.

Several studies have examined the relevance of school-level financial data systems to decision makers and analysts. In a review of school-level financial information from Ohio and Texas, Sherman, Best, and Luskin (1996) found that these systems provided data for key functions (instruction, support services, non-instructional services) and instructional programs, but they did so largely by allocating existing district-level expenditures downward. Issacs, Garet, and Broughman (1997) looked at the *Schools and Staffing Survey* (SASS) to assess the opportunities and problems in collecting both staffing and expenditure data at the school level. Using the survey, Issacs et al. (1997) collected detailed data about the characteristics of staff in schools across the

United States. This wealth of staffing data allowed researchers to provide an accurate record of teachers and principals in public and private schools. It did not, however, meet the needs of education finance researchers interested in informing discussions of education policy regarding resource allocation both within and among schools (Chambers, 1999).

Chambers (1999) compared two different approaches to measuring school resources: the accounting method, which uses expenditure data from existing educational accounting systems, and the resource cost model, which identifies resources in programs and places prices, actual or standardized, on these resources to determine the costs of the programs. He concluded that the resource cost model provided more accurate and useful information for decision-making, although it required additional data collection (Denison, Stiefel, Hartman, & Deegan, 2011).

Interest is building on the topic of within district resource allocation, specifically the allocation of funds related to teacher salaries, numerous studies have found considerable variation in funding related to teacher salaries. These disparities are evident in both California and New York (Adamson & Darling-Hammond, 2011). The districts offering the lowest salaries provide greater proportions of minority and poor students than those offering higher salaries. In short, instead of having access to experienced, prepared, well-compensated teachers and smaller class sizes, traditionally underserved students in California and New York attend larger classes taught by poorly paid teachers with less experience and training than their nonminority, wealthier peers. These realities trace back to the financial inequities within which districts operate.

Factors Contributing to Intra-District Funding Inequities

There are several factors that contribute to intra-district funding inequities. These include misaligned incentives, local policies about teacher assignments, transparency in spending, state allocation formulas, lack of readily available data, patterns of social stratification, and local political dynamics (Owings & Kaplan, 2010). These variables interact and are usually within the district's control.

Intra-district financial inequities often result from funding formulas that allocate positions rather than dollars to schools (Owings & Kaplan, 2010). For example, budget allocations charge schools for an average teacher salary rather than the actual earnings of teachers in the schools, and teacher sorting patterns allow higher-paid teachers to systematically choose lower-needs schools without financial implications for schools to which they transfer (Rubenstein, Schwartz, & Stiefel, 2006; Rubenstein, Schwartz, Stiefel, & Amor, 2007). About 95% of all public school districts in the United States use this uniform salary schedule which provides no financial incentive for teachers to work hard or accept the more challenging assignments (Owings & Kaplan, 2010; Protsik, 1996; Wisconsin Department of Public Instruction, 2007). At the same time, collective bargaining agreements (CBAs) routinely give priority to teachers with seniority when schools have vacancies or are forced to reduce staff (Koski & Horng, 2007). A review of literature suggests that such seniority priority rules contribute to teacher experience and credential inequalities among schools as teachers use their seniority rights to transfer out of high minority, high poverty schools (Koski & Horng, 2007; Rubenstein, Schwartz, & Stiefel, 2006). To remedy this, comparability needs to happen in terms of dollars, and that data reporting should be simplified to allow easy comparisons between schools.

Transparency impacts intra-district allocations. Rubenstein et al. (2006) observed that while formulas used to allocate funding from states to districts are usually well publicized and disclose annual budgetary bargaining between state legislatures and governors, intra-district formulas are usually produced by the school district bureaucracies with little advertising or public debate. Very few school districts provide complete and timely financial data that are understandable to the general public. To fully understand public school spending, citizens require complete and timely data in an easy-to-analyze format. Awareness about public school spending has implications for the public discourse over public education. A 2008 Harvard University survey shows the public vastly underestimates how much public schools cost, which affects the public's spending preferences (Howell, West, & Peterson, 2009). When citizens are informed about the real cost of public education, they are significantly less likely to support increasing spending. Consequently, the current situation of intra-district allocation inequities remain.

While state allocation formulas commonly allocate resources in inverse relationship to district level capacity to pay measures, such as property wealth and/or income and often have clear equity and adequacy goals, the same tax base supports all schools within the district. Intra-district formulas do not allocate resources to offset wealth or income differentials across school communities (Owings & Kaplan, 2010). Additionally, state funding formulas most often focus exclusively on distributing dollars across districts, while intra-district formulas may assign a combination of dollars, personnel positions, and other resources (Rubenstein, Schwartz, & Stiefel, 2006).

The lack of readily accessible school-level expenditure data has likely frustrated interest in resource disparities within districts among taxpayers and families with children in school (Rubenstein, Schwartz, & Stiefel, 2006). However, the widespread availability of school report cards with detailed data on school performance has coincided with the increased expectation of, and demand for, information about school resources. The National Center for Education Statistics (1998) has called for reporting of the school-level program costs, in part, to help ensure adequate and equitable funding for schools and state accountability and assessment programs. An *Education Week* (2005) survey conveyed that 22 states and the District of Columbia collect school-level financial information although the types of data varied across states. Nevertheless, access to such data remains problematic, and reporting of school-level spending is often confusing.

Intra-district funding inequities may be related to patterns of social stratification and concentration, a possibility that has received little attention in the recent literature. A handful of studies, conducted in the 1960s and 1970s, found that some money-related school resources lacked in poor and minority schools relative to white and higher socioeconomic status (SES) schools in large urban districts. These missing resources included physically sound buildings (Owen, 1972; Sexton, 1961), teachers with more experience and better verbal ability (Owen 1972; Sexton, 1961), smaller classes (Sexton, 1961), and financial support from local sources (Andrew & Goettel, 1972). Kozol's (1991) interpretation of race and class inequity in school funding illustrated these realities, showing how being of a minority or a poor social class status is often synonymous with attending a run-down, overcrowded, unsafe, and unhealthy school.

Local school board decisions about financial and resource allocation within districts may reflect and reinforce local class and racial differences (Brooks-Gunn, Duncan, & Aber, 1997; Roscigno, 1995, 2000). Since elected officials include the school board members in most locales, their decision-making is likely to be shaped by their expected voting constituency. As poor and minority communities are more likely to be alienated from the political process, they are less likely to participate in it (Piven & Cloward, 2000; Teixeira, 1987). School boards often implement application processes to be followed by schools for discretionary funds. Poorer schools are simply less organizationally and bureaucratically equipped to formulate proposals for additional funds, especially if they are overwhelmed with their daily functioning and the general maintenance of order. In addition, school boards may be inclined to reject proposals by poorer, minority schools, given that such schools are receiving additional allocations in the form of Federal Title I funds (Condrón & Roscigno, 2003).

The Title I program originated as part of the Elementary and Secondary Act of 1965. Title I is designed to meet the needs of educationally at-risk students through additional financial assistance to school districts. The goal of Title I is to provide extra instructional services and activities to support students identified as failing or most at risk of failing the state's challenging performance standards in mathematics, reading, and writing. A school-wide Title I program is not just limited to those students who are considered to be economically disadvantaged or educationally at-risk and can, therefore, provide benefits to all students. Each school-wide Title I school must carry out a comprehensive needs assessment to identify areas of greatest need. Then, school-wide strategies (based on identified needs) must be developed that:

- strengthen the core academic program
- increase the amount and quality of learning time
- use strategies for meeting the needs of underserved students
- address needs of all students, but particularly low-achieving students
- provide instruction by “highly-qualified” teachers provide any professional learning for teachers that are needed to help them meet low-achieving students’ needs (U.S. Department of Education, 2014).

These school-wide strategies stand to provide benefits to all students, not just those students who are considered to be economically disadvantaged or educationally at-risk.

Finally, political scientists have established a consistent relationship between SES and political participation. Parent and parent-teacher organizations from the higher socioeconomic status (SES) schools tend to be more active and politically astute advocates of resources for their children’s schools. It is also likely that higher-SES schools are more bureaucratically and politically coordinated when it comes to designing and submitting grant proposals for additional funds compared to low-SES schools (Condrón & Roscigno, 2003). Unless significant challenges arise regarding local educational disparities in poor and minority communities, it is likely that local political processes and resource-allocation decisions will increase the extent to which the disparities compare with larger patterns of racial and class inequality.

The Effects of Intra-District Funding Inequities

Various studies have begun to investigate the effects of funding disparities within school districts, and differences include: resource allocations, classroom accommodations, building quality, and the merit of teachers who serve minority

populations (Avilés, 2010; Baker, 2012; Owings & Kaplan, 2010; Woodworth & Ritter, 2012). So far, teacher qualifications represent the most impressive inequity. In short, better-funded school districts, schools within those districts, and classrooms within those schools seem to be able to attract teachers with higher levels of education, more experience, and higher scores on competency tests; these teachers, in turn, help to produce better achievement scores among students (Biddle & Berliner, 2002). Moreover, differing levels of teacher qualifications create large disparities in student achievement (Darling-Hammond & Post, 2000).

Better funded schools are often able to reduce class sizes, and smaller classes seem also to help produce better achievement among students. As a rule, the effects reported for class size seem to be weaker than those for teacher qualifications. For one, a number of studies have not examined class size directly, but rather the effects of the student-teacher ratio, which usually represents class size. There are problems associated with this assumption. Among others, student-teacher ratio is typically measured at the school or district level and counts coaches, nurses, social workers, and other service professionals in the school who do not teach (Biddle & Berliner, 2002). Properly considered, class size refers to the number of students a given teacher instructs within a classroom.

Well-funded schools also enjoy other advantages that normally are not available in poorly funded schools. Some of these correlated to student achievement and a few studies have begun to explore these effects. Wenglinsky (1998) reported a study which found that when funding for instruction and capital expenditures are high, achievement gaps between students from rich and poor homes decline, but when they are low those

achievement gaps are greater. Harter (1999) found similar effects for funds applied to school maintenance, and Elliott (1998) described achievement effects associated with funding for classroom resources. Additional research may help to determine how these mechanisms interact with teacher qualifications and class size as generators of student achievement.

Several studies focus specifically on the relationship between school funding changes and student achievement. Notable examples include Evans, Murray, and Schwab's (1997) assessment of the impact of legal mandates on the amount and distribution of funding and Card and Payne's (2002) assessment of the link between school finance reforms, changes in the amount and allocation of resources, and student outcomes. Both studies found that, in the aftermath of a negative court decision, states tend to increase the relative funding available to lower-income districts. Card and Payne show evidence that point to a modest equalizing effect of school finance reforms on the test score outcomes for students from different family background groups. Other studies on improvements to equity or adequacy of funding over time had focused on particular states and reached similar conclusions (Deke, 2003; Downes, 2004; Downes, Zabel & Ansel, 2009).

A few relatively recent publications have described inequities in school funding by race and poverty across states. For example, Bifulco (2005) conducted a longitudinal study of racial disparities in school funding, looking at data from the late 1980s through 2002 across all states. He found that, in 2002, the average black student's funding was almost 8.5% higher than the average white student's funding, with no adjustments applied. However, when adjusting resources for factors affecting the costs of producing

equivalent student outcomes, as well as the relationship between size and cost and regional labor market variation, Bifulco found that the average black student's district had from 3.2% to 15.8% less funding than the average white student's district (Baker & Welner, 2010).

According to Kohler and Lazarín (2007), Hispanics have become the fastest growing population in the United States, significantly surpassing the growth of any other ethnic group. The major issue to be addressed is how inequitable funding among schools in a school district, particularly schools with low-income, minority, and limited English speaking students, contribute to inequity in services and opportunities that lead to underachievement, low student expectations and poor graduation rates among these student groups (Avilés, 2010).

In summary, on average, aggregate measures of per-pupil spending are positively associated with improved or higher student outcomes, while schooling resources that cost money, including class size reduction or higher teacher salaries, are positively associated with student outcomes. In some studies, the size of this effect is larger than in others and in some cases, additional funding appears to matter more for some students than others. There are other factors that may moderate the influence of funding on student outcomes, such as how that money is spent to yield benefits. Schooling resources that cost money, including class size reduction or higher teacher salaries, are positively associated with student outcomes. Again, in some cases, those effects are larger than others, and there is also variation in student population and other contextual variables. On the whole, however, the things that cost money benefit students, and there is scarce evidence that there are more cost-effective alternatives.

The Relationship between Money and Results

The relationship between school funding and academic achievement is a matter of much debate in the education policy community. Some experts contend it is possible to reduce education funding without lowering the achievement, while others argue that only an influx of more money can bring the achievement increase schools so desperately need (Adamson & Darling-Hammond, 2011; Boser, 2011). The literature strongly calls into question the notion that only investing more money in schools will result in improved outcomes. The research suggests that when policymakers allocate additional education dollars without clear directions on how the money is spent, the funds do not appear to have a significant impact on achievement (Adamson & Darling-Hammond, 2011; Baker, Sciarra, & Farrie, 2010; Boser, 2011; Monk, Pikanowski, Hussaine, 1997). Taxpayers have invested considerable resources in the nation's public schools. Instead of just increasing funding for public education, policymakers should implement reforms designed to improve resource allocations that truly enhance student performance.

The patterns of spending on schools tell a fairly simple story. Spending on schools has been increasing for a long time. The spending has been happening in the ways that are commonly advocated: teacher education has been increasing, teacher experience has been increasing, and pupil-teacher ratios have been falling. At least for the past three decades when student performance has been measured, there is little indication that these increases in resources have led to discernible improvements in student outcomes. While results from individual states vary, the overall conclusion is inescapable: solving America's public education crisis requires more than just money that will be increasingly difficult for schools to get as federal funding declines and states face

rising expenses that produce no services. Hence, the resonant suggestion is earmarking funds towards special programs rather than increasing the general funds of schools, as this could yield the highest return on the dollar.

Private Fundraising for Public Schools

Some lawmakers are worried private fundraising for public schools is leading to an unfair advantage for students in wealthier communities. For example, at a recent Council on Education Committee hearing in Montgomery County, Maryland, a council member asked the Board of Education to figure out how many Montgomery County public schools have private foundations and how much money those foundations are raising (Kraut, 2013). The issue came up regarding upgrades at some of the Montgomery County schools that were not funded with taxpayer dollars, instead through private donations and parent fundraising. Examples of the upgrades include the \$110,000 video scoreboard at Damascus High School, the \$80,000 electronic scoreboard at Winston Churchill High School, and the million-dollar turf field at Thomas S. Wootton High School. Of the 126 privately funded school improvement projects in the county in the past three years, 22 have cost between \$10,000 and \$1.3 million, almost all of them in wealthier communities with few minority students. Of those 22 projects, 17 were in schools with low rates of students receiving free and reduced-price meals, a measure of poverty, and the majority of the projects were in schools where Whites and Asians made up more than half of the student body (Bui, 2013). The Montgomery County School Board and Council Members are considering policy reforms that could more tightly regulate private donations for public schools. Some council members have suggested having booster clubs or foundations pool their money and share it with schools that have

fewer resources. Many schools in the eastern part of the county are not afforded the same support because the schools do not have booster clubs or foundations.

There are close to 5,000 school foundations across the country and working successfully with them is becoming part of the job description for school leaders. The means of raising money are diverse, but many foundations are taking their cue from private institutions. For instance, the Falls Church Education Foundation, in an upper-middle-class district in the Virginia suburbs of Washington, D.C., sought large private donations to build a \$10 million endowment. The endowment was to fund programs the school system could not afford, including support for the sciences, international exchange programs, and leadership and sabbatical programs for teachers, with an eye towards improving teacher retention. One Silicon Valley school district raised \$300,000 over two years, primarily to save the jobs of librarians, music teachers, and computer lab aides. In New York City, the P.S. 6 Alumni Foundation appealed directly to the graduates of the Upper East Side elementary school, raising almost \$750,000 for a new library. The school's principal single-handedly located records and addresses of past graduates, entered thousands of names on her computer and sent out mailings (Schachter, 2005).

Booster clubs and parent-teacher associations have long been important sources of funding for schools. They serve as auxiliaries to the school and conduct activities and fundraising events involving the primary participation of parents and other adult community members (Guidelines for Parent Organizations and Booster Clubs, 2014). Some booster clubs are organized to help with special interests such as band, football, and other sports programs, or to assist with field trips and procuring needed school

supplies. In general, booster clubs provide financial support and direct assistance to help achieve the common goals of boosters and school programs.

Large-scale fundraising, once the exclusive domain of elite private schools and colleges, is becoming more popular throughout the country. The money that school districts would like to put into their systems is getting harder and harder to come by, so people within these communities are choosing to raise the needed money themselves. According to the National Education Association, public schools from California to New Jersey are using hundreds of thousands of dollars in private donations to ward off cuts to staff and facilities. In great part, these districts are doing so by establishing 501(c)(3) non-profit foundations, which focus on locating private funding. Despite the positive impacts of the foundation movement, private fundraising is not going to replace public spending on public education. It is estimated that private donations amount to five cents on every dollar spent and fundraisers worry that their efforts could result in little net gain if public funding shrinks (Schachter, 2005).

Legal Consequences of Intra-District Funding Inequities

Differences between the distribution methods of education funds from the states to the districts and from the districts to the schools can lead to legal action and court mandates demanding school finance reform. Researchers have expressed concern that, within districts, resources are systematically directed away from needier students to more advantaged students (Carr, Gray, & Holley, 2007; Iatarola & Stiefel, 2003; Roza, Guin, & Davis, 2008; Roza & Hill, 2004). Carr et al. (2007) went so far as to state, "Equity created by the state [Ohio] funding formula is contravened by severe inequity in how districts then allocate resources to their individual schools" (pp. 49-50). In a 2006

national study, The Education Trust, an educational advocacy group, found that, in 28 states, high-minority school districts received less state and local funds for each child than did low-minority districts. Consequently, large and growing gaps in education quality exist between more affluent school districts and less-affluent ones. The real extent of this problem is difficult to determine because school funding and spending only occur at the district level in most states. Thorough investigations of this potential problem require data on funding and spending at the school level.

Until recently, researchers have had no way of tracking school-level expenditures. However, with improvements in state data systems and reporting requirements, this is changing. While reporting school-level expenditures is an arduous task for school districts and states, it provides a valuable source of information on education spending. For example, in a 2010 study, Owings and Kaplan examined two high school budgets – one where surveys indicated parents would move to the attendance zone to have their children attend that school and one where the same survey indicated parents would consider moving to avoid having their children attend that school. Owings and Kaplan compared spending in specified budget categories for each school and determined the spending for each school and category area. These categories included, but were not limited to: transportation, facilities, energy, instruction, curriculum and staff development, and school leadership and support. They found that for every \$1.00 spent per-pupil at the high-status school (Alpha High School), 39.4 cents was spent per-pupil at the low-status high school (Omega High School). Further, the study revealed that teacher salaries accounted for most of the per-school funding difference. Alpha High School had more teachers with 25 to 30 years of experience and graduate degrees. Omega High

School had mostly first-year through fifth-year teachers without graduate degrees and had much larger class sizes. Additionally, Alpha High School's administrative salaries were higher as were utility costs (Alpha High School was air conditioned and Omega High School was not). Technology and field trip transportation costs were higher at Alpha High School than at Omega High School. Ultimately, Alpha High School had higher per-pupil expenditures than did Omega High School in every category. Owings and Kaplan subsequently make a case that within-district disparities may be inequitable to high poverty schools, and intra-district funding disparities might truly be subject to challenge as unconstitutional.

To limit the inequities, districts must accurately access the resources available to students within their district, including all supplementary resources and services. Supplementary resources and services may involve numerous combinations of supports, including assistive technology, environmental accommodations, staff support, alternative presentation of content, behavioral support, and modified assignments. Failure to include the supplementary resources may limit the success of schools in providing the best educational opportunities for all students, particularly those from lower socioeconomic communities. Perspective plaintiffs perceiving such could bring suit based upon state education clauses and equal protection claims, particularly if a racially disparate impact were shown (Roos, 2000; Warner-King & Smith-Casem, 2005). Although equal protection claim litigation at the state level has had limited success to date, such claims may well be more successful in intra-district cases.

The Waves of School Finance Litigation

School finance cases have been divided into at least three distinct waves. The first two waves focused on achieving greater educational equity, which often meant a search for equal funding for school districts within a given state. The search for greater educational equity has typically meant that all students should be afforded an equal opportunity to succeed. It has meant that a student's success should not depend upon circumstances outside of his or her control, such as geographic location or the wealth of the household (Obhof, 2004).

The First Wave

The first wave of school finance litigation involved state and federal challenges to funding systems based on the Federal Equal Protection Clause. This phase was short-lived, beginning in 1971 with *Serrano v. Priest* and ending in 1973 with the U.S. Supreme Court's rejection of this approach in *San Antonio Independent School District v. Rodriguez*, (1973). In *Serrano*, the California Supreme Court declared that education is a fundamental right and that the state's property tax-based funding system violated that right by creating vast spending disparities among school districts (see *Serrano I*, 487 P.2d at 164-66). The U.S. Supreme Court quickly invalidated this with *Rodriguez*, when it stated that education is not a fundamental federal right and that the states are free to balance the values of local control and equality of educational resources (Obhof, 2004). This decision essentially foreclosed challenges to school funding under the Equal Protection Clause of the U.S. Constitution.

The Second Wave

Serrano v. Priest (1971, 1976) and *Robinson v. Cahill* (1973) signaled the beginning of the next wave of school finance litigation, which focused on equality. In both cases, the school finance plan was abolished based on the state constitution, signifying that school finance litigation was possible in state courts (Verstegen, 1994). Influenced by these decisions, most states either modified or reformed their school funding plans to equalize funding.

The results of this stage were mixed, primarily due to difficulties over what kind of “equality” judges should be required to enforce (Koski & Reich, 2006). For instance, some advocates argued that equal funding alone would not be enough and that disadvantaged children need additional resources to achieve socially desirable levels of educational success – a type of vertical equity that distributes resources according to student needs. Vertical equity, however, is contrary to state equal protection guarantees and presents problems for judicial administration: How much more should student X get than student Y to be considered “equal?”

The Third Wave

Some new directions in school finance litigation emerged in the 1990s as litigants moved away from the traditional focus on spending disparities and, instead, towards the overall sufficiency of funds that states allocated to public schools. In doing so, litigants concentrated almost exclusively on education clauses of state constitutions, rather than on equal protection clauses or a combination of the two. State courts have been receptive to these new adequacy-based arguments distinguished by their focus on the state’s obligation to provide some absolute, adequate level of education to all (Gillespie, 2010).

This wave of litigation began with notable plaintiff victories in Kentucky and Montana. Plaintiffs in these cases began seeking to invalidate school finance systems, not because of funding disparities per se, but rather because the quality of education provided in some school districts failed to meet some constitutionally required minimum standard (Obhof, 2004). The plaintiffs, representing poor children and school districts, succeeded in having the school finance systems ruled unconstitutional in Kentucky, Texas, Montana, and New Jersey (Verstegen, 1994).

This shift from equality to adequacy was primarily the result of the standards-based reform movement of the 1980s (Gillespie, 2010). During this period, several national studies compared America's education system with that of other industrialized nations. The findings were staggering, calling into question the quality of schools not only in impoverished districts, but in all public schools and warning that the poor quality of American education was undermining the country's ability to compete in the international economy.

The influence of the standards-based reform movement is best illustrated in *Rose v. Council for Better Education, Inc.* (see 790 S.W.2d 186), arguably the most successful adequacy-based litigation. In *Rose*, the Kentucky Supreme Court noted "Kentucky ranked fortieth nationally in spending and thirty-seventh in average teacher salary" (Heise, *supra* note 8, at 1163). Although the plaintiffs brought the lawsuit on behalf of poor school districts that sought more equitable support for their students, the court went further and found that even Kentucky's more affluent school districts were inadequately funded when compared against accepted national standards. The court declared that Kentucky's entire system of public schooling was inadequate and unconstitutional,

directing the Kentucky General Assembly to re-create and re-establish a system of common schools (Gillespie, 2010). *Rose* was important both for its holding and for its definition of an adequate education, which has proved particularly influential.

New Directions in School Finance Litigation

The cases continued to consider not just distribution of funding, but also the sufficiency of resources to provide quality educational programs, services, and opportunities to learn. Overall, the state courts called for closing the gap between the best- and worst-financed education systems. They suggested remedies that would provide equal opportunities for financing excellence in education. For instance, in *Abbott II* (1990), the New Jersey court's decision directed the Legislature to amend or enact new legislation to secure funding for the urban districts at the foundation level, "substantially equivalent" to that in the successful suburban districts. Furthermore, the decision directed districts to provide adequately for the supplemental programs needed to address the serious disadvantages of urban schoolchildren (Education Law Center, 2011).

In 1994, the Court entered a second remedial order, *Abbott III*, directing the Legislature to adopt another funding law that would ensure "substantial equivalence" in foundation funding to suburban districts and provide the necessary supplemental programs (Education Law Center, 2011). Taken together, the *Abbott IV* (1997) and *Abbott V* (1998) rulings ordered the implementation of a comprehensive set of remedial measures, including high quality early education, supplemental programs of studies and reforms, and school facilities improvements, to ensure adequate and equal education for low-income schoolchildren (Education Law Center, 2011).

The *Abbott* remedies were extremely detailed and comprehensive. The mandates also broke new ground in school finance and education policy in the United States. No other state had assured equality in the education resources provided to children in its lowest-wealth communities at the level spent in more affluent ones. The New Jersey state court needs-based approach to providing additional programs and reforms was an unprecedented effort to target funds to initiatives designed to improve educational outcomes of low-income schoolchildren (Education Law Center, 2011).

As the state courts applied a much stricter definition of acceptable variation between schools and districts linking finances to programs, they also found a correlation between school quality and funding. In Kentucky, for instance, the courts found that achievement test scores in poorer districts were lower than those in the richer districts. The courts also found that the school system failed to meet its definition of effective: it was not uniform, adequate, or unitary. Further, the courts spelled out essential competencies that an adequate system would develop in students, thereby linking inputs to outcomes while calling for systemic change (Obhof, 2004).

In the 1989 landmark *Edgewood Independent School District v. Kirby* case, the Texas Supreme Court declared the then-existing finance plan for public education unconstitutional because it failed to treat all people equally and because it was inefficient. On May 28, 1993, the Legislature passed a multi-option plan for reforming school funding. The new plan improved equity and adequacy of school funding and included the partial recapture of local revenues from the state's wealthier school districts for redistribution to property-poor districts (National Education Access Network, 2011).

These decisions and other relevant decisions in Montana, Kentucky, Texas, and New Jersey shifted the focus to the basic meaning of the state's education clause. In order to invalidate finance plans in the past, court cases often relied on the belief that education was a fundamental right or that a group of individuals that have been historically subject to discrimination (a suspect class) was affected. Because such findings potentially apply to all areas of government, courts were often reluctant to find state funding systems unconstitutional on these grounds. A decision that overturns the education clause increases the reluctance of courts to invalidate finance plans because of its limitations in the context of education. Across the states, this means the door is open for invalidating finance plans.

Changing Climate of Litigation

While the majority of school finance litigation has focused on state formulas to distribute resources equitably across school districts, the focus is shifting (Rubenstein, Schwartz, & Stiefel, 2006). Much of the current litigation and legislative action in education funding seeks to ensure “adequacy,” that is, a sufficient level of funding to provide an adequate education to every student (Augenblick, Myers, & Anderson, 1997). To date, adequacy litigation has mainly focused on inter-district funding inequities. In view of the fact that students learn in schools, and schools are accountable for improving students’ academic performance, examining education spending at the school level takes on added importance (Owings & Kaplan, 2010; Stiefel, Rubenstein, & Schwartz, 2004). Financial disparities within school districts may be the next wave of school funding litigation.

Large urban school districts occasionally befall to litigation over financial inequities across different schools within the same district. Researchers often cite *Hobson v. Hansen*, originally decided in 1967 with subsequent court orders in 1970 and 1971, as a significant case in achieving educational equality. The case involved the differences in spending among schools within a single district based upon race and wealth, in part, assigning significantly more experienced, well-educated, and higher-salaried teachers to schools with a larger majority of white students rather than to schools serving predominantly poor and minority students (Rubenstein, Schwartz, & Stiefel, 2006). As then head of the U.S. Court of Appeals, Judge J. Skelly Wright appeared to have thought the time must have seemed “ripe” to strike a blow for justice. In 1967, *Hobson v. Hansen* found the Washington D.C. school superintendent and school board guilty of practicing racial and economic discrimination, resulting in a demand for an equalization in school by school expenditures within 5% variation (Research Center: School Finance, 2011). This lawsuit served as a stimulus for change in states’ education finance systems.

The second major intra-district equity case, *Rodriguez v. Los Angeles Unified Schools District* (LAUSD) in 1992, also focused on the distribution of teachers across schools. *Rodriguez* plaintiffs charged that poor and minority students in the LAUSD were deprived of the equal protection of the laws under the California state constitution because schools serving higher proportions of poor and minority students had less experienced and less educated teachers (Rubenstein, Schwartz, & Stiefel, 2006). Lower teacher salaries and expenditures, as well as higher levels of overcrowding, appeared in schools with lower-income and more minority students as compared to schools with

higher income and more white students (Roos, 2000; Rubenstein, Schwartz, & Stiefel, 2006). As part of the consent decree, the LAUSD agreed to equalize non-categorical spending in 90% of schools to within \$100 of the district average and to reduce spending in schools with expenditures well above the district average (Rubenstein, Schwartz, & Stiefel, 2006). A decade later, the district had substantially equalized spending across schools, but high poverty schools continued to have lower proportions of more experienced teachers (Rubenstein, Schwartz, & Stiefel, 2006; Sugarman, 2002).

In 1999, several California organizations filed a school funding suit, *Williams v. State*, in state superior court on behalf of a class of students attending substandard schools. The complaint cited inadequate, unsafe, and unhealthy facilities, a shortage of qualified teachers, missing libraries, lack of instructional materials, and overcrowded schools, which resulted in a staggered and shortened school year. In August 2004, the parties announced a settlement to:

- provide \$800 million over the next several years for school repairs,
- create a School Facilities Needs Assessment program,
- create standards for instructional materials and facilities,
- require a complaint process for insufficient instructional materials, teacher vacancies, and emergency facilities problems,
- intervene in schools ranked in the bottom 30% on the 2003 Academic Performance Index if schools fail to meet requirements for instructional materials and facilities standards,
- streamline California credentialing for out-of-state credentialed teachers,

- allocate about \$140 million for instructional materials in 2004-2005, and several other provisions (Access Quality Education: California Litigation, 2011).

While the parties were optimistic about the settlement, leaders of some education organizations expressed concern that it might focus too much on compliance and not enough on educating every child plus the amount of the settlement may be insufficient to improve every school and provide books to all children (Access Quality Education: California Litigation, 2011). Since the settlement agreement, California has not even paid half of the Emergency Funds that it promised, leaving more than 700 schools still waiting for funds to repair broken toilets, infestations, battered walls, and clogged sewer lines (School Funding Cases in California, 2011).

Simultaneous to *Rodriguez* and *Williams*, standards-based reforms added impetus to the adequacy litigation. By defining and assessing academic achievement, standards provided courts with judicially manageable criteria for implementing sensible resolutions in cases in which the courts have invalidated state education finance systems. Focus on standards ignited serious discussion of education's basic democratic goals. It also motivated contemporary courts to expand the study of the skills that citizens in a self-governing society need to perform their civic responsibilities (Access Quality Education: California Litigation, 2011).

More recently, the advent of rigorous state accountability plans and the federal No Child Left Behind Act (2001) have pushed the issue of resources and conditions necessary for all students to achieve at high levels to the forefront. Under NCLB, all students are owed a highly qualified teacher, which is defined as a teacher who has met the state's level of "full certification." That certification is awarded to teachers who have

completed all their teacher training requirements. Moreover, the Act stipulates that where a state or district lacks 100% highly qualified teachers, low-income students and students of color may not be disproportionately taught by teachers who are not highly qualified. Just months after the No Child Left Behind Act (NCLB) was signed into law, Rod Paige, the Secretary of Education under George W. Bush, passed regulations that attempted to redefine “highly qualified” to include teachers “participating,” even for one day, “in an alternative route to certification program” (Darling-Hammond, 2013).

In *Renee v. Duncan* (2008), a coalition of parents, students, community groups, and legal advocates, sued the United States Department of Education and the Secretary of Education for violating the teacher quality provisions of NCLB. In the first lawsuit of its kind, the plaintiffs argued that a Department regulation had created a major loophole in NCLB that defied the will of Congress and harmed students nationwide by defining teachers-in-training enrolled in alternative route teacher certification programs as “highly qualified teachers.” The Department’s regulation allowed alternative route trainees only making “progress toward full certification” and still in training to be deemed “highly qualified.” As a result, students attending low-income, high-minority schools were being disproportionately taught by interns still in training and working toward full certification (Public Advocates, n.d.).

In July 2009, the Ninth Circuit Court of Appeals issued a 2-1 decision in *Renee v. Duncan*. While the trial court upheld the Department interpretation of the statute, the appeals court did not even reach the substantive issues since they held that plaintiffs had not shown sufficient legal injury to qualify them to hear the case. The reasoning arose from the ambiguous NCLB definition of “highly qualified,” which leaves it to the states

to determine the requirements for “full state certification.” The state, even in the absence of the challenged federal regulation, could decide that teachers participating in alternative internship programs held credentials. The U.S. Court of Appeals for the Ninth Circuit ruled that the plaintiffs lacked standing to challenge the regulation (*Access Quality Education: California Litigation*, 2011). The plaintiffs subsequently filed a petition for rehearing.

In an unusual reversal, the Ninth Circuit Court of Appeals revoked its earlier decision and accepted jurisdiction for the *Renee* case. In October 2010, the court ruled that intern teachers cannot be labeled “highly qualified” under NCLB standards. Subsequently, however, the U.S. Department of Education modified its regulations and, in essence, reversed the Ninth Circuit’s ruling, which stemmed from statutory and regulatory interpretation (*School Funding Cases in California - National Education*, 2011).

Recent Research on Intra-District Funding Inequities

Recent research has started to identify the nature of intra-district spending patterns. These studies are mostly limited to a few states or individual districts where school-site expenditure data have been available, which includes California, Ohio, and Texas, selected cities in New York State, and the city of Chicago (Baker & Welner, 2010). None of the mentioned studies addresses more broadly the level of inter-district disparities across states and school districts. This is important because the current policy arguments directly implicate the relationship between intra-district and inter-district disparities. Some researchers and advocates have begun to argue that intra-district disparities are more serious than any remaining inter-district disparities. Carr, Gray, and

Holley (2007), for example, stated that the average spending in higher-poverty districts in Ohio has increased over time at a rate faster than in lower-poverty districts. The researchers presented cursory analyses to support these contentions though they failed to explore in any depth whether these differences are consistent across districts. Instead, they moved quickly from their broad findings to the argument that the state of Ohio has met its state obligation and that the remaining focus should be on intra-district inequities.

A highly publicized report on school finance reform from the Center for Reinventing Public Education (2008) presented more alarming claims. The report stated that current intra-district studies have questioned the importance of district-level spending differences, showing that there is more variation in spending within than between districts (Hill, Roza, & Harvey, 2008). The researchers' only reference to the belief that intra-district inequity is a greater national problem than inter-district inequity is of a study by Roza, Guin, Gross, and Deburgomaster (2007). These researchers made a national policy argument because previous research has documented intra-district inequity as the greater problem. The weakness here is that Hill, Roza, and Harvey mention only one piece, coauthored by Roza and considered only Texas data, not national data or data on any state other than Texas. A more systematic collection of data is needed.

In the same report, Hill, Roza, and Harvey cited the findings of Rose, Sonstelie, and Reinhard (2006) on intra-district teacher salary disparities in California. Again, they carried these findings to the remainder of the country, but they offered no grounds to substantiate their view that what happens in California happens to some level in every other state and every large district. Interestingly, the nearly concurrent study by Roza and her coauthor used more deliberate wording. For example, Roza, Guin and Davis

(2008) stated simply “Several studies give cause for concern by demonstrating that spending differences among schools within districts at times exceed spending differences across districts” (p. 10). The researchers’ statement recognized the limited nature of their Texas study. These publications suggest that intra-district disparities “at times” exceed inter-district disparities. On other occasions, Roza and Hill (2004) have argued that persistent inter-district disparities may exist but are relatively unimportant.

The literature review highlights the extremely shallow depth of the current research base that might be used to identify the relative sources of school-level funding disparities. Studies of intra-district disparities are mainly confined to a few states or individual districts where school-site expenditure data have been available (Baker & Welner, 2010). Despite the fact that state school finance policies are idiosyncratic, studies having dubious validity from select locations have been extrapolated by leading researchers and advocates to have broader implications for intra- and inter-district disparities in other states.

The field of intra-district study is a case-based endeavor; however, certain spending patterns emerge. First, studies conducted at the national, state, and district levels consistently find considerable resource disparities across schools (Burke, 1999; Hertert, 1995). Second, while the results across studies are somewhat mixed, it is typical to find significantly higher expenditures in schools with students who may be more expensive to educate, such as poor and minority children (Rubenstein, Schwartz, Stiefel, & Amor, 2007). At the same time, studies consistently find less experienced and less educated teachers along with lower average teachers' salaries in high-poverty, high-minority, and low-performing schools (Clotfelter, Ladd, & Vigdor, 2005; Iatarola &

Stiefel, 2003; Lankford, Loeb, & Wykoff, 2002; Roza & Hill, 2004; Stiefel, Rubenstein, & Berne, 1998). Third, school-level disparities often seem to occur as a consequence of policies governing the distribution of teachers across schools rather than from decision making within individual schools (Rubenstein, Schwartz, & Stiefel, 2004).

Some conclusions are evident from the literature. There is a consistent pattern observed in large district school allocations. Schools with higher proportions of poor and minority students have teachers who earn lower salaries as a result of their lower levels of education, experience, and credentials. This pattern emerges from district policies that typically allocate positions rather than dollars and teacher transfer policies that allow senior teachers priority in hiring when vacancies occur. Much of the current thinking on how to change this pattern focuses on intra-district student weighted formulas, intra-district dollar rather than position budgets for schools, and funding for schools that bypasses, or simply passes through, districts from states (Rubenstein, Schwartz, & Stiefel, 2006). The evidence on resource distribution after the initiation of changes in allocation formulas is insufficient.

Though little evidence directly comparing school-level and district-level disparities exist, the resource disparities found across schools within districts are often large and occasionally larger than the more widely known disparities across districts (Rubenstein, Schwartz, & Stiefel, 2006). These disparities show schools with greater student need often find themselves disadvantaged relative to other schools in the same district. Overall findings suggest that districts have different inequities. Many variations followed no clear pattern. However, the almost universal practice of averaging teacher

salaries masked the inequities in teacher quality that consistently impacted the poor and low-performing schools.

The growing availability of school-level personnel data have facilitated more comprehensive analysis of potential quality/quantity trade-offs by focusing on the number of staff members employed in schools (Miller & Rubenstein, 2007). A common finding in research examining the distribution of teachers is that high-poverty schools have more teachers relative to pupils but that these teachers are less experienced and less educated and, thus, lower paid (Rubenstein, Schwartz, & Stiefel, 2006). This pattern repeats across several years, as well as across a wide variety of districts (see, for example, Ginsburg, et al., 1981; Owen, 1972; Roza and Hill, 2004; Rubenstein, Schwartz, & Stiefel, 2006; Stiefel, Rubenstein & Berne, 1998; Summers & Wolfe, 1976). Research suggests the pattern occurs as a result of allocation formulas that primarily distribute teacher positions rather than dollars to schools combined with teacher sorting across schools.

California's class size reduction program of the late 1990s provides an opportunity directly to observe potential trade-offs between teacher quantity and teacher characteristics (Rubenstein, Schwartz, & Stiefel, 2006). Following a state-funded class size reduction effort in grades K-3, the gap between schools serving the highest and lowest proportions of low-income students with respect to the percentage of fully credentialed K-3 teachers increased from 2% to 17%. A similar, though less dramatic, widening of gaps occurred in the percentage of teachers with only a bachelor's degree (Reichardt, 2000; Rubenstein, Schwartz, & Stiefel, 2006). Note that these analyses are the result of teacher movement both within and across districts. Approximately twice as

many teachers moved across districts as compared to those changing schools within the district (Schwartz, Rubenstein, & Stiefel, 2009). While Krueger (2003) estimates that the long-term monetary benefits of class-size reduction are greater than the costs (using effect size estimates from Tennessee's STAR experiment), Harris (2002) argues that these estimates do not consider changes in teacher distribution resulting from large-scale class size reduction. He suggests that raising teacher salaries to improve teacher quality may be a better way to increasing student performance.

As the largest district in the country and one in which school site resource data have been publicly available since 1995-96, New York City has increasingly become a focus of research on school-level resources. Work by Iatarola and Stiefel (2003) and Rubenstein, Stiefel, and Schwartz (2006) have found that elementary schools with higher proportions of students with exceptional needs (with the exception of immigrant status) tend to have more teachers (with lower salaries) per student with similar results for schools with higher proportions of minority students in both elementary and middle schools. Lankford, Loeb and Wyckoff (2002) used data for all of New York State to investigate teacher sorting and reported that urban areas have fewer qualified teachers than nonurban areas. They also found that within large urban districts, low-performing, poor, and minority children are more likely to have teachers who are not licensed and who have failed licensure exams.

The existing studies on school-level resource disparities in New York City and elsewhere have reached remarkably similar conclusions. First, though limited evidence directly comparing school-level, and district-level disparities exist, the resource disparities found across schools within districts are usually large and, in some cases, may

be larger than the widely-recognized disparities across districts (Stiefel, Rubenstein, & Schwartz, 2006). Second, these disparities are perversely related to school and student characteristics; schools with greater student need often find themselves disadvantaged relative to other schools in the same district, especially in terms of the quality of teacher resources (Miller & Rubenstein, 2007). Third, these patterns of resource disparities are often the result of intra-district funding formulas that allocate positions, rather than dollars, to schools, and teacher sorting patterns that allow higher paid teachers to opt into lower-need schools without financial ramifications for schools to which they transfer (Schwartz, Rubenstein, & Stiefel, 2009).

Summary

Though there is a substantial amount of research on inter-district equity, the research on intra-district resource allocation is relatively scarce. Concerns regarding the equitable distribution of resources and the impacts of resources on student outcomes have driven research almost exclusively at the federal and state levels. Too little is known about the decisions districts make when determining how to allocate resources to schools and students. Below the district level, schools are supported by the same state aid package and local tax base. Formulas to allocate dollars to schools are not designed to address disparities in wealth (Rubenstein, Schwartz, Stiefel, & Amor, 2007), which can have implications for equity at the school, program, and classroom level. While state and local policies may be intended to provide for all students equitably, institutional, political, and economic factors can impede this goal (Picus, 1995; Roza & McCormick, 2006).

The increasing emphasis on schools as the locus of accountability efforts, combined with better data availability, has led to increased attention in recent years to the

amount and allocation of resources to the school itself. Understanding the allocation of resources to schools within a district is necessary to the extent that schools produce learning. The existing literature shows a pattern of unequal resource distribution in large district school allocations. Financially driven resources, such as class size, the quality of teachers, curriculum, and learning materials can vary considerably from one school and even one classroom to another. However, researchers have not been able to document that financially driven resources conclusively will lead to higher student performance. The uncertainty is due, in part, from the lack of agreement regarding the meaning of improved performance (Picus, 2001). More research is needed to determine whether schools receive adequate resources to achieve ambitious performance standards. Moving beyond district-level analyses to school-level analyses will more accurately assess the resources available to students and identify any patterns of inequitable distribution of resources. This can assist in the development of school funding policies that provide resources targeted to schools in which students have trouble reaching performance targets (Schwartz, Rubenstein, & Stiefel, 2009).

Some research suggests that intra-district disparities may be unfair to high poverty schools. Since much of this research supposes that student socioeconomic status (SES) has the greatest impact on student performance, perhaps additional resources should be devoted to governmental programs outside of education to mitigate the problems created by low SES. These are complex issues for which answers are not readily available because of inadequate data. Insufficiently educated low-income students can produce costly consequences. As a result, intra-district inequities may likely be the next focus for fiscal equity litigation in state courts (Owings & Kaplan, 2010). It is essential, therefore,

to move beyond district-level analyses to more accurately assess the resources available to students in their schools.

Even though many educators believe that additional resources will lead to higher student performance, it is still unclear how best to spend dollars to achieve this goal. Consequently, demands for more money, absent a well-reasoned description of how the money will be used, do not build confidence that the money itself will make a difference in student performance. Regardless of what impact additional funds might have, existing resources must be used as efficiently as possible. Indeed, recent studies have shown that the bulk of new dollars provided to schools over the past 40 years was not spent on staff for core instructional programs (Lankford & Wyckoff, 1995; Rothstein & Miles, 1995).

The nation's school systems have, for too long, failed to ensure that education funding consistently promotes strong student achievement. After adjusting for inflation, education spending per student has almost tripled over the past four decades (Boser, 2011). Nonetheless, while some states and districts have spent their additional dollars wisely—and thus shown significant increases in student outcomes—overall student achievement has largely remained flat (Boser, 2011). While some forward-thinking education leaders have taken steps to promote better educational efficiency, most states and districts have not done nearly enough to measure or produce the productivity gains the education system so desperately needs.

Chapter 3: Research Method

Introduction

The literature review revealed that while the distribution of resources across school districts is well studied, relatively little attention has been paid to how resources are allocated to different schools within those districts. These studies are mostly limited to a few states or districts in which school-site expenditure data have been available, which include California, Ohio, and Texas, selected cities in New York State, and the city of Chicago (Baker & Welner, 2010; Carr, Gray, & Holley, 2007; Roza, Guin, Gross, & Deburgomaster, 2007). Furthermore, very little research has analyzed the equity of expenditures at the student-level. This gap in the literature stems from the limited availability of student-level data and the complexity of combining raw datasets. This study seeks to address that need.

The purpose of this chapter is to review the data and methods used to answer the following research questions:

1. Do differences exist in the availability to and distribution of resources among different high schools within the same division?
2. What is the extent to which the differences are associated with student characteristics that have been identified with higher costs of learning?
3. Is there a relationship between spending and academic achievement?

In this study, the researcher analyzed intra-district variations in spending and achievement between two high schools in two school divisions, one urban and one suburban, in the Commonwealth of Virginia. The high schools in each school division with the highest percentage and the lowest percentage of students eligible for free and

reduced-price lunch were included in the study. This indicator is often used as a proxy for childhood poverty. Studying the distribution of resources in these schools utilizing relatively new, detailed information on school funding and student characteristics provided insight into the magnitude of disparities in resources, schools, and student characteristics. Additionally, the data were helpful in determining whether or not there was a direct academic-achievement benefit from supplementary funding.

The remaining sections of this chapter will restate the purpose of the study, discuss measuring equity in intra-district funding, describe the research design and rationale for its selection, describe the steps taken to conduct the study, and provide an explanation of how the researcher intends to analyze the data.

Purpose Statement

The debate as to how educational spending affects achievement has persisted for decades. Over the past 40 years, reforms adopted in most states have significantly improved how evenly funding is distributed across school districts in a state (Roza, Guin, Gross, & Deburgomaster, 2007). Although reforms have been successful in reducing disparities among districts, there is ample evidence that funding varies across schools within the same district (Biddle & Berliner, 2002; Owings & Kaplan, 2010; Roza, Guin, Gross, & Deburgomaster, 2007; Rubenstein, Schwartz, & Stiefel, 2006). Subsequently, concerns have surfaced regarding the impact on the student's education if his school receives fewer resources than that of others within the district and the extent to which the differences are associated with individual student characteristics.

Mounting evidence suggests that districts regularly distribute different amounts of funding to schools, even when schools accommodate the same types of students. Moving

beyond district-level analyses to school-level analyses provides a more accurate assessment of the resources available to students in their schools. Given that education is produced by teachers within schools rather than districts, the caliber and quality of resources received by the school itself could be critical to determining student achievement (Darling-Hammond, 2000). A better understanding of current resource allocation can assist in the development of school funding policies that provide resources more opportune, especially to schools in which students have trouble reaching performance goals (Schwartz, Rubenstein, & Stiefel, 2009).

In this study, the researcher utilized school-level expenditure data to examine the funding and resources available to students within and between two Virginia school divisions and determine what, if any, disparities exist in the availability to and distribution of resources among different schools within the same district. Additionally, the researcher analyzed the extent to which the differences are associated with student characteristics identified with higher costs of learning, such as students eligible for free or reduced-price lunch and students eligible for bilingual education programs. By concentrating on two divisions, the data provided the extent of differences or inequity that exists. The overarching goal is to examine equity, particularly vertical equity, in the distribution of resources and, ultimately, to improve the efficiency of how resources are adjusted to promote student performance (Schwartz, Rubenstein, & Stiefel, 2009).

Measuring Equity in Intra-district Funding

Prior work in the area of intra-district funding has exposed the difficulty in collecting relevant data that captures school by school variation in staffing costs and supplemental costs (Berne & Stiefel, 1984; Roza, 2005; Stiefel, Rubenstein & Berne,

1998). Often, the literature on school-level data comes from district-directed policy initiatives, such as the data collection systems established in the state of New York (Houck, 2011). Researchers have endeavored to categorize school level data by function code or other organizational schemes, with little noticeable effect (Odden, 1998).

To a large extent, the existing empirical work on intra-district finance is set in a framework of horizontal, vertical, and equal opportunity equity. Horizontal equity specifies that equally situated students should be treated equally and, therefore, in an analysis of spending, investigators often study general education operating revenue, separating it from categorical revenue, which is directed to particular student groups (Iatarola & Stiefel, 2003). The operating revenue is intended to be allocated as a base upon which resources for special needs are supplemented (Iatarola & Stiefel, 2003). Many statistical measures can be used to determine the degree of horizontal equity in resources. Most researchers rely on the measures described by Berne and Stiefel (1984) to assess horizontal equity in school funding (Toutkoushian & Michael, 2007). As noted by Berne and Stiefel, these measures are statistics that capture the spread in the distribution of funding/resources. Perfect equity would exist when every student in the distribution receives the same entity, such as total local and state general revenues, total current operating expenditures, and instructional expenditures. Horizontal equity measures assess how far the distribution is from perfect equity. Modifications in dispersion are then interpreted as movements toward horizontal equity (Toutkoushian & Michael, 2007).

Following Berne and Stiefel's framework, Hertert (1995) and others (Stiefel, Rubenstein, & Berne, 1998) have used the range, restricted range, and federal range ratio,

as well as the coefficient of variation, to assess levels of horizontal equity. Burke's 1999 study deviates from the traditional use of the Berne and Stiefel framework, instead using the Gini coefficient to examine differences among inter-state, intra-state, and intra-district funding disparities using a national data set. Adopting a methodology from Lambert and Aronson (1993), Burke assesses state-level Gini coefficients to account for inter- and intra-district disparities. Lambert and Aronson use Gini coefficients and concentration indexes in analyzing redistribution and re-ranking effects of taxes with respect to a population of income earners. Burke finds that intra-district Gini coefficients occasionally demonstrate significant levels of inequity, while state and district level examinations reveal relatively stable Gini coefficients that represent horizontal equity.

Vertical equity focuses on the treatment of differently situated students, assuming that students require different amounts of resources to achieve set levels of performance (Iatarola & Stiefel, 2003). In order to measure vertical equity in spending, researchers include categorical revenue with general education operating revenue and designate school and student characteristics that have been identified with higher costs of learning, such as students eligible for free or reduced-price lunch, students eligible for bilingual education programs, and students eligible for gifted programs (Iatarola & Stiefel, 2003). Frequently, multiple regression analysis, with total spending as the dependent variable and characteristics of pupils as the independent variables, is used to measure vertical equity. Multiple regression is a flexible method of data analysis that is appropriate whenever a quantitative variable is to be examined in relation to any other factors (Cohen, Cohen, West, & Aiken, 2003). Contingent upon the data available and the nature of the research questions posed, vertical equity analysis can utilize quantile

regression, a technique that estimates relationships at differing percentiles of the dependent variable (Koenker & Hallock, 2001).

Another method of analysis is the use of a weighted student index (WSI) to compare the equity of the intra-district distribution of funds (Carr, Gray, & Holley, 2007; Miles & Roza, 2006; Roza & Hill, 2004). Under WSI, each school would receive funding based on the characteristics of the students who attend the school. A school with a higher percentage of students who need more services (such as high poverty students) would receive more funding per student than a school with students requiring fewer services. The WSI method of distribution of funds from the district to the schools is more in line with the way most states provide funds to the districts (Woodworth & Ritter, 2012).

Equal opportunity in resource allocation is conceptualized in two ways. A neutral formulation postulates that an equal opportunity exists if there is a lack of association between resources and characteristics associated with historically disadvantaged groups, while affirmative action formulation postulates that equal opportunity is achieved if there is a positive association in the relationship (Iatarola & Stiefel, 2003). For both formulations, multiple regression analyses are used to measure the extent to which characteristics of students or schools explain variations in resources.

As expectations rise for students and teachers to perform at higher levels, and for schools to guarantee the success of all students, the question of how best to support this reform through the effective and efficient allocation of resources becomes even more critical. Research efforts in recent decades have helped broaden our understanding of the role of school resources in student outcomes and how the distribution and use of

resources might be improved. However, the relationship between resources and student performance is still not clear. Equity in the distribution of performance is not as commonly measured as equity of resource distributions (Iatarola & Stiefel, 2003). Such measures are useful, however because ultimate concern over resource distribution is tied to concern over the distribution of performance.

While disparities in schools within small districts (any public school district with fewer than 2,500 students) are likely to be relatively modest, intra-district disparities in districts with many schools can be considerable (Rubenstein, Schwartz, & Stiefel, 2006). To understand allocation practices from districts to schools, the researcher would ideally analyze resource allocation patterns in all of the districts in a state or country. The lack of data, or of reliable data, and the lack of access to such data limits the scope of this analysis. Subsequently, the researcher will focus on two school divisions within the same state. The sample is restricted to two divisions with enough high schools to provide an adequate sample to make inferences about the association between funding and resource allocation patterns and student characteristics. Also, these divisions have heterogeneous student populations. Without variation of student type across schools, there would be no observable factors to co-vary with the dependent variables and allocation decisions would seem random (Miller & Rubenstein, 2007).

Methodology

In this study, the researcher utilized school-level expenditure data to examine the funding and resources available to students within two Virginia school divisions and determine what, if any, disparities exist in the availability to and distribution of resources among different schools within the same division. Additionally, the researcher analyzed

the extent to which the differences are associated with student characteristics identified with higher costs of learning, such as students eligible for free or reduced-price lunch and students eligible for bilingual education programs (Iatarola & Stiefel, 2003; Roza, Guin, Gross, & Deburgomaster, 2007).

While there are many ways to conceptualize and measure intra-district equity in school financing, the study employed a pragmatic approach that focused on collecting, analyzing, and mixing both quantitative and qualitative data in a single study. This design combined the strength of both quantitative and qualitative research approaches and enabled the researcher to address a wider range of research questions. The central premise is that the use of quantitative and qualitative approaches, in combination, provides a better understanding of research problems than either approach alone and produces stronger evidence for a conclusion.

The study employed a convergent design to compare findings from qualitative and quantitative data sources. This involved collecting both types of data at roughly the same time; assessing information using parallel constructs for both types of data; separately analyzing both types of data; and comparing results through a side-by-side comparison in a conversation of data. This method was useful in identifying and understanding confirmations and contradictions between the quantitative results and qualitative findings. The researcher recognizes that each method has its limitations and that the different approaches can be complementary.

While there are many ways to conceptualize and measure intra-district equity in school financing, this study adapted Berne and Stiefel's (1984) inter-district framework in which three equity concepts are analyzed: horizontal equity, vertical equity, and equal

opportunity. More than 30 years later, these measures continue to be used in most studies of horizontal and vertical equity.

When exploring issues of horizontal equity (addressed in the first research question), the education research field and other disciplines have relied on a variety of measures, each of which pursues different, and not always consistent, means of gauging the magnitude of unequal distribution of resources. In so doing, the measures represent different aspects of the inequality that can exist in the distribution (Paternick, Smerdon, Fowler, & Monk, 1997). Two common measures of horizontal equity are the Gini Index and the McLoone Index.

The McLoone Index was created to provide a measure of the bottom half of a distribution, to indicate the degree of equality only for observations below the 50th percentile. It has some potentially objectionable properties. For instance, it does not use all information, discarding the observations above the median. Certainly there is a substantial difference between a distribution where the higher values lie just above the median and one where some observations lie far beyond the median. While the McLoone Index has thus far been concerned primarily with school finance inequity measurement, there are similar measures with broader application.

Originally, the researcher was going to use a Gini coefficient to measure horizontal equity, but its proper use and interpretation are controversial. Gini coefficients are simple, and this simplicity can lead to oversights and can confuse the comparison of different populations. Also, the Gini coefficient has a downward bias for small samples. To address these problems, the researcher employed an alternative approach to assessing horizontal equity and used an analysis of variance (ANOVA) for purposes of determining

total variability between schools within a data set. If the overall ANOVA were significant, follow-up tests were conducted. These follow-up tests involved a comparison between pairs of group means. SPSS calls these tests post hoc multiple comparisons. SPSS Statistics is a software package used by the researcher for statistical analysis. In addition to an ANOVA, a Pearson Correlation was used to measure the strength and direction of the relationship between two variables.

The second research question focuses on the concept of vertical equity. Vertical equity is the appropriate unequal treatment of unequals (Odden & Picus, 2008) and is based on the assumption that students who bring certain educational needs to the classroom require additional resources to address those needs within the educational process. Vertical equity, though simple in theory, is difficult to implement due to controversy about the reasons why some students, districts, or programs should receive additional resources. However, some of the agreed-upon reasons for unequal treatment of children include disabilities, low-income backgrounds, and limited English language proficiency (Baker & Duncomeb, 2004; Berne & Stiefel, 1984; Carey, 2002).

Unfortunately, no statistic exists that directly measures the vertical equity of a system. Instead, one of two approaches can be used. An analyst can assign “weights” to students with special needs, adjust the funding in accordance with those weights, and measure the equity of the system using the usual horizontal equity statistics. This approach, however, can only be taken when good data exists to specify the weights, which does not yet exist for all districts. The second method involves removing from the equation all the programs that address special needs and assessing the horizontal equity of the remaining programs (Odden & Picus, 2008).

To avoid the problems inherent in assigning “weights” to students with particular needs, adjusting the funding by those weights, and measuring the equity of the system using the usual vertical equity statistics, the researcher used the second method described above. This essentially provided a stronger horizontal equity analysis because it considers the equity of the programs that are supposed to possess horizontal equity.

The third equity concept that was addressed (in the third research question) deals with the relationship between school expenditures and student outcomes. By linking school-level expenditures with school-level achievement data, the relationship between expenditures and outcomes can be explored more effectively than they were in earlier studies, which had to relate district-level expenditures to different outcome measures.

Procedures and Data Analysis

Data for the study were drawn from sources publically available in the field, such as the state report cards by school division, information for the particular localities from the Virginia Department of Revenue, and information obtained from the State Department of Education as well as the National Center for Education Statistics.

The main methods used for collecting the qualitative data involved direct interaction with individuals in a group setting and continuing discussions through email correspondence and telephone conversations. To obtain the financial and descriptive information needed from the two divisions being investigated, the researcher conducted face-to-face interviews with various officials within the divisions. The main advantage of the face-to-face interview was the presence of the interviewer, which made it easier for the respondents to either clarify answers or ask for clarification for some of the items on the questionnaire. Nonetheless, several follow-up conversations were necessary to

confirm understanding of data and validate the researcher's interpretation of the data. Conditional to the divisions' participation, the researcher was obligated to provide anonymity of the people and the divisions involved in the study. Since anonymity was necessary to the study protocol, any identifying information of individual subjects (e.g., name, school division, Email address) is not included in citations or references.

A questionnaire was used to solicit information on student performance and demographics, teacher characteristics, school enrollment, and school-based expenditure reports. These reports included the total amount of money that each division received from the state, separated by the foundation funding amount and the categorical funding additions. The categorical funding amounts included in this study were the supplemental resources for disadvantaged students (economically disadvantaged students and Limited English Proficient students). The reason for focusing on these students is that they are the groups traditionally allocated sizeable categorical funding with little oversight to guarantee that they receive the benefits of those funds.

Once the researcher obtained the data from the two divisions and the high schools within those divisions, the researcher further examined the schools with the highest and the lowest percentage of students qualifying for free or reduced-price lunches in each division. Students living in poverty are indexed by participation in the federal free and reduced-price lunch program. To be eligible for free lunch under the National School Lunch Act, students must live in households earning at or below 130 percent of the Federal poverty guidelines. To be eligible for reduced-price lunch, students must live in households earning at or below 185 percent of the Federal poverty guidelines (National School Lunch Program, 2013).

The database reports included the financial allocations to schools by district. Thus, for each school, the researcher knew the nontargeted, or noncategorical, allocations made for each student who attends the school as well as how much the school received for the targeted groups of students (students eligible for free or reduced-price lunch and students eligible for bilingual education programs). The researcher examined the differences between schools in noncategorical resources by comparing each school's per-pupil funding to each other and the reported average per-pupil funding in the division.

Equity is prone to two alternative and supplementary definitions: horizontal equity and vertical equity. As mentioned earlier, horizontal equity refers to funds allocated equally among schools that share certain characteristics. This definition does not assume that all schools have comparable needs; rather, it refers to the philosophy of "equal treatment of equals." For example, general education spending provides an equal base for all students. Thus, horizontal equity could provide a valid criterion upon which to evaluate the equality of general education funding (Berne & Stiefel, 1994).

Vertical equity is the notion that students should be treated according to their different learning needs and characteristics. This is the principle of "unequal treatment of unequals" and implies differently situated children should be treated differently (Levacic, 2008). The concept of vertical equity stresses that if students have different educational needs, an equitable state funding system should provide different levels of funding to meet these needs (Rubenstine et al., 2000).

In this study, the researcher examined horizontal and vertical equity by looking at the variations in per-pupil funding levels from the same model. The researcher considered the effect of two independent or classification variables (e.g., social class) on

a set of dependent variables and assessed the relationship using a one-way analysis of variance (ANOVA). The one-way ANOVA allowed the researcher to analyze mean differences between two groups on a between-subjects factor. A between-subjects factor divides research participants into different groups such as high-SES and low-SES. For a one-way ANOVA, each individual or case had scores on two variables: a factor and a dependent variable. The factor divided individuals into groups while the dependent variable differentiated individuals on some quantitative dimension. The ANOVA *F*-test evaluated whether the group means on the dependent variable differed significantly from each other. An overall ANOVA was conducted to assess whether means on a dependent variable were significantly different among groups.

The General Linear Model procedure computed an effect size index (eta square). Eta Square ranges in value from 0 to 1. An eta square value of 0 indicates that there are no differences in the mean scores of groups. A value of 1 indicates that there are differences between at least two of the means on the dependent variable. In general, eta square is interpreted as the proportion of variance of the dependent variable that is related to the factor. Eta square of .01, .06, and .14 are, by convention, interpreted as small, medium, and large effect sizes, respectively.

A correlation between sets of data were used to measure how strongly they are related. The most common measure of correlation in statistics is the Pearson product-moment correlation coefficient (Laerd Statistics, 2013.). It shows the linear relationship between two sets of data. The Pearson product-moment correlation coefficient is a measure of the strength of the linear relationship between two variables. It is often referred to as Pearson's correlation or simply as the correlation coefficient (*r*). Pearson's

r can range from -1 to 1. An r of -1 indicates a perfect negative linear relationship between variables, an r of 0 indicates no linear relationship between variables, and an r of 1 indicates a perfect positive linear relationship between variables (see Table 1).

When computing Pearson's r , significance can be a controversial topic. When there is a small sample, for example only a few schools, moderate correlations may misleadingly not reach significance. Conversely, when there is a large sample, for example many schools, small correlations may misleadingly appear to be significant. Some researchers think that significance should be reported but perhaps should receive less focus when it comes to Pearson's r .

Table 1

Guidelines for Interpreting Pearson's Correlation Coefficient

Strength of Association	Coefficient, r	
	Positive	Negative
Small	.1 to .3	-0.1 to -0.3
Medium	.3 to .5	-0.3 to -0.5
Large	.5 to 1.0	-0.5 to -1.0

Note. Adapted from *Laerd Statistics*, 2013.

According to researchers, understanding spending at the school level is a critical factor in improving student performance (Wenglinsky, 1998). With increased attention focused on policies and data related to resources within schools, it is likely that a new series of equal opportunity issues will surface at the school level that may include concerns about expenditures and outcomes with respect to race and ethnicity (Berne & Stiefel, 1994).

For this study, equal opportunity is defined in terms of the relationship between school characteristics and student performance. With respect to student performance,

equity is defined as the relative absence of group differences when student performance is analyzed by gender, family background, race, and ethnicity, or any other characteristic that is not related to academic achievement. This type of equity can be studied by comparing data from different student groups in a single school. In this study, the data included student-teacher ratio, school organization/curriculum (e.g., college-prep classes, advanced placement courses), teacher credentials, and daily attendance (students and teachers). The outcome variables used were mathematics, reading, and science test scores. The researcher used standardized achievement measures (such as Standards of Learning tests) to assure that scores are in the same metric and to interpret the between-school variances as the percentage of variation in student achievement accounted for by schools.

The researcher postulated equal opportunity in performance in two ways. A neutral formulation suggests that an equal opportunity exists if there is a lack of association between student performance and characteristics associated with historically disadvantaged groups, while an affirmative action formulation suggests that an equal opportunity is achieved if there is a positive association in the relationship (Iatarola & Stiefel, 2003). For both formulations, correlation analyses and multiple regression analyses were used to measure the extent to which characteristics of students or schools explained variations in performance. The multiple correlation (R) is a strength-of-relationship index that indicates the degree that the predicted scores are correlated with the observed scores for a sample. Multiple regression analyses are extensions of correlation analyses. The main advantage of a multiple regression approach is that it allows the researcher to examine the relationship between one dependent variable

(student performance), and more than one independent variables (student characteristics, family backgrounds, resources, and teachers).

Data Constraints

Although the data amassed from the divisions and the state, and the methods employed to analyze these data, are helpful in evaluating resource allocation among schools, there are a number of ways in which the data and methods used in this study are lacking. These include the sample size of the divisions in which the analysis was conducted and the lack of school-level data on spending by the schools.

Transparency of school funding helps districts and schools plan more strategically and make better decisions about the distribution of resources. Too often, however, school-level reporting and the budget building process lack clarity, preventing school leaders and the community from seeing an accurate picture of resource use. One of the two divisions in the study provided school-level reporting that allowed the researcher to trace funds down to the level of individual schools. The other division did not report expenditures for each school. Budgets for individual schools were not disclosed. Operating budgets were aggregated at the division level, representing a combination of departments. This limited the transparency of spending on individual categorizations such as instructional supplies, professional development, transportation, and facilities management.

Due to the small number of schools in the two divisions, it was not possible to conduct the type of analysis most commonly used in the evaluation of vertical equity in larger districts, whereby the impact of individual student needs (e.g., ELL status, low-SES status) can be considered separately as coefficients in multiple regression equations.

Additional data on human capital resources would also inform this study, but those were not readily available. Although enhanced data would make for a more robust analysis, the findings presented in the following chapters are compelling and provide a template for school districts to use in considering how various financial and human capital resources are distributed among schools and students.

Summary

The purpose of this chapter was to describe the research methodology of this study, describe the procedure used in collecting the data and provide an explanation of the statistical procedures used to analyze the data. The Berne and Stiefel (1984) methodological framework was used as a guide for the equity analysis of schools within two Virginia school divisions. Horizontal equity, vertical equity, and equal opportunity were addressed. Common analysis of variance statistical techniques were used as were correlation and regression analysis procedures with the end goal to amend equity in the distribution of resources and, ultimately, to improve the efficiency of how resources are adjusted to promote student performance.

Chapter 4: Results

Introduction

Students in rural, suburban, and urban communities across the country face significant obstacles to critical educational resources. The nation's lowest performing schools are often in schools and districts where poverty is concentrated, populations mobile, and resources and support scarce. If these challenges are left unaddressed, a state may fail in its obligation to provide equitable and adequate resources to a school district while still holding the district accountable for the low performance of the enrolled students (National Opportunity to Learn Campaign, 2011). Two claims are being increasingly made around school finance: that states have largely met their obligations to resolve disparities between local public school districts, and that the bulk of remaining disparities are those that persist within school districts (Baker & Welner, 2010). In this study, the researcher examines the basic contention of within-district inequities.

Many studies examine resource distribution across school districts; however, a shortage of information exists regarding resource distribution to individual schools within those districts. Districts should be clear about how much money each school should have before reorganizing spending or increasing school-level control over dollars. As districts review their spending to support school-level reform and improvement in student achievement, they need to evaluate the allocation to individual schools to determine if it is equitable and adequate to meet the needs of each school's student population. Schools can monitor their funding and resources to ensure that they are distributed appropriately to academic instruction and student needs.

This study explored intra-district spending and resource distribution within two school divisions in Virginia to determine what, if any, disparities exist. Additionally, the study examined the extent to which the disparities are associated with student characteristics identified with higher costs of learning, such as students eligible for free or reduced-price lunch and students eligible for bilingual education programs. The eventual goal is to amend equity, particularly vertical equity, in the distribution of resources and to improve the efficiency of how resources are adjusted to promote student performance.

This study compared students and schools within an urban school division and students and schools within a suburban school division of Virginia (see Table 2). On average, the urban public schools served more low-income students than their suburban counterparts due to a higher concentration of low-income families. In the urban division, there were higher percentages of Black and Hispanic students than in the suburban division. The population of students in the suburban schools varied considerably. The suburban schools were located in residential areas on the outside of large metropolitan areas and compared to many of the urban schools, the suburban schools had higher standardized test scores, college-bound rates, and attendance rates.

Using the percentage of students eligible for free or reduced-price lunch as a proxy for poverty within a school, the researcher identified the high school with the highest and lowest percentages in each division and compared spending in specified budget categories for each school. These categories included, but were not limited to: transportation, facilities, energy, instruction, curriculum and staff development, and school leadership and support.

Table 2

Comparison of Schools by Socioeconomic Status and District Type

School	School Type	Number of Students	Student: Teacher Ratio	Subsidized Lunch (%)	Reported District Spending Per-Pupil (FY13)
Low-SES 1	Suburban	597	14:1	27.39	\$9,738
High-SES 1	Suburban	1166	17:1	13.61	\$9,738
Low-SES 2	Urban	1060	16:1	62.98	\$10,061
High-SES 2	Urban	1648	19:1	38.80	\$10,061

Note. The divisions reported district spending per-pupil. Since only division averages were reported, actual per-pupil expenditures were impossible to compute.

The remainder of this chapter organizes and reports the study's main findings, including the presentation of quantitative (statistical) data and relevant qualitative (narrative) data. The researcher will present the findings of the study in figures and tables and written text. The interpretation and implications of findings will be addressed in Chapter 5.

Findings

Horizontal Equity – Research Question 1

Horizontal equity specifies that students with like characteristics should be treated alike (Ananthakrishnan, 2005). This principle is best applied when comparing resource distributions across equally situated subgroups of students, such as at-risk or high school students. However, this view is not useful given the heterogeneity of most school-age populations. For this reason, horizontal equity is most often used to justify the creation or separation of funding streams specifically meant for compensatory or other purposes

from streams intended for all students (Berne & Stiefel 1999). While horizontal equity appears to be the starting point for allocating resources within the divisions studied, there were several instances in which this goal was not achieved (i.e., administrative salaries, teacher effectiveness, novice teachers, curricula, instructional material).

The low-SES schools spent more per-pupil on administrative salaries than did the high-SES schools (see Table 3). Additionally, the low-SES schools were likely to have more administrators per-pupil than the high-SES schools. The types of school administrator jobs are varied according to school. For the purposes of this study, principals, assistant principals, and deans were all considered part of a school's administration.

Table 3

Comparison of Schools by Administrator Salary and Experience

School	Principal Salary Per-pupil	Average Years Experience	Assistant Principal Salary Per-pupil	Average Years Experience	Dean of Students
Low-SES 1	\$122.82	6	\$113.07	5	NA
High-SES 1	\$80.97	5	\$55.79	8	NA
Low-SES 2	\$85.36	30	\$69.28	18	\$46.89
High-SES 2	\$54.61	14	\$44.42	4	\$30.69

There were differences in the amount of student support provided to the schools. Both of the urban schools were staffed with a College and Career Coach as well as a Graduation Coach. The scope of services allows students in the schools to receive some form of college and career coaching and allows many of the ninth and eleventh-grade

students to receive important information that is relevant to their grade. The Graduation Coach's primary responsibility is to identify at-risk students and help them succeed in school by keeping them on track academically before they consider dropping out.

(personal communication, January 28, 2015).

Both of the low-SES schools in the study had lower student-to-teacher ratios (class size indicator) than the high-SES schools. The smaller number of students makes it possible for teachers to develop stronger bonds with students and be able to conduct more individualized instruction with struggling students. One result of this, however, is that smaller class sizes mean more teachers are needed, and more teachers cost the division more money. Consequently, the total amount spent on teacher salaries (per-pupil) is higher in the low-SES schools than in the high-SES schools (see Table 4). The results of a correlational analysis indicated a very strong negative relationship between class size and teacher salaries, $r(2) = -.960, p < .05$.

Table 4

Comparison of Schools by Student:Teacher Ratio and Teacher Salary Per-Pupil

School	Number of Students	Student:Teacher Ratio	Teacher Salaries Per-Pupil	Reported District Spending on Teacher Salaries (FY13)
Low-SES 1	597	14:1	\$3,389	\$2,023,404
High-SES 1	1166	17:1	\$2,865	\$3,340,356
Low-SES 2	1060	16:1	\$2,866	\$3,037,363
High-SES 2	1648	19:1	\$2,583	\$4,256,235

There were some differences in teacher qualifications between high-SES schools and low-SES schools, including experience, education, and licenses (see Table 5). However, a one-way ANOVA yielded no significant differences between groups in regard to teacher qualifications and school type (Low-SES, High-SES), with the exception of the percentage of teachers with fewer than five years of experience. There was a statistically significant difference between groups regarding the number of teachers with fewer than five years of experience $F(1,2) = 4.94, p = .025$. Post hoc tests were not performed because there were fewer than three groups.

Table 5

Comparison of Schools by Teacher Qualification

School	% Teachers with Bachelor's Degree	% Teachers with Master's Degree	% Teachers with Doctoral Degrees	% Teachers with Provisional Licenses	% Teachers with Fewer Than Five Years of Experience
Low-SES 1	36	59	3	2	28
High-SES 1	38	61	1	1	19
Low-SES 2	38	56	2	5	21
High-SES 2	46	50	1	4	15

There was a sizeable difference in spending on field trips. The high-SES schools spent over twice as much as did the low-SES schools on field trips (\$13,589 vs. \$6,063). In the low-SES schools, money once spent on field trips is being spent to help students prepare for standardized tests (personal communication, October 28, 2014).

This study showed that students in the low-SES schools are underrepresented in the most challenging classes, such as honors and Advanced Placement (AP) courses (see

Table 6). Despite the rapidly growing enrollments in AP courses, large percentages of low-SES and minority students are essentially left out of the AP program. Furthermore, even though the costs of offering AP courses itself are not substantial, the low-SES schools have so few students choosing to take AP courses that rather than allocate a teacher to teach an AP section, they offer many of the courses through The Virtual High School. As a program of the Virginia Department of Education, Virtual Virginia offers online Advanced Placement, world language, core academic, and elective courses to students across the Commonwealth.

Table 6

Comparison of Schools by Advanced Courses Offered

School	AP Courses Offered/ Number of Students	Sections of AP Courses/ Number of Students	Number Students Taking 1+ AP Courses	Honors Courses Offered/ Number of Students	Sections of Honors Courses/ Number of Students
Low-SES 1	10/374	23/374	215	10/332	NA
High-SES 1	15/762	24/762	392	9/790	NA
Low-SES 2		22/333	219	NA	102/1853
High-SES 2		49/1012	526	NA	157/3552

Note. There are no specific standards or universal definition for “honors courses.” Consequently, honors courses may vary widely in design, content, quality, or academic challenge from school to school, and even from course to course within a school (The Glossary of Education Reform, 2013).

Vertical Equity – Research Question 2

Vertical equity specifies that differently situated students should be treated differently (Iatarola & Stiefel, 2003). Thus, the goal is not that educational resources provided per-pupil will be equally distributed but rather that the resources are

proportionally distributed according to differences in student needs (Ananthakrishnan, 2005). This principle recognizes that different types of students may be more or less costly to educate and adjusts inputs and expenditure accordingly. For example, consider that poor students commonly are more expensive to educate than are students from wealthy families. To achieve vertical equity, it is expected that more money will be spent to educate poor students than wealthy students.

Ample evidence shows that almost all students can achieve at high levels if they are taught at high levels (Haycock, 2001; Haycock & Hanushek, 2010). Equally clear is that some students require more time and more instruction to achieve educationally (meet state achievement standards). School districts attain vertical equity if resources are allocated to schools based on the needs of these students. Reported student subgroups who historically have had difficulty meeting state achievement standards are economically disadvantaged students and limited-English-proficient (LEP) students.

Categories of salaries were reviewed to determine their relationship with school type (see Table 7). Due to the small sample size, there were fewer statistically significant results than might have been expected. However, there were correlations between student-to-staff ratio, administrative salaries (per-pupil) and the total amount spent on Guidance Services (per-pupil) and school type. Interestingly, the number of students per staff is negatively correlated with SES. A negative correlation is a good sign, indicating that low-SES schools are more likely to have fewer students per staff.

Table 7

School Per-Pupil Spending on Administrative and Support Staff Salaries

School	Student:Staff Ratio	Total Spent on Administrative Salaries (Per-Pupil)	Total Spent on Counselor Salaries (Per-Pupil)	Total Spent on Additional Support Staff (Per-Pupil)
Low-SES 1	6.4:1	\$349.01	\$194.23	NA
High-SES 1	8.5:1	\$192.56	\$203.17	NA
Low-SES 2	7.3:1	\$386.97	\$264.40	\$99.46**
High-SES 2	9.8:1	\$293.68	\$185.72	\$35.80*

Note. *Denotes the addition of Graduation Coach. **Denotes addition of Graduation Coach and College and Career Coach.

The study did find a substantial difference within one division in the amount of money spent on technology and instructional materials. In SY 2013-14, there was a large financial investment in technology for K-12 schools to help bridge the digital divide between high- and low-SES students. These investments included hardware, software, professional development, and research on the effectiveness of technology in the classroom. Instruction-related spending was also considerably higher in Low-SES School 1 than in High-SES School 1 (per-pupil spending of \$449.55 vs. \$168.52).

Both of the divisions' low-SES schools provided supplemental educational services for their students. Supplemental educational services are additional academic instruction designed to increase the academic achievement of students. These services, which are in addition to instruction provided during the school day, include academic assistance such as tutoring, remediation and other academic enrichment services that are consistent with the content and instruction used by the local educational agency (LEA)

and are aligned with the State's academic content and achievement standards (personal communication, November 3, 2014).

The average age of the school building in the study is 43 years old. In both divisions, the high-SES school was the older school (44 and 50 years old vs. 39 years old). Both of the schools in the suburban division have been renovated (1998 and 2002). Age was a surrogate for other variables of building condition such as proper lighting, temperature control, sound control, support facilities, laboratory condition, and aesthetic values.

There were differences in a school's ability to raise private funds to purchase equipment, supplies, and uniforms, as well as funds for school improvements. Communities with higher median incomes were more likely to have these fund-raising groups in the first place and more likely to raise a greater amount of money than those in less affluent neighborhoods. For example, within the high-SES schools, funds raised went towards the purchasing of new sheet music and instruments, also to subsidizing band uniforms and travel to band competitions. Other funds raised went towards new bats, balls, and bags for the baseball team. A basketball fundraiser brought in extra funds for team uniforms, new equipment and away game travel expenditures. The ability to fund-raise to supplement school resources raises some important issues that are not fully explored in this study.

The study found that a core of extracurricular activities including sports, performing arts, publications, honor societies, academic clubs and student government were available to virtually all students. Although differences in availability of extracurricular opportunities between less affluent and more affluent schools were small

or nonexistent, low-SES students were less likely to participate in activities than were high-SES students. This participation gap is a cause for concern, especially if extracurricular activities can be a means of bringing at-risk students more fully into the school community, thereby increasing their chances of school success (Holloway, 2002). In spite of the gap, however, low-SES students participated at fairly high levels, and they persisted in their participation regardless of the relative affluence of the schools they attended. These data explain neither the gap nor the persistence, but together they suggest the value of the further study of the individual constraints of poverty and family background and the influence of school community on student engagement.

Spending and Academic Achievement – Research Question 3

This study examined the relationship between spending and academic achievement by comparing the schools' expenditures to the students' End-of-Course assessment pass rates and on-time graduation rate. The researcher calculated the following information for each school: students eligible for free and reduced-price lunch (student SES indicator); total amount spent on administrative salaries per-pupil; total amount spent on Guidance Counselors and support staff per-pupil; amount spent on instructional supplies and resources per-pupil; amount spent on professional development per-pupil; average teacher salary (teacher experience indicator); student-to-teacher ratio (class size indicator). Using the Pearson correlation coefficient, the researcher measured the strength of the relationship between the above variables to the percentages of students who passed at the proficient and at the advanced level on the English, mathematics, history, and science EOC tests and percentages of students graduating in four years

(academic performance indicators). An ANOVA was used to determine whether any of those relationships are significantly different from each other.

It is important to note that using the findings with ANOVA, the researcher can detect *interaction* effects between variables, and, therefore, test the more complex hypotheses about reality. The most the researcher can say about a correlation is that the variables *share something* in common; that is, are related in some way (O'Connor, 2011). The more two things have something in common, the more strongly they are related. Correlation does not imply causation.

The researcher assessed the degree to which teacher experience affects student performance. There were positive correlations found between the two variables: average teacher salary and student performance on EOC assessments in English, mathematics, and science. The two variables were very strongly correlated for English and mathematics, $r(2) = +.993, p < .01$ and science, $r(2) = +.990, p = .01$. The correlations were found to be significant ($p \leq .01$). A statistically significant finding is one that is determined (statistically) to be very unlikely to happen by chance.

A difference was found between the percentages of students eligible for free and reduced-price lunch programs and the percentages of students passing EOC assessments in all subjects on the current mandated achievement tests in grades nine through twelve (see Table 8). A correlation was computed to determine the relationship between the percentages of students eligible for free or reduced-price lunch programs and the percentage of students passing EOC tests. There was a statistically significant finding for mathematics, $r(2) = -.958, p < .05$.

Table 8

Comparison of School EOC Pass Rate to EOC Pass Rate for Economically Disadvantaged (ED) Students

School	School English EOC Test Pass Rate/ ED Pass Rate (%)	School Math EOC Test Pass Rate/ ED Pass Rate (%)	School History EOC Test Pass Rate/ ED Pass Rate (%)	School Science EOC Test Pass Rate/ ED Pass Rate (%)
Low-SES 1	90/88	76/63	81/64	82/69
High-SES 1	96/88	84/77	94/88	93/84
Low-SES 2	85/83	67/65	84/80	75/73
High-SES 2	93/91	77/73	88/84	84/79

A more intense aggregation of the data revealed a correlation between the percentages of students eligible for free or reduced-price lunch programs (SES indicator) and the percentages of students performing poorly in mathematics on the mandated achievement tests in Geometry and Algebra 2. The Pearson's r correlation revealed a positive association of 0.44 between the percentage of students participating in the free or reduced-price lunch program and the percentage of students scoring below basic on the mathematics benchmark tests. This is indicative of a moderate correlation between a student's socioeconomic status and mathematics test scores but is not statistically significant ($p > .05$).

In all schools, findings indicate that lower level mathematics, English, and science classes contain disproportionate numbers of low-SES students. This "tracking" perpetuates a modern system of segregation that favors affluent students and keeps poor students, many of them minority, from long-term equal achievement. Tracking in schools occurs with students choosing or being assigned to classes working at different

levels or covering different content. Broadly speaking, under this approach, high-SES students are more likely to enroll in advanced courses, which ultimately leads them to college, whereas low-SES students are less likely to take those courses and are, therefore, less college ready.

The researcher was interested in examining the relationship between on-time graduation rate (student achievement indicator), and more than one independent variables (school type, average years of teacher experience, and instructional supplies). A multiple regression analysis was conducted to determine the joint contribution of the independent variables on on-time graduation rate. The analysis showed that the *R*-value, which represents the simple correlation, is 0.817, indicating a high degree of correlation. The R^2 value (the "R Square" value) indicates how much of the total variation in the dependent variable, on-time graduation, is associated with the independent variables. In this case, 67.7% is associated, which is large. According to this model, school type, average years of teacher experience, and instructional supplies are positively significant variables that influence student achievement ($p < .05$).

The on-time graduation rate is a measure of the percent of students that complete high school in 4 years with a regular high school diploma (NCES, 2014). The term "regular high school diploma" also includes an "advanced diploma" that is awarded to students who complete requirements above and beyond what is required for a regular diploma ("standard diploma"). The on-time graduation rate was lower in the low-SES schools than in the high-SES schools (see Table 9). An ANOVA was conducted to evaluate the relationship between the administrative salaries and teacher salaries (experience indicator) and the on-time graduation rate, and there was not a statistically

significant difference between the groups. However, the results of the correlational analysis were statistically significant for administrative salaries and on-time graduation, $r(2) = +.977, p < .05$. These results imply a very strong positive correlation indicating that the higher the administrative salaries, the higher the on-time graduation rate.

Virginia dropout and graduation rates are cohort rates. They look at what happens to a cohort of students - those who started ninth grade together. The dropout rate is not simply one hundred minus the graduation rate. The dropout rate is determined by dividing the number of dropouts over a four-year period by the cohort of students for that time (Virginia Performs, 2015). Not surprisingly, the dropout rate was higher in the low-SES schools than in the high-SES schools (see Table 9). However, there was not a statistically significant difference between groups as determined by ANOVA, $F(1,2) = 10.225, p = .085 (p > .05)$.

Table 9

Comparison of Dropout Rate and On-Time Graduation Rate for All Students vs. Economically Disadvantaged (ED) Students

School	Dropout Rate for All Students (%)	Dropout Rate for ED Students (%)	On-Time Graduation Rate for All Students (%)	On-Time Graduation Rate for ED Students (%)
Low-SES 1	3.0	5.3	92.7	87.7
High-SES 1	2.0	3.3	96.5	93.3
Low-SES 2	5.3	6.7	80.6	77.2
High-SES 2	3.3	4.5	86.3	80.0

Note. Adapted from VDOE Statistics & Reports, 2014

There were specific, concrete measures taken by both divisions to increase graduation rates for those students in the low-SES population. Common practices

include use of early warning systems to identify high-risk students, special teams that provide support to at-risk students and to dropouts, and strong management and accountability models to ensure better alignment and more consistent implementation of interventions (personal communications, January 26 & 28, 2015).

In most of the schools studied, the Limited English Proficient (LEP) population was a group below state definition for personally identifiable results (objective not evaluated due to too few students). However, those ELL students tested lagged behind their English proficient peers in all content areas.

In both divisions, the English Language Learner (ELL) programs are content-based programs in which students are grouped by language ability level. If a student is found eligible for English as a Second Language (ESL) support, he/she will attend one of the ESL centers in the division. Both divisions provide transportation at no cost to the family. Group assignments are flexible and temporary, changing according to the learners' needs. High school ELL students spend the majority of the school day mainstreamed in the regular education program at their home school, where they are monitored for one year to assure success in the regular education program. Sessions held during summer school are offered for struggling ELL students. These sessions provide emphasis on social and language skills without the pressure of the academic curriculum timeline that the students face during the regular school year (personal communications, January 26 & 28, 2015).

Spending on general operating expenses did not affect achievement scores. Virtually all of the observed differences in student scores were explained by instruction-

related expenditures. While money for items such as transportation and building maintenance may matter, they were not directly related to student achievement.

This study showed that given the right conditions, every student – including those from less fortunate circumstances – have the opportunity to succeed. Ample evidence shows that almost all students can achieve at high levels if they are taught at high levels (Haycock, 2001). But equally clear is that some students require more time and more instruction. If students are going to be held to high standards, they need teachers who know the subjects and know how to teach the subjects. Large numbers of students, especially those who are poor or are members of minority groups, are taught by teachers who do not have strong backgrounds in the subjects they teach.

Summary

Within the findings of this study, there is ample evidence that funding varied within the school divisions examined. These disparities, however, did not always favor the most affluent schools or students. In both of the low-SES schools, for example, the student-to-employee ratio was smaller, additional full-time support personnel were on staff, considerably more was spent on instructional resources for mathematics, and the buildings were of newer construction.

When comparing teachers' qualifications and average years of experience between school type, while some differences did exist, statistical analysis showed no significant differences. There was a statistically significant difference between the percentage of teachers with fewer than five years of experience and school type. It was higher in the low-SES schools. Schools that serve large proportions of low-income students tend to have trouble attracting and keeping good teachers – a situation that

seriously hampers their efforts to narrow achievement gaps (Center for High Impact Philanthropy, 2010).

This study showed a clear relationship between low-level curriculum and poor results. In all schools, findings indicated that lower level mathematics, English, and science classes contained disproportionate numbers of low-SES students and disadvantaged students lagged behind their peers in all content areas. Similarly, low-SES and dropout rates were connected. As a result, all schools implemented preventative strategies and intervention services to ensure students do not fall behind or fail before being provided additional help.

In closing, many of the observed differences in student performance were explained by instruction-related expenditures. While money for items such as transportation and building maintenance may matter, the findings of this study indicate that they were not directly related to performance. The findings indicated that the detrimental effects of low SES can be ameliorated by quality teachers and instructional resources, academic assistance, and remediation. Several other school improvement efforts commonly advocated in today's debates have merit and should be pursued, such as improved professional development and school leadership, the use of assessments that provide guidance to teachers and principals, and access to high-quality college preparatory curriculum for all students.

Chapter 5: Discussion, Conclusions, and Recommendations

Discussion

In recent years a growing number of researchers, education advocates, and legislators have emphasized that by not requiring districts to consider actual school-level expenditures in the examination of school funding, the probability of meaningful disparities will remain significant (USDOE, 2011). Few districts can quantify with accuracy at any given time the funding available to an individual school. Even with modern methods of cost accounting, districts do not have accurate figures on costs with which to compare spending in different schools and student populations. Instead, districts show comparability in simpler ways, such as by using a district-wide salary schedule. Many districts focus on the distribution of staff and supplies, remaining indifferent to quality issues (Cohen & Miller, 2012). This indifference conceals the fact that many schools serving students from low socioeconomic neighborhoods have fewer resources that enhance teaching and learning than do schools in more affluent neighborhoods.

Unless the attendance zone is gerrymandered to achieve a racial/SES balance, a school's SES is determined by the neighborhood in which it is located and by the SES of the families whose children attend the school. Typically, the school uses the percentage of students on free and reduced-price lunch as the primary indicator of school SES. Studies and statistics have clearly demonstrated a link between low achievement and low-SES (Aikens & Barbarin, 2008; Morgan, Farkas, Hillemeier, & Maczuga, 2009; Palardy, 2008). However, studies have also shown that given the right conditions, every student – including those from less fortunate circumstances – can succeed (Milne & Plourde, 2006;

Slavin, 2006). While some of this success can be attributed to the resilience and drive arising from within the student, research has been able to identify several common factors that help disadvantaged schools and students improve, such as: strengthening and supporting school leadership; attracting, supporting and retaining high quality teachers; ensuring effective classroom learning strategies; and linking schools with parents and communities.

Previous research has suggested that students from schools with high concentrations of low-income students and students from urban schools would be expected to have less successful educational outcomes, less supportive home environments, and less positive school experiences than students from other schools (NCES, 1996). Students attending schools with both an urban location and high poverty concentration are expected, therefore, to have particularly unfavorable circumstances. The differences that exist in Virginia may not be as vast as other states, but there are disproportionate amounts of funding that exist. Many students in urban areas are educated in schools that do not have the funding capable of producing comparable learning environments to their counterparts. Teachers can provide excellent learning environments and a rigorous curriculum, but they cannot always access the same resources (e.g., equipment and supplies) as schools with comparable student populations. This study found differences between the urban and suburban schools and high poverty and low poverty schools on multiple indicators. However, the data also document that equality of funding can produce comparable schools and decrease the achievement gap.

This study provides a picture of how school and classroom resources – measured in terms of class size, teacher quality, curriculum, equipment, and supplies – vary among

schools within the same division. Using a database of four public high schools, two from an urban division and two from a suburban division, the study found that while average class size varies to some extent among the schools, there are significant differences in teacher quality, curriculum, equipment, and supplies. Even though this study was limited in its sample size, the implications, and the opportunities are far reaching. If low-SES children have the proper support and understanding, financial status does not have to be the ultimate determinant of academic achievement (Jensen, 2009).

The data from the two divisions in this study are somewhat consistent, although, the suburban division reported more specific school-level financial information. These school level data made it possible to assess more accurately the resources available to students in their schools. The information provided by the suburban division suggests that the per-pupil expenditures in the low-SES schools are higher in many cases than in the high-SES schools. For example, in the high-SES school, the expectation is that students will bring their supplies to school. In the low-SES school, when families are budgeting for day-to-day necessities, the school must provide student supplies because they cannot assume that their low-SES students will bring their own. Students from low-SES households have other expenses that are often not budget items. These include field trips, uniforms, pictures, yearbooks, and extra-curricular activities. These costs can add up and, in most cases, the division made financial arrangements for them.

Determining intra-district resource allocation in the urban division was difficult without the school-level data. Routinely missing is a financial breakdown that follows the money into the school building to the classroom. The individual school allotments

were masked in analyses using division level averages. Nevertheless, certain spending patterns emerged.

It is known that teachers have a crucial role in improving learning outcomes. Since the quality differs from teacher to teacher, their potential impact on student outcomes may also differ. Historically, students from low-income families and minority students are the least likely to be taught by teachers with experience, knowledge, and credentials - the elements of teacher quality that research demonstrates are strongly associated with high student achievement. Research shows that these students produce the most gains when assigned to effective teachers (Hightower, Delgado, Lloyd, Wittenstein, Sellers, & Swanson, 2011). These findings have led many academics and analysts to assert that the lack of high-quality teachers is a major contributor to the achievement gap.

This study did find differences between teacher qualifications such as experience, education, and credentials pertaining to the high-SES schools and the low-SES schools. For example, because of higher teacher turnover in the low-SES schools, more of these students are taught by inexperienced teachers (a greater percentage of teachers with less than five years of experience). Studies show that inexperienced teachers tend to be less effective, especially in their first three to five years of teaching (Clotfelter, Ladd, & Vigdor, 2005; Grissom, 2011). Furthermore, about 30 percent of new teachers flee the profession after just three years, and nearly half of all new teachers leave the job within five years (Desimone & Long, 2010; Haycock & Hanushek, 2010). Their flight leaves openings in struggling schools, which are typically filled by more new teachers. Then

again, a teacher need not be experienced to be effective, and there are plenty of ineffective veterans.

The idea that teachers improve over their first three or so years in the classroom and plateau after that is deep-seated in K-12 policy discussions, coming up often in debate about pay, professional development, and teacher seniority. Nevertheless, findings from recently released studies are raising questions about that proposition. In fact, the studies suggest the average teacher's ability to improve student achievement increases for at least the first decade of his or her career – and likely longer (Sawchuk, 2015).

Research indicates that time on instruction matters and disadvantaged students are more likely to get the teachers who spend less time on instruction (Desimone & Long, 2010). If that is the case, research has identified an area in which schooling exacerbates the achievement gap but has the potential to improve it.

Inside nearly all large school districts, the most experienced and highly paid teachers congregate in the more affluent schools. The opposite takes place in the low-SES schools, where teachers tend to be less experienced and lower paid (Owings & Kaplan, 2010; Roza & Yatsko, 2010). Financially, this apportionment means that a larger share of the district's salary dollars is spent on the more affluent schools, and conversely, the poorer schools with lower teacher salaries get fewer funds per-pupil. The problem is that the resulting dollar allocation patterns work to reinforce achievement gaps, not address them.

This study found a positive correlation between a student's SES and academic achievement in school. Some findings attributed poor academic achievement to the fact

that lower-SES students have poor attendance records. Research confirms a strong link between attendance and student outcomes (Jensen, 2009). Other findings suggest that poor achievement is more heavily influenced by lower teacher quality, less rigorous curriculum, and lower expectations for academic performance (Center for Public Education, 2014).

This study showed that students in the low-SES schools are underrepresented in the most challenging classes, such as honors and college preparatory courses. The data suggest that high school course selections are somewhat predetermined by elementary and middle school placement. Tracking involves assigning students to classes based on their achievement level in the previous year. Once tracked into the lower ability group, students are almost always restricted in their access to advanced programs and courses. Tracking disproportionately assigns low-SES students to low-achieving classrooms. Thus, the students who need the most stimulation and motivation are given the least. The original disparity between the achievement levels of the high-track students and the low-track students widens as tracking continues (Brogan, 2009).

The findings of this study indicate that lower-level mathematics classes contain disproportionate numbers of low-SES students. A relationship was also found between the percentages of students in free and reduced-price lunch programs and the percentages of students performing below proficient in mathematics on the current mandated achievement tests in grades nine through twelve. Mathematics has been and continues to be used as a gateway to success and higher education (Adelman, 2006; Hill, 1998). By tracking students early in their mathematics careers, schools are closing doors to future opportunities for a large number of students, particularly low-SES and minority students.

Previous studies suggest that the highest level of mathematics in high school can be one of the strongest predictors of college success (Adelman, 2006). Similar patterns occur in science and history.

This study indicates that certain resource-intensive school improvement strategies significantly increase student performance, particularly among low-income students. One of the low-SES schools in the study used additional funds for students to implement specific resource-intensive education improvement strategies and programs for Algebra 1 (*Inside Algebra*) that resulted in increased student achievement, particularly among low-income students. This research-based program provides hands-on, manipulative-based activities to master algebra concepts and skills. *Inside Algebra* helps students who are struggling to understand algebra and need a mastery-based and multi-sensory approach to developing the skills necessary for algebra success (personal communication, January 28, 2015).

This study raises concerns regarding the participation and performance of low-income and underrepresented students in the Advanced Placement (AP) program. Though programs have expanded to the point that all schools offer AP courses when looking at the individual schools, it becomes apparent that there remains a significant gap in who participates in advanced coursework. Minority and low-income students are less likely to participate, even when they come from schools in which they are in the majority. The lack of representation of minority and low-income students in AP courses has been of great concern for decades. The lack of AP courses can have implications for the students as they transition to their post-secondary educational lives. For instance, in its 2011 State of College Admission Report, the National Association for College Admission

Counseling found that grades in college preparatory courses were the top factor that colleges considered in the admission decision. It is not that the AP courses are not available to the students, rather, low-SES students are not taking AP courses because they feel out of place, have not been convinced that they can do college-level work, or do not have the required prerequisite classes.

In one of the low-SES schools, AP courses were offered online rather than taught face-to-face. Online courses can increase access to courses for students who otherwise would not be able to take them. Taking courses online might reduce the cost of providing education, and online learning might increase student achievement for students who have access to similar courses in a face-to-face, onsite format (Watson, 2014). Few rigorous research studies of the effectiveness of online learning for K–12 students have been published. Nevertheless, interaction is the primary difference between online and face-to-face instruction. Students seek both deeper and stronger relationships, and they also value frequent and timely feedback (Weiner, 2003). Most students want to know who the teacher is, and they want the teacher to connect to their world. When teachers cannot connect personally, students are less likely to commit to them. Although the opportunity for teachers and students to interact still exists in online courses, online education is a more limited environment that cannot reproduce the same depth of interactions that occur face-to-face (Berjerano, 2008).

The second problem is that online education requires students to be self-disciplined. With online education, the instructor delivers the content, but students must take greater initiative to access, learn, and understand the material. Furthermore, students have to actively seek help. This type of independent learning can be especially

challenging. Some students may not yet have learned the skills to be effective learners. For others, they may lack the motivation to learn independently. Online education makes it harder to maximize student learning outcomes because the resources that foster learning in face-to-face environments are substantially diminished (Bejerano, 2008).

Minority students dropped out at disproportionately higher rates than their white counterparts and the dropout rates for the low-SES schools were higher than those for the high-SES schools. Nevertheless, the dropout rates for 2014 were lower than 2013 for both divisions. One of the most significant factors influencing high school dropout rates is family income. According to the U.S. Department of Education (2013), students from low-income families are six times more likely to drop out of high school than students from high-income families. Many of the most significant factors affecting dropout rates are beyond the reach of the school system, such as family income. Programs aimed at dealing with dropout issues take one of two forms:

- Preventive programs that are designed to keep young people in school by identifying and helping students at risk of dropping out, and
- Programs like Race to GED and the Virginia Community College System's Middle College, which "recover" dropouts by helping them get a GED after they leave high school

Determining the appropriate state role in providing or enabling student supports is a critical and often difficult issue. While a few states have put successful programs together, most have delegated this responsibility to districts or schools. The urban schools in the study allocated funds in the form of specialist and support staff to assist their students in danger of dropping out. Support staff might include Career Coaches,

Graduation Coaches, instructional tutors, and other learning specialists. Funding such specialists and support staff may address gaps in districts where students with higher needs are at a disadvantage.

Career Coaches are school employees who are based at the high school to help students define their career aspirations. Additionally, they are acquainted with community college and other postsecondary programs, including apprenticeships and workforce training, which can help students achieve their educational and financial goals. The fundamental objectives of the Career Coaches Program are to empower students to make informed decisions about their career and educational plans and to prepare students for success in postsecondary education and training. It appears as though the coach is probably an asset to the school, offering students various interest assessments as well as giving them a good look at the training and requirements of different careers (personal communication, January 28, 2015).

The graduation coaches were tasked with identifying “at-risk” students within the school and employing strategies to get them back on track for success in school and graduation. The coaches work with students and offer help by enlisting tools to give them extra support and attention in the areas needed. Many coaches utilize support mechanisms such as credit recovery and tutoring targeted to preparing students to pass high school assessments, but coaches also have the flexibility to create their own approaches (personal communication, January 28, 2015). The justification for the Graduation Coach is certainly evident through the increase in on-time graduation rates and the decline in dropout rates.

Teachers complain that many students enter high school unprepared to act like students – to sit still and listen, take notes, study on their own, engage in classwork, and finish homework. This is especially true of students in schools in low SES neighborhoods. The schools in low SES neighborhoods suffer from the lack of support from the students' homes (Brogan, 2009). The home environment contributes substantially to the development of academic skills (Woolfolk, 2007). When students exhibit the behaviors mentioned above, school staff members must work together to transform students with little history of school success into students who are engaged in doing academic work. For the schools in the study, interventions fell into three categories: academic supports (e.g., homework assistance or tutoring), targeted problem-solving (e.g., conflict resolution, helping students overcome barriers to waking up and getting to school on time, negotiating alternatives to out-of-school suspensions), and helping students explore recreational or community service opportunities (personal communication, October 28 & 30, 2014).

The same factors that produce dropouts in the general population also apply to ELL students. The longer students are classified as ELL, the greater the likelihood that they will drop out of school. ELL students who are reclassified as English proficient in earlier grades tend to be similar to non-English learners when it comes to achievement and dropout rates. In general, research findings underscore the need for more effective programs for students who are long-term ELLs or those who only start to learn the language in later grades (Rance-Roney, 2009). Given the current demographic shifts in the U.S. population, it is likely that all teachers will eventually encounter students who do not yet have sufficient proficiency in English to be successful in traditional classrooms.

Many teachers do not have the preparation to provide high-quality instruction to this population of students. Even the most committed teachers cannot provide high-quality education without appropriate skills and knowledge. There is a growing need for increased teacher education and professional development for mainstream teachers to build capacity to address the needs of these learners (personal communications, October 28 & 30).

Both divisions in the study offer the Tests of General Educational Development (GED) to enable people who do not graduate from high school to demonstrate the attainment of skills associated with the completion of a high school program of study. GED preparation classes also are available for a nominal fee to residents 18 years and older who want to get a GED or want to improve their basic mathematics and reading skills (personal communications, October 28 & 30).

The findings show both great opportunities and significant challenges for policymakers seeking to improve academic achievement among low-income students. The evidence suggests that providing additional funding to school districts and targeting resources to cost-intensive strategies of proven effectiveness can significantly enhance educational success, particularly for poor children.

Conclusions

This study has addressed the disparities in spending within two school divisions in Virginia. The association with student characteristics and patterns for student achievement were examined in both divisions. This focus is unique in that most analyses of spending have been confined to district-level data. The researcher analyzed the extent to which the disparities are associated with student characteristics typically identified

with higher costs of learning, such as students eligible for free or reduced-price lunch and students eligible for bilingual education programs.

Of the two divisions in the study, only one presented financial data disaggregated on the school-level. An analysis of these data provided the researcher with the needed information to answer questions about differences in the distribution of expenditures and resources within the division. Also, the school-level data provided enabled the examination of the assumption that all students in a district receive the same dollar amount of resources.

School resources do matter

Costly educational resources, including smaller class sizes, more highly educated teachers with more years of experience, a school climate with little teacher turnover, a rigorous curriculum, and certain resource-intensive school improvement strategies, are positively associated with student outcomes (Baker, 2012). In some cases, those effects are larger than others, and there is also variation by student population and other contextual variables.

One seemingly obvious way to help low-SES children who are at-risk for school failure is smaller class sizes. Although this is contrary to what a number of researchers assert, class size reductions can be beneficial for specific groups of students, subject matter, and teachers (Krueger, Hanusek, & Rice, 2002; Rubenstein, Schwartz, & Stiefel, 2006). Smaller class sizes allow teachers to conduct more individualized instruction with students who are struggling. A downfall of this approach, however, is that smaller class sizes mean a need for more teachers, and more teachers cost the district more money - money that simply may not be available. Class size reduction is very expensive, thus

consideration is often given to alternative uses of those resources (Krueger, Hanusek, & Rice, 2002). In that context, policymakers might consider targeting the reductions at students who have been shown to benefit the most: disadvantaged students; students in the early grades, or providing a certain amount of funding for class size reductions, but leaving it up to school leaders on how to distribute it.

Teacher quality is strongly related to student achievement

Many factors contribute to a student's academic performance, but research suggests that, among school-related factors, teachers matter most (Adamson & Darling-Hammond, 2011; Center for Public Education, 2014; Darling-Hammond, 2000, 2010; Haycock & Hanushek, 2010). Studies consistently show that teacher quality - whether measured by content knowledge, experience, training and credentials or general intellectual skills - more heavily influences differences in student performance than do race, SES, or school of the student. (Nye, Konstantopoulos, & Hedges, 2004). Skilled teachers produce better student results. Teacher quality stands out in the research for its potential to close the gap in academic achievement between students from traditionally poor, non-white, and/or urban backgrounds and their more affluent peers (Center for Public Education, 2014).

Teacher experience is a partial predictor of success in the classroom

Despite common perceptions, effective teachers cannot reliably be identified based on where they went to school, whether they are licensed or (after the first few years) how long they have taught. In this study, when comparing qualifications and average years of experience of teachers between school type, there was a statistically significant difference between the percentage of teachers with fewer than five years of

experience and school type. There were far more inexperienced teachers in the low-SES schools. This is noteworthy because the presence of new teachers in a school is one of the strongest predictors of higher dropout rates (Center for Public Education, 2014). Many novice teachers struggle during their initial years in any classroom, especially in classrooms in the neediest schools. Thus, teacher experience is at least a partial predictor of success in the classroom. Experienced teachers (those with more than five years of experience) tend to have better classroom management skills and a stronger command of curricular materials (McGuire, 2009). Additionally, schools with many inexperienced teachers have higher rates of staff turnover, which perpetuates the cycle of novice teachers instructing students with the greatest needs (Hanushek, 2004). These findings suggest that policymakers and practitioners who wish to retain talented, effective teachers in high-poverty, hard-to-staff schools must pursue retention strategies designed to improve the teaching environment.

Lower level classes contain disproportionate numbers of low-SES students

The findings show that lower level mathematics, English, and science classes contain disproportionate numbers of low-SES students. This is often caused by the practice of tracking, which can negatively affect the low-SES student. Tracking in schools occurs with students choosing or being assigned to classes working at different levels of rigor or covering different content. Under this approach, high-SES students are more likely to enroll in advanced courses. There are different expectations for the hierarchy of tracks; the high tracks set higher academic expectations and offer more encouragement than the lower tracks. In many lower track classes, students remain unchallenged and are often subjected to a highly repetitive, remedial curriculum.

Additionally, many lower track classes continue indefinitely to be subjected to inexperienced or unqualified teachers (Brogan, 2009). Since these lower tracks have been shown to lead to lower achievement in later years, the tracking system perpetuates the inequities of SES in our society.

Remedying this may require designing remediation to engage students, accelerate their progress, and quickly move them into advanced college preparatory coursework. With this said, a rational system would acknowledge that the likelihood of getting all students to a true level of college readiness by the end of 12th grade is extremely low. There should be another pathway, one with significantly greater chances of success and opportunities to find a job that will allow students to be self-sufficient. There is a need for a means to a high-quality career and technical education, ideally the kind that combines rigorous coursework with a real-world apprenticeship and maybe even a paycheck.

Problems outside the classroom

Some analysts argue that education funding is not equitable unless more money is spent on minority students compared to white students (Darling-Hammond, 1995, 2000; Kozol, 1991; Richwine, 2011). The justification is that poor and minority students face greater socioeconomic problems outside the classroom, necessitating greater education spending as a kind of remediation. The original argument made by equalization advocates identified the alleged disparity in school funding as the cause of lower minority achievement. After reviewing the research, it appears that the cause may stem from problems outside the classroom, and spending is considered equitable only if it is high enough to remediate those problems. Parental income is a marker for pre-school

conditions and behaviors in the classroom. The poorer the family, the less likely the child is ready in terms of schooling-related enablers: habits, vocabulary, thinking, and experience (Jensen, 2009). Perhaps we should invest more heavily in early-childhood education. The degree to which we invest and where we invest is beyond the scope of this paper.

Reflecting on practices

As a final point, the findings from this study emphasize the importance of policymakers, administrators, and teachers reflecting on their practices and making adjustments to budgets to ensure they are educating all of the students in their charge as well as possible. Drawing on the work of Loughran (2002), reflective practice is understood as the need for practitioners to develop their understanding of the way they conduct their work, and to be skilled practitioners through their work. By doing so, the questions that were explored in this study would resurface and be addressed, which in time may find answers that enhance teaching and learning for all students.

Recommendations for Change

It is important that budget decisions be made with student needs in mind and that there be transparency and accountability. A look at any district budget, with its rows and columns of figures, reveals the challenges in identifying funding decisions. A budget that is not transparent, accessible, and accurate cannot be properly analyzed. Its implementation cannot be thoroughly monitored, nor its outcomes evaluated. Given the technical nature of budgets and the budget process, transparent budgets require that the information contained in budgets be presented in a simplified form and actively disseminated to citizens. Furthermore, such information must be disseminated promptly

so that citizens can effectively provide feedback that can influence policy formulation and resource reallocation.

A typical citizen, even a relatively engaged and determined one, would have a difficult time discovering how much his or her local school district spends to educate each child under its care. Most school districts do not publish readily accessible information on per-pupil spending. If a taxpayer is fortunate enough to find a section on the school district website that states what is spent per child, it is likely that the figure will be misleading. The disconnect between official accounting and reality raises troubling questions regarding democratic control of public institutions and the ability of citizens to determine whether or not they are getting that for which they are paying. There needs to be a significant increase in school district budget transparency. Citizens and politicians deserve up-to-date access to basic information on school district spending.

School leaders, not central offices, are best positioned to decide how to improve achievement. Money should follow each student to the school that he or she attends, and principals should have greater flexibility about how to spend money with more responsibility for dollars and greater accountability for results. Any disparities in school budgets (or per-pupil spending) should be the result of sound reasoning.

High-poverty schools tend to be staffed by teachers with less experience than low-poverty schools. School budgets and financial reports feign that all teachers within a school district earn the same salary, thus concealing that high-poverty schools are often shortchanged when it comes to financial resources devoted to teacher salary. This could be resolved by allocating dollars to schools to offset inequities in salaries. By allocating dollars to schools, the district would, in essence, give freedom to allocate money where it

is most needed, according to principal discretion. Schools with lower-salaried teachers would have more funds to employ options such as tutoring and hiring more specialists.

Research continues to support assertions that the most significant gains in student achievement will be realized when students receive instruction from good teachers over consecutive years (Center for Public Education, 2014; Harris & Sass, 2008; Hightower, Delgado, Lloyd, Wittenstein, Sellers & Swanson, 2011; Ingersoll, 1998). Districts must step up their recruiting efforts to aggressively seek teacher candidates who have strong academic credentials and who have completed a rigorous teacher preparation program. Districts can establish and maintain intensive, long-term training programs that focus on helping new teachers and teachers new to the district meet challenging professional performance standards. Districts can also plan and implement comprehensive, standards-based professional development programs for all teachers that provide continuous access to professional learning activities specifically tailored to teacher needs and district priorities.

Although diversity is not reflected in advanced courses, in many instances it has become an institutional belief of low-SES and minority students that “those classes aren’t for me.” Consequently, school districts should change that in policy-driven ways. Schools should automatically enroll middle and high school students with high test scores into honors and Advanced Placement courses. Additionally, districts ought to apportion money on professional development for all teachers and support services for students. To withdraw, students would have to speak with a counselor and their teachers.

Most educational decisions face constraints in the availability of budgetary and other resources. Thus, cost-efficiency analyses must be conducted to make good

decisions. It would be prudent, for example, to choose those resources that are least costly for reaching a particular objective or that have the largest impact per unit of cost. Choosing the most cost-effective solution will free up resources for other uses or allow a greater impact on any given investment in comparison to a less cost-effective solution.

Another recommendation is that schools must engage in a strategic budgeting process that targets resources known to increase performance. They must ensure that the core elements for improving instruction and student performance are in place. Systematically deploying such core elements in all classrooms requires teachers to have access to formative assessment data, have schedules organized so they can work with these data in collaborative groups, and hone instruction to student needs. Further, even when core instruction is exceptional, some students will struggle to perform to high standards. The most effective intervention strategy is individual or small-group tutoring of no more than five students (Rebell, Odden, Rolle, & Guthrie, 2011). Hence, tutoring staff should be a budget priority. Some combination of extended day and summer academic help should also take precedence if there is money remaining in the budget.

Recommendations for Future Research

The disparities in spending reported here are important and educationally meaningful. Although unequal spending within districts has received comparatively little attention in legal cases and educational literature, such disparities clearly warrant more attention. Future research should thus continue this line of inquiry and press the fundamental and sociological question of “Why?” For research on within-district inequality to mature, school-level data must become more widely available and more easily accessible.

For research on within-district inequality to mature, school-level data must become more widely available and more easily accessible. Ideally, states would be required to provide expenditures on a school-by-school basis, not just on a district-by-district basis so that the spending data would have the same level of precision as the racial and ethnic data. Given the only district limitation, students are assigned the per-pupil spending level of their district as a whole, rather than the per-pupil spending in their individual schools. Research is needed to explore the reasons why school-level data are so difficult to access.

As the review of the literature pertinent to achievement gaps reveals, even the best-designed and most thoughtfully implemented reforms that focus on traditional within-school factors cannot close more than a tiny share of large U.S. achievement gaps. Substantial differences in student readiness to learn emerge long before kindergarten and are compounded by differences across racial and income lines. Students from low-SES neighborhoods often suffer from a lack of support at home. The home environment contributes substantially to the development of academic skills. Enriching experiences in the home can contribute up to one-half of the measured achievement in verbal skills, reading, and mathematics (Brogan, 2009; Woolfolk, 2007). The expectation that classroom training will be augmented by “homework” is not realistic in light of the evolving structure of the 21st-century family.

The data analyzed in this study provide support for further research in other Virginia and U.S. public school divisions. The information gathered would enable comparisons between the divisions/regions/states to determine if additional research results could assist in determining which methods of teaching, curriculum, and

instructional resources would prove most beneficial in contributing to the students improved test scores, as well as overall school success.

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Appendix A: Salary Information

Table A1

Administrative Salaries and Per-pupil Amounts

	Low SES 1	High SES 1	Low SES 2	High SES 2
Number of students enrolled	597	1166	1060	1648
Number of school employees	93	137	146	169
Student:Employee ratio	6.4:1	8.5:1	7.3:1	9.8:1
<i>Principal</i>				
Years of experience	6	5	30	14
Salary	\$73,323	\$94,412	\$90,485	\$90,000
Salary per-pupil	\$122.82	\$80.97	\$85.36	\$54.61
<i>Assistant Principals</i>				
	2	2	3	4
Ave. years of experience	5	7.5	17.67	14.25
Average salary	\$67,504	\$65,055	\$73,433	\$73,209
Salary per-pupil	\$113.07	\$55.79	\$69.28	\$44.42
<i>Dean of Students</i>				
			2	2
Ave. years of experience			13	12
Average salary			\$49,700.50	\$50,576
Salary per-pupil			\$46.89	\$30.69
Total administrative salaries	\$208,360	\$224,522	\$410,185	\$483,987
Total salaries per-pupil	\$349.01	\$192.56	\$386.97	\$293.68

Table A2

Support Salaries and Per-pupil Amounts

	Low SES 1	High SES 1	Low SES 2	High SES 2
<i>College/Career Coach</i>			1	
Salary			\$46,036	
Salary per-pupil			\$43.43	
<i>Graduation Specialist</i>			1	1
Salary			\$59,392	\$59,000
Salary per-pupil			\$56.03	\$35.80
<i>Guidance Counselors</i>	2	4	5	6
Ave. years of experience			20	14
Average salary	\$57,978	\$59,222	\$56,052	\$51,011
Salary per-pupil	\$97.12	\$50.80	\$52.88	\$30.95
<i>School Psychologist</i>		1		
Salary		\$77,872		
Salary per-pupil		\$66.79		

Table A3

Teaches Salaries and Per-pupil Amounts

	Low SES 1	High SES 1	Low SES 2	High SES 2
<i>Teachers</i>	42.5	68	65.5	88.5
Student:Teacher ratio	14:01	17:01	16:01	19:01
Average years of exp.	6	13	12	15
Number of teachers w/under 5 years exp./%	12/28%	13/ 19%	14/21%	13/15%
Total teacher salaries	\$2,023,404	\$3,340,356	\$3,037,363	\$4,256,235
Average salary	\$47,610	\$49,123	\$46,372	\$48,093
Salaries per-pupil	\$3389	\$2865	\$2866	\$2583
<i>Athletic Director</i>	1	1	1	1
Years of experience	20	23		
Salary	\$57,131	\$61,379	\$55,385	\$61,860
<i>Athletic Director Assistant</i>	1			
Stipend	\$4,004			
<i>No. of extracurricular programs</i>	47	54	55	55

Appendix B: Expenditures

Table B1

Expenditures and Per-pupil Allocations (PPA)

	Low SES 1	High SES 1	Low SES 2	High SES 2
Office Supplies			\$4,240	\$6,592
PPA			\$4.00	\$4.00
Postage			\$4,240	\$6,592
PPA			\$4.00	\$4.00
Capital			\$6,360	\$9,888
PPA			\$6.00	\$6.00
Local Travel			\$1,500	\$1,500
PPA			\$1.42	\$0.91
Instructional supplies			\$33,920	\$52,736
PPA			\$32.00	\$32.00
Materials	\$5,287	\$2,621		
PPA	\$8.86	\$2.25		
Computers	\$137,934	\$93,150		
PPA	\$231.05	\$79.89		
Inside Algebra	\$1,200			
PPA	\$2.01			
PPA for supplies	\$118,572	\$98,091		
PPA	\$198.61	\$84.13		
Instructional Resources				
CTE	\$1,537			
PPA	\$2.74			
Math	\$3,750	\$2,250		
PPA	\$6.28	\$1.93		
Science		\$371.00		
PPA		\$.32		
Utility costs	\$158,573	\$242,896	\$242,844.42	\$219,262.84
PPA	\$265.62	\$208.32	\$229.10	\$133.05
Operations and maintenance	\$17,630	\$23,970		
PPA	\$29.53	\$20.56		
Facilities costs	\$111,302	\$115,773		
PPA	\$186.44	\$99.29		
Age of school building	1976	1972	1976	1964
Last renovated	2002	1998		
Field trip transportation	\$2,883	\$8,645	\$3,180	\$4,944
PPA	\$4.83	\$7.41	\$3.00	\$3.00
Professional development	\$3,465	\$5,025		
PPA	\$5.80	\$4.31		

Appendix C: Instructional Programs

Table C1

Number and Type of Instructional Programs and Enrollments

	Low SES 1	High SES 1	Low SES 2	High SES 2
Governor's School enrollment	3	16	23	25
Advanced course enrollment	893	1694	2186	4564
Sections of AP classes	23	24	22	49
Number of students enrolled	374	762	333	1012
Number of AP classes offered	10	15		
AP Eng 11 enrollment	52	141		
AP Eng 12 enrollment	45	93		
AP Human enrollment	30	65		
AP US History enrollment	52	94		
AP Euro enrollment	51	72		
AP Gov enrollment	77	69		
AP Psych enrollment	28	61		
AP Calc AB enrollment	8	48		
AP Calc BC enrollment		13		
AP Stats enrollment	30	42		
AP Bio enrollment		17		
AP Environ enrollment		25		
AP Physics enrollment		18		
AP Studio 3D enrollment		2		
AP Studio Draw enrollment		2		
AP Spanish enrollment	1			
AP classes offered virtually	11	8		
Virtual AP class enrollment	176	24		
Students taking 1 or more AP	215	392	219	526
Sections of Honors/No. students			102/1853	157/3552
Honors classes offered in school	10/332	9/790		
Adv. Eng 9	55	118		
Adv. Eng 10	57	135		
Algebra II / Trig	31	118		
Adv. Geometry	15	63		
Math Analysis	32	110		
Calculus	17			
Bio II / Marine Science	51	42		
Bio II / Anatomy	22	108		
French IV	14	28		
Spanish IV	38	68		