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Evaluating Intradistrict Resource Allocation and its Implications for Equity: A Case Study

Abstract

Financial and human capital resources play a vital role in the ability of a school to fulfill its mission of educating students. Access to these resources varies - and this variation is often due to districts' allocation of resources among schools. Research on equity often disregards this concern and focuses attention on differences among district-wide revenue sources. My dissertation explores the implications for equity of intradistrict resource allocation through an examination of school disparities and district practices in a mid-sized urban school district.

First, I establish a comprehensive equity framework which joins together principles of adequacy and vertical equity. Then, using financial, personnel, student enrollment/ demographic, and student achievement and behavior data from the Allentown, Pennsylvania School District (ASD), I employ a mix of quantitative and qualitative methods to ascertain how resources are directed to schools in accordance with the comprehensive equity framework. I describe resource allocation using horizontal equity statistics and I provide context by evaluating the relationship between student outcomes and attending a particular school. Subsequently, I test: adequacy, looking at school outcomes for the entire student population and various subgroups with higher needs; vertical equity, identifying how inputs are allocated differentially based on schools' characteristics and demographics; and, comprehensive equity, a construct incorporating both adequacy and vertical equity designed to measure the justness of the district's approach to resource allocation. I also measure the portion of resource allocation in unexplained by vertical and comprehensive equity and conduct a simulation of weighted student funding.

Qualitative analysis, comprised of interviews with district administrative personnel - at the central office and in schools - provides context and the rationale for district resource allocation policies. Overall findings uncover a misalignment between school-level student needs and resources in the ASD. Results are strongest when considering human capital resources, including teacher effectiveness and teacher efficacy. Based on my findings, I conclude that the ASD does not achieve comprehensive equity in school year 2009-2010. This case study provides a window into equal educational opportunity within school districts and offers a template for districts seeking to determine the extent to which they are serving students equitably.

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**EVALUATING INTRADISTRICT RESOURCE ALLOCATION AND
ITS IMPLICATIONS FOR EQUITY: A CASE STUDY**

Stephanie Levin

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EVALUATING INTRADISTRICT RESOURCE ALLOCATION AND ITS
IMPLICATIONS FOR EQUITY: A CASE STUDY

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DEDICATION

To Becky Bowser Lowenthal,
January 24, 1965 to January 20, 2009

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ABSTRACT**EVALUATING INTRADISTRICT RESOURCE ALLOCATION AND
ITS IMPLICATIONS FOR EQUITY: A CASE STUDY**

Stephanie Levin
Richard M. Ingersoll

Financial and human capital resources play a vital role in the ability of a school to fulfill its mission of educating students. Access to these resources varies – and this variation is often due to districts’ allocation of resources among schools. Research on equity often disregards this concern and focuses attention on differences among district-wide revenue sources. My dissertation explores the implications for equity of intradistrict resource allocation through an examination of school disparities and district practices in a mid-sized urban school district.

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CHAPTER 1 - INTRODUCTION

Financial and human capital resources play a vital role in the ability of a school to fulfill its mission of educating students. Access to these resources varies – and this variation is often due to districts’ allocation of resources among schools. Research on equity often disregards this concern and focuses attention on differences among district-wide revenue sources. My dissertation explores the implications for equity of intradistrict resource allocation through an examination of school disparities and district practices in a mid-sized urban school district.

Both the state and the federal government contribute significantly to school district revenues. However, with the exception of Title I requirements, neither entity mandates specific distributions of resources among schools, programs, or classrooms within a district. Even state requirements that all students be provided an adequate or *thorough and efficient* education have seldom been pursued below the district level.¹

Pennsylvania’s former education finance reform agenda is a prime example of state policy designed to improve spending equity for individual students through allocation of funds to school districts. In 2008, the Pennsylvania state legislature voted to alter the state’s basic education funding formula to address both inadequate funding and serious inequities among school districts. Similar to other states’ approaches to address inequities, this action requires restructuring at the interdistrict, rather than intradistrict level. The formula adopted by the State is based on an adequacy target

¹ There have been only two major cases that look at resource allocation below the district level: *Hobson v. Hansen* in the District of Columbia and *Rodriguez v. Los Angeles Unified School District (LAUSD)*. Both were de-segregation cases and both relied on the theory of horizontal equity as the plaintiffs charged that minority and poor students were deprived of equal protection of the laws.

determined to provide all students with the necessary resources to become proficient on state assessments and to meet state standards in twelve academic areas. It includes weights to provide additional funds for economically disadvantaged students and English Language Learners (ELL).² With this policy, the State aimed to address a multifaceted vision of equity; primarily, the new funding formula was designed to achieve adequacy, an outcomes-based principle whereby all students are provided the necessary resources to reach a predetermined standard. To realize this objective, Pennsylvania's new funding formula addressed vertical equity, an inputs-based measure, by providing additional resources for students with additional needs. Also, the new funding formula sought to improve horizontal equity, an inputs-based measure requiring equivalent resources for all similarly situated students, by increasing the State's financial contribution such that children are not penalized due to the wealth of their district³.

While the new funding policy seemed promising, realizing these ideals of equity cannot be accomplished by the State alone. Districts, not states, are responsible for allocating resources generated from all levels of government at the building or student level. These district level allocation decisions impact how students with different educational needs are served. My dissertation evaluates intradistrict resource allocation using a conceptual framework built on theories of equity.

² District size and regional cost differences are also incorporated in the funding formula. While higher weights for special education students had been recommended, they were not included in the revised funding formula.

³ The State's financial contribution is determined by each district's need for revenue to meet the State adequacy target. It assumes no increase in local property tax rate.

The data used in this dissertation is drawn from a case study of a mid-sized, urban school district, the Allentown School District (ASD). This case study seeks to answer the following research questions:

1. How are resources allocated among schools?
2. What is the rationale for resource allocation patterns among schools?
3. Using a comprehensive equity framework which encompasses adequacy and vertical equity, what are the implications of resource allocation patterns?
4. What would be the financial impact of an alternative approach to resource allocation aligned with the comprehensive equity framework?⁴

ASD, the third largest urban school district in Pennsylvania⁵, offers a rich environment for research. Approximately 18,000 students are served in two early learning centers, 14 elementary schools, 4 middle schools, and 2 high schools. Seventy-eight percent of students in the district are classified as economically disadvantaged⁶, 84% of students in the district are non-white, and 64% are Hispanic. In the 2009-2010 school year, 8 of 20 schools met Adequate Yearly Progress goals; the graduation rate for the district was 70%; and 57% of all students tested proficient or above in math⁷. Leadership in the district supported a thorough assessment of budgeting practices as well as an analysis of the distribution of teachers among schools.

⁴ School-year 2009-2010 data is used answer these research questions.

⁵ The Allentown School District is approximately two-thirds the enrollment size of Pittsburgh, Pennsylvania.

⁶ These students are eligible for free and reduced priced lunch.

⁷ Thirty-nine percent of a sample of 4th grade students tested proficient or above on the National Educational Assessment Program (NAEP).

Significance of the Study

Though there is a sizeable body of research on interdistrict equity, the research on intradistrict resource allocation is relatively sparse as most U.S. school finance research that discusses equity focuses on the district. Concerns regarding the equal distribution of resources, the appropriate enhancements to ‘level the playing field’, 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 (Betts, Rueben, & Danenberg, 2000). Below the district level, all schools are supported by the same state aid package and local tax base and formulas to allocate dollars to schools are not designed to address disparities in wealth (Schwartz, Stiefel & Rubenstein, 2008). However, there are serious implications for equity at the school, program, and classroom level, as well (Monk & Hussain, 2000; Roos, 1998; Satz, 2008). Rubenstein, Stiefel, and Schwartz (2006) point out that the focus on “total or average resources at the district level implicitly assumes that the average resources reach all schools more or less evenly within a district” (p. 3). While state and local policies may be intended to provide for all students equally, institutional, organization, political, and economic factors can derail this objective (Picus, 1995; Roza & McCormick, 2006). Research has shown that much of the variation in resources happens at the school level within, not between, districts (Betts et al., 2000; Clotfelter, Ladd, Vigdor & Wheeler, 2007; Imazeki & Goe, 2009; Rubenstein et al., 2006). Furthermore, even in schools that have a diverse student body, it is not uncommon for minority and low-income students to be

taught by less qualified teachers (Roos, 1998). By not paying attention to how districts allocate resources, policy makers miss potential large-scale inequities.

In recent years, there has been increasing interest in resource allocation below the district level. Researchers have debated the value of money in improving student outcomes, and many have come to the conclusion that the way in which money is spent is as important as the amount of money spent (Odden, Goertz, Goetz, Archibald, Gross, Weiss & Mangan, 2008). Analysis of resource allocation below the district level provides valuable information about the relationships between expenditures and student outcomes (Stiefel, Rubenstein & Berne, 1998). Also, patterns of inequitable distribution of resources become more evident. This information should lead to more efficient and fairer spending decisions by educators, helping them to target effective interventions to students in need (Schwartz et al., 2008). As demonstrated in the following chapter, evaluations of equity among schools within districts have found uneven distributions of resources, with less privileged students most often receiving inferior resources, such as less experienced teachers (Schwartz et al., 2008).

Another reason that the examination of how districts allocate resources has become particularly advantageous is that, under our present accountability system, schools are held responsible for student outcomes. Standards-based reform under the federal No Child Left Behind (NCLB) Act requires schools to demonstrate the proficiency of all their students (Odden, Goetz, & Picus, 2008). It is important that schools understand what resources are necessary to meet this goal (Denison, Stiefel, Hartman & Deegan, 2009). Clotfelter, Ladd, and Vigdor (2007d) explain: “it is logical

to investigate the extent to which schools of different types are playing on a level playing field in terms of their access to the teaching and leadership resources that are essential for meeting the achievement goals required under ... accountability systems” (p. 6). The focus on school accountability has led to the proliferation of assessments to determine if students are achieving proficiency goals. Data collection and analysis has improved greatly in recent years. Assessment results, integrated into sophisticated data systems that link students and teachers over time, are now becoming available to help determine if an adequate education is being provided within schools and districts (Odden et al., 2008). Schools and districts can investigate the impact of classroom effects (e.g., teachers), school effects (e.g., peers), and student mobility on student achievement outcomes (Denison et al, 2009).

In 2005, California passed the first legislation of its kind requiring schools to provide data on per pupil expenditures. This data must represent the actual salaries of school personnel along with information on teacher credentials and experience (Rubenstein et al., 2006). As required, online school accountability report cards disclose school-level average teacher salaries. Analysis of this data reveals significant intradistrict inequities⁸ (Miller, 2010). This appears to be the beginning of a national trend, as Elementary and Secondary Education Act (ESEA) reauthorization discussions have included calls for different measures of school-level comparability as well as school-level reporting of teacher characteristics and teacher spending.

⁸ Researchers report: “a 10 percent increase in the rate of student poverty in a California public school is associated with a \$411 drop in average teacher salary, on average, controlling for several characteristics of districts and schools known to affect funding streams” (Miller, 2010, p. 2).

Challenges to evaluating intradistrict equity – including the complexity of district budgets, lack of accessible data at the school level, and difficulty in allocating shared resources – impede research. Addressing these challenges is imperative, however, as much of the variation in resources happens at the school level within, not between, districts (Betts et al., 2000; Imazeki & Goe, 2009; Roza, 2005; Rubenstein, Schwarz, Stiefel, & Hadj Amor, 2007). Insufficient focus on district level decision-making has left a gap in our knowledge as to the ability of districts to achieve equitable resource allocation (Lankford, Loeb & Wyckoff, 2002; Miller & Rubenstein, 2008; Rubenstein, Schwartz, Stiefel & Hadj Amor, 2007). Additional research is necessary to highlight inequities where they exist.

In addition to a lack of understanding about intradistrict inequities, there is a lack of evidence on the comparative efficacy of various resource allocation strategies. For example, investigations into the impacts of weighted student funding initiatives⁹ have shown them to have positive, though often small, effects on equity (Carr, Gray, & Holley, 2007; Chambers, Levin & Shambaugh, 2010; Roza & Hawley-Miles, 2004). Yet, Baker (2009) points out that much of this research neither isolates the impacts of the change to the allocation formulas, nor adequately considers the merit of the weights used to direct additional funds to high cost students. Additional research is necessary to help policymakers understand the implications of different resource allocation policies,

⁹ Weighted student funding is a system with two components: 1) funding follows the student through an allocation formula that directs real dollars to schools according to the needs of the students within the building; and, 2) funds are controlled at the building-level, not the district-level.

including impacts on opportunities and outcomes for students, so that they may make informed decisions that will support the learning of all children.

My research, a mixed methods case study of a mid-sized, urban school district helps to fill this gap in the literature by offering a unique view into resource allocation below the district level; insight into how and why a district's resource allocation decisions are made; and an analysis of how a district's allocation decisions might impact equity.

Methods

Using financial, personnel, student enrollment/ demographic, and student achievement data¹⁰, I employ a mix of quantitative and qualitative methods to ascertain how resources are directed to students. First, I describe ASD resource allocation using horizontal equity statistics. I provide additional context by evaluating the relationship between student outcomes and attending a particular school through the use of an unconditional 2-level model. I then test: (1) *adequacy*, looking only at school outcomes – both at the school level, taking into account the entire student population, and based on outcomes of various student populations with higher needs; (2) *vertical equity*, identifying how inputs are allocated differentially based on schools' characteristics and demographics; and, (3) *horizontal equity post vertical equity*, identifying how much of resource allocation is unexplained by vertical equity. Lastly, I test *comprehensive equity*, a construct I have developed which incorporates both adequacy and vertical

¹⁰ Additional student outcomes data (i.e., attendance, disciplinary actions), is included in the analysis.

equity and is designed to measure the effectiveness of the district's approach to resource allocation.

My measurement of adequacy is quite strait forward. I consider a number of student outcomes (i.e., state assessment results, attendance, and suspensions) at the school level as well as at the subgroup level within schools – and employ simple statistical measures of dispersion to quantify the variation among schools.

In the remaining analysis, I take an analytical approach similar in theory to methodology used by researchers to examine equity among school districts, whereby regression analysis is used to determine whether funds allocated to districts match the weights occurring in the state's funding formula (Toutkoushian and Michael, 2007). Given a limited sample size, and the desire to have a single measure with which to evaluate district equity, I construct an index to use as a single weight at the school level to account for school-wide needs given a school's particular student population. By altering my needs index to reflect differing theories of equity, I evaluate both vertical equity and comprehensive equity in the Allentown School District. This model allows me to examine the unexplained variations in per-pupil funding after taking into account the additional needs of certain subgroups of students¹¹ - a construct which I refer to as "horizontal equity post vertical equity." By correlating the needs index with various resources, I am able to identify the direction, size, and strength of the relationship between resources and school characteristics (as defined by the characteristics of the student population – e.g., % poverty). While much of the analysis of equity has been

¹¹ In their paper, Toutkoushian and Michael (2007) refer to this construct as horizontal equity.

conducted at the district level, my research focuses its investigation at the building level, comparing all elementary schools and all middle schools.

I employ qualitative research methods, composed of a review of district and state financial documents and interviews with senior district administrators and a School Board member, to illuminate the quantitative findings by providing a description of the current resource allocation system and its rationale. Qualitative research is useful in identifying impediments to greater equity among schools.

To address the final research question, "What would be the financial impact of an alternative approach to resource allocation aligned with the comprehensive equity framework?" I conducted a simulation. The simulation illustrates the implications of two possible changes to the allocation of resources: the first change is based on the State's approach to funding districts and is consistent with vertical equity, and the second change builds on this by also accounting for students' prior academic performance and is consistent with the district's mission of having all students achieve pre-determined¹² academic and social outcomes.

Ultimately, this research project describes district resource allocation practices and how these practices result in a misalignment between school-level student needs and financial and human capital resources.

The remainder of this dissertation is organized into six chapters: a literature review; background and data; methodology; district context and qualitative findings; quantitative analysis and results; and my conclusion. The literature review begins with

¹² The State sets yearly benchmarks for proficiency, as mandated by federal No Child Left Behind legislation.

an appraisal of various conceptions of equity leading to a framework used first to evaluate existing studies of intradistrict resource allocation – and, later, to inform the research questions and analysis of resource allocation in the Allentown School District. This chapter also includes a discussion of intradistrict resource allocation policies and procedures and completed studies of intradistrict resource allocation. Chapter Three presents background information on both state and district policies to provide context for the case study; the sources and collection methods of my data are also reviewed. A description of the analyses follows, and specific research methods are explicated. In the fifth and sixth chapters, I present my research findings from both quantitative and qualitative analysis and the final chapter provides a summary of major findings, limitations of the study, policy implications, and recommendations for future research.

CHAPTER 2 - LITERATURE REVIEW

The organization of this review of pertinent research reflects my approach to understanding how districts allocate resources among students. The first section offers a critical review of conceptions of equity consistent with a social justice perspective calling for equal educational opportunity for all students. A theoretical framework for grounding an analysis of resource allocation is derived from this review. The next section explains the mechanisms for resource allocation from districts to schools, programs, and classrooms. The first part of this section describes allocation policies including institutional procedures and organizational concerns that influence allocation patterns, such as incorrect (and correct) assumptions of need, administrative inertia, and school reform initiatives. The political influence of key stakeholders (i.e., teacher unions, connected parents, and the business community) and external requirements (i.e., court cases and supplemental federal funds) are also considered. Following this general review is an examination of the constraints on school districts which limit their ability to promote equitable outcomes for students. These constraints are categorized as local education agency policies and practices and the teacher labor market. Weighted student funding, an approach to resource allocation designed to address concerns of governance and fairness, is also reviewed. The third section of this chapter offers a summary of the major studies of intradistrict resource allocation, beginning with an assessment of challenges to this line of inquiry and a discussion of the research methods employed and ending with a review of the measures of inputs (i.e., teacher characteristics) used in my analysis of intradistrict equity. Finally, this chapter reviews 34 studies of

intradistrict resource allocation utilizing the different theories of equity presented earlier in this paper. Studies are categorized according to their authors' intention of testing the existence of horizontal equity, vertical equity, and/or adequacy.

A Critical Review of Equity Models

Given the many views of what constitutes equity, analysis and evaluation of the equitable allocation of resources at the school district level or elsewhere requires that the concept be clearly defined. This section of the literature review explores definitions of “equity” in relation to equal educational opportunity. Consideration of the implications of four distinct approaches to equal educational opportunity – all which have been quantified in the school finance literature - leads to a fifth approach which capitalizes on the positive aspects and addresses the weaknesses of existing interpretations of equity.¹³

While “equity” is generally conceived of as fairness in resource allocation by economists, political scientists, and philosophers, the various disciplines use the term for somewhat different ideas. Many legal scholars and philosophers characterize equity in education as “equal educational opportunity”; however, the appropriate meaning of this phrase has been debated for decades (Coleman, 1975). Peterson and Woessmann (2007) acknowledge two interpretations of “equal educational opportunity:”

“For some, equal opportunity means only that everyone is treated the same way within the school house and each is given instruction appropriate to his or her ability, so that all are given the same chance to build on the capabilities they bring to the school door. For others, equal opportunity asks schools to remedy

¹³ In 1964, James Coleman struggled with a similar task after being commissioned by the United States Department of Health, Education, and Welfare “to assess the availability of equal educational opportunities to children of different race, color, religion, and national origin.”

the deficiencies that some children bring with them to school so that only random chance determines which members of the next generation rise to the highest positions of society.” (p. 4)

The first definition offered above is embraced by Peterson and Woessmann (2007) as all that is required and feasible in a democratic society which values individual liberty. This vision of equal educational opportunity calls for equivalent resources for all students. The second definition of equal educational opportunity put forth above is consistent with Rawls’ views on social justice, whereby students should have access to resources such that their subsequent opportunities are equalized (Berne & Stiefel, 1984; Rawls, 1971). This goal holds regardless of whether the focus is on inputs into the education system or student outcomes. Inputs refer to resources dedicated to schooling (i.e., money, human capital), and outcomes refer to results (i.e., knowledge acquired, income, life satisfaction). An additional version of equal educational opportunity, one that gained more traction in recent years as a result of the persistent ambiguities of equity, requires that each student is prepared to perform at (at least) an adequate level such that he/she can succeed economically, politically and socially.

Approaches to equal educational opportunity emphasize inputs (e.g., equal inputs for all students), outcomes (e.g., adequate outcomes for all students), or a combination of both. Different measurement tools are required to examine inputs and outcomes, and calculating inputs can be more straightforward than quantifying outcomes.¹⁴ This

¹⁴ When James Coleman was commissioned by the United States Department of Health, Education, and Welfare to report on “the lack of availability of equal educational opportunities for individuals by reason of race, color, religion, or national origin in public educational institutions” (Title IV of the 1964 Civil

literature review examines four conceptions of equity which broadly cover the range of approaches that have been considered by policy makers and scholars: horizontal equity (equivalent resources for all students); vertical equity (resources directed to students based on their differing needs); equivalent outcomes for all students; and adequacy (equality of either inputs or outcomes up to a threshold level). An analysis of these different interpretations of equity leads to a conceptual model of equity against which policy makers can measure current practice.

Horizontal equity. The simplest approach to equity is to provide equivalent resources to all students. Essentially, horizontal equity requires that students from different backgrounds and living situations have access to comparable resources (i.e., financial support, qualified teachers and principals) (Clotfelter, Ladd & Vigdor, 2007). This approach treats all students as if they are the same – it does not take into account differences in student need or the costs of services. An equal distribution of resources to all students ensures that the school is not responsible for creating inequalities, but it does not provide the school with a means of redressing existing inequalities. One manifestation of horizontal equity is “wealth neutrality” which maintains that “the education a child receives should not be dependent on the wealth of the district in which the child resides” (Underwood, 1994, p. 143).¹⁵ This particular approach to horizontal equity addresses differences in local preferences for allocating public funds

Rights Act, Sec. 402.) he offered a similar analysis to the one provided in this paper, acknowledging numerous concepts of equal opportunity (Coleman, 1975).

¹⁵ To attain wealth neutrality, Coons, Clune and Sugarman (1970) maintained that state aid should supplement local revenues to the extent that local tax rates meet state requirements but local property values are too low to meet the state’s guaranteed level of funding.

to education. Wealth neutrality has been used by litigants in court cases challenging state funding systems.

Horizontal equity is an inadequate measure of equity because the cost of providing an education to different students varies according to students' needs and school conditions (Underwood, 1994). Certain students require greater supports to be successful. Disadvantaged schools and districts are likely to require funds above and beyond those of advantaged schools and districts. The reasons for this include the cost of acquiring high quality teachers at less desirable schools, maintenance expenditures for older infrastructure, the existing resource discrepancies between schools, and the propensity of some parents to compensate their children's education at higher levels (Ladd, 2008). Another problem with using horizontal equity as the measure of equity is that because no minimum amount of funding is required, even equivalent resources could be insufficient, providing a very low quality education and potentially "leveling educational resources downward for all" (Satz, 2008, p. 426).

Vertical equity. Vertical equity responds to some of the critiques of horizontal equity by taking into account discrepancies among students. Specifically, vertical equity is designed to address the fact that different students and conditions require different treatment (or inputs) to have the opportunity to achieve similar outcomes (Berne & Stiefel, 1999; Ladd, 2008). For example, economically disadvantaged families and minority families often do not have the same access to a range of supports, such as secure housing arrangements, health care, and high quality pre-school, that

wealthier and non-minority families do (Rebell, 2007).¹⁶ For this reason, some students require greater resources in order to address their needs. As Ladd (2008) argues, “equality of outcomes requires inequality of inputs” (p. 404). This approach to equality of educational opportunity leads to a greater consideration of student outcomes.

Vertical equity falls within a larger characterization of equal educational opportunity whereby “all students ... have an equal chance to succeed, with actual observed success dependent on certain personal characteristics, such as motivation, desire, effort, and to some extent ability” (Berne & Steifel, 1999, p. 13). Proponents of this form of equity allow for differences in the allocation of resources among students based on ability and effort, but do not accept differences based on morally arbitrary traits such as wealth or ethnicity (Brighthouse & Swift, 2008; Strike, 2008; Walzer, 1991).¹⁷ In the field of school finance, vertical equity calls for additional resources for students with defined educational needs (Berne & Stiefel, 1999; Owens & Maiden, 1999; Underwood, 1994). These educational needs are generally identified as student characteristics which research has shown to be highly correlated with a lack of academic achievement.

¹⁶ See Grissmer, Flanagan, and Williamson, 1999, Reschovsky and Imazeki, 1999, Weiner, 2008 and Baker and Green, 2009 for analysis on the costs of educating economically disadvantaged and minority students.

¹⁷ Scholars offer numerous views on this conception of equal educational opportunity. Brighthouse and Swift (2008) write that “an individual’s prospects for educational achievement may be a function of that individual’s talent and effort, but ... not be influenced by his or her social class background” (p. 447). In other words, students with the same level of “merit,” conceived of as ability plus effort, should have the same chance for success.¹⁷ Underwood (1994) believes that all students have the right to “the opportunity to develop the skills necessary to be a productive member of society, to be able to participate in the democratic process, and to exercise his or her constitutional rights” (p. 147), and Strike (2008) regards “ability, aspirations, choice, and effort” to be “morally appropriate grounds for differences in treatment and outcomes” while “race, class, gender, religion, and sexual preference are factors that should be (generally) irrelevant” (p. 478). Similar to Strike, Walzer (1991) writes that justice requires that the distribution of educational goods not depend upon students’ attributes such as ethnicity or wealth.

A compelling reason to support this conception of equal educational opportunity is that it is socially just, as students are afforded the same opportunity to succeed, regardless of race, class or other ascribed trait (Brighthouse & Swift, 2008; Satz, 2008; Strike, 2008). Because success includes economic and political attainment, as well as a life of enhanced experiences through appreciation of the arts and sciences, it is just that all students be afforded the same opportunities (Brighthouse & Swift, 2008).

Drawbacks to vertical equity, as with any approach to equal educational opportunity that seeks to allocate resources to redress unfair disadvantages due to external circumstances, have to do with its focus on inputs rather than outcomes, for the individual and for society as a whole. First, vertical equity does not take into account the quality of the education provided to students. Even with a means of compensating for student disadvantages, all students might get a low quality education. This approach to equity does not require that children be educated to even a minimum level.

Inadequate education is even more likely for those children with less ability or motivation (Gutmann, 1987; Satz, 2008). Additionally, a system that is not concerned with outcomes could lead to a reduction in overall productivity, negatively impacting all children (Satz, 2008).

There are additional theoretical concerns that arise when vertical equity is adopted as the determinant of equal educational opportunity. These include the murkiness derived from holding students accountable for ability and motivation while

compensating students for other ascribed traits¹⁸, and the conflict that arises between the values of parental and local control and those of equality¹⁹.

Vertical Equity in Practice. Implementation of vertical equity necessitates a way to adjust for the unequal circumstances of students. Adjustments provide greater inputs to the students who require additional resources to achieve outcomes similar to less disadvantaged students (Berne & Stiefel, 1999). To achieve vertical equity, states use categorical programs to address the needs of particular groups of students. Some states and districts also use pupil weights in their funding formulas to take into account the additional needs of some categories of students such as English language learners or Special Education students (Augenblick, Myers, & Anderson, 1997). Similarly, pupil weights can be constructed to compensate students for past unequal treatment (Strike,

¹⁸ While vertical equity deems that groups of students should not differ in their outcomes, it does allow individuals within these groups to differ. As such, there exists the possibility of large disparities among students in terms of inputs and outcomes. Some argue that it is unclear why the line is drawn at this point. Satz (2008) points out that it is wrong to hold individuals accountable for such traits at an early age. She writes, “We expect children to go to school and master certain capabilities; it is not enough that they have the opportunities to do so” (p. 429). Jencks (1998) agrees, stating, “I can understand the argument that society is not responsible for children’s genes or for their upbringing. I have never seen a coherent defense of the proposition that society is responsible for one but not the other” (p. 523). Gutmann (1987) reaches a similar conclusion based on the likelihood that effort “is dependent upon happy family and social circumstances” (p. 131). Brighthouse and Swift (2008) do acknowledge that it may be unfair to hold children accountable for their efforts which may be heavily influenced by background circumstances, but address this difficulty by invoking/relying on the democratic process to determine how “merit” is defined.

¹⁹ In the courts, local control has been referred to as a legitimate state interest while education has not been identified as a fundamental right to be protected (Underwood, 1994). Ladd (2008) points out that affluent districts will not compromise the quality of their schools to allow for equality. And Gutmann (1987) makes the argument that they should not have to. She claims that forcing the equalization of resources would violate the value of family autonomy. Brighthouse and Swift (2008) also have concerns with inhibiting parental freedom and, for that reason, are careful to incorporate values of the family into their conception of meritocracy. When contemplating the value of family, Brighthouse and Swift (2008) make clear their view that educational equality should not “jeopardize, threaten, or undermine family values” (p. 458). They do, however, carefully define family values in such a way as to limit its scope. For example, spending time reading to children should be considered a family value while supporting elite, exclusive institutions should not.

2008). Implementing pupil weights requires two steps: first, establishing which categories of students should be granted additional funds, and second, determining appropriate weights for these categories. In practice, vertical equity relies on equivalent resources per weighted pupil across schools and districts (Ladd, 2008). Equal outcomes for categories of students, rather than individual students, is the desired result (Berne & Stiefel, 1994; Ladd, 2008; Strike, 2008). This makes the distinction between educational inputs and outcomes unclear (Strike, 2008).

While the idea of pupil weights is compelling as a theoretical approach to school funding, there are concerns with its implementation. First, there is the possibility that the weights will be incorrect. Berne and Stiefel (1999) explain that there is no consensus on how to determine the correct weights. Strike (2008) shares this view and worries that weights are arbitrarily assigned to students. Another issue is that pupil weights are based on individual students and do not take into account concentrations of disadvantaged students (Baker & Green, 2009). Ladd (2008) explains that to be more accurate, “weights should take into account not only the characteristics of the students themselves but also the extent to which students whose characteristics make them hard to teach are concentrated in particular schools or districts” (p. 412). A final concern with pupil weights is that individual students may be stigmatized. Since pupil weights sort individuals into groups, the assumption is that these individuals are less responsible for their lower achievement than others. As a society, we run the risk of identifying some students as belonging to an “inferior” group (Ladd, 2008; Satz, 2008). Addressing concerns related to inadequate outcomes for students leads to two additional approaches

to equal educational opportunity – both of which use student outcomes to measure fairness.

Equal outcomes. A third conception of equity, “equal outcomes” or “equality of outputs” requires that resources be allocated in such a way as to create equal outcomes. Outcomes can be defined in any number of ways, including student achievement, graduation rates, prospective economic outcomes, or citizenship. A focus on outcomes is consistent with recent education policy in the United States in which student assessments are used as an indicator of student learning outcomes. In order to achieve equal outcomes by all students, it is necessary to determine which inputs are required to achieve them, which in turn requires an unequal allocation of resources among students.

The idea of equal outcomes is appealing as it leads one to imagine a more communal society with less competition and no disparities between the “haves” and the “have-nots.” The adoption of an equal outcomes standard is unlikely, however, due primarily to democratic concerns regarding autonomy and the role of government . A system designed to ensure equal outcomes for all students would be extremely expensive, as it would require the state to devote all of its educational resources to the poorest performing students until they can match the accomplishments of the highest performing students. Also, there would be a need for significant change in social and economic policies outside of the educational arena (Clotfelter et al., 2007; Rothstein, 2004). Given limited resources, and public needs beyond education, a system such as this might never be able to provide resources to higher performing students.

Furthermore, it is unlikely that taxpayers would endorse this conception of equity, as available resources must be shared to address a variety of public needs (Gutmann, 1987; Satz, 2008). The second problem is that, taken to its extreme, a system of equal outcomes would lead to a homogenous student population. It is unlikely that the public would embrace a system calling for entirely equal outcomes; nobody argues in favor of a system where achievement scores are the same for all students (Berne & Stiefel, 1999; Gutmann, 1987; Satz, 2008).

Another deterrent to an equal outcomes model is fear of the effect it would have on the behavior of both students and the public. For example, there is concern that undesirable incentive effects could reduce individual effort (Ladd, 2008), or that the call for equal outcomes would cause a bidding war among parents for improved outcomes (Brighthouse & Swift, 2008; Gutmann, 1987; Ladd, 2008). Dealing with this “arms race” would require restricting the power of parents – resulting in a politically unfeasible loss of autonomy for families (Gutmann, 1987; Strike, 2008).

The final challenge of this equity ideal is that it is difficult to agree on what constitutes appropriate outcomes. Even if assessment results were determined to be appropriate outcomes to measure, the economic tools used to study the relationship between inputs and outcomes, such as production functions and cost functions, are inconclusive in terms of the type and amount of resources required to attain specific outcomes (Berne & Stiefel, 1999). Therefore, the public lacks important information in making accurate decisions regarding pupil weights.

Adequacy. The final conception of equity presented, adequacy, has gained traction in scholarly debate, policy, and practice as it addresses some of the shortcomings of vertical equity and equal outcomes. As with the principle of equal outcomes, adequacy is outcome-focused rather than input-focused. Unlike other concepts of equity, however, adequacy is not comparative in nature. Similar to the difference between a criterion-referenced test and a norm-referenced test, adequacy requires measurement against specified criteria, not against other individuals (or schools or districts). This difference makes adequacy a politically viable approach to equal educational opportunity, since it offers a means of providing students with the resources necessary in our society to attain a certain goal, such as citizenship, proficiency on assessments, or social mobility. In doing so, adequacy frames education as a right, consistent with the views of numerous legal scholars and philosophers.²⁰

Adequacy provides an outcome level below which no student is allowed to fall. The determination of this outcome level is crucial as it sets expectations for students that may or may not impact their long term success. The theory of adequacy requires that each child is allotted the necessary resources to attain a specified goal, but in practice policy-makers have measured adequacy as at the district level, meaning that districts within a state are held accountable for their students' attainment of a pre-determined standard (Berne & Stiefel, 1998). Adequacy differs from other conceptions

²⁰ Education is considered to be a right because it “is required by individuals (for them) to secure other rights to which they are entitled, such as citizenship and autonomy” (Strike, 2008, p. 471). Further, society has legitimate interests in educating all citizens – that complements the idea that education is a right (Strike, 2008). This is held up in the Supreme Court’s *Brown* decision which states that education is required for the “performance of our basic public responsibilities” (Satz, 2008, p. 432).

of equal opportunity in that it requires value judgments as to what outcome is adequate, or sufficient, and to what resources will support all students in reaching this particular outcome (Guthrie & Rothstein, 1999). Finally, a key difference between adequacy and vertical equity or equal outcomes is that it allows for inequality above this minimum threshold.

Scholars and policy makers have debated the appropriate standard for all students to meet.²¹ Policy makers have relied on state-wide test scores, construed to be a proxy for long-term outcomes. This is problematic to the extent that these standardized tests are insufficient in forecasting success²², but it does allow for a measurable definition of adequacy: being deemed proficient on a state test.²³ The recent requirement that all students be tested provides a measure of school and student

²¹ Gutmann (1987) and Satz (2008) share the view that the threshold should be at the level at which a person has the ability to participate effectively in the political process. This threshold is democratically determined, as is the allocation of resources above the threshold level. This approach enables future citizens to determine the appropriate level of adequacy (Gutmann, 1987). For Satz (2008), educational adequacy is tied to the requirements of equal citizenship. This means that schools have an obligation to break down “stereotypes and animosity between groups and encouraging intergroup knowledge and understanding” (p. 425). Satz (2008) includes social and economic rights in her understanding of equal citizenship. Therefore, “an education system that precludes the children of poorer families from competing in the same market and society as their wealthier peers cannot be adequate” (Satz, 2008, p. 434). Satz’s view of adequacy requires “accountable output standards on a national level, increased funding in many school districts, and substantial integration across class and racial lines” (Satz, 2008, p. 441). This threshold for adequacy is so high that it appears to converge with the conception of meritocracy outlined earlier, where resources are directed to students with greater educational needs such that all students reach a level playing field. Other visions of adequacy focus on private outcomes – such as the ability to compete in the market. An example of this is Rawls’ view that all students should attain outcomes “connected to his or her long-term life chances” (Rawls, 2001, as cited in Ladd, 2008, p. 412). While some worry that adequacy may result in “leveling down,” conceptions of adequacy put forth by Satz and Gutmann require a high enough threshold to deal with concerns related to a lower quality of education. Satz (2008) points out that adequacy offers a minimum threshold of attainment that should prevent states from under-funding schools and districts. An additional advantage of Satz’s and Gutmann’s versions of adequacy is that they secure support for those that are most disadvantaged and ensure that they can participate in society. Ultimately, this should restrict disparities in educational outcomes (Satz, 2008).

²² Proficiency scores in certain disciplines, such as math and reading, might not represent the full set of skills and knowledge that are necessary for a successful life (Guthrie & Rothstein, 1999).

²³ This characterization of adequacy is consistent with the federal “No Child Left Behind” legislation.

performance which has been used to determine whether states are upholding the Constitutional mandate of provision of public education. Plaintiffs in adequacy lawsuits are able to point to a clear definition of an adequate education, increasing plaintiff victories and resulting in the allocation of new funds to disadvantaged districts. Advocates for directing more resources to disadvantaged students report that “the adequacy movement has improved educational opportunities and led to gains in student achievement, the ultimate litmus test” (Rebell, 2008, p. 436).

While adequacy has continued to garner support in recent years, there are a number of concerns related to its use. Foremost, it addresses neither issues of inequality nor the concept that education is a positional good (Reich & Koski, 2006). Adequacy provides for a certain level of scholastic attainment, but beyond this level some groups of students will have greater resources and better access than others (Baker & Green, 2008; Strike, 2008). This will inevitably result in the advantaged groups having greater success, as the playing field is not truly level²⁴. While all students will be able to compete, the competition will be unfair as those who need no compensation have, in essence, access to a superior education and, therefore, an advantage in economic and/or political attainment (Brighthouse & Swift, 2008; Strike, 2008).²⁵ Since the current standards are not being met by many students, this argument has some merit; still, the

²⁴ An adequate education alone may not provide all the benefits that schooling has to offer. Education is valuable for reasons other than economic or even civic pursuits. Education can enhance one’s life immeasurably by “enabling (students) to engage in a wide range of intrinsically valuable pursuits, such as reading good literature and discussing it with friends, playing complex games, entertaining themselves with mathematical puzzles, and socializing with people who speak other languages” (Brighthouse & Swift, 2008, p. 462).

²⁵ Adequacy advocates address this concern by claiming that an appropriately high standard would minimize disparities (Satz, 2008).

call for greater equity which may be achieved through adequacy models is equally compelling.

Adequacy also suffers from two political liabilities. As educational adequacy is highly dependent upon where the bar is set, it is conceivable that districts would set a minimal adequacy standard and could thus be judged as providing an adequate education, leaving huge variations between disadvantaged and advantaged school districts. Affluent districts might even promote minimal definitions of adequacy in order to avoid higher taxes to compensate less well-off districts (Strike, 2008). The second political liability is that, in the likely event that the legislature is unwilling or unable to produce the necessary funds, a theory of adequacy, in place of a theory of vertical equity or equal outcomes, could result in an unequal system. This situation might be more difficult to overcome than the situation where all schools are equally but inadequately funded. Similar to the idea that a universal draft would increase resistance to war, in a situation where all schools were equally but inadequately funded, more districts would be vested in raising the level of support to an adequate level. With fewer schools inadequately funded, there would be no “shared basis for improvement in equity” (Kauffman, 2004).

One last technical issue with adequacy models, discussed earlier with regard to equal outcomes, is that it is extremely difficult to address questions regarding appropriate outcome measures and the links between inputs and outputs. Augenblick, Meyers, and Anderson (1997), Guthrie and Rothstein (1999), and Ladd (2008) agree that determining the necessary inputs to achieve certain outcomes is a slowly evolving

science. Also, there are practical and theoretical concerns with the allocation of resources, including the determination of accurate pupil weights. Researchers and policymakers have not yet resolved the education production function and are currently unable to ascertain what inputs are necessary to achieve certain outcomes (Ladd, 2008). Questions such as “To what extent should schools be held responsible for the specified outcomes?” and “Are the level of resources necessary to produce adequate outcomes in reading the same as those required to produce adequate outcomes in math, or citizenship?” remain unanswered (Guthrie & Rothstein, 1999, p. 251).

Comprehensive Equity Framework. The previous section reviewed four approaches to equal educational opportunity, providing an overview of current methods of establishing the existence of the equitable distribution of resources. Here I offer a fifth approach, a conception of equity which joins together principles of adequacy and vertical equity. This comprehensive equity framework seeks to ensure positive outcomes for all students, is consistent with a social justice interpretation of equity, and is politically feasible in a democratic society.

The intention of this new equity framework is twofold: 1) to ensure that all students obtain the skills and competencies required to participate in a democracy and be economically and socially self-sufficient and 2) to ascertain that, beyond the minimum standards attained, all students are similarly situated to progress according to their competencies and desires. The comprehensive equity framework, developed to be used in evaluating resource allocation, embraces a definition of adequacy as all students

being “college and career ready”²⁶ and, in addition, employs a paradigm of vertical equity by requiring that, beyond adequacy, resources be distributed to students based on their needs, thereby ensuring that students’ educational opportunities are not impacted by circumstances over which they have no control. In this case, the paradigm of vertical equity specifies that supplementary resources are directed to students with given characteristics based on links between these characteristics (e.g., English-language learner status, low-income status) and greater educational need. Supplementary resources are not to be directed to students based on their possession of characteristics unrelated to educational need (e.g., race).

Though they often presented as opposing views of equity, theories of adequacy and vertical equity are not incompatible. When combined, they can promote the goal of all students obtaining an education that prepares them to achieve a certain “standard” and, above this standard, enjoy similar opportunities for success. In fact, adequacy theories “should be used in conjunction with equity theories to ensure that all children receive an education that (1) affords equal opportunity to all children, consistent with educational need, and (2) is a quality education adequate to prepare students from diverse backgrounds for life in the twenty-first century” (Morgan, Cohen & Hershkoff, 1995, p. 561).²⁷ This formulation is consistent with the theory that understanding and

²⁶ College and career ready has been presented by the National Governors Association and the Council of Chief State School Officers as “prepared for college-level courses upon matriculation (from high school), or for a job that can support a family (Paulson, 2010).

²⁷ Several researchers, policymakers, and legal scholars agree with this broad interpretation of equal educational opportunity. Examples of supporters of an approach to equal educational opportunity which includes aspects of both vertical equity and adequacy: 1) Berne and Stiefel (1999) recommend the continued use of input measures along with output measures, as “many users (e.g., lawyers, the public) find input equity meaningful” (p. 24); 2) Strike (2008) argues that equality and adequacy are

rectifying inequities requires researchers and policymakers to take into account both the relative position and the absolute achievement of students (Baker & Green, 2008; Walzer, 1991).

A new equity framework is required to overcome the previously outlined difficulties of existing approaches to equal educational opportunity. Adequacy's greatest drawback is that it does not fully address the problem of inequality. Vertical equity's most significant shortcoming is that it does not ensure that all students are held to a minimum standard. Coupling adequacy and vertical equity provides a means of assessing equal educational opportunity, along with a greater capacity to determine the appropriate allocation of resources among districts, schools, and students.

Additional concerns related to adequacy and vertical equity can be addressed with morally just policies and practices. For example, fears that the definition of adequacy could be incorrect, or the bar for adequacy set too low, are dealt with by offering more precise definitions with clear standards. As an illustration, the Obama administration is considering moving away from a system which relies on state assessments to measure long-term student outcomes and seeks instead to develop a minimum criterion for all students of "college and career-ready." An adequacy target reconfigured to "college and career ready" as opposed to "proficiency on state

complementary approaches to school finance and proposes a three-tier approach. On the first tier, all children receive a level of education that meets a certain threshold tied to outcome goals such as citizenship or other social or economic goals. On the second tier, above this threshold, education is provided equally to all students up to a specified limit. And on the third tier, families can make choices for their children that result in unequal outcomes (Strike, 2008, p. 472); and, 3) Ladd (2008) suggests that adequacy should be the primary goal, but disparities above the threshold should be limited, especially to the extent that they are publicly funded. She explains that this approach is needed because of the deficits of full equality, including its "undesirable incentive effects," its high costs, and the desire that some families may have to retain their position (Ladd, 2008, p. 415-416).

assessments” is less likely to result in large numbers of students unable to participate in democracy and/or compete in the economy. Furthermore, impediments to the implementation of vertical equity, stemming from technical complexities related to assigning accurate pupil weights to compensate for student disadvantages, are an empirical problem that could be addressed with sufficient research into best practices for service provision.

Lastly, the comprehensive equity framework has an advantage over the current “adequacy” systems created by No Child Left Behind legislation. Systems which focus only on student outcomes are ill-equipped to comprehend the relationship between discrete resources and their impact on student progress. This makes it difficult for districts to effectively and efficiently address budget shortfalls or expand programs because administrators and policy-makers lack information on how dollars are spent at the school level. A system which requires the evaluation of how dollars, personnel, and programs are distributed among schools and students creates an environment in which policy makers and stakeholders are better equipped to understand the implications of resource allocation decisions.

This new equity framework will still suffer from some of the limitations inherent in adequacy and vertical equity models. The most obvious limitations include: 1) difficulty in resolving the conflicting ideals regarding the appropriate standard for all students to meet; and 2) the inability to eliminate all inequities among groups of students. Sufficient resources would go a long way to minimize these limitations, but

no equity framework can completely satisfy the numerous, and often incompatible, requirements of all stakeholders.

The Equity Framework in Practice. With access to financial, personnel, student enrollment/demographic, and student achievement data, quantitative methods can be employed to ascertain how resources are directed to students.²⁸ Based on the comprehensive equity framework put forth in this dissertation, I test both vertical equity and adequacy to provide a complete picture of equal educational opportunity in the Allentown School District. Vertical equity is tested by identifying how inputs (i.e., expenditures, personnel) are allocated differentially based on schools' characteristics and demographics. This analysis uses weights to compensate for the additional needs of certain students with given characteristics (i.e., ELL status, poverty). In order to achieve a more detailed understanding of resource allocation, I further investigate the allocation of ASD resources by quantifying the variation among school resources which is not accounted for by defined school need.²⁹ Adequacy is tested by examining student outcomes. I first consider the effect of being from a particular school on student outcomes. As my primary objective in evaluating intradistrict adequacy is to understand the extent to which students are "college and career ready" by school, I look at the percentage of students in each school that have not met benchmarks that put them on a track to achieve this goal. I also examine the various student populations within each school and consider their success in attaining "college and career ready" standards.

²⁸ Additional student outcomes, such as behavioral data (i.e., attendance, disciplinary actions), can be included in the analysis.

²⁹ School need is determined by student population.

Taken together, the evaluation of vertical equity and adequacy provides a comprehensive and useful picture of equal educational opportunity.

Intradistrict Distribution of Resources - Process

In considering the implications of the allocation of resources among schools, programs and classrooms, it is important to understand the processes by which funds, services, and personnel are distributed within districts. The following section provides a synopsis of the means in which resources (dollars, services, and personnel) are disbursed. It begins with a description of allocation policies, highlighting institutional procedures. These allocation policies are explained in terms of their implications for equity. An exploration of organizational concerns, the political influence of key stakeholders (i.e., teacher unions, connected parents, and the business community), and external requirements (i.e., court cases, supplemental federal funds, and local education foundations) follows. Next, district limitations, district human resource practices, and the teacher labor market are considered as the constraints on resource allocation. This section concludes with a discussion of weighted student funding as an approach to resource allocation designed to address concerns related to the current system.

Allocation Policies. Schools are funded with federal, state and local revenues. Based on 2006-07 U.S. Census data, nationally the local share of revenues is 44.1%; the state share is 47.6%; and the federal share is 8.3%. The mix of funds varies considerably from state to state. Illinois has the highest local share, at 58.9%³⁰, and

³⁰ The District of Columbia is not included as it is funded with local (88.3 percent) and federal (11.7 percent) funds.

Vermont has the lowest local share, at 5.3%³¹, (U.S. Census Bureau, 2009). This same variation can be seen within states as well. For example, in Pennsylvania among the school districts with enrollments of greater than 10,000 students, the average local share is 63.1%.³² Of these 17 districts, 8 districts have a local share higher than 75% and 4 districts have a local share lower than 45% (U.S. Census Bureau, 2009).

In many states, as a result of court rulings or legislative mandate, the state's funding scheme is shaped to equalize spending across districts and ensure that an adequate education is provided to all students. While states do not control how all dollars are spent, a specific recommendation – especially with regards to per pupil funding and additional funding for students deemed to have special needs – is implied. However, because state aid is directed to school districts as opposed to schools, classrooms or programs (or students), there is no guarantee that districts use funds in accordance with the state's intentions.

Institutional Procedures. Financial management of the public school system is similar to financial management in the public sector in general. At the district level, a budget is developed based on expected revenue (from state and federal aid and local tax base) and forecasted expenses. In a small minority of cases, schools within districts are provided with a lump sum to spend according to their own determined needs. (This model will be discussed further in the section on weighted student funding.) Typically, budgets are centrally managed, and district officials administer the use of funds, sorting

³¹ Hawaii, with only one school district, is not included. Its local share is 1.6 percent and its state share is 89.8 percent.

³² The statewide local share in Pennsylvania is 57.0 percent.

dollars into functions such as instruction, pupil personnel services, staff support services, administrative support services, business support services, operation/maintenance, transportation, food services, and central support services. For accounting purposes, funds are further classified into categories such as salaries, benefits, purchased professional and technical services, purchased property services, other purchased services, supplies, dues/fees, and property.³³

Understanding resource allocation within an equity framework. Roza (2008) provides a framework for understanding district resource allocation. She offers eight categories of inputs that must be allocated to schools (funds, staff, access to central services, professional development, supplies/materials/equipment, program access, roaming specialists, and, some combination of these) along with methods for how these inputs are distributed. Distribution methods include formula (per pupil, per school, per staff, per pupil type, and some combination) and non-formula allocations (school/student/staff demand, discretion, politics, application process, other) (p. 12). Berne and Stiefel (1994) explain that funding allocated on a per pupil basis is described as “general” education funding (p. 407), and as such, can be interpreted as addressing the call for horizontal equity. Funding categories designed to address the needs of certain groups of students (such as ELL students or students with disabilities) can be interpreted as addressing the call for vertical equity. While some forms of vertical equity are addressed below the district level, it is important to note that disadvantages

³³ These particular cost functions and categories are used for district reporting to the Pennsylvania Department of Education.

due to the income level of students are not addressed by the allocation of state and local revenues (Rubenstein et al., 2006).³⁴

Just as district central offices allocate funds per pupil, they also allocate staff per pupil, based on pre-determined class size requirements and enrollment. Teacher positions are included in school budgets and translated into dollars using average salaries, though most public school districts utilize salary schedules whereby payments are linked to years of experience, level of education (degrees obtained), and coursework completed (Podgursky, 2002). Given the range of experience, education, and coursework, there is considerable variation among teacher salaries, and those higher on the pay scale could be receiving double the salary of those lower on the pay scale (Picus, 1999). This can result in large variations of actual expenditures at the school level. Using data from four large districts (Seattle, Rochester, Baltimore, and Oakland), Roza and Hill (2004) demonstrated that the uneven distributions of teachers (as represented by their compensation) leads to large differences in resources devoted to children based upon where those children attend school. As salaries and benefits make up the largest proportion of school budgets, with the personnel budget representing just over 80 percent of total expenditures for public elementary and secondary education in 2006-2007 (National Center for Education Statistics, 2010), this variation leads to a lack of horizontal equity at the school level in many districts.

³⁴ Certain funding streams, such as Title I, are meant to be allocated through states and districts to schools to address the needs of students in poverty. These funding streams are considered to be outside state and local allocations.

In addition to per pupil funds and positions, school budgets often include funds which are intended to be directed to groups of students requiring additional supports, such as ELL students and students with disabilities. As stated above, these funds address vertical equity. Other funds may be allocated by the district central office to address a range of concerns, such as accountability targets (i.e., not meeting Adequate Yearly Progress as defined by the No Child Left Behind Act) and community desires. Additionally, state legislatures may seek to control districts' use of additional funds, such as those resulting from adjustments to funding formulas, by targeting funds at specific programs. This is intended to ensure that new funds are used to the greatest benefit, or possibly to guarantee to that politicians receive credit for directing funds to their legislative districts (Baker, 2003). Unfortunately, as discussed in the following section, constraints on funding often create inefficiencies.

Not all funds flow from the district central office to the schools; in many cases, over half of the budget remains at the district level (Roza, 2008). Examples of district expenditures which do not flow through to schools include transportation budgets, professional development services, and staff benefits such as pensions (Berne & Stiefel, 1994). To better understand the costs associated with providing an adequate or appropriate education, it would be useful to have more complete information at the school level. This would require greater consideration of expenditures that remain at the district central office (Denison et al. 2009; Monk & Hussain, 2000).

Organizational concerns. Decisions regarding allocation of resources are made with a number of considerations in play. While some policy decisions have been made

democratically (by state legislatures or local school boards), others are tied to organizational concerns, political influence, or external requirements.

Goertz and Natriello (1999) found that organizational considerations, more than economic or political considerations, drive districts in their allocation of resources. Their research, conducted in New Jersey after the Abbott Court decision mandated that additional resources be allocated to poorly-funded districts, demonstrated that districts spend additional dollars based on perceived needs and allocate dollars across expenditure categories similarly to wealthier districts (p. 102), rather than in such a way as to increase student performance.³⁵ Goertz and Natriello (1999) wrote, “It appears that at least in this early stage the spending norms were so strong that departures from the patterns of spending evident in higher-performing neighboring districts were not seriously entertained” (p. 127). Parallel findings have been made at the school level; in an analysis of school budgeting, Goertz and Hess (1998) reviewed district expenditures in Chicago, Illinois and Rochester, New York and found that additional funds were directed towards long-established uses (such as reducing class size, adding programs which had been reduced or eliminated, and professional development). Based on surveys and interviews with school administrators, teachers, and parents, they surmise that this was due to the budgetary constraints faced by administrators. However, Goertz and Hess (1998) also suggest that school administrators make decisions based on their own ideas on what is necessary for student success.

³⁵ The data for this study were collected in the early 1990’s, prior to NCLB requirements.

Other researchers have sought to understand the distribution of resources below the district level. Monk and Hussain (2000) used New York State data to study allocations of existing funds and positions across different academic subject areas. They found that considerable variation in expenditure patterns across districts is correlated with certain district characteristics (i.e., spending, wealth, poverty, and size), with spending having the largest effect on staffing levels (p. 21). They also concluded that higher property wealth districts were more likely to move staff to secondary academic areas and higher poverty districts were less likely to increase “professional staff into the academic program” (p.21). Additionally, all four of these district characteristics were positively associated with “the total net supply of resources into administration” (p.21). The most interesting outcome of Monk and Hussain’s work, however, is the discovery that decision-making was taking place at different levels within the system and this is likely to impact resource allocation decisions.

Administrators at different levels within the education system are likely to have different objectives. For example, accountability requirements might compel greater or lesser adherence, depending on the ramifications of failure to meet targets. Different governance structures also impact where and how decisions are made. In some cases, management of school districts has been reconfigured to allow for certain entities, such as the Mayor’s office, to have greater control over funds. Examples of this practice include the 1995 restructuring of the Chicago school system under the control of a Chief Executive Officer appointed by the Mayor (Goertz & Hess, 1998) and the 2002 restructuring of the New York City school system, when management was reorganized

under the Chancellor of the New York City Department of Education (Goertz & Levin, 2009). Top-down management strategies certainly affect the allocation of funds, but schools and districts responsible for implementing new funding plans are likely to temper the influence of the central office (Iatarola & Rubenstein, 2007). This may be due to a lack of understanding on the part of staff of the district's goals (Roza, 2008), or to the distrust of new agendas (McLaughlin, 1987). While school reform initiatives designed to improve student outcomes have been evaluated (Fuhrman & Elmore, 2004; Gross & Goertz, 2005), there has been little investigation into the impact of accountability requirements on how funds are allocated. This research would clarify how and where decisions are made and would provide better knowledge for policy makers to understand how different expenditure approaches are related to improvements in student outcomes (Denison, Stiefel, Hartman, & Deegan, 2009).

Political influence. The allocation of funds by the district central office is seldom reviewed or questioned by the public (Schwartz et al., 2008). However, Ladd (2008) and Augenblick, Meyers, and Anderson (1997) contend that politics plays an important role in the allocation of resources at the local level, pointing out that the political costs of higher taxes inhibit spending. Baker (2003) agrees, stating that political officials call upon school administrators to increase efficiency to address school resource needs. Also, wealthy school districts seek to keep their advantage; schools with involved, powerful parents are more likely to demand high-quality teachers (Lankford et al., 2002). This increases the likelihood that children of less powerful parents will be taught by lower quality teachers (Clotfelter et al., 2005).

Political groups, including parents and local community organizations, expend significant effort to ensure that candidates (including school board members and state legislators) who represent their views are elected (Roos, 1998). The lack of political capital among poorer communities helps to explain the inferior conditions of their public schools.³⁶

Another influential political group is the teachers' union (Roos, 1998), which generally enjoys the strong support of many parents. A major role of the union is to maintain and augment the compensation and benefits of their members. Working on behalf of the instructional staff, the teachers' union is often responsible for negotiating labor contracts with the school district. Such contracts include seniority rules, which mandate certain guarantees and benefits for educators who have the longest tenure (and, consequently, the highest salaries), and are largely responsible for affecting teacher allocation.

School districts' effort to retain wealthier families is one more explanation for the disparities among schools. Research shows that wealthier students are more likely to attend magnet schools and other elite programs because the supports they receive at home give these students an advantage in the application process (Elis, 2006). Even within schools, tracking by ability often serves the more advantaged students, as programs for gifted students are more likely to serve wealthier children. The argument in favor of this disproportionate allocation of services is the increased tax revenue and

³⁶ Integration was a successful strategy for improving public schools because families with more political capital were willing to fight for the schools attended by their children. As inner-city schools re-segregate, schools composed primarily of disadvantaged and minority students no longer have the same powerful advocates on their behalf (Orfield & Lee, 2005).

social capital provided by these wealthier families increases the ability of the district to provide services to all students (Elis, 2006).

Imazeki and Goe (2009) suggest another reason minority students might be at a disadvantage in terms of teacher quality. They contend that parents choose where to live and send their children to school based in part on racial make-up, as they seek environments with people similar to themselves. When minority parents have their children taught by minority teachers, they are increasing the likelihood that the teacher will have weaker credentials as measured by indicators such as college selectivity (Imazeki & Goe, 2009). A counter to this argument is offered by Dee (2004); utilizing data from the Tennessee' Project STAR, Dee found that minority students benefit (as demonstrated by increased math and reading test scores) from having a teacher of the same race.

Although local politics play a significant role in the allocation of funds, politics at the national and state level also exerts a great deal of influence. As we have seen in Pennsylvania and elsewhere, the current standards-based reform environment, which holds schools accountable for student outcomes, makes adequacy a politically viable approach for allocating resources.

External forces. In addition to organizational and political influences at the local level, external forces greatly affect school districts' allocation of resources. Three external forces designed to impact district allocation of resources are court cases, Title I of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6301 et seq.), and Local Education Foundations (LEFs).

Court cases. As mentioned earlier, few court cases have addressed resource allocation below the district level. The two that have- *Hobson v. Hansen* and *Rodriguez v. LAUSD*- looked beyond average teacher salaries and acknowledged the actual differences in school per-pupil expenditures. In *Hobson v. Hansen*, the Court of Appeals ruled that per-pupil teacher salary and benefits must fall within five percent of the average across the city (Rubenstein et al., 2006b). The consent decree issued as a result of *Rodriguez v. LAUSD* also addressed the unequal distribution of teachers among schools; in order to reduce the discrepancies between teachers in low-minority, higher wealth schools and teachers in high-minority, higher poverty schools, the consent decree provided each school with a dollar budget with which to hire teachers (Rubenstein et al., 2006b). The stated goal was to equalize non-categorical per-pupil spending in 90% of schools to within \$100 of the district average (Biegel & Slayton, 1997). Furthermore, in an effort to reduce the disparities among school faculties, the consent decree required human resource decisions to factor in training and experience. According to Michael Rebell, Executive Director of the Campaign for Fiscal Equity, there have been no other major cases which have resulted in the redistribution of resources from districts to schools (personal communication, October 2009).

Title I. Title I, Part A of the Elementary and Secondary Education Act of 1965 (Title I) is the largest elementary and secondary education federal program, providing approximately \$14.5 billion in fiscal year 2009 (U.S. Department of Education, 2009). Title I provides for greater vertical equity by enhancing resources for disadvantaged students in high-poverty schools (McClure, 2008). Unfortunately, there are

considerable problems with the allocation of Title I funds, resulting in distribution patterns that do not correspond to the intent of the program. While inequities exist at the state and the district level, I limit my discussion to inequities below the district level.

States are required to pass not less than 95% of their allotted Title I funds through to local educational agencies (LEAs)³⁷, and four formulas combine to determine the amount and destination of these funds. The Basic Grant, representing 52% of the total funds in 2010, is allotted as a per pupil value to all school districts with at least 10 poor children and 2% of their children in poverty. The Concentration Grant, representing 8% of the total funds, is allotted as a per pupil value to school districts with higher numbers of children in poverty – at least 15% or over 6,500 children. The Targeted Assistance Grant, representing 20% of the total funds, differs in that it provides more dollars per child as the poverty rate of the district increases. Finally, the Education Finance Incentive Grant, representing 20% of the total funds, targets funds in high-poverty school districts in states which do a poor job of allocating money equitably among students (New America Foundation). These grants are provided to districts in a lump sum which schools can spend on supplemental educational assistance, targeted assistance, school-wide programs, and public and non-public programs. Title I regulations require that school districts rank their schools according to percent low-income and allocate funds to schools accordingly. Schools with greater than 75% poverty must be served first, after which the ranking can be adjusted to

³⁷ The state may provide services directly to LEA's or arrange for their provision if approved by the LEA (U.S. Department of Education website).

include attendance areas, such as grade spans. Districts have additional discretion in determining the per pupil allocation in each school as well (e.g., designating a school attendance area or school with 35% or more of the children from low-income families as eligible) (U.S. Department of Education).

Title I regulations also require “comparability,” meaning that schools within districts must be provided with the same state and local funds prior to the addition of federal funds. Meeting the criteria for comparability is not burdensome; according to the U.S. Department of Education’s non-regulatory guidance on Title I Fiscal Issues (2008), a school district has met the comparability requirement if it has demonstrated to the state that it has a “district-wide salary; a policy to ensure equivalence among schools in teachers, administrators, and other staff; and, a policy to ensure equivalence among schools in the provision of curriculum materials and instructional supplies” (p. 16). The LEA may also meet the comparability requirement by establishing and implementing “other measures for determining compliance such as— student/instructional staff ratios” (p. 16). This allows districts to meet the comparability requirement by counting paraprofessionals along with teachers in calculating the student/instructional staff ratio.

A major issue related to Title I comparability is that “staff salary differentials for years of employment are not included in comparability determinations” (U.S. Department of Education, Title I Fiscal Issues, 2008, p. 17), which allows the true cost of educating students to be masked. School budgets are constructed with district average salaries; in schools with less experienced and less credentialed teachers (those

most likely to have more disadvantaged students) the budgeted amount is higher than actual expenditures. In schools with more experienced and more credentialed teachers (those least likely to have more disadvantaged students) the budgeted amount is lower than actual expenditures. The result is that the highest poverty schools receive fewer dollars per low income pupil than middle and low poverty schools (Riddle, 2004). As Weiner (2008) explains, “equivalence” can be achieved with the use of a single-salary schedule and other vague policies regarding “comparable” access to teachers (p. 37).

While Title I requires comparability to ensure that federal funds are supplemental, the fact that expenditures on teacher salaries are not specified means that federal funds supplement an unequal base. True comparability can only be achieved if actual expenditures were calculated in school budgets. Compounding this inequality, Roza (2008) reports that many districts use categorical funds (such as Title I) to provide services to disadvantaged students and then use state and local money, which comes with no strings attached, to provide the same services to more advantaged students. Districts also fund programs outside of the allocation formula that go unnoticed in the comparability calculation.

Local Education Foundations. Beyond those resources that flow through the district and school budget, more privileged schools have access to considerable additional assets. Local Education Foundations (LEFs) have been created in some communities to raise private funds to supplement school resources (Elis, 2006). These financial supports, as well as time commitments from parents and community members, can impact resource allocation and reinforce inequality among students (Berne &

Stiefel, 1994; Crampton & Bauman, 1998; Elis, 2006). Regarding the magnitude of assets contributed by LEFs, a review of the literature by Zimmer, Krop, Kaganoff, Ross, and Brewer (2001) found that “foundation contributions represent a small percentage of revenue in all but a handful of schools” (p. 88). Given more recent fiscal constraints, it is likely that this source of income has grown significantly, and will have an increasing impact on differential allocation of resources.

Factors Impacting Resource Allocation. Additional factors which impact resource allocation between the district and school level include the limitations placed on school districts that restrict district administrators’ control of resources, the methods in which human capital resources are distributed (i.e., district hiring practices, seniority plans, salary schedules, working conditions and hiring preferences), and the teacher labor market.

District limitations. Berne and Stiefel (1999) explain that, “In most cases, despite special, bilingual, and compensatory education regulations, districts have significant freedom to decide how to allocate revenues to their schools” because “state general aid and locally raised revenues come with few restrictions on how it must be spread among schools” (p. 5). However, others argue that budgets have considerable restrictions, resulting from both external (i.e., federal and state) and internal requirements. District obligations due to external sources include mandates from the federal government resulting from policy decisions addressing such areas as accountability (e.g., student assessment, school evaluation) and equal protection (e.g., Title I of the Elementary and Secondary Education Act of 1965 (Title I)). District

obligations also include mandates from state governments, often tied to funding, implementing federal requirements and creating their own sets of rules and regulations (e.g., class size requirements). For example, in Pennsylvania, a recent funding increase to previously underfunded districts as a result of a change to the state's education funding formula requires districts to spend 80% of new funds in specific areas tied to increases in student achievement. Furthermore, many states courts have ordered spending be tied to specific reforms (Peyser & Costrell, 2004). Additional restrictions might result from teacher contracts which can specify salaries, class size, teacher placements, and tenure (Goertz & Hess, 1998). While administrators have different conceptions of what is required for success, in many situations those responsible for budgets find that they do not have the necessary authority to make the types of decisions they deem necessary. Levin and Quinn (2003) found that this situation was magnified for leaders in high poverty schools. It is important to keep these various restrictions in mind when holding districts and schools accountable for allocations of funds and positions, as administrators have limited control over the distribution of resources at the district level and below (Baker, 2003).

Distribution of human capital resources. A number of institutional policies tied to personnel issues impact how human capital resources are distributed to schools and programs. Specifically, hiring practices and school situations impact the ability of school districts to successfully hire well-qualified teachers who will remain in their positions. Conditions which impact hiring include: the use of seniority rules, salary

schedules, working conditions, and hiring preferences by district and school administrators.

District hiring practices. Researchers have found significant inefficiencies in human resource practices that have serious ramifications on the ability of districts to employ qualified teachers (Imazeki & Goe, 2009; Koski & Horng, 2007; Lankford, Loeb & Wyckoff, 2002; Levin & Quinn, 2003). These inefficiencies begin during the hiring process; many districts are unable to compete for the most qualified teachers because they are not in a position to make hiring commitments at the time when most teachers are seeking employment. In their study of hiring practices among urban districts, Levin and Quinn (2003) and Koski and Horng (2007) identified major impediments to well-timed hiring. First, teachers who plan to leave the system are often not required to give notice early enough for district personnel staff to plan for the next year's staffing requirements. Second, state and local budgets are often not completed in time for districts to have their funding allotments, preventing human resource offices from knowing the number of placements they will be able to make for the coming year. Finally, transfer rules in many districts give personnel with the greatest experience in the district first priority in filling open positions. The result of late hiring is that large urban districts lose the ability to hire candidates who are well-qualified and willing to work in high poverty schools. Also, those candidates who are placed later in the year are more likely to be a poor match and, therefore, more likely to be unsuccessful in the position (Imazeki & Goe, 2009).

Seniority. The advantage conferred on teachers with longer tenure is referred to as seniority. This status is one of the bargained rights which unions and districts agree to as part of the teacher contract.³⁸ Seniority preferences are prevalent in many school districts and restrict schools from having discretion in employment decisions, impacting transfer and reassignment policies as well as hiring.³⁹ As teachers gain more experience, they tend to move out of schools with disadvantaged students (Betts, Rueben, & Danenberg, 2000; Hanushek, Kain, O'Brien, & Rivkin, 2004; Lankford, Loeb, & Wyckoff, 2002). While many researchers fear that the movement of more experienced teachers out of high-poverty schools results in fewer high-quality teachers where they are needed most (Hill, 2006; Moe, 2007), there is a growing body of research that suggests that the most effective teachers do not transfer out of high-poverty schools (Hanushek, 2009; Imazeki & Goe, 2009; Ingersoll, 2002; Nelson, 2006).

One argument for strong seniority rules is that districts with robust benefits, including seniority rights, attract high quality teachers. Koski and Horng (2007) compared California districts with weak and strong seniority rules and found that “strong seniority preference rules are associated with a greater percentage of credentialed teachers in school districts” (p. 262). While this is true based on a comparison of districts, Koski and Horng (2007) found that credentialed teachers are not evenly distributed among schools within these districts. In fact, “schools with

³⁸ Many districts without collective bargaining also have seniority rights firmly in place (citation? Maybe the NCTQ website).

³⁹ New York City has recently changed its hiring practices and now has an open system which allows school leadership teams to make employment decisions (Goertz & Levin, 2008).

higher percentages of minority students, within districts, have lower percentages of credentialed and experienced teachers” (p. 262). That being said, Koski and Horng’s analysis does not provide evidence to support the notion that seniority rules have an impact on the distribution of teachers among schools within districts. There is, however, a great deal of research supporting the impact of teacher preference on employment decisions ((Betts, Rueben, & Danenberg, 2000; Hanushek, Kain, O’Brien, & Rivkin, 2004; Lankford, Loeb, & Wyckoff, 2002). Clearly, seniority rules result in the fact that new teachers are most likely to teach in schools with the most disadvantaged children. However, there is some conflict among researchers as to the effect of seniority rules. One would think that it would be beneficial for instructional leaders to have control over the composition of their faculty. However, the impact of district-union agreements guaranteeing seniority rights seems to be overwhelmed by other considerations related to the teacher labor market (Koski & Horng, 2007).

Salaries. There is significant literature on the impact of wages on the choices people make, when entering the job market and when choosing locations in which to work (Boyd et al., 2004; Corcoran et al., 2004; Hanushek, 2006; Lankford et al., 2002; Murnane et al., 1991). Some of this literature documents how women and minorities are moving into fields with greater compensation opportunities than education (Corcoran et al., 2004). This research suggests that an increase in wages would have a positive impact on the ability of schools with harder to serve students to hire more qualified educators. However, while wages can impact the decision of job seekers in choosing to become teachers or in choosing between school districts, wages will not

impact decisions at the school level because salaries remain the same (Boyd et al., 2004).

Working conditions. While teachers report that compensation is an influential factor in choosing employment, they also indicate that working conditions are extremely important (Ingersoll, 2004). Furthermore, because salaries are unlikely to have an impact on choice among schools in a district, working conditions become critical in the distribution of teachers within districts, both in the initial employment decisions (when there is choice involved) and, possibly more significantly, in later employment decisions.

Working conditions are generally encompass the physical environment (such as the condition of school facilities), materials to support instructions (such as books and computers), workload (such as class size and time to accomplish tasks), student behavior, professional development, decision-making authority, and support from administration. In a review of the National Center for Education Statistics' Schools and Staffing Survey and the Teacher Follow-up Survey, Ingersoll (2004) found that "significant numbers of those who depart from their jobs (in disadvantaged schools) ... report that they are hampered by inadequate support from the school administration, too many intrusions on classroom teaching time, student discipline problems and limited faculty input into school decision-making" (p. 2). Looking at the role of teacher workforce policies in improving student outcomes, Boyd, Lankford and Loeb (2004) found that school principals can positively alter working conditions in a school.

Hiring preferences. District and school administrators often do a poor job in identifying the best candidates to improve student outcomes, which can also impede successful hiring (Ballou, 1996; Imazeki & Goe, 2009; Strauss et al., 2000). Research by Ballou and Podgursky (1997) demonstrates that public schools do not show preference for teacher candidates with strong academic records. Additional research indicates that districts and schools concern themselves with supplemental roles teacher candidates might be willing to take on (such as coaching) above other criteria that may be more closely tied to their effectiveness in the classroom (Ingersoll, 2001; Strauss et al., 2000). Districts are also likely to prefer candidates who are familiar with certain schools or who have attended similar schools in the same district or local schools for their training. This becomes an issue in terms of staff composition at the various schools within a larger school district. A study by Strauss and colleagues (2000) of school districts in Pennsylvania found that most school districts hired a large majority of their teachers from schools of education within a 70 mile radius; eight large districts (Allentown, Erie, Johnstown, Lancaster, Philadelphia, Pittsburgh, Reading, Sharon, and Williamsport) hired over 80% of their teachers from within this radius. It would be interesting to learn if educators with similar experiences (e.g., education training, location of secondary education) are more likely to work together in the same building within a district. Finally, as mentioned earlier, districts, on behalf of their parents, may hire teachers that are most demographically similar to the children in the school. To the extent that disadvantaged schools have provided an inadequate education to former

students, teacher candidates who attended these schools may not be effective in the classroom.

Teacher labor market. The single salary schedule in a school district, which mandates compensation for teachers, means that teachers, rather than school districts, have the most influence in determining how they are sorted across the school district. Goldhaber (2008) explains, “The teacher labor market ... adjusts based on the job attributes of a school assignment through teacher sorting across schools, rather than through salary differentials that depend on the job attributes of a school assignment” (p. 1). Many researchers have studied the movement of teachers to understand their preferences, and have found, not surprisingly, that teachers choose to work in the more desirable setting. For many teachers, this means favorable working conditions, students with higher academic performance, less poverty, a lower percentage of minority students, and fewer accountability requirements (Imazeki & Goe, 2009). Also, teachers choose to work at schools close to their own home.

A great deal of research supports the impact of teacher preference on employment decisions. Lankford, Loeb and Wyckoff (2002) studied the movement patterns in New York City and found that teachers transfer to schools with fewer low performing, low income and minority students. Hanushek, Kain, O’Brien and Rivkin (2004) reached similar conclusions using data from Texas, and Betts, Rueben, and Danenberg (2000) found similar patterns in California. Miller and Rubenstein (2008), Clotfelter, Ladd and Vigdor (2005), Ladd (2008), Boyd (2004), Imazeki and Goe (2009), and others have written about their concern that experienced teachers (those

with greater qualifications) will move away from schools with students requiring more support, either due to low achievement or poverty. Teachers may assume that children of low-income families will have fewer supports at home and will be less prepared to learn (Clotfelter et al., 2007). This will leave vacancies for novice teachers to fill in schools populated with the hardest-to-educate students. Based on the research on the effectiveness of novice teachers, it is probable that these teachers are less effective (Goldhaber, 2008).

A disturbing finding revealed by a number of researchers is that many teachers have a strong aversion to working with minority students. Boyd, Lankford and Loeb (2004) report that “both white and minority teachers tend to choose schools with lower minority populations” (p. 109). In their analysis, Boyd et al. assume that this choice is due to the working conditions of schools with high percentages of minority students, rather than direct bias teacher against the minority students themselves. Other researchers reach similar findings but do not attribute the preference for non-minority students to be tied to other variables such as working conditions. In a major study of teacher turnover in Georgia, Stinebrickner, Scafidi, and Sjoquist (2007) used a linear probability and competing risks model to separate correlated characteristics of students to determine what is driving teacher preferences. They found that teachers are more likely to leave schools with higher proportions of minority students, not because of high poverty or poor working conditions, but because of the racial characteristics of students.

There is some discussion in the literature that state and local accountability measures also impact teachers' employment decisions. Accountability systems are designed to hold teachers accountable for the performance of their students. Most systems look at the achievement of students according to certain standards rather than student growth. Teachers who work with students who are struggling and unable to reach proficiency targets are more likely to be penalized and less likely to receive financial bonuses. For this reason, teachers will be attracted to positions in which they would be more likely to have successful students (as defined by the accountability scheme). Clotfelter et al. (2007) found this to be the case in North Carolina, where the state accountability initiative made it more difficult for low performing schools to hold on to their teaching staff and their principals. Interestingly, Boyd et al. (2005) found that schools in New York State successfully directed teachers with more experience to fourth grade classrooms in which state-required testing was being implemented. It is likely that these schools made an intentional effort to enhance teacher quality in classrooms in which students would be tested. Currently, efforts to replicate this approach at the district level are being made through the use of financial incentives to entice effective teachers and administrators to work in hard-to-staff schools (Goertz & Levin, 2008).

Location is a final consideration in choosing employment for teachers, and has implications for the larger school districts. Researchers investigating employment patterns in New York and Pennsylvania have found that teachers prefer to work close to where they grew up. Boyd et al. (2004) report that "over 60 percent of first-year public

school teachers in New York take jobs within fifteen miles of where they grew up, with 85 percent taking jobs within forty miles” (p. 109). Similarly, Strauss, Bowes, Marks, and Plesko (2000) reported that on average, 40% of teachers serve in school districts in which they were students, and if they are not able to remain in the area in which they grew up, prefer to teach in areas that are reminiscent of their hometown. This is confirmed by Boyd et al. (2005) in their analysis of New York State data. There is also a positive (though somewhat weaker) relationship between where teachers are trained and where they work (Imazeki & Goe, 2009).

These findings reflect a potential concern for urban districts, in that teacher candidates from their own schools may be less qualified, given the poor academic opportunities available in the district (Boyd et al., 2004; Clotfelter et al., 2007). While schools hiring “locals” have the advantage of knowing the candidates better, they may not be acting in the best interest of the students in choosing local candidates over more qualified outsiders (Goldhaber, 2008). As noted earlier, this may be tempered by the fact that students are more successful when they are matched with teachers of a similar race (Dee, 2004). In any case, urban districts do not supply nearly enough teachers to fill their classrooms, and must therefore compete for non-local teachers who are unlikely to choose them over non-urban districts. Given that student demographics are unlikely to change, the best way to address the hiring challenges of urban districts would be for districts to offer teacher candidates more, in the form of compensation and working conditions. New York City has taken this strategic approach in its efforts to

ensure that effective teachers are placed in hard-to-staff schools (Goertz & Levin, 2008).

Teacher mobility. While teachers' preference for working close to where they grew up has greater impact in terms of the ultimate distribution of teachers (Boyd et al., 2008), high turnover in struggling schools is extremely harmful because vacancies are filled with novice teachers who are likely to be less effective in the classroom.

Furthermore, the lack of faculty continuity in schools which must fill many vacancies each year is detrimental to the schools as learning communities (Clotfelter et al., 2007). That being said, there are contradictory findings as to the effectiveness of teachers who transfer out of struggling schools (Boyd et al., 2008; Imazeki & Goe, 2009); a recent study by Hanushek (2009) finds that ineffective teachers are the most likely to leave.

Weighted Student Funding. The inequitable allocation of resources below the district level has led policy makers to consider alternative methods for distributing resources to schools. School-based management and budgeting provides an approach to financing that moves control of funds from the district central office to the schools, closer to where the money is being spent and, presumably, to the knowledge regarding the true needs of the students. Moving spending authority to the school allows school leaders to budget dollars and hire staff in a more flexible and efficient manner. In return for this authority, schools leaders become accountable for student outcomes. According to Goertz and Stiefel (1998), school leadership, composed of administrators, teachers, parents, and community members, can work together to determine how best to allocate dollars among classrooms and programs. However, to be successful, school leadership

must have access to, and knowledge of, financial data, as well as clear goals and strategic plans in place to achieve those goals.

As an approach to school-based management and budgeting, weighted student funding (WSF) is designed to address not only school-based management, but inequities in intra-district resource allocation. In its report, “Fund the Child: Tracking Inequality and Antiquity in School Finance,” the Fordham Foundation (2006) offers five principles to define weighted student funding (p. 21):

1. Funding should follow the child, on a per-student basis, to the public school that he/she attends.
2. Per-student funding should vary according to a child’s need and other relevant circumstances.
3. The funds should arrive at the school as real dollars (i.e., not teaching positions, ratios, or staffing norms) that can be spent flexibly, with accountability gauged by results, not inputs, programs, or activities.
4. These principles for allocating money to schools should apply to all levels (e.g., federal funds going to states, state funds going to districts, districts to schools).
5. All funding systems should be simplified and made transparent.

Weighted student funding is attractive to a variety of stakeholders; for those on the left of the political spectrum, it provides vertical equity by ensuring that students with greater needs are allotted higher per-pupil funding (Rubenstein et al., 2006); for those on the right, it moves control away from the school district and closer to the student, thereby supporting decentralization to “promote efficiency and foster school choice”

(Baker, 2009, p. 2). An additional advantage of WSF is that it is transparent. Dollars, as the universal unit of measurement, serve as a metric that allows onlookers to ensure that funds are distributed according to predetermined need.

Weighted student funding encompasses two significant goals for discussions of equity: the use of actual teacher salaries in determining budgets, and school control over budgets. Examples of WSF to date demonstrate that each of these goals is difficult to implement on its own, and that one does not necessarily lead to the other. Edmonton, Cincinnati, Seattle, Oakland, San Francisco, New York City and Houston have all implemented some aspects of weighted student funding. (Seattle has since ended its WSF plan and Philadelphia is in the process of creating a pilot project to test the idea.) Of these districts, only Oakland is confronting salary issues. The great advantage of including actual teacher salaries, as opposed to average teacher salaries, in the budgeting processes is that schools can use their additional funds to assist less experienced teachers with professional development or to make other enhancements to the school. Through their weighted student funding initiative, Oakland was able to balance the distribution of resources across all schools (Hill, 2008); the other metropolitan districts that have implemented some version of WSF are limited in their control over budgets by teacher contracts and district constraints. Advocating for the successful implementation of WSF, Roza (2008) explains that the use of actual budgets is necessary, writing: “Allocations that inhibit the power of school leaders to make decisions about resource use in their schools can undermine the district’s efforts, and

thus the district should avoid allocations managed centrally or according to central staff discretion” (p. 26).

In order for weighted student funding to work, five factors must be firmly in place. First, schools must be granted real budgeting and spending authority, including hiring of staff. Second, most of the budget should be allocated through WSF. Third, the weights must be correct. In 1999, Picus wrote, “Without some kind of system to provide support and knowledge about what kinds of programs are available and which ones work for children with particular needs ... it would be difficult to ensure that schools would be capable of meeting these needs” (p. 33). The fact that educators are uncertain as to the best approaches to serve students with particular needs raises the question of how appropriate weights should be determined. The variation in weights from district to district suggests a lack of clarity with regard to the true cost of serving certain categories of students. Fourth, the decision-makers at the school level must be fully informed and competent to take on the new management and budgeting responsibilities. Roza (2008) warns that, “If school leadership is weak, then increasing the portion of resources allocated at the school level may not be a viable strategy” (p. 25). Few schools have the capacity to be successful in these new roles. Fifth and finally, school districts must have a plan in place to support schools that are unsuccessful. More specifically, districts must determine what authority stays with the school and what authority reverts to the district in this instance (Goertz & Hess, 1998).

Even when all these variables are addressed, it is unclear if a weighted student funding system is the answer to the problem of inequitable allocation of resources.

Recently completed studies of WSF systems in Texas, California, and Ohio have arrived at both positive and negative conclusions. A review of WSF in Houston by Miller and Rubenstein (2009) seeking to determine “the effect of the WSF budgeting system on the actual distribution of resources across” across schools (p. 3) found that the WSF budgeting system did result in more resources being allocated to schools with students in need of greater supports. Furthermore, this reallocation did not take place in comparison districts working without a WSF budgeting system. Alternatively, Chambers, Shambaugh, Levin, Muraki, and Poland (2008) arrived at mixed results in their analysis of spending patterns in San Francisco and Oakland to determine the impact of their WSF systems on the distribution of resources according to student need. They discovered that San Francisco “increased the proportion of total resources allocated to high-poverty relative to low-poverty middle and high schools” but that, in Oakland, “there did not appear to be a significant difference in [the] relationship between per pupil expenditure and student poverty” as a result of having a WSF system in place (Chambers et al., 2008, p. xi). In fact, subsidies meant to address tensions in schools with high numbers of veteran teachers (to alleviate short-term issues due to the use of actual salary numbers in determining budget allocations) seemed to negatively impact the relationship between per pupil expenditure and student poverty. Matthew Hill, Oakland Unified School district’s Executive Officer for Strategic Project, has confirmed these findings, reporting that while Oakland’s weighted student funding initiative has resulted in greater equity and transparency in revenues, a subsequent increase in equity and transparency has not been seen with expenditures (Hill, 2008).

Finally, based on research comparing districts with weighted student funding to districts with typical funding processes in Texas and Ohio, Baker (2009) concludes that weighted student funding is not necessary for districts to “achieve greater rationality in cross school expenditures,” as “districts not using weighted funding appear comparably able to target resources to schools with greater student needs” (p. 21).

Measuring Intradistrict Equity

While a significant amount of research has addressed equity concerns at the district level (Iatarola & Rubenstein, 2007), there has been limited research on intradistrict resource disparities. This research has found great inequities within districts, often greater than those among districts (DeAngelis et al., 2005; Lankford et al., 2002; Monk & Hussain, 2000). For example, Clotfelter et al. (2005) find that “about two-thirds of the overall black-white difference in exposure to novice teachers reflects patterns within, rather than across, school districts in North Carolina” (p. 19). However, while studies of individual districts have shown significant disparities, there is no national or state data that quantifies the extent of the differences among schools in per pupil spending.⁴⁰

This following section of this dissertation first looks at challenges to studying intradistrict resource allocation. It then reviews some of the methods which have been employed by researchers to better understand the impact of intradistrict resource

⁴⁰ Augenblick, Meyers and Anderson reported this in 1997, and it remains true in 2010. However, this may be challenged with the reauthorization of ESEA as one proposal requires the states to collect and disseminate data on school-level expenditures (Sawchuk, 2009).

allocation. Finally, it presents the findings of the research using the equity principles discussed earlier in this chapter.

Challenges to studying intradistrict resource allocation. While there are numerous studies examining resource allocation below the district level, “relatively little research has focused on the processes and patterns of resource allocation across schools within districts” (Rubenstein et al., 2006, p. 2). There are four main reasons for this: first, there is a significant lack of accessible data on school level expenditures. Second, expenditure data does not tell the whole story and can be misleading. Third, it is difficult to allocate shared resources fairly. And fourth, most often districts, not schools, control the administration and management of budgets.

Lack of data. While districts may report on expenditures by function (such as instruction, instructional support, and administration), this information is often not helpful to researchers as “accuracy, consistency, and detail of the reported data, as well as assumptions made by researchers in creating categories and assigning individual expenditures to each” are often in question (Stiefel, Rubenstein, & Berne, 1998, p. 449). Cohen (1997) argues that a shortage of administrative capacity is responsible for the inadequate collection of school-level data. Goertz and Odden (1999) add to this assertion, attributing the scarcity of data to a “lack of school-based funding policies” (p. x).

Expenditure data does not tell the whole story. Even if the school level budget data is available, it does not, on its own, accurately represent the total value of resources. Dollars for personnel, for example, are often a combination of staff positions

and salaries which have not been untangled (Berne & Stiefel, 1994, p. 408). As we will see, many studies on intradistrict allocation find that funding directed to schools with higher percentages of low-income students appears to be equitable (horizontally and even vertically), but closer investigation reveals that teachers serving in schools with greater numbers of low-income students are more likely to have lower salaries, corresponding to their minimal experience and credentials. Furthermore, it is often the case that school budgets use average teacher salaries in place of actual salaries. As stated earlier in this paper, the use of average salaries masks discrepancies in actual teacher salaries at the school level.

Allocation of shared resources. Another way in which expenditure data does not reveal the details of resource allocation has to do with the allocation of shared resources. According to Miller et al. (2004), “shared resources, including programs, staff, and funds managed by the central office for the purpose of educating children, are not reported in school budgets despite the fact that they can represent a substantial portion of the total resources which benefit any one school” (Abstract). Resources allocated to the district central office could include everything from professional development, such as support for struggling teachers in schools with more disadvantaged students, to music programs, which may disproportionately impact schools with higher proportions of high-income students. Fringe benefits and pensions may also not be allocated directly to the schools. Stiefel et al. (1998) found that fringe benefits and pensions were not allocated to schools in any of the four districts they investigated - Chicago, Fort Worth, New York City and Rochester. To measure the

impact of this practice, Miller et al. (2004) constructed a cost allocation model for Denver Public Schools. It revealed that school-level budgets increased by one-third when district budgets were apportioned accurately. This situation is especially troublesome because central office budgets can hide such funding inequities. Roza (2008) reports that, “Funds doled out through central budgets were less equitable than those allocated in school budgets in both districts, as shown by the coefficient of variation computed on the total dollars received per pupil” (p. 21). Clearly, studies which do not accurately allocate resources may be biasing their results.

Methods employed in studying resource allocation. A review of the literature reveals 34 studies which examine intradistrict resource allocation. This paper takes a new look at these studies in order to synthesize the findings on intradistrict resource allocation utilizing an equity framework. A matrix has been developed to help categorize the studies in different ways. (See Appendix A.) Information collected in the matrix includes: data source; methodology; findings; the relationship between inputs and variables of interest; and, the conception of equity being measured (i.e., horizontal equity, vertical equity, or adequacy).

The following discussion first examines how researchers study intradistrict resource allocation in these 34 studies. Most investigate the relationships between inputs and given variables of interest. Inputs generally include financial and/or human capital resources and variables of interest include outcomes such as relative position among student subgroups in terms of allotted resources or student performance (e.g., a comparison of expenditures among groups of students identified by certain

characteristics such as income level or race, an analysis of the relationship between student subgroup and student performance).

One input that has not been used in extant studies of intradistrict resource allocation is a measure of teacher effectiveness. This is largely due to the lack of an available metric. Given the expansion of the use of value-added methods which link teachers to student outcomes, some districts now have access to value-added measures for teachers. Other potential inputs that could be considered in an analysis of resource allocation are measures of teacher self-efficacy and teacher collective efficacy – as these metrics of teacher quality have shown to be related to student outcomes. I suggest that teacher value-added measures and teacher efficacy measures be included as teacher quality inputs in future studies of intradistrict resource allocation.

Inputs. Thirty-three (33) of the 34 studies identified analyze how one or more specific inputs provided by the district are allocated among schools and students.⁴¹ Most inputs fall into four broad categories: total expenditures per pupil; total instructional expenditures per pupil; pupil-teacher ratio; and, teacher quality. Of the studies reviewed, 14 investigate total expenditures per pupil, 8 investigate total instructional expenditures per pupil, 8 investigate pupil teacher ratio and 18 investigate teacher quality.

Human capital resources. While there has been debate as to the value of money in improving student outcomes (See Burtless, 1996; Ferguson, 1991; Hanushek, 1989; Hedges, Lain & Greenwald, 1994), most scholars conclude that money matters, but is

⁴¹ One study, conducted by Baker and Green (2009), was designed to investigate the costs associated with black student concentration necessary to ensure adequate outcomes.

insufficient to improve outcomes (Grubb, 2009; Picus, 1995). Therefore, in addition to looking at money alone, it is necessary to examine what the money buys. Twenty-one of the reviewed studies look at various teacher characteristics and/or pupil-teacher ratios as a means of quantifying resources. This is consistent with the research on improving student academic outcomes as researchers have identified “teacher quality” as the input most highly correlated with student achievement (Card & Kreuger, 1992; Ferguson, 1991; Rivkin, Hanushek & Kain, 2005; Rockoff, 2004; Sanders & Horn, 1998; Sanders & Rivers, 1996). Goldhaber (2006) writes, “Education research convincingly shows that teacher quality is the most important *schooling* factor influencing student achievement. A very good teacher as opposed to a very bad one can make as much as a *full year’s* difference in learning growth for students. Indeed, the effect of increases in teacher quality swamps the impact of any other educational investment, such as reductions in class size” (p. 1).

Researchers have investigated teacher characteristics as proxies for teacher quality. The teacher characteristics most often studied are those for which there is data readily available (Rice, 2003). Unfortunately, these do not include such important teacher characteristics as teachers’ expectations for students, teachers’ efficacy⁴², ability to motivate, and perseverance are less frequently addressed in the literature. Lack of readily available data on these characteristics has also resulted in a lack of teacher effectiveness measures in studies of resource allocation.

⁴² Tournaki & Podell (2005) define teacher efficacy as “a teacher’s belief that teaching can overcome factors external to the teacher, such as the home environment” (p. 300).

Seven teacher characteristics that have been used on studies of intradistrict resource allocation as measures of teacher quality are: experience; credentials; content knowledge and pedagogical knowledge; general academic ability and intelligence; teacher training; certification status; and, National Board Certification status. Because these teacher characteristics have been used by researchers on the input side of their equation, it is important to establish the relationship between these characteristics and student achievement.

Experience. A number of studies have demonstrated the positive impact of teacher experience, particularly in the first few years of teaching. In 1998, Roos reported, “Although research suggests that there may be a leveling off of teacher effectiveness after five to eight years of teaching, a strong body of research as well as ample anecdotal evidence reveals that first- and second-year teachers are considerably less effective than those who have some experience” (p. 42). An extensive review of the literature conducted by Rice (2003) arrives at a similar conclusion. More recent research conducted by Rockoff (2004) and Clotfelter, Ladd and Vigdor (2007) is consistent with prior work. Using data from two New Jersey school districts, Rockoff (2004) finds “evidence that teaching experience significantly raises student test scores, particularly in reading subject areas. Reading test scores differ by approximately 0.17 standard deviations on average between beginning teachers and teachers with ten or more years of experience” (p 248). Clotfelter et al. (2007), with access to ten years of longitudinal data from North Carolina, also find evidence that “novice teachers in the sample are less effective than teachers in the sample with some experience, but beyond

the first couple of years, more experienced teachers are no more effective than those with a couple of years of experience” (p. 19). As Goldhaber (2008) writes, “all else equal, novice teachers tend to be less effective than those with more experience” (p.5).

Credentials. Research on the relationship between credentials, most often thought of as degrees associated with level of education (i.e., master’s degree or doctorate), and student achievement provide mixed results. Hanushek (1997) and Monk (1994) find that a master’s degree is either uncorrelated or negatively correlated with student achievement. Rice’s (2003) review of the literature also finds ambiguous results with regard to the impact of advanced degrees at the primary level. However, advanced degrees in mathematics and science seem to be linked to positive outcomes for high school students studying mathematics and science (Rice, 2003). Betts et al. (2000) discovered that the percentage of teachers with a master’s degree is “in some cases ... positively and significantly related to test scores” and that “a higher percentage of teachers with only a bachelor’s degree within a given grade is negatively related to student achievement” (p. xxii). Finally, recent research conducted by Clotfelter, Ladd and Vigdor (2007) find that weak credentials are associated with large negative effects on student achievement, particularly in math education.

Content knowledge/ pedagogical knowledge. In her review of the literature, Darling-Hammonds (2000) reports weak and inconsistent findings on the relationship between subject matter knowledge and student achievement. Other researchers have arrived at conflicting conclusions regarding content knowledge (Hill, Rowan & Ball, 2005; Monk, 1994). For example, based on correlations of student achievement and

National Teacher Exam (NTE) scores in Pennsylvania, as well as studies outside of Pennsylvania, Strauss (2000) finds stronger content knowledge to be associated with stronger classroom achievement. As noted above, the effects of teachers with degrees in mathematics seem to be associated with student achievement in mathematics (Goe, 2007). To the extent that degrees in mathematics represent mathematics content knowledge, there is evidence that content knowledge in mathematics is associated with student achievement in mathematics.

With regard to pedagogical knowledge, Darling-Hammonds (2000) reports stronger and more consistent findings on the relationship between pedagogical knowledge and student achievement. Supporting this position, Rice's literature review (2003) concludes that pedagogical coursework seems to contribute to teacher effectiveness, and that both pedagogical and content knowledge coursework enhance this relationship.

General academic ability and intelligence. Researchers have studied the impact of teachers' general academic ability and intelligence on student achievement with varied results.⁴³ In reviewing the earlier literature, Darling-Hammond (2000) found small and statistically insignificant correlations between teacher intelligence and general academic ability. A more recent study by Harris and Sass (2007) corroborates this, finding no evidence that college coursework or scholastic aptitude, as measured by college entrance exam scores, impacts student achievement. Other researchers reach very different conclusions. Ferguson and Ladd (1996) used data from several Alabama

⁴³ Measures used by researchers to quantify intelligence include the quality of the teachers' undergraduate institution, teacher test scores, certification test scores, SAT scores and ACT scores.

school districts to demonstrative that if teachers of Black children were to have higher test scores on the ACT⁴⁴ (by an increase of one standard deviation), about two-thirds of the achievement gap in Alabama would be eliminated. Also concerned by the inequitable distribution of teachers among students, Clotfelter et al. (2006) analyzed administrative data on North Carolina public schools. Looking only at 5th grade, they found licensure test scores in mathematics to be strongly associated with student achievement. The Goldhaber (2003) review goes further and concludes that measures of teacher academic ability are generally the best predictors of student achievement. A few years later, Goldhaber (2007) found a positive relationship between teacher licensure tests and student achievement and, in 2008, he reported that “stronger records of academic proficiency” as measured by “the selectivity of the colleges (teachers) graduated from or their performance on tests such as licensure exams or the SAT or ACT college-entrance tests” are associated with greater effectiveness in the classroom (p.5). Finally, some studies have identified a relationship between teachers’ verbal ability and student achievement, especially for certain students (Darling-Hammond, 2000; Rice, 2003).

Teacher training. Measuring the impact of specific teacher training programs is a relatively new phenomenon. Monk and King (1994) examined the total course credits in area of specialization to discern the impact of quantity of courses taken and found a positive relationship with student outcomes. This impact was also greater among students of teacher training programs with lower pre-test scores, indicating that teacher

⁴⁴ The ACT test assesses high school students’ general educational development and their ability to complete college-level work. (Retrieved on April 10, 2010 from <http://www.act.org/aap/>.)

training is most helpful to those with fewer skills (as cited in Strauss, 2000, p. 12). More recent research differs from these studies, in that it seeks to better understand the relative impact of various teacher training programs. Harris and Sass (2007) looked at different types of programs in Florida to distinguish those programs that are most highly correlated with student achievement. They concluded that teacher training has little influence on teacher effectiveness, with the exception of content-focused professional development, which seems to have an impact on middle and high school math achievement. In an effort to better understand the components of teacher training tied to student achievement, Boyd et al. (2008) estimate the effects of features of teacher training programs in New York City on teachers' value-added scores, which indicated teachers' impact on student test scores in mathematics and English language arts. Results point to discrepancies across teacher training programs in teacher effectiveness.⁴⁵ Other programs have looked more specifically at alternative certification routes and, in so doing, consider the associated teacher training required (Constantine, Player, Silva, Hallgren, Grider & Deke, 2009).

Certification status. Teacher certification or licensure provides a means of ensuring that teachers reach a certain threshold before being considered competent to educate students. Certification varies by state, but generally requires that the teacher candidate has completed a state-approved teacher education program, possesses a major or minor in the field in which he/she will teach, earned a certain number of education credits, passed a test in basic-skills, pedagogy, and subject area, and has had the

⁴⁵ The state of Louisiana has taken on a similar research agenda as a means of evaluating and improving teacher training programs (citation).

opportunity to student teach (Darling-Hammond, 2000). Alternative certificate programs are also available in many states for non-traditional teacher candidates. Most of the requirements remain, but time frames for entering the classroom may be different. Rice's (2003) review of the literature regarding teacher certification is consistent with that for other teacher characteristics: most studies revealed that teacher certification in mathematics had a positive effect on high school mathematics achievement.

At the time of Rice's publication, the studies did not reveal a positive effect of emergency or alternative-route certification on high school mathematics achievement. One of these studies, conducted by Goldhaber and Brewer (2000), examined the impact of different certification status (e.g., probationary certification, emergency certification, private school certification, no certification, and standard certification in subject area) on 12th grade students. They found that teachers holding a standard certification in mathematics had a significant positive impact on student achievement, while teachers holding a private school certification or no certification did not. However, teachers holding emergency certification had the same impact on student achievement as those holding a standard certification (p. 129). More recently, research conducted by Clotfelter et al. (2007) finds regular licensure to have a positive effect on student achievement, again with larger effects for math than English language arts. Finally, in a review of a New York City initiative⁴⁶ to remove uncertified teachers from the

⁴⁶ This initiative was dependent upon three policy changes: the virtual elimination of temporary licenses for uncertified teachers effective in September, 2003; the creation of alternative certification programs; and, the development and the Teaching Fellows program (Boyd et al., 2007).

workforce and replace them with teachers certified through an alternative route, Boyd, Lankford, Loeb, Rockoff, and Wyckoff (2007) attribute a reduction in the test score gap between students in high- and low-poverty schools to the influx of more qualified teachers replacing emergency certified teachers in high-poverty schools.

National Board Certification status. The National Board for Professional Teaching Standards (NBPTS) has created a certification system that goes above and beyond state certification systems.⁴⁷ Calling for “high and rigorous standards,” National Board Certification requires an initial screening, preparation of a portfolio, and successful completion of a set of assessment exercises (Harris & Sass, 2008). While the impact of National Board Certification is disputed, many states financially support teachers’ efforts to become Nationally Board certified, and provide financial incentives to those who achieve certification. Citing research conducted by the National Research Council (2008) and Goldhaber and Brewer (2007), among others, NBPTS claims that “research is consistently positive about the impact of National Board Certification on improvement to teacher practice, professional development and areas of school improvement that are critical to raising student achievement” (National Board for Professional Teaching Standards (NBPTS) website, www.nbpts.org).

On behalf of the National Research Council, Hakel, Koenig, and Elliot (2008) reviewed studies of National Board Certification on student achievement. These studies were conducted mainly in North Carolina and Florida, states with excellent databases to track teachers and students, as well as a significant numbers of National Board

⁴⁷ More than 82,000 teachers have achieved National Board Certification (NBPTS website).

Certified teachers. While studies found a relationship between National Board Certification and higher student achievement, the effects detected were small and less significant in Florida than North Carolina (Hakel et al., 2008).⁴⁸ Goldhaber and Anthony (2007) arrived at a slightly different conclusion, finding that teachers who are National Board certified are more effective than teacher applicants who do not become certified. They also found that the benefits that accrue in terms of student achievement vary by grade level and student type. Lastly, they found no evidence that the process of becoming certified increases teacher effectiveness (p. 146). A study conducted by Harris and Sass (2008) challenges Goldhaber and Anthony's conclusions, finding "relatively little support for NBPTS certification as a signal of teacher effectiveness" (p. 25). Only in a few isolated cases did the authors find National Board Certification to be associated with student achievement. These associations are small, with the exception of future National Board Certified teachers who are middle school math teachers. However, Harris and Sass (2008) agree with Goldhaber and Anthony in regards to their finding that the process of becoming certified does not increase teacher effectiveness.

Relationship among teacher characteristics. Lankford, Loeb and Wyckoff (2002) have found that the seven characteristics listed above (experience; credentials; content knowledge and pedagogical knowledge; general academic ability and intelligence; teacher training; certification status; and, National Board Certification

⁴⁸ One study reviewed, conducted by Sanders, Ashton and Wright (2005), had been commissioned by the NBPTS. Using data from two large school districts in North Carolina, the authors compared teachers with and without National Board Certification and found no effect of certification on student achievement.

status), as well as other teacher characteristics, are highly correlated. They explain, “Schools that have low quality teachers as measured by one attribute are more likely to have low quality teachers based on all other measures” (p. 42). This is not surprising, as there is understandable overlap among many of the teacher characteristics. For example, it makes sense that credentials, which represent instruction in a specialized content area and/or pedagogical skill), is highly correlated with content and pedagogical knowledge.

Value-added measures. A potential human capital resource input that has not yet been utilized in studies of intradistrict resource allocation is value-added measures. The availability of value-added measures is growing as support and incentives from states and the federal government for implementing value-added systems has increased.⁴⁹ This metric could be used at both the school level and the teacher level if the data were available. Value-added models measure teacher and school effectiveness as determined by their students’ growth on standardized assessments. The more sophisticated value-added measures take into account students’ previous test performance, as well as other student characteristics, and predict students expected growth. To the extent that growth in a given year is greater or less than predicted, the school or teacher is given credit. Using several years of data, statisticians can measure the impact that a teacher or school has had on student achievement (Hershberg, Simon & Lea-Kruger, 2004).

⁴⁹ Most recently, the U.S. Department of Education’s Race to the Top competition required that rigorous teacher evaluation be based on student outcomes (Glazerman et. al., 2010; Baker et. al., 2010).

There is general agreement among researchers that value-added systems provide better measures of teacher effectiveness than achievement scores alone, which take no account of student growth. Value-added systems are also thought to provide better measures of teacher effectiveness than simple growth measures that do not take into consideration student attributes (Baker et. al., 2010). However, there is an extensive debate in the research community as to the viability and appropriate use of value-added methods. In response to the U.S. Department of Education's Race to the Top competition, the Board on Testing and Assessment of the National Research Council (2009) submitted a letter expressing concern with, among other issues, the use of value-added methods to evaluate teacher effectiveness. They cite experts Henry Braun (Educational Testing Service) and Daniel McCaffrey and J. R. Lockwood (Rand) to support their argument that, "a great deal is unknown about the potential and the limitations of alternative statistical models for evaluating teachers' value-added contributions to student learning" (National Research Council [NRC], 2009, p.8). The Economic Policy Institute also issued a report warning against the use of value-added methods as a tool for teacher evaluation (Baker et. al., 2010). Concerns regarding value-added methods include the accuracy of results derived from using value-added methods and the impact of utilizing value-added measures for personnel decisions.⁵⁰

⁵⁰ Some concerns regarding the impact of value-added methods have to do with their potential use by administrators. For example, if value-added scores are used to evaluate teachers, some researchers fear that teachers will focus only on tested materials, thereby narrowing the curriculum (Baker et. al., 2010). This could happen at the class level, where a teacher spends more time on subject matter covered in the state assessment, or at the school level, where time spent on courses such as history and art is restricted in order to make more time for English Language Arts and Mathematics, tested subjects. Using value-added to make high stake decisions could also lead to teacher demoralization and even cheating (Baker et. al., 2010). Other concerns include: the political issue of having a metric that is difficult to explain to

While questions regarding the impact of the adoption of value-added methods are of great importance, only the accuracy of results derived from using value-added methods is useful for the purpose of studying inequities in the distribution of human capital resources.

I will briefly address the numerous issues tied to value-added methodology and its ability to provide valuable estimates of teacher effectiveness, but for a more comprehensive review of the technical subject matter, see Henry Braun's (2005), "Using Student Progress to Evaluate Teachers: A Primer on Value-Added Models."

1. Students and teachers are not randomly assigned (Baker et. al., 2010; Braun, 2005; Harris & Sass, 2009; NRC, 2009). Baker et. al. (2010) explain "teachers' value-added effects can be compared only where teachers have the same mix of struggling and successful students, something that almost never occurs, or when statistical measures of effectiveness fully adjust for the differing mix of students, something that is exceedingly hard to do" (p. 11).
2. Value-added methods are only as good as the assessments they are built on. For the most part, assessments are not perfectly aligned to standards (Baker et. al., 2010; NRC, 2009). Furthermore, they do not cover all the material for which teachers are responsible (e.g., teaching respect, responsibility). Another technical issue is that tests have ceilings and floors, which can prevent student

teachers as well as the community at large (NRC, 2009); the fact that new teachers and teachers not teaching tested material cannot be included in a system-wide evaluation initiative; and, the fact that decisions based on value-added methods leading to the removal of teachers do not make sense if replacement teachers are no better (Baker et. al., 2010).

demonstration of growth or regression (Baker et. al., 2010; NRC, 2009). Finally, measurement error exists for all assessments.

3. Statistical properties of value-added assessment lead to results that may be imprecise. Specifically, measurement errors lead to misclassification of some teachers (Baker et. al., 2010). The Board on Testing and Assessment (BOTA) of the NRC (2009) points out that value-added measures can vary unexpectedly from year to year. One cause of this instability can be small class size which lessens the power of the analysis for any given teacher. Also, while tests that are vertically aligned lend themselves more readily to value-added assessment, most assessments used in value-added modeling are not vertically aligned (Baker et. al., 2010). Finally, there are a variety of value-added models being implemented, and they differ in their sophistication. Glazerman et. al. (2010) point out that “any practical application of value-added measures should make use of confidence intervals in order to avoid false precision, and should include multiple years of value-added data in combination with other sources of information to increase reliability and validity” (p.5).
4. Not all teachers are teaching material that is covered by state assessments. This is a significant issue as educators for untested grades and subjects are unable to be evaluated through value-added methods.
5. Positive and negative outside influences on students’ learning may be wrongly attributed to teachers. Value-added methods attribute student improvement beyond, or less than, that predicted to their teachers. Therefore, outside

influences on student learning, other than those controlled for in the value-added model, are attributed to the teacher. Influence can come from other teachers, either in the same grade-level or from a previous years' instruction.

When students receive instruction from more than one teacher it is very difficult to accurately attribute gains in learning (NRC, 2009). Other influences can include summer activities, mobility, and parental support.

6. Valid value-added results rely on complete data bases and accurate links between students and their teachers which are often lacking. Districts are in the process of building this infrastructure, but many have a ways to go (NRC, 2009). Student mobility presents a particular challenge for many districts (Baker et. al., 2010).

While legitimate concerns abound, there is a body of evidence that supports the use of value-added methods. Three recently published studies serve as examples: Harris and Sass (2009) studied value-added and principal ratings in a mid-sized Florida school district and found value-added measures “constructed from multiple years of test score data” to do “a much better job at predicting future teacher performance than principal ratings” (p. 28). Subsequently, Goldhaber and Hansen (2010) conducted a large study using North Carolina data to examine the stability of value-added model estimates and their value in predicting student achievement (p.1). They found value-added teacher effect estimates to be “better indicators of teacher quality (at least as measured by standardized tests) than observable teacher attributes” (p.2). Lastly, the Bill & Melinda Gates Foundation (2010) issued a preliminary report of its Measures of Effective

Teaching (MET) project. Their analysis reveals, “In every grade and subject, a teacher’s past track record of value-added is among the strongest predictors of their students’ achievement gains in other classes and academic years. A teacher’s value-added fluctuates from year-to-year and from class-to-class, as succeeding cohorts of students move through their classrooms. However, that volatility is not so large as to undercut the usefulness of value-added as an indicator (imperfect, but still informative) of future performance” (Bill & Melinda Gates Foundation, 2010, p.9).

The Brookings Brown Center Task Group on Teacher Quality also issued a report in 2010 which supports the role of value-added. The authors of the report state:

If student test achievement is the outcome, value-added is superior to other existing methods of classifying teachers. Classification that relies on other measurable characteristics of teachers (e.g., scores on licensing tests, routes into teaching, nature of certification, National Board certification, teaching experience, quality of undergraduate institution, relevance of undergraduate coursework, extent and nature of professional development), considered singly or in aggregate, is not in the same league in terms of predicting future performance as evaluation based on value-added. (Glazerman et. al., 2010, p.9)

Given this finding, it is not surprising that the report advocates for the use of value-added measures. However, the authors acknowledge that “there is much to be learned about how best to use value-added information in human resource decisions” (Glazerman et. al., 2010, p.1). This view is consistent with that of the Bill & Melinda Gates Foundation, which promotes the use of value-added as a means of adding useful information to inform decisions to improve student outcomes (Bill & Melinda Gates Foundation, 2010).

Many who caution against the use of value-added methods are most uncomfortable with its use in high stakes decisions such as compensation and tenure. Despite this concern, they remain interested in pursuing a research agenda that augments the knowledge base related to the evaluation of educators (Baker et. al., 2010; NRC, 2009). Researchers seeking to better understand the distribution of human capital resources among schools and students would benefit from the consideration of value-added measures of teacher and/or school effectiveness as an input to be equitably allocated.

Teacher efficacy measures. Teacher efficacy measures and teacher collective efficacy measures are two additional human capital resource inputs that also have not yet been utilized in studies of intradistrict resource allocation. Teacher efficacy has been defined in the literature as an individual teacher's attitude and thinking about his or her ability to positively impact student outcomes (Skaalvik & Skaalvik, 2010; Soodak & Podell, 1996). Tschannen-Moran and Woolfolk Hoy (2001) go further and describe the construct as a teacher's "judgement of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (p. 783). This definition gets to idea that a teacher's input can serve to override negative influences that a child might bring to the classroom given their abilities and/or their family backgrounds. Teacher collective efficacy is a similar construct, but rather than being based on an individual teacher's views of his or her potential impact on students, it is individual teachers' views of the ability of an entire group of teachers, to impact students, such as all the teachers in a school

(Goddard, Hoy & Hoy, 2000; Henson, 2001; Skaalvik & Skaalvik, 2010).⁵¹ One argument for the relevance of studying efficacy is that self-efficacy informs motivation, and people behave in a way that is consistent with their expectations of what their actions might facilitate (Bandura, 1986).

Numerous studies over the years have provided evidence that teachers' self-efficacy is related to positive student outcomes, including academic achievement, motivation, and student self-efficacy (Henson, 2001; Tschannen-Moran & Woolfolk Hoy, 2001). These findings are consistent regardless of the measurement tool employed. Not surprisingly, researchers have also found that self-efficacy is strongly related to positive impacts on teacher practice and behavior, and that teachers with weaker self-efficacy are more controlling and critical of students (Woolfolk Hoy, 2003). Another interesting finding related to individual teacher efficacy is that, beyond pre-service training, it appears to be stable, and not readily subject to change (Henson, 2001; Tshannen-Moran, Hoy & Hoy, 1998).

While less research has been conducted on the relationship between collective efficacy and student outcomes, the studies which do exist reveal that collective efficacy has a positive impact. In fact, in a study by Goddard, Hoy & Hoy (2000), "collective teacher efficacy was more predictive of elementary students' math and reading achievement than gender, ethnicity, or socio-economic status" (Henson, 2001).

⁵¹ According to Skaalvik & Skaalvik (2010), while there is little research that evaluates the relationship between individual self-efficacy and collective efficacy, the studies which exist point to a positive relationship between the two, but the constructs are theoretically different.

A concern with considering individual teacher efficacy and teacher collective efficacy as teacher and school-level “qualities” or “characteristics” is that measures of efficacy (at this point) rely solely on teachers’ self reports, which has implications for the validity of the data. Furthermore, this line of research continues to evolve as researchers use differing measures to capture these constructs.

Outcomes - variables of interest. As researchers consider the implications of intradistrict resource allocation, they examine how inputs are differentially related to groups of students. The most common variables of interest to researchers and policy makers are race, poverty, ELL status, special education status, school size and student performance. Of the 34 studies reviewed, 15 investigate differential impact by minority status, 26 investigate differential impact by poverty status, 4 investigate differential impact by ELL status, 6 investigate differential impact by special education status, 3 investigate differential impact by school size, and 10 investigate differential impact by student performance. Additionally, 3 studies examine measures of equity to determine the variation on per-pupil expenditures.

Reviewing the research. In their paper, “Rethinking the Intradistrict Distribution of School Inputs to Disadvantaged Students,” Rubenstein et al. (2006) provide a review of studies that address this topic, dividing them into three categories: those quantifying school-level funding disparities; multivariate studies relating school funding to student characteristics; and, multivariate teacher characteristic results. Teacher characteristics include: experience, salary, education and certification. Pupil-teacher ratios are also considered in this group of studies is. Other studies not falling into these categories

include those which look at non-fiscal resources, such as class size, course offerings, and instructional time (Odden et al., 2008; Betts, Rueben and Dannenberg, 2000; Burke, 1999). An example of research into the impact of non-fiscal resources is provided by Betts, Rueben and Dannenberg (2000) who investigated both class size and course offerings in California schools in 1997-1998.⁵²

Another way to classify the types of studies that address intradistrict resource allocation is by the unit of analysis employed by the researcher. Some studies look at how resources are allocated among schools within a given school district. For example, Summers and Wolfe (1976) looked into resource allocation in Philadelphia; Rubenstein (1998) looked into resource allocation in Chicago; Owens and Maiden (1999) looked into resource allocation in a large district in Florida; and Berne and Stiefel (1984), Iatarola and Stiefel (2003), Lankford, Loeb, and Wyckoff (2002), Boyd, Lankford, Loeb, Rockoff, and Wyckoff (2007), Iatarola and Rubenstein (2007) and Schwartz, Stiefel, and Rubenstein (2008) looked into resource allocation in New York City.

Other studies investigate multiple districts and their allocation decisions. Focusing on elementary schools, Owens (1972) investigated the distribution of human capital resources (teacher salary expenditures, teacher experience, and teacher verbal ability) among students by income and racial make-up of neighborhoods in nine large cities. Carr (1998) used school-level data from eight large school districts in Texas to explore resource allocation and Stiefel, Rubenstein and Berne (1998) conducted school

⁵² While Betts et al. (2000) find little variation in average class sizes across schools, they identify significant variations in the number of Advanced Placement courses offered as well as the percentage of courses that satisfy public university entrance requirements.

level equity analyses in Chicago, Fort Worth, New York City and Rochester. More recently, Rubenstein, Schwarz and Stiefel (2007) studied resource allocation in New York City, Cleveland, and Columbus, and Miller and Rubenstein (2008) examined the magnitude of intradistrict resource disparities in four mid-size school districts in New York City.

Yet another group of studies looked at resource allocation across schools in separate districts (Rubenstein et al., 2006). Many of these studies focus on districts within a given state to avoid misinterpretations due to different policy environments. Hertert (1995) and Betts, Rueben and Dannenberg (2000) looked at fiscal and non-fiscal allocations among students by race, income and performance throughout schools in California. DeAngelis et al. (2005) created an index of teacher quality to determine how teacher quality is distributed among students by poverty and minority status and student performance in Illinois. And, Clotfelter et al. (2006, 2007a, 2007b, 2008) use data from North Carolina to evaluate how teachers are distributed among schools according to their attributes such as credentials, experience, aptitude (as measured by quality of undergraduate institution and licensure test scores) and certification. Finally, a set of studies look at the impact of district characteristics on intradistrict resource allocation. Monk and Hussein (2000) employed multivariate models to examine the influences of school district spending, wealth, poverty, and size on internal decisions about how to divide staffing resources across different areas of the curriculum. Taking another approach, Pan, Rudo and Smith-Hansen (2003) studied the allocation decisions

of high-performing and low-performing districts in an effort to determine how successful districts allot resources.

Findings - Evaluating Equity in Resource Allocation. None of these approaches to categorizing intradistrict resource allocation studies differentiate between studies which test the relationship between: (1) inputs, such as funding and staffing, and how they are allocated **equally** among different groups of students based on race, poverty level, etc. [horizontal equity]; (2) inputs, such as funding and staffing, and how they are allocated **differentially** among different groups of students based on race, poverty level, etc., [vertical equity]; and, (3) inputs, such as funding and staffing, and student achievement outcomes [adequacy].

Certain methodologies are used to address these different conceptions of equity. When looking at horizontal equity, researchers often provide descriptive analyses and summary statistics that measure the variation in per pupil expenditures, such as the range, the restricted range, the coefficient of variation, the Gini coefficient, and the McLoone index. (For example, see Clotfelter et al., 2005; DeAngelis et al., 2005; Hertert, 1995; Iatarola & Stiefel, 2003, Rubenstein, 1998; and, Stiefel et al., 1998.) Horizontal equity can also be tested with a regression analysis, allowing researchers to identify the direction, size, and strength of the relationship between resources and school characteristics.⁵³ If, for example, resources were distributed according to the ideal of horizontal equity, one would expect to see, on average, no relationship, either positive or negative, between the allocations to schools with different characteristics or

⁵³ Theoretically, this analysis can be done at the program level or classroom level as well.

groups of students with different characteristics (Owens & Maiden, 1999). The existence of vertical equity is evaluated with similar techniques, but regression analysis is utilized more often. Following the same logic as in our example of horizontal equity, according to the principle of vertical equity, one would expect to see a positive relationship between school funding and, for example, student poverty. (Examples include: Ajwad, 2006; Berne & Stiefel, 1994; Boyd et al., 2007; Clotfelter et al., 2007; Owens, 1972; and Schwartz, Stiefel, & Rubenstein, 2008.) Analysis of adequacy focuses on the impact of inputs on student outcomes as opposed to the allocation of inputs. Researchers investigating adequacy employ similar methodological tools to those used when testing for vertical equity, but the relationships being investigated are between inputs (funding, teacher quality, etc.) and student achievement. In other words, the equation is turned around. Researchers test to see if achievement (as measured by assessments) of groups of students (defined by certain characteristics) is equivalent. To the extent it is not, the principle of adequacy has not been achieved. (Examples of studies of adequacy include Betts et al. (2000) and Iatarola and Rubenstein (2007).)

Horizontal equity. Determining whether a study is testing horizontal equity or vertical equity is sometime difficult, as it requires the author of the study to articulate whether they examine resources distributed equally among all schools/classrooms/students, or resources distributed in a way as to compensate for disadvantages among all schools/classrooms/students. Summers and Wolfe (1976) suggest that certain allocations are “intended to be neutral ... unrelated to the proportion of disadvantaged” students (p.331). These might include school desks, or

books, or nurses. Researchers have investigated the allocation of resources to determine if their allotment is indeed neutral.

Summers and Wolfe (1976) conducted an early study of the equitable allocation of resources in Philadelphia. When looking at how funds are allocated to African American students in elementary schools, they discovered that “neutrally intended resources,” with the exception of “teacher and principal quality characteristics,” were distributed equitably (p. 341). They found this not to be the case at the junior high school level, where “neutrally intended resources” were allocated disproportionately in favor of non-minority students. Again, teachers’ and principals’ quality characteristics were unfairly allocated. At the high school level, horizontal equity was found to be most prevalent (p. 341).

More recent studies have led to similar results, finding overall expenditures to be distributed according to the principle of horizontal equity (Hertert, 1995; Rubenstein, 1998; Stiefel, Rubenstein & Berne, 1998). Findings were less definitive when looking at expenditures tied to instruction. For example, Owens and Maiden (1999) found that the percentage of African American students in a school and the percentage of students on free/reduced lunch programs are negatively associated with instructional expenditures while Baker (2003) found that “limited English proficient and low-income populations ... led to increased allocations to instruction and instruction-related staff, including librarians and school counselors, but not to increases in classroom teachers” (p. 22).

A consistent finding in the literature is that schools with more disadvantaged students are more likely to have more teachers with less experience, fewer credentials, lower certification status, less content and pedagogical knowledge, and lower academic ability and intelligence (Ingersoll, 2002). Research on intradistrict teacher distribution bears this out. While it is often the case that high-poverty schools have higher teacher to student ratios, these teachers also receive lower salaries and are considered to be less qualified by measures such as experience and education (Schwartz et al., 2008). This finding has been corroborated by Owen (1972), Summers and Wolfe (1976), Stiefel, Rubenstein & Berne (1998), Lankford, Loeb & Wyckoff (2002), Iatarola & Stiefel (2003), DeAngelis et al. (2005), Clotfelter et al. (2007), and Rubenstein et al. (2007). This is also the case for schools with higher percentages of non-white students (Clotfelter et al., 2007; DeAngelis et al., 2005; Lankford, Loeb, & Wyckoff, 2002; Owen, 1972; Rubenstein et al., 2007; Stiefel, Rubenstein, & Berne, 1998; Summers & Wolfe, 1976). Lankford et al. (2002) write, “Low-income, low-achieving and non-white students, particularly those in urban areas, find themselves in classes with many of the least skilled teachers” (p. 38).

Vertical Equity. Vertical equity is a function of the extent to which resources are allocated with the intention of being compensatory -- addressing the needs of a certain group of students that may have particular hurdles to jump (Summers and Wolfe, 1976). Federal funds, such as Title I, have been designed to provide for vertical equity by addressing the needs of low-income students. Iatarola and Stiefel (2003) write, “In order to measure vertical equity in spending, we include categorical revenue

with general education operating revenue and we specify school and student characteristics that have been identified with higher costs of learning, such as poverty status, limited English proficiency classification, high mobility, and learning disability status” (p. 70).

In their review of the literature on intradistrict resource allocation, Rubenstein et al. (2006) find strong evidence that “higher concentrations of student needs, such as poverty, are sometimes associated with higher levels of per-pupil spending” (p. 6). My own review of the literature confirms this finding. For example, Stiefel, Rubenstein and Berne (1998) determined that for general education or total funds, Chicago, New York, Rochester and Fort Worth provide mixed results--some positive relationships and some weak negative relationships. However, dollar allocations tend to favor schools with lower poverty levels. In New York City, Iatarola and Stiefel (2003) found vertical equity to be lacking in elementary schools but more recent work by Schwartz, Stiefel and Rubenstein (2008) revealed that the relationship between funding and the percentage of the low-income students, limited English proficiency students, and special education students, is positive, demonstrating vertical equity. Also, Ajwad (2006) analyzed the relationship between expenditures per pupil and discretionary resources and concluded that “the combined effect of poor students and a poor neighborhood is to raise school spending per pupil” (Abstract). One last study that looks at the relationship between resources and disadvantaged students in eight school districts in Texas reports that resources are disproportionately allocated to schools serving high needs students, demonstrating vertical equity. However, there is scarce

evidence that this allocation of resources is having an impact on student outcomes (Clark, 1998). It is possible that the vertical equity seen in the eight Texas school districts does not lead to improvements in student performance because of the way that the dollars are spent. As found in the investigation of horizontal equity, researchers reveal that schools with more disadvantaged students may have more money allotted to them, but their teachers are likely to be less educated (Baker, 2009; Rubenstein et al., 2007). I was unable to identify any studies that found a positive relationship between teacher qualifications and size of the population of disadvantaged students. Goertz and Stiefel (1998) acknowledged this contradiction, that the distribution of financial resources overall could be allocated in accordance with the ideal of vertical equity while the distribution of teacher quality would not.

Adequacy. Rubenstein et al. (2004) explain that adequacy can be measured by examining the extent to which groups of students with certain similar characteristics, such as race or poverty, receive the necessary resources to achieve standards. However, this approach is conceptually difficult to grasp – perhaps because of the ambiguous relationship between inputs (such as dollars and staffing) and student achievement.

Of thirty-four studies reviewed on intradistrict allocation of resources, only five address adequacy as a form of equity. The earliest of these studies was conducted by Betts et al. (2000). The authors ask the question: “Do existing inequalities in school resources contribute to unequal student outcomes?” (p. viii). Using regression analysis which allows the researchers to control for school and student characteristics, they find the level of teacher experience and the percentage of teachers without a full credential

to be strongly related to student achievement. They also find teachers' education level to be related to student achievement, but this relationship is weaker. However, the strongest relationship is between student achievement and student socioeconomic status.

Pan, Rudo, and Smith-Hansen (2003) looked at the relationship between financial and staffing resources and student performance using data from low- and high-performing school districts in four states in the Southwest (Arkansas, Louisiana, New Mexico, and Texas) and 12 districts with consistent gains in student performance in an effort to help determine the necessary resources to achieve success. This study found that high-performing districts spent more money and employed more staff in certain instructional areas. Clotfelter et al. (2006) also sought to understand what resources are necessary for high student performance. They found that teachers with more experience and with higher licensure test scores are positively associated with students with higher test scores.

Two final studies that consider adequacy rely on data from New York City. Iatarola and Rubenstein (2007) sought to evaluate the impact of a policy change calling for more stringent graduation requirements (the outcome in question). They employed a regression analysis controlling for unchanging school characteristics through school fixed effects and for changes affecting all schools through year effects, and found that spending levels and resource allocation changed somewhat in response to the new policy. Further research is necessary to determine the impact of the new funds on student graduation rates. Finally, Boyd, Lankford, Loeb, Rockoff, and Wyckoff (2007)

looked at the relationship between teacher qualifications and student outcomes and found that changes in teacher qualifications, such as SAT scores or certification status, appear to be related to “a modest improvement in the average achievement of students in the poorest schools” (p. 2).⁵⁴

Districts might be more likely to address the needs of struggling students in response to standards-based reform and state and federal accountability requirements. Given the strong correlations between low-performance and student characteristics such as income and race, it is reasonable to assume that students considered to be disadvantaged would have more resources directed their way (Gross & Goertz, 2005). As better data becomes available to quantify student achievement, it is likely that more researchers will seek to investigate the relationship between the quantity and quality of resources and student outcomes in an attempt to support policy makers in their efforts to address all three conceptions of equity: horizontal equity, vertical equity, and adequacy.

Summary

This chapter began with a review of four conceptions of equity, spanning principles of equivalent inputs to adequate outcomes. I propose a fifth model to serve as a framework which I use to evaluate resource allocation in the Allentown School District. Following this theoretical discussion of equity, this chapter presents an analysis of the current processes which dictate how resources are distributed below the district level. This analysis makes clear that there is a complex system in place, shaped

⁵⁴ The authors used a measure of student growth derived from value-added analysis to investigate the impact of teacher characteristics on student growth.

by district allocation policies and the teacher labor market, with multiple forces influencing how resources are allocated among schools and programs. The next segment of this chapter provides a review of the existing research on intradistrict resource allocation. This review discusses the research challenges and then considers the methods employed in studying resource allocation. Lastly, findings of intradistrict resource allocation studies are presented.

A synopsis of these findings reveals the following points: 1) overall expenditures are often distributed according the principles of horizontal and vertical equity, with equivalent or greater financial resources being allocated to schools and students with greater needs. However, this is more likely to be the case at the high school level than the elementary school level. Furthermore, there is a question as to the sufficiency of the additional resources directed to disadvantaged schools and students to achieve vertical equity; and, 2) human resources, as opposed to financial resources, are less likely to be distributed equitably. Disparities in teacher quality – as defined by measurable indicators such as years of experience, certification status, and content and pedagogical knowledge – are most often perversely related to school and student characteristics (i.e., schools with more disadvantaged students often have more teachers with less experience, fewer qualifications, etc.).

According to the model of comprehensive equity developed earlier in this chapter, school districts should be able to demonstrate that resources are distributed such that all students are able to participate as citizens and be economically self-sufficient. Beyond this distribution, public funds should be disbursed in accordance

with the principle of vertical equity with additional compensation for disadvantaged students. Finally, comprehensive equity requires that resource allocations not favor students based on unjustifiable criteria such as race. The review of studies investigating intradistrict resource allocation does not produce findings consistent with comprehensive equity.

CHAPTER 3 – BACKGROUND AND DATA

Pennsylvania's Definition of Equity

Pennsylvania has consistently received low ranks on measures of school funding equity. As of 2008, prior to the implementation of a new funding formula, Pennsylvania ranked 8th among all states in terms of school finance inequity, based on the average percentage difference in per-pupil spending among school districts (Federal Education Budget Project). While other states have altered their school funding formulas as the result of court-ordered mandates, Pennsylvania's legislature confronted the issue directly, commissioning a costing-out study to establish the actual resources necessary to ensure that the students of Pennsylvania receive an adequate education.⁵⁵ In response to the recommendations of this study, the governor proposed a budget that included additional funds to be directed to certain districts. The budget, along with a new school funding formula, was enacted by the legislature in the summer of 2008.

Pennsylvania's new formula sets an adequacy target determined by the number of students in each school district and their educational needs. Specifically, a base cost of \$8,003 is allotted for each student, and then additional funding is provided based on the number of low-income students and English language-learners, the district's size, and regional cost differences (Augenblick, Palaich & Associates, 2007). Districts that are unable to raise sufficient funds to meet the adequacy target are provided with state funds to cover the gap. Of the 501 districts in the state of Pennsylvania, 471 districts

⁵⁵ This work was instigated by a group of business leaders in the Lehigh Valley (Education 2010) who had commissioned Augenblick, Palaich & Associates to study the Allentown School District. The consultant's analysis revealed a \$2000 per pupil revenue gap which, in part, was the result of the state's funding formula to districts ("Pennsylvania's Costing-Out Study," n.d.).

had spending below the estimate of what it would take to have their children reach an adequate level.

For the purposes of the costing-out study, an adequate education is defined as 100% of students achieving proficiency on state reading and mathematics assessments and mastering state standards in 12 academic areas by the year 2014 (Augenblick, Palaich & Associates, 2007). Per pupil allotments include the cost of educating an average student in the Commonwealth to meet state performance expectations plus “weights” for certain categories of students (including students in poverty, special education students, gifted students, and English language learners) to allow them to also meet state performance expectations.

The authors of the costing-out study used three methods to determine the appropriate per pupil allotments: a successful school district approach, which examines the spending of high performing school districts as measured against state performance expectations; a professional judgment approach, which relies on the expertise and experience of educators to specify the resources, staff, and programs that schools need to meet performance expectations; and an evidence based approach, which uses education research to help provide answers about how resources should be deployed in schools so that students can meet performance expectations (Augenblick, Palaich and Associates, 2007). Findings of these analyses led Augenblick, Palaich and Associates to develop a new state funding formula designed to enable all districts to reach their proficiency goals. Table 1 describes the weights tied to student needs used to determine the appropriate state funding.

Table 1. Value of Formula for Factor Related to Student-Based Need

Student-Based Need	Value or Formula for Factor
Special Education	1.30 x all students enrolled in special education programs
Poverty	0.43 x number of students eligible for free/ reduced-price lunch
English-Language Learners	((-.023) x (LN of 2005-06 enrollment) + 3.753) x number of ELL students, with a minimum of 1.48 and a maximum of 2.43 [ASD: 1.4978 x number of ELL students]
Gifted	((-0.13) x (LN of 2005-06 enrollment) + 1.482) x number of gifted students, with a minimum of .20 and a maximum of .66 [ASD: 0.2052 x number of gifted students]

Note. Adapted from *Costing-Out the Resources Needed to Meet Pennsylvania's Public Education Goals* (p. 30), by Augenblick, Palaich and Associates, Inc., 2007.

The school funding formula adopted by the state is designed to ensure that education funds are distributed among districts to ensure vertical equity. Such an approach is intended to provide for an adequate education for all students. This formula provides a basis for defining equity in Pennsylvania.

Governance and Resource Allocation in Allentown School District

The Allentown School District operates with a \$233 million budget and employs more than 2,300 educators and support staff (school year 2010-2011), making it the sixth largest employer in the Lehigh Valley. The Allentown School Board sets policies for the district, guided by the Pennsylvania School Code. It is also engaged in long-range planning and formal and informal evaluation of district initiatives. Required duties of the Board include levying taxes, electing the superintendent and all district employees, approving matters relating to investments and expenditures, and adopting the annual budget. Nine school directors are elected by district residents to serve on the board for four-year terms. Though locally elected, school directors are considered to be

state officials designated by law to administer the school system. The superintendent and the administrative team support the board in all educational and financial actions (ASD Board Brochure), and the superintendent serves as a non-voting member of the board.

Budgets for the Allentown School District are prepared by the Chief Financial Officer in cooperation with district administrators. All budgets are informed by contracts with the various public employee unions operating in the district as well as state and federal requirements. Procedures for allocating funds among schools and programs have evolved over the years but appear to be comparable to the vast majority of school districts in the United States. Budgeting is centralized and comprehensive school-level budgets are not produced. To satisfy ESEA requirements for Title I allotments, the district provides teacher average costs at the school level rather than including actual costs. Specific methods for resource allocation are reported in greater detail in Chapter V. In school year 2010-2011, the administration in Allentown hired the education consulting firm of Cross & Joftus⁵⁶ to conduct a resource assessment, providing district personnel with detailed information of how and where money was being spent in the 2009-2010 school year.

Data Collection

All data collection has been approved by the Allentown School District and the University of Pennsylvania Institutional Review Board. Data collection took place

⁵⁶ Cross & Joftus collaborated with Education Resource Strategies in this work.

during the 2010-2011 school year and consists of document analysis and interviews; the analysis is based on 2009-2010 data.

The information used to complete this study includes data on students, teachers, and schools. Student data includes student characteristics (i.e., ELL status, poverty, race, special education status), student achievement data (i.e., Pennsylvania System of School Assessment scores, AYP performance levels), and student behavior data (i.e., attendance, disciplinary actions). This data is collected at the district and state level and reported by the state.

Teacher data includes teacher attributes⁵⁷ (i.e., years of experience, credentials), teacher compensation, and metrics of professional practice (i.e., evaluation reports, value-added scores, teacher self-efficacy measures, teacher collective-efficacy measures). Information on teachers' attributes presents the greatest difficulty in terms of data collection. The human resources department has data on teachers' years of experience, credentials (e.g., B.S., M.S.), professional development courses taken, teachers' certification status, and teachers' college attended and grade point average in personnel files in the Administration Building. The department does not keep PRAXIS test scores, which could serve as a proxy for content and pedagogical knowledge. Unfortunately, teacher data has not yet been transferred to a centralized personnel database, so only information on experience and credentials is available for my study. Data collected on teacher compensation include salary, benefits, and funding source.

⁵⁷ I was unable to attain reliable teacher data on general academic ability, training, or certification status – beyond the fact that all teachers in elementary schools and middle schools are “highly qualified” as required by No Child Left Behind federal legislation.

Amassing metrics of professional practice required some additional collection of data. The district's only available measure of individual teacher practice is an evaluation report that indicates whether teachers are "satisfactory" or "unsatisfactory." Over 98% of teachers were categorized as "satisfactory" in the 2009-2010 school year. As this finding does not provide much discrimination for an equity analysis, I have not used it in my study. Two district initiatives were implemented in the 2011 to support the collection of measures of teacher practice: first, the district contracted with SAS EVAAS to provide teacher level value added scores; and second, I administered a survey to all the teachers in the district to question their sense of self-efficacy and the collective efficacy of the building in which they work.

As a result of additional data collection, I have four measures of human capital resources that have not been included in the literature on intradistrict equity. The first metric of professional practice which I use in my analysis is ratings of teachers according to their value-added scores. This metric is used to differentiate among schools on the basis of the portion of highly effective teachers in each school and the portion of highly ineffective teachers in each school. The second metric used in my analysis is a calculation of teacher efficacy determined using data from a survey administered to all elementary and middle school teachers. Two additional measures are similar in that they rely of value-added measures and efficacy measures, but they differ in that they offer a view of what the entire school offers to students. The Growth Index, provided by the State for each school, is a measure of student progress across the

tested grade levels in schools. Teacher collective efficacy measure provides teachers perspectives regarding their schools' faculty, as a whole, to impact student outcomes.

Value added measurements of low and high teacher effect. Teachers have long been acknowledged for their students' accomplishments. Many have pointed out that this is unfair, as teachers are only responsible for a portion of student achievement outcomes. Value-added models were developed to address this problem. In theory, they partition out student growth that is the result of the classroom environment, or teacher practice, and the growth that is due to what the student brings to the classroom: her prior knowledge, the support of her family, previous teachers, etc. After these factors have been separated these models can, essentially, rate teachers based on their contribution to student achievement outcomes.

Value-added models rely on student assessment results and links between teachers and students. Data systems have been enhanced in recent years, making the application of value-added models possible though approach only offers information on teachers that are teaching tested grades and subjects (such as Mathematics and English Language Arts). To date, the information generated through the PA Value-added assessment system has been primarily used as a tool to aid teachers in their instruction. For example, value-added results can identify the type of students (high achieving or low achieving) with which the individual teachers are achieving the best results. This information can be used to target appropriate supports to teachers.

The more data that is included in value-added models, the more accurate their results. This limits the models' validity in situations with a great deal of missing data.

As previously discussed, there are additional technical concerns that must be acknowledged when using value-added models to measure teacher effectiveness: one such concern is that value-added models generally assume that students are randomly assigned to classrooms, which is often not the case. Also, a teachers' influence may go beyond his classroom, thereby skewing the results for other teachers. Additionally, not all value-added models are the same - and some provide better information than others. More practical concerns include the fact that value-added models are complex and difficult to explain.

While the state does not provide teacher level value added scores to school districts, it is possible to obtain this information if the district is willing to provide teacher level data and student level data, and links between them, to an organization with the capacity to conduct the analysis. ASD has contracted with SAS EVAAS to provide teacher-level value-added scores for all elementary school teachers in grades four through five and middle school teachers teaching mathematics and English Language Arts in grades six through eight. Students in these grades must take the Pennsylvania System of School Assessment (PSSA), providing the data required to conduct value-added analysis.⁵⁸ Using a longitudinal, mixed model approach, SAS EVAAS offers a complex statistical model which provides less vulnerable outcomes than simple value-added models (McCaffrey, Han & Lockwood, 2008). Furthermore, SAS EVAAS methodology has been approved as a viable growth model for states and

⁵⁸ SAS EVAAS currently has a contract with the State to provide school- and district-level value added data.

districts to include in their Teacher Incentive Fund and Race to the Top applications⁵⁹ (U.S. Department of Education website).

With data on student PSSA scores, and links to teachers provided by the district, SAS EVAAS was able to construct a teacher level value-added measure. This measure compares teachers within the district and divides these teachers into quintiles according to their effectiveness. Definitions for these quintiles are provided below:

- Level 1, Least Effective: Teachers whose students are making substantially less progress than state growth standard (the teacher's index is less than -2).
- Level 2, Approaching Average Effectiveness: Teachers whose students are making less progress than the state growth standard (the teacher's index is less than -1 but equal or greater than -2).
- Level 3, Average Effectiveness: Teachers whose students are making the same amount of progress as the state growth standard (the teacher's index is less than 1 but equal to or greater than -1).
- Level 4, Above Average Effectiveness: Teachers whose students are making more progress than the state growth standard (the teacher's index is less than 2 but equal to or greater than 1);
- Level 5, Most Effective: Teachers whose students are making substantially more progress than the state growth standard (the teacher's index is 2 or greater).

⁵⁹ The first two growth model pilots awarded by the U.S. Department of Education were awarded to Tennessee and North Carolina, each engaging SAS EVAAS to provide value-added analysis.

For my equity analysis, I look at how teachers are dispersed among schools according to their effectiveness as defined above. More specifically, I consider schools in two ways: 1) by percentage of teachers⁶⁰ in bottom two quintiles of effectiveness (least effective and approaching average effectiveness); and 2) by percentage of teachers⁶¹ in top two quintiles of effectiveness (above average effectiveness and most effective).

Three-hundred-forty-one (341) value-added measures were provided for elementary and middle schools. There are 819 teachers in elementary and middle school. This represents only 31% of all teachers. This is due to a number of reasons: 1) in elementary schools, the majority of scored teachers get rankings for both reading and mathematics; 2) in elementary schools, only teachers in grades four and five are included in the calculus; and 3) value-added scores were only provided for teachers with two years of data available. Table 2 provides school level data.

⁶⁰ This is calculated only for teachers with value-added scores.

⁶¹ This is calculated only for teachers with value-added scores.

Table 2. Number and Percentage of Teacher-Level Value Added Scores by School

School	Number of Teachers included in Analysis	Total Number of Teachers in the Building	% of all Teachers included in Analysis
McKinley ES	4	18.4	22%
Lehigh Parkway ES	1	18.1	6%
Cleveland ES	5	18.5	27%
Jackson ES	5	18.4	27%
Ritter ES	8	32.4	25%
Washington ES	9	39.2	23%
Muhlenberg ES	7	34.8	20%
Sheridan ES	7	42.2	17%
Jefferson ES	7	50.1	14%
Roosevelt ES	4	36.5	11%
Mosser ES	4	46.2	9%
Hiram Dodd ES	7	46.2	15%
Union Terrace ES	9	43.2	21%
Central ES	10	50.3	20%
Harrison-Morton MS	42	56.0	75%
Raub MS	42	67.1	63%
Trexler MS	47	68.3	69%
South Mountain MS	36	84.6	43%

Given the small sample size of teachers with value-added scores, especially in elementary schools, this data should be considered with great caution. Also, while this metric may be more useful in middle schools where a greater number of teachers are included in the analysis, there is still an issue stemming from the variation among schools in *the percent of all teachers included in the analysis*. As demonstrated in the table above, Harrison-Morton Middle School has scores for 75% of its teachers while South Mountain Middle School has scores for only 43% of its teachers.

Growth Index. Just as teacher effectiveness is determined through an analysis of what “value” teachers add, the Growth Index similarly provides a measure of what “value” an entire school adds. According to an informational document provided by

one of the state's Intermediate Units (IU5), "the index is a value based on the average growth across grade levels and its relationship to the standard error so that comparison among schools is meaningful" (IU5, 2011, p.4) A growth index of fifty indicates that, on average, students in the school achieved a year's worth of academic growth in a year.⁶² A growth index greater than fifty indicates that, on average, students in the school achieved more than a year's worth of academic growth in a year and a growth index less than fifty indicates that, on average, students in the school achieved less than a year's worth of academic growth in a year (IU5, 2011). In my equity analysis, I consider how the State's calculated growth index for each school varies by school.

Teacher efficacy. An additional input that has not been included in research on intradistrict equity is that of teacher efficacy. As noted earlier, both teacher self-efficacy and teacher collective efficacy have shown to be related to student outcomes. As such, it is worthwhile to include these metrics as measures of teacher quality, resources which are potentially differentially distributed across schools. In order to evaluate teacher efficacy, I administered a survey to all teachers in ASD. (The email sent to principals requesting that they have the teachers in their building respond to an email survey is included in Appendix D.) The survey presented to teachers included 25 responses: the first response required was to indicate in which building the respondents' primary teaching responsibilities lay. The following twelve items measured teacher self-efficacy, and the final twelve questions measured teacher collective efficacy.

Survey response was high. Assuming that all teachers, and only teachers, received the

⁶² The Growth Index provided by the State uses zero to indicate a year's worth of growth in a year. I have transformed their numbers in order to accurately apply my equity statistics.

request to complete the survey, 79% (429) elementary school teachers responded and 91% (251) middle school teachers responded.⁶³

My dissertation uses the Teacher Beliefs Scale – short form (TBS), originally called the Teacher Sense of Efficacy Scale, to measure teacher self-efficacy.⁶⁴ This instrument, developed by Tschannen-Moran and Woolfolk Hoy (1998), uses a 9 point likert scale with anchors at 1– Nothing, 3 – Very Little, 5 – Some Influence, 7 – Quite a Bit, and 9 – A Great Deal. Items in this survey include: “How much can you do to motivate students who show low interest in school work?” and “How much can you do to get students to believe they can do well in school work?” (See Appendix D.) A confirmatory factor analysis of responses reveals three constructs: efficacy in classroom management, efficacy in student engagement, and efficacy in instructional strategies. (See Appendix D for Promax-rotated Standardized Regression Coefficients.) These constructs were also found by the survey creators in their own research.⁶⁵

The following table and figures provide survey results. Figure 1 demonstrates the average of all schools- by school level. Figures 2 and 3 provide responses from middle school teachers and elementary school teachers. Next, Table 3 presents the means and standard deviations of the average school response for elementary and middle schools. As can be seen, there is slightly greater variation among elementary

⁶³ I was unable to confirm that principals sent the email request to only teachers in their building – and the only identifier requested was “In which school did you teach for the majority of last year (September 2009-June 2010).”

⁶⁴ The Teacher Efficacy Scale is available for use by researchers on the website of Wayne K. Hoy, professor in educational administration in the School of Educational Policy and Leadership at Ohio State University.

⁶⁵ Alpha reliabilities for the constructs encompassed in the TBS are .86 for Classroom Management, .81 for Student Engagement, and .86 for Instructional Strategies (Tschannen-Moran & Woolfolk Hoy, 2001).

schools than middle schools. Horizontal equity statistics provided in Chapter 5

corroborate this finding.

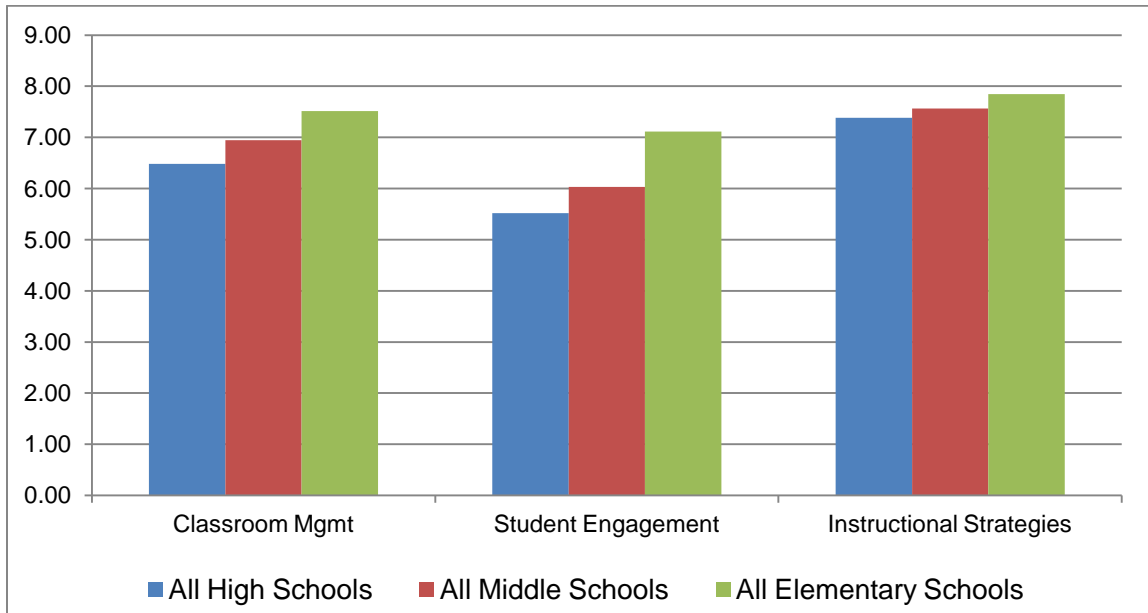


Figure 1. School Level Comparison of Teacher Responses to Self-Efficacy Survey

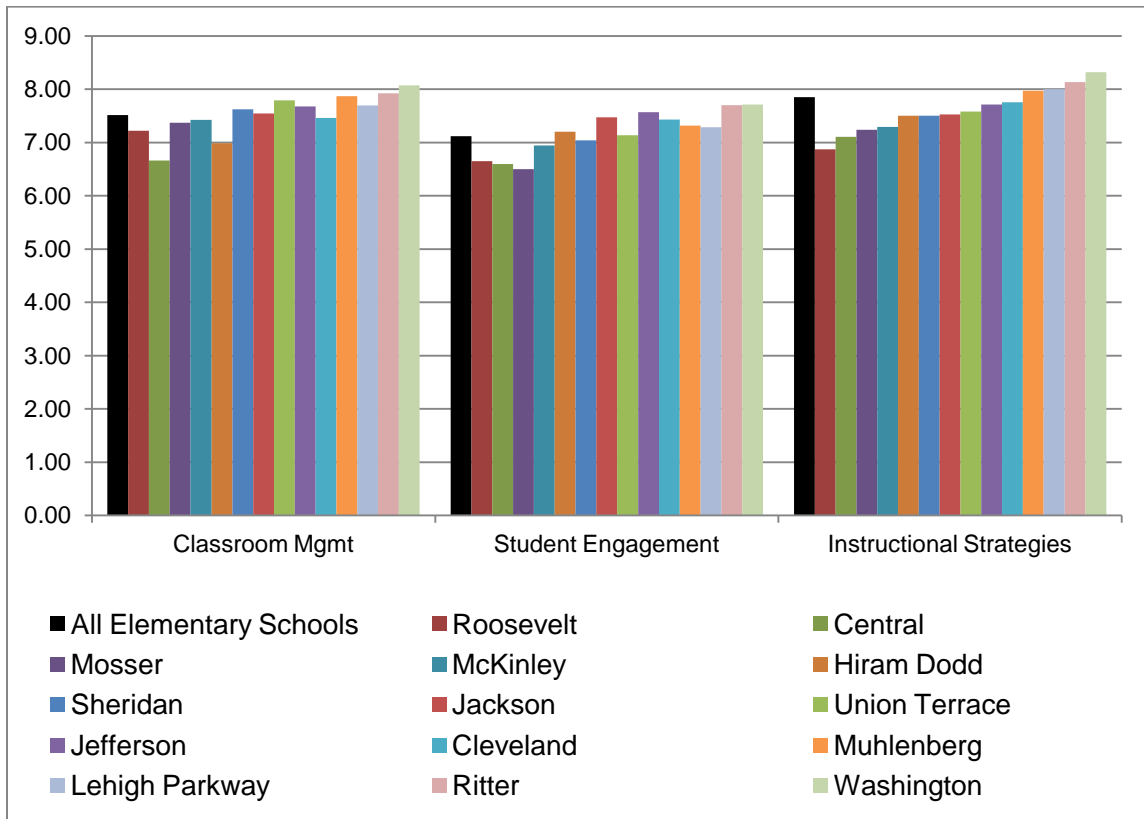


Figure 2. Elementary School Teacher Responses to Self-Efficacy Survey, by School

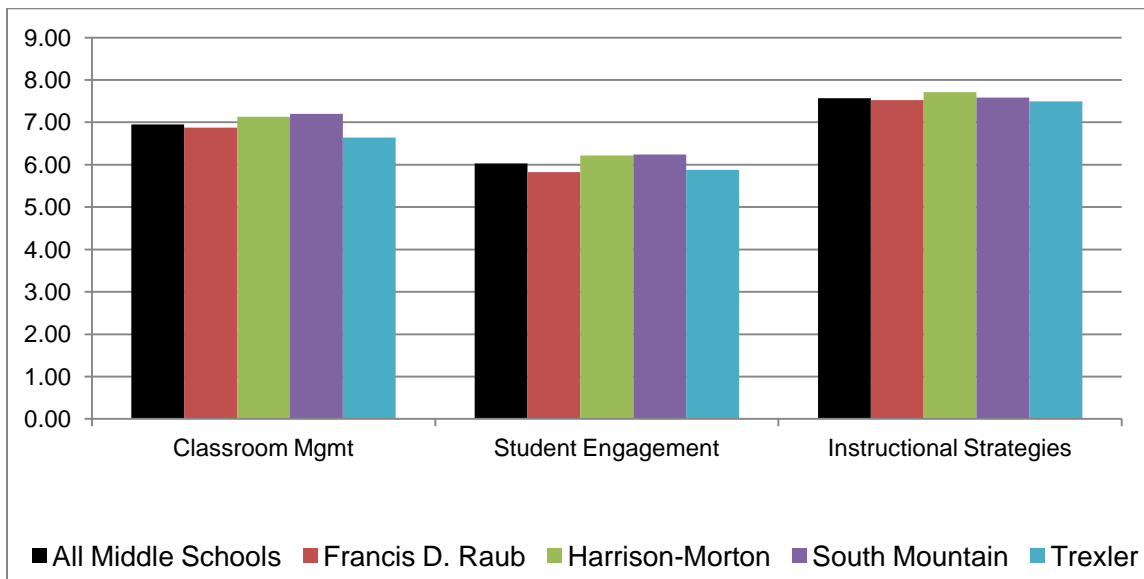


Figure 3. Middle School Teacher Responses to Self-Efficacy Survey, by School

Table 3. Mean and Standard Deviation for School Average Response to Teacher Self-Efficacy Survey

	Elementary Schools Mean (SD)	Middle Schools Mean (SD)
Classroom Management	7.52 (.38)	6.96 (.26)
Student Engagement	7.18 (.40)	6.04 (.22)
Instructional Strategies	7.61 (.41)	7.58 (.10)

For my equity analysis, I use scores for each construct determined by computing the unweighted means of the items that loaded onto each factor.⁶⁶

In order to examine how the ‘input’ – collective efficacy – is distributed across schools, I included the Collective Teacher Efficacy Scale (CES) in my survey to teachers.⁶⁷ Developed by Goddard (2002), this tool measures “the shared perceptions of teachers in a school that the faculty as a whole will have positive effects on students” (Hoy, n.d.) This instrument uses a 6 point likert scale with anchors at 1- Strongly Disagree, 2 – Disagree, 3 – Somewhat Disagree, 4 – Somewhat Agree, 5 – Agree, and 6 – Strongly Agree. Items in this survey include: “If a child doesn’t want to learn teachers here give up” and “Teachers here don’t have the skills needed to produce meaningful student learning.” Goddard reports that the validity and the reliability of this form are strong (Goddard, 2002). However, Henson (2001) points out that this tool has not been tested across multiple samples.

The Ohio State University website which posts the Collective Efficacy Scale also provides a scoring key. First, half of the items are scored in reverse. (For 6 items,

⁶⁶ These groupings are items 1, 3, 6, and 8 for Efficacy in Classroom Management; items 2, 4, 7, and 11 for Efficacy in Student Engagement; and, items 5, 9, 10, and 12 for Efficacy in Instructional Strategies.

⁶⁷ The Collective Efficacy Scale is available for use by researchers on the website of Wayne K. Hoy, professor in educational administration in the School of Educational Policy and Leadership at Ohio State University.

Strongly Disagree becomes a “6” rather than a “1.”) Second, an average school score is computed for each item through the averaging of responses of each teacher in a given building. Finally, the sum of the average item scores for all 12 items is divided by 12. The result is a number between 1 and 6. (The average of all elementary schools is 4.3 and the average of all middle schools is 3.6) Information is provided to standardize these scores based on normative data provided in a representative Ohio sample.⁶⁸ Four elementary schools are “below average” and ten elementary schools are “above average” with their average score being 526. All middle schools are “below average” with their average score being 416. My equity analysis uses this information to look at how collective efficacy is distributed across schools.

⁶⁸ With the standardized score, “500” indicates average.

Table 4. Teacher Collective Efficacy, by School

	Standardized Scores
Lehigh Parkway ES	612
Washington ES	579
Muhlenberg ES	579
Ritter ES	569
Jefferson ES	536
Jackson ES	533
Hiram Dodd ES	510
Union Terrace ES	508
Cleveland ES	506
Sheridan ES	503
Mosser ES	499
McKinley ES	497
Roosevelt ES	477
Central ES	462
South Mountain MS	450
Harrison-Morton MS	449
Francis D. Raub MS	389
Trexler MS	379

Note: Survey conducted in April, 2011. Responses were to address SY2010

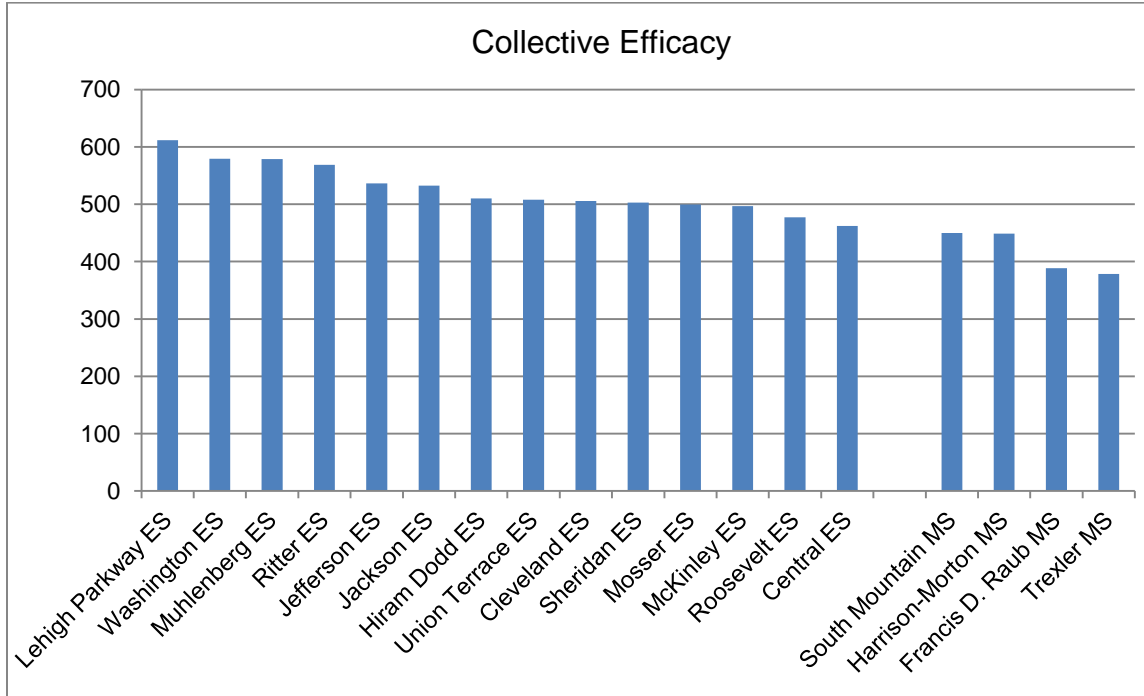


Figure 4. Teacher Collective Efficacy, by School

Note: This is a standardized scale. A score of 500 represents the average score in a representative sample of teachers/schools from Ohio. A score of 400 would be lower than 84% of all schools in the sample.

School data includes school demographics, student achievement data (i.e., average PSSA scores, number of “high” PSSA scores, number of “mid” PSSA scores, number of “low” PSSA scores, school-wide AYP performance level, and AYP status – percent below basic, percent basic, percent proficient, and percent advanced), human capital data (i.e., number of new teachers, average years of teacher experience, number of teachers in highest performance category using value-added scores, number of teachers in lowest performance category using value-added scores, percent of teachers with Masters Degrees, experience level of principal), school effectiveness data (i.e., school-wide value-added score, AYP status), and budget information (i.e., total funds,

total teacher compensation⁶⁹, average teacher salary, allocation of funds, source of funds). I pay particular attention to Title I and other funding sources coming from outside the district.

Data was collected from the Pennsylvania Department of Education (Office of Elementary and Secondary Education and Bureau of Budget and Fiscal Management) and the Allentown School District (Business Office - budget and payroll, the Human Resources Office, and the Assessment and Accountability Office). To help in this effort, ASD engaged the consulting firm, Cross & Jofus, to conduct a basic review of how resources are deployed in the district. Cross & Jofus collected data on both allocated and non-allocated operating costs, and accounted for all grants and funding sources (i.e., Title I, School Improvement Grants, IDEA). Alternative schools were not included in their data collection efforts. Cross & Jofus awarded a sub-contract to Education Resource Strategies (ERS), an education consulting firm partnering with large urban districts (i.e., Atlanta, Baltimore, Boston, Chicago, Duval County, Los Angeles, New York City, Oakland, Philadelphia, St. Paul) to reconfigure how people, time and money are used in urban education. Cross & Jofus tailored ERS materials and approaches to support the needs of a smaller district.

⁶⁹ Compensation data will be collected such that average teacher salaries, as well as total teacher compensation, can be determined at the school level.

Table 5. Data Used in ASD Resource Allocation Study

Data	Source	Year	Use of Data
District Data			
Overall funds	ASD	SY2010	Context
State funds	PDE/ASD	SY2010	Context
PA-Pact funds	PDE	SY2010	Context
Title I funds	ASD	SY2010	Context
School Data			
Enrollment	ASD-SIS	SY2010	Determine school need (CE, VE)
#(%) students receiving free lunch	ASD-SIS	SY2010	Determine school need (CE, VE)
#(%) students receiving reduced price lunch	ASD-SIS	SY2010	Determine school need (CE, VE)
#(%) special education students	ASD-SIS	SY2010	Determine school need (CE, VE)
#(%) ELL students	ASD-SIS	SY2010	Determine school need (CE, VE)
#(%) gifted students	ASD-SIS	SY2010	Determine school need (CE, VE)
AYP reading (total, by subgroup)	ASD-Accountability	SY2010	Measure adequacy
AYP math (total, by subgroup)	ASD-Accountability	SY2010	Measure adequacy
% proficient reading (total, by subgroup)	ASD-Accountability	SY2009	Determine school need (CE)
% proficient math (total, by subgroup)	ASD-Accountability	SY2009	Determine school need (CE)
% below proficient reading (total, by subgroup)	ASD-Accountability	SY2009	Determine school need (CE)
% below proficient math (total, by subgroup)	ASD-Accountability	SY2009	Determine school need (CE)
% proficient reading (total, by subgroup)	ASD-Accountability	SY2010	Measure adequacy (academic)
% proficient math (total, by subgroup)	ASD-Accountability	SY2010	Measure adequacy (academic)
% below proficient reading (total, by subgroup)	ASD-Accountability	SY2010	Measure adequacy (academic)
% below proficient math (total, by subgroup)	ASD-Accountability	SY2010	Measure adequacy (academic)
% attendance	ASD-SIS	SY2010	Measure adequacy (non-academic)
% in-school and out-of-school suspensions	ASD-SIS	SY2010	Measure adequacy (non-academic)
Total operating budget	ASD-Budget	SY2010	Measure HE, VE, and CE
Poverty spending	ASD-Budget	SY2010	Measure HE, VE, and CE
ELL spending	ASD-Budget	SY2010	Measure HE, VE, and CE
Special education spending	ASD-Budget	SY2010	Measure HE, VE, and CE

Professional development spending	ASD-Budget	SY2010	Measure HE, VE, and CE
Total teachers	ASD-Human Resources	SY2010	Measure HE, VE, and CE
Total paraprofessionals	ASD-Human Resources	SY2010	Measure HE, VE, and CE
Total administrators	ASD-Human Resources	SY2010	Measure HE, VE, and CE
Average teacher salary	ASD-Budget	SY2010	Measure HE, VE, and CE
Average class size	ASD - SIS	SY2010	Measure HE, VE, and CE
Average teaching experience	ASD-Human Resources	SY2010	Measure HE, VE, and CE
% teachers < 3yrs of teaching experience	ASD-Human Resources	SY2010	Measure HE, VE, and CE
Teacher evaluation (Sat/Unsat)	ASD-Human Resources	SY2010	Measure HE, VE, and CE
% of highly effective teachers	ASD-Account-ability	SY2010	Measure HE, VE, and CE
% of ineffective teachers	ASD-Account-ability	SY2010	Measure HE, VE, and CE
Teacher self-efficacy	ASD-Stud services	SY2010	Measure HE, VE, and CE
Teacher collective efficacy	ASD-Stud services	SY2010	Measure HE, VE, and CE
Student Data			
AYP reading	ASD-Account-ability	SY2010	Look at variation in student outcomes
AYP math	ASD-Account-ability	SY2010	Look at variation in student outcomes

Additional information was amassed in interviews with key stakeholders, including central office administrators, building administrators, and School Board members. The following chapter provides greater detail on qualitative and quantitative methods.

CHAPTER 4 – METHODOLOGY

This case study employs both quantitative and qualitative methods to examine intra-district resource allocation. This research was composed of three stages: the first stage entailed the development of an equity framework to serve as the theoretical basis for analysis of district practices with regard to the distribution of resources among its schools. The second stage, described in greater detail in this chapter, involves the use of a variety of tools (i.e., statistical analysis, in-depth interviews) to examine the current practice of one mid-size, urban, school district. Finally, using district data, a simulation is conducted whereby alternative practices for the distribution of resources are tested.

The Case Study

The case study method allows for thorough examination of a single entity: in this instance, the Allentown School District (ASD) (Merriam, 1998). This approach lends itself to a deep understanding of intradistrict resource allocation, including the rationale(s) behind procedures and methods utilized to disburse funds and human capital across schools. While not considered to be statistically generalizable, a case study can offer analytic generalization, given an appropriately developed study design as offered in this research (Yin, 2004). Furthermore, information obtained from interviews with key stakeholders as well as financial data, enrollment data, and student outcomes data, provides for a robust analysis (Yin, 2003).

Site Selection. I chose ASD because of its participation in the University of Pennsylvania - Institute of Education Sciences (IES) Pre-doctoral Program. ASD maintains a collaborative relationship with the University of Pennsylvania such that

fellows intern in the Superintendent's office, provide research support to the district, and are given access to data in order to conduct evaluations leading to improved student outcomes. Given my interest in school finance and district policy, I had the opportunity to fulfill my IES Pre-doctoral Fellowship requirements in Allentown during the 2010-2011 school year.

The Allentown School District provides an excellent source of data for investigating resource allocation and equity. First, as a mid-sized, urban school district, ASD is similar in size and composition to many other districts. In 2008-2009, 366 out of 13,365 school districts in the U.S. had between 8,000 and 35,000 students and were classified as being in an urbanized area. This represents 13.2% of all students (National Center for Education Statistics, Common Core of Data: School Year 2008-2009). Further investigation reveals that 200 of these school districts have greater than 40% of its population reporting as African American and Hispanic (National Center for Education Statistics, Common Core of Data: School Year 2008-2009). To date, a great deal of research has focused on very large school districts. For example, of the published research that investigates resource allocation by studying single districts, the earliest published study on intradistrict resource allocation used data from Philadelphia (Summers and Wolfe, 1976); Rubenstein (1998) did an analysis of intradistrict resource allocation in Chicago; and six major studies look only at resource allocation in New York City (Berne & Stiefel, 1994; Boyd, Lankford, Loeb, Rockoff, and Wyckoff, 2007; Iatarola & Rubenstein, 2007; Iatarola and Stiefel, 2003; Lankford, Loeb, and Wyckoff, 2002; and Schwartz, Stiefel, and Rubenstein, 2008). My literature review revealed only

one study that focused on mid-sized districts (Miller and Rubenstein, 2008). Given the large number of similarly situated districts, examining a mid-size urban district offers the potential of adding new information to existing literature. Second, the smaller size of the district makes it possible for thorough assessment in a manageable time period.

Additionally, while ASD is considerably smaller than other districts studied, it shares many other characteristics with these districts, including a diverse population with a high percentage of students in poverty. This variation in the socio-economic and racial composition of the schools allows for an in-depth analysis of differential resource allocation. And although it is only mid-sized, the district is large enough to make inferences about the association between allocation patterns and student characteristics.

Research Questions

As stated in the introduction, this study will address the following research questions:

1. How are resources allocated among schools?
2. What is the rationale for resource allocation patterns among schools?
3. Using a comprehensive equity framework which encompasses adequacy and vertical equity, what are the implications of resource allocation patterns?
4. What would be the financial impact of an alternative approach to resource allocation aligned with the comprehensive equity framework?⁷⁰

Resources. As this research is based on the evaluation of how various resources are distributed among schools, I first describe these “inputs” in greater detail.

⁷⁰ School-year 2009-2010 data is used answer these research questions.

Resources considered include: overall expenditures (i.e., operating funds, poverty spending, ELL spending, discretionary building funds, professional development funds); expenditures related to human capital (i.e., total salaries, instruction salaries⁷¹, instruction support and professional development salaries, leadership salaries, operations and maintenance salaries, pupil services salaries); full time equivalents (i.e., students per staff, students per teacher, students per administrator, students per paraprofessional) and class size; individual measures of teacher quality (i.e., teacher salary⁷², teacher effectiveness⁷³, teacher efficacy⁷⁴, average years of teaching experience, percentage of teachers with less than three years of experience, the percentage of personnel with a masters degree or above); and school-wide measures of teacher quality (i.e., growth index in reading⁷⁵, growth index in math, collective efficacy⁷⁶). As stated earlier, my analysis focuses on the elementary and middle school levels.

⁷¹ Instruction salaries are comprised of teacher compensation, aide compensation and substitute compensation.

⁷² Average teacher salaries are reported in the following categories: all teachers; core teachers (Elementary, English, Mathematics, Reading, Science, Social Studies); non-core teachers (Art, Music, PE, French, German, Spanish, Business, Home Economics, Industrial Arts, Junior ROTC, Other); and, special population teachers (ESOL, IST, Special Ed, Itinerant Gifted).

⁷³ Teacher effectiveness measures rely on value-added scores calculated for the ASD by SAS EVAAS. Low teacher effect represents the percentage of teachers in a school in the bottom two quintiles of teacher effectiveness relative to other teachers in the district. High teacher effect represents the percentage of teachers in a school in the top two quintiles of teacher effectiveness relative to other teachers in the district.

⁷⁴ Three categories of teacher efficacy are considered: classroom management, student engagement, and instructional strategies.

⁷⁵ Growth indices are provided by the state in their efforts to determine the “value-add” for each school to student learning.

⁷⁶ Collective efficacy is calculated by taking the average of all teacher collective efficacy scores in each building.

Question #1. How are resources allocated among schools? My first research question seeks to understand the current resource allocation pattern and how this impacts the variation of resources among schools. To answer this question I use descriptive statistics along with graphs to represent the variations in resources among schools. Univariate measures of dispersion quantify relationships between inputs and demonstrate how they are distributed among students. At this point, the composition of the student body of each school is not taken into account, just the size. To provide additional context as to the variation among schools in terms of student achievement, I offer a measure of equivalent outcomes to describe what portion of student test scores are a result of being from a particular school as opposed to other inputs.

Question #2. What is the rationale for resource allocation patterns among schools? To answer this question, key informants were interviewed. Using purposive sampling, as described below, eleven interviewees were chosen based on their knowledge of resource allocation strategies in the district and/or their role in impacting these decisions. Open-ended questions were posed to elicit detailed information on the budget process and the specific procedures in place which account for the disbursement of funds across schools.

Question #3. Using a comprehensive equity framework which encompasses adequacy and vertical equity, what are the implications of resource allocation patterns? My third research question analyzes resource allocation patterns in terms of the equity framework established earlier in this paper. Vertical equity, equal

opportunity and adequacy are examined using statistical techniques to test relationships among resources, student characteristics, and student outcomes.

Question #4. What would be the financial impact of an alternative approach to resource allocation aligned with the comprehensive equity framework? My fourth and final research question is designed to test an alternative approach to resource allocation. I conduct two simulations to test scenarios in which first vertical equity, and then comprehensive equity, are sought. Modeling vertically equitable resource allocation relies on weights included in Pennsylvania's basic education formula and modeling comprehensive equitable resource allocation relies on weights included in Pennsylvania's basic education formula plus weights used to compensate for prior performance. Results are compared with the 2009-2010 allocation of resources in ASD.

Qualitative Research

Qualitative research methods, composed of key informant interviews, are used to tackle research question two: *What is the rationale for resource allocation patterns among schools?* This question seeks to understand the motivations for decision-making at the district level.

Sampling. I conducted eleven interviews with administrators in the ASD, identified through purposive sampling. According to Patton (2002), purposive sampling is a powerful sampling method for qualitative research if it is used to select information-rich cases, "from which one can learn a great deal about issues of central importance to the purpose of the inquiry, ... yield[ing] insights and in-depth

understanding rather than empirical generalizations” (p. 230). Those interviewed include: School Board President, Deputy Superintendent, Chief Financial Officer, Executive Director of Planning and External Funding, Executive Director of Elementary Education, Director of Special Education, Director of Language Acquisition, and four building principals. Speaking with administrators serving in a variety of roles in the district serves to triangulate the information attained. A sample size of eleven provides ample coverage given the intent of the study (Merriam, 1998).

Interview Strategies and Protocol. I developed guiding interview questions for key informant interviews using interview strategies recommended by Patton (2002). Such strategies include carefully avoiding dichotomous questions which can result in short answers which interrupt the flow of the interview, and asking one question at a time to allow the respondents to answer all questions fully so that information is more likely to be consistent across interviews. Guiding interview questions include possible probes with many questions to be pursued if additional clarification is needed. Additionally, during the interview process I conveyed professionalism, developed rapport with the respondents, and, when necessary, redirected subjects who veered off topic or focused for too long on a particular topic (Merriam, 1998).

Yin (2003) explains that using a case study protocol and following similar procedures for all interactions ensures reliability of data in qualitative research. Using consistent and well-documented data collection procedures helps to minimize bias and ensure that information collected is accurate. To ensure reliability, I developed a detailed interview protocol for key informant interviews, which includes the specific

questions and probes covered in the interviews and procedures for the interview. For example, I skipped around the interview question topics to follow subjects that naturally came up in the interviews, rather than sticking rigidly to a particular topic or order, to enhance the flow of the interview. As I was the only data collector, lack of reliability due to multiple interviewers was not an issue. The interview protocol is included in Appendix C.

Analysis Methods. All interviews have been digitally recorded and transcribed to ensure preservation of the discussions for analysis (Merriam, 1998). Following transcription, I wrote up reports of each interview, summarizing key points and recording my insights (Yin, 2003). The reports followed a specific template and included details of the budget process, perceived motivations for actions, and other issues raised by the respondents. I devised a coding matrix to indicate how each informant understood the process whereby funds are allocated to various schools and programs (Miles & Huberman, 1994).

Prior to conducting interviews with identified key informants, I conducted a pilot with an alternative ASD administrator to test the interview protocol. Based on this pilot, slight modifications were made to ensure the validity of the instrument. Each interview lasted approximately one hour. Interviews were conducted over a span of six weeks during June and July 2011.

Quantitative Research

I have used quantitative research methods to tackle research questions one, three and four. I assigned measures to the various conceptions of equity outlined in Chapter

II: horizontal equity, equivalent outcomes, vertical equity, and adequacy. I also used a measure of horizontal equity post vertical equity to illustrate the variation in resources among schools after accounting for student need. Lastly, I measured comprehensive equity, my own approach to a socially just representation of equity.

Horizontal Equity. Horizontal equity statistics are used to describe the district's allocation of resources in school year 2009-2010. Horizontal equity statistics are univariate measures of dispersion which quantify relationships between inputs and demonstrate how they are distributed among students. These measures include range, coefficient of variation and the McCloone Index. The coefficient of variation is calculated by dividing the standard deviation by the mean of all observations. A finding of zero (0) indicates that perfect horizontal equity is achieved. Odden and Picus (2008) define the standard as being 0.1. The McLoone Index is calculated by determining the ratio of the sum of the values of all observations below the median to the sum of these observations if they all had the value of the median. A finding of one (1) indicates that perfect horizontal equity is achieved. Odden and Picus (2008) define the standard as being 0.95. (0.7 - 0.9 are often found in districts.)

Equivalent Outcomes. Equivalent Outcomes (EO) are achieved if resources are allocated to students such that their outcomes are equivalent. (As described above, this notion of equity is theoretically and practically difficult, as it neither ensures a minimum level of achievement nor accounts for differences in student motivation, ability, etc. However, it does provide necessary information to evaluate equity.)

Measure of EO: The Interclass Correlation Coefficient (ICC) represents the proportion of the variance in outcomes between schools. The ICC is derived from the unconditional 2-level model, which allows the total variation in outcome to be clearly divided between variation over students and variance on a school level (Raudenbush & Bryk, 2002).

The Intercept Only (Unconditional Model):

$$\text{Level 1 (student): } Y_{ij} = \beta_{0j} + \varepsilon_{ij}, \quad \varepsilon_{ij} \sim N(0, \sigma^2)$$

$$\text{Level 2 (school): } \beta_{0j} = \gamma_{00} + \upsilon_{0j}, \quad \upsilon_{0j} \sim N(0, \tau_{00})$$

$$\text{Combined: } Y_{ij} = \gamma_{00} + \upsilon_{0j} + \varepsilon_{ij}$$

Y_{ij} = student outcome measure for student i in school j (PSSA scores will be used as a proxy for proficiency)

β_{0j} = mean student outcome for each school

ε_{ij} = the residual for student i in school j

γ_{00} = mean student outcome across schools (i.e., grand mean)

υ_{0j} = the residual for the β_{0j} equation (representing the difference between β_{0j} and γ_{00})

Interclass Correlation:

$$\rho = \tau_{00} / (\tau_{00} + \sigma^2)$$

σ^2 = total variance in outcomes within school that can be explained by a level-1 model

τ_{00} = total explainable variation at level-2 (schools)

Vertical Equity. Vertical Equity is achieved if resources are allocated to students based on their differing needs. To measure vertical equity in my study, I have developed a construct with one variable to represent the four variables which the State uses to determine appropriate weights for funding schools: English language learner status, economic disadvantage, and special education, and gifted education.⁷⁷ This is consistent with my quest to measure overall equity, rather than equity specifically

⁷⁷ The state had deemed it worthy to provide additional resources through the state funding formula to districts with students who fall into these categories as researchers have found that these students are more likely to require additional resources to achieve at proficient levels (Hannaway, 2005).

related to certain subgroups of students. Given that I have the student composition of each school, I created a new variable to represent need due to various student characteristics. The new variable, “NEED_{VE},” is derived at each school as follows:

$$\text{NEED}_{VE_i} = \{[\text{Enrollment}_i + (\text{State's Weight for ELL students} * \text{number of ELL students}_i) + (\text{State's Weight for economically disadvantaged students} * \text{number of economically disadvantaged students}_i) + (\text{State's Weight for special education students} * \text{number of special education students}_i) + (\text{State's Weight for gifted education students} * \text{number of gifted education students}_i)] / \text{Enrollment}_i\}$$

NEED_{VE} in the *i*th school is a “per student” measure to allow for consistent scaling.^{78 79}

The following weights, based on Pennsylvania’s Costing-Out Study, are used in this formula:

Table 6. Value or Formula for Factor Related to Student-Based Need

Student-Based Need	Value or Formula for Factor
Special Education	1.30 x all students enrolled in special education programs
Poverty	0.43 x number of students eligible for free/ reduced-price lunch
English-Language Learners	1.4978 x number of ELL students
Gifted	0.2052 x number of gifted students

My aim in measuring vertical equity is to understand the relationship between inputs and need. I consider a range of financial inputs in this analysis as well as human capital inputs. (These resources are described earlier in this chapter.) I also consider the

⁷⁸ This variable will also account for school size, to address cost differences due to economies of scale.

⁷⁹ The weights used in this formula are the exact weights used by the state of Pennsylvania in its funding formula to districts.

relationship between poverty expenditures and the number of students in poverty, ELL expenditures and the number of ELL students, and special education expenditures and the number of special education students. Lastly, I consider the allocation among schools of specific funding streams such as Title I.

The measure I use for vertical equity is the correlation coefficient which represents the relationship between school need (as defined above) and various school resources (i.e., per-pupil operating costs, per-pupil school salaries, average teacher salary, percentage of teachers with less than 3 years experience, percentage of personnel with masters or above, students per teacher, percentage of teachers in bottom 2 quintiles of effectiveness as measured by PVAAS, percentage of teachers in top 2 quintiles of effectiveness as measured by PVAAS, school effectiveness as measured by PVAAS, measures of teacher efficacy).

Horizontal equity post vertical equity. Horizontal equity post vertical equity is a measure I use to describe the unexplained variance after vertical equity is taken into account. This measure can be used to illustrate the variation in resources (e.g., per-pupil expenditures, human capital inputs) among schools after accounting for student need as defined by the State. Horizontal Equity post Vertical Equity (HE_{VE}) is achieved if there is no variation in resources (e.g., per-pupil expenditures, human capital inputs) among schools after accounting for student need. The definition follows:

$$HE_{VE} = (1 - R^2) \times 100\%$$

- HE_{VE} = horizontal equity and R^2 = coefficient of determination. If R^2 decreases, horizontal equity worsens, as there is more unexplained variability in the funding of schools. Likewise, if R^2 increases, overall

horizontal equity improves, as there is less unexplained variability in the funding of schools. Using the equation above, when HE = 0% then horizontal equity has been achieved (See Toutkoushian and Michael, 2007).

- The R^2 is derived from the regression equation, $Y_i = b_0 + b_1 \text{NEED} + e_i$, where Y is the input (resources) per student in the i^{th} school; b_0 represents the estimated intercept; NEED represents a measure of need within the student body of the school; and b_1 represents how funding is weighted according to the student NEED.

Toutkoushian and Michael (2009) use this approach to identify discrepancies of resource allocation among similarly situated students. (This assumes that weights included to test vertical equity encompass all differences among students that are tied to higher costs.)

Adequacy. Adequacy is achieved if resources are allocated to students so that all students attain a certain similar goal such as proficiency on assessments. Measuring adequacy only requires looking at outcomes. If we are interested in district level adequacy or school level adequacy, we can look at the portion of students who test as proficient on an assessment.⁸⁰

⁸⁰ Odden and Picus (2008) have proposed an “educational adequacy” statistic, the Odden-Picus Adequacy Index (OPAI) (p.76). This statistic, however, is more aptly expressed as a measure of *adequate funding*. The OPAI measures how far a school finance system is from achieving adequate funding. It is similar to the McLoone Index used to measure horizontal equity, but uses an “adequate” spending level rather than the median (Odden & Picus, 2008; Rubenstein, Ballab, Stiefel, & Schwarz, 2008). The OPAI takes into account the needs of schools not achieving adequacy and provides a ratio representing the portion of need met. It adds to this the portion of schools, or school systems, meeting adequacy. The end result is a measure that indicates how close the entire system is to providing an adequate level of funding for all schools. An OPAI of 100 indicates that all schools were spending at or above the adequacy benchmark. As no schools in ASD are adequately funded (using the adequacy benchmark determined in Pennsylvania’s costing-out study prepared by Augenblick, Palaich and Associates), in ASD the OPAI is a ratio of the total spending in the district to the total funds necessary to achieve adequacy. My

Relative Adequacy (or Relative Adequacy Deficit). Given my desire to look at the variation among schools, I needed a measure of the relative adequacy of schools in Allentown. I use the variable “distance from proficiency” (1 - % proficient or above) to represent the *adequacy deficit* in each school. The disparities among schools’ *adequacy deficit* tells us how the district is doing in terms of equivalent outcomes – but the goal is a specific outcome, or standard, which the state has determined that all students should meet.

A simple way to express these disparities is with the coefficient of variation (CV) statistic. The CV is calculated by taking the square root of the variance of the *adequacy deficit* divided by the mean *adequacy deficit*. The CV describes the dispersion of the variable or, in this case, the dispersion of the *adequacy deficit* in the district by school. As the CV increases, the dispersion of the variable is greater (Rubenstein et. al., 2008).

Comprehensive Equity. Comprehensive Equity is the final construct used to evaluate equity in the Allentown School District. Comprehensive Equity is achieved if resources are allocated to students based on their differing needs. The measure used to test comprehensive equity is methodologically similar to the vertical equity measure. The difference is in the definition of student need. In addition to the four categories of students (ELL students, economically disadvantaged students, and special education, and gifted education students) given weights in the Needs Index, additional weights are

simulation, which will specify the gaps between spending and adequacy, is consistent to this approach to measuring adequate funding.

given to students based on prior performance. The new variable, “NEED_{CE},” is derived at each school as follows:

$$\text{NEED}_{\text{CE } i} = \{[\text{Enrollment}_i + (\text{State's Weight for ELL students} * \text{number of ELL students}_i) + (\text{State's Weight for economically disadvantaged students} * \text{number of economically disadvantaged students}_i) + (\text{State's Weight for special education students} * \text{number of special education students}_i) + (\text{State's Weight for gifted education students} * \text{number of gifted education students}_i) + (\text{Weight for percentage of students scoring "basic" on PSSA} * \text{number of students scoring "basic" on PSSA}) + (\text{Weight for percentage of students scoring "below basic" on PSSA} * \text{number of students scoring "below basic" on PSSA})] / \text{Enrollment}_i\}$$

NEED_{CE} in the *i*th school is a “per student” measure to allow for consistent scaling.^{81, 82}

The following weights, based on Pennsylvania’s Costing-Out Study and New York City’s weighted funding formula for schools, are used in this formula:

Table 7. Value or Formula for Factor Related to Student-Based Need

Student-Based Need	Value or Formula for Factor
Special Education	1.30 x all students enrolled in special education programs
Poverty	0.43 x number of students eligible for free/ reduced-price lunch
English-Language Learners	1.4978 x number of ELL students
Poor Prior Performance- “basic”	0.35 x number of students scoring “basic” on PSSA
Poor Prior Performance- “below basic”	0.50 x number of students scoring “below basic” on PSSA

⁸¹ This variable will also account for school size, to address cost differences due to economies of scale.

⁸² The weights used in this formula are the exact weights used by the state of Pennsylvania in its funding formula to districts.

As with my vertical equity measure, in measuring comprehensive equity I evaluate the relationship between inputs and need. I consider a range of financial inputs in this analysis as well as human capital inputs.

The measure I use for comprehensive equity is the correlation coefficient. The correlation coefficient represents the relationship between school need (as defined above) and various school resources (i.e., per-pupil operating costs, per-pupil school salaries, average teacher salary, percentage of teachers with less than 3 years experience, percentage of personnel with masters or above, students per teacher, percentage of teachers in bottom 2 quintiles of effectiveness as measured by PVAAS, percentage of teachers in top 2 quintiles of effectiveness as measured by PVAAS, school effectiveness as measured by PVAAS, measures of teacher efficacy).

Constructions of School Budgets. The analyses of horizontal equity, vertical equity, and comprehensive equity rely on an accounting of resources within each school. In order to have a complete picture of the variation among schools' financial resources, I constructed individual school budgets based on operating costs encumbered in school year 2009-2010. These school budgets include funds from federal, state, and local revenues (i.e., Title I, IDEA, Title III) but exclude capital expenses and other debt services. Constructing school budgets required two steps: tracking all expenditure data by building code in order to determine spending at each school⁸³; and, tracking items which had been allocated to the central office but were servicing individual schools, or addressing individual school needs, back to these schools.

⁸³ The financial analysis provided by Cross & Jofus, Inc. included a review of expenditures by school.

Figure 5 presents a view of the district's expenditures for school year 2009-2010 broken out by central and school-reported expenditures.⁸⁴ While the numbers differ from those provided in my school level analyses because they include ASD high schools and alternative schools in ASD schools, the presentation makes it clear that almost half of all dollars spent in the school district are budgeted centrally, and over half of those funds are estimated as being spent at schools. Without further investigation, it is not possible to know the true dollars being spent at each school.

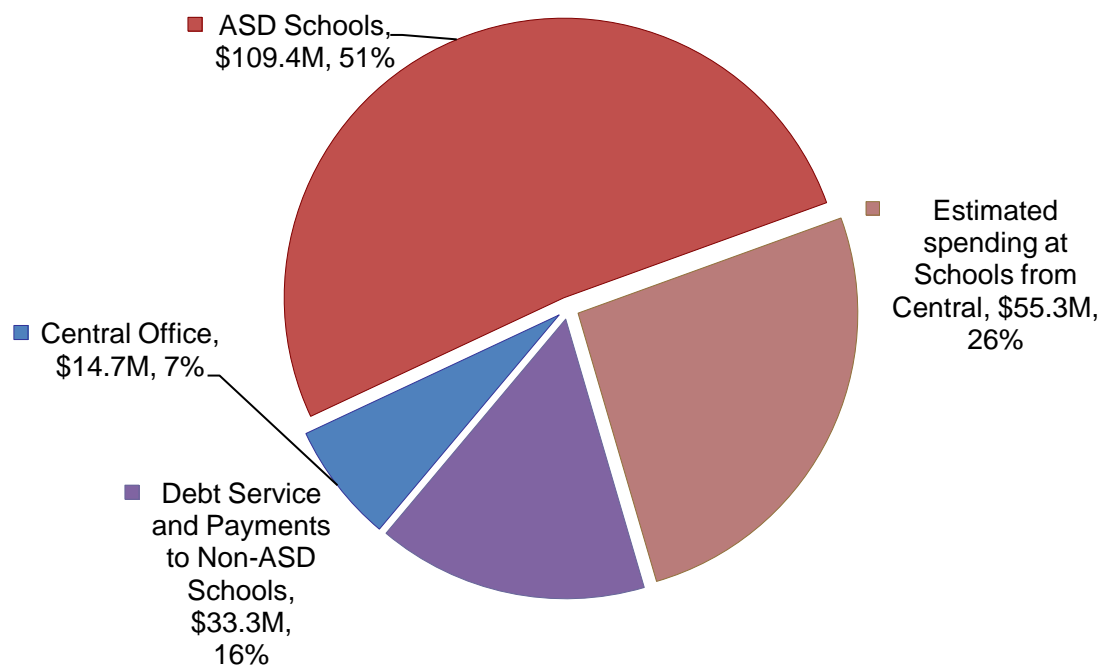


Figure 5. ASD Central and School-Related Expenditures (Total \$212.6m), SY2009-2010

Source. Allentown SD, Revenue and Expenditure File, FY09-10 YTD Activity, Cross & Joftus, Inc.

⁸⁴ The portion allotted to schools includes high schools and alternative schools in addition to elementary and middle schools.

Through an analysis of the central budget, I am able to allocate additional dollars to each school. Appendix B provides a table of specific revenues that fund programs in schools. Program area directors worked with me to allocate total dollars to various schools. Thus, operating funds are a mix of dollars coded to schools and dollars coded centrally.⁸⁵

In addition to an adjustment to the operating budget, I adjusted school budgets for poverty and ELL spending, to include spending which had not been coded at the school level though funds were flowing through to schools and supporting children at schools. Poverty spending at the school includes school dollars spent on poverty, including Title I, as well as centrally budgeted Title I dollars and centrally budgeted Student Services dollars tied to specific state and federal grants (e.g., Safe Schools/Healthy Students). ELL spending includes school dollars spent on poverty and Title III funds that are budgeted centrally.

Simulation. The final piece of my analysis is a simulation to answer the research question: *What would be the financial impact of an alternative approach to resource allocation aligned with the comprehensive equity framework?* To conduct this simulation, I model two potential changes to the district's resource allocation policies. The first policy change entails a systematic distribution of resources similar to that of the State - and is consistent with the vertical equity model. Specifically, weights are assigned to students according to the identified needs (i.e., low income, ELL), similar to the new State funding formula. The second policy change entails a systematic

⁸⁵ I do not have information on salaries or positions broken out for the centrally coded dollars.

distribution of resources like that of the State, but with the addition of assigning weights to students based on their prior performance on State assessments.

I describe the impacts of the new resource allocation policies at the school level – identifying the schools that would gain resources and the schools that would lose resources. Unfortunately, I am unable to model the potential impact of a change in resource allocation policies to the district’s ability to achieve adequacy.

Data Constraints. Although the data amassed from the district and the state, and the methods employed to analyze this 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 insufficient. These include the sample size of the district in which I conducted my analysis, lack of data on students within schools, and lack of data on human capital resources.

Due to the small number of schools in the Allentown School District, it is 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., poverty, ELL status, and special education status) can be considered separately as coefficients in a multiple regression equation. Because of this, as described earlier in this chapter, I calculate an index of need to evaluate the relationship between resource allocation and school need. This provides a useful measure of overall school need, but it does not allow for a disaggregation of particular needs. A related concern, tied to the use of a needs index in the context of ASD, is that there is not enough variation among

the school need to identify strong relationships between resource allocation and school need.

Another constraint on my data is that the information I have about individual students within schools is very broad. This is true for both student need and student outcomes. First, my analysis would be enhanced if I could better understand student need. A prime example of this is my data on school poverty. I use free and reduced price lunch status as a proxy for poverty. This measure does not necessarily capture the range of disadvantages (e.g., poor health care, less educated parents) related to low family income.⁸⁶ I have no detail on the range of needs and associated costs of special education students, making special education another area of data deficiency. While I was able to acquire data on the intensity of need of special education students at the district level, I did not acquire this information at the school level. I also lack sufficient indicators of student outcomes. My analysis would be greatly enhanced if I had stronger measures of academic achievement, beyond PSSA scores, and better measures of positive outcomes for students, beyond attendance and suspensions.

Additional data on human capital resources would also inform this study, but are not readily available. Better data on teachers' impact on students would be extremely useful.⁸⁷ Unfortunately, my teacher level value-added measures only capture a portion of the teachers in any school. Therefore, this measure should be considered with caution. Another useful measure which is not readily available would be a

⁸⁶ There is little variation among schools in terms of the percentage of students in free and reduced price lunch status that receive a reduced price lunch.

⁸⁷ This could take numerous forms, such as an in depth review of student work.

measure of principal effectiveness beyond the school-wide growth index. One final measure of teacher effectiveness that is missing from this analysis is a student review of teacher quality.⁸⁸

Although enhanced data would make for a more robust analysis, the findings I present in the following chapter 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.

⁸⁸ The Student Perceptions of Teacher Effectiveness (SPTE) survey, developed by Ronald Ferguson of the Civil Rights Project, has been shown to be highly correlated with teacher value-added scores (Ferguson, 2010).

CHAPTER 5 – DISTRICT CONTEXT AND QUALITATIVE FINDINGS

Overview

I begin this chapter by describing the Allentown School District to provide context to the description and analysis of resource allocation. Overall findings present a complicated picture within the district and it is helpful to understand how this complexity fits into the larger landscape. I first identify how Allentown struggles due to financial and societal disadvantages and how the school district has changed over the last decade. This is followed by a review of the structure of ASD's budget, including funding sources and expenditures. I complete this section with an explanation of resource allocations in the 2009-2010 school year which relies on an analysis of horizontal equity statistics to describe the variability among schools. The second section of this chapter relies on qualitative findings to examine how the budgeting process and resulting resource allocations are perceived by district and school administrators.

Context

The Allentown School District Has Great Needs. While the Allentown school district has numerous strengths (e.g., diversity, committed staff), it struggles with challenges that inhibit successful outcomes for children. The district is significantly underfunded as a result of the State's funding structure, which relies heavily on local support. The map below indicates that Allentown stands out as a distressed area in the state.

Table 8. Poverty Level, SY2005

	Allentown	Pennsylvania	National
Percent of population under 65 at or below poverty level (2005)	24.0	16.9	18.5

Source: Educational Needs Index

Poverty may be tied to employment prospects for Allentown residents, which are, in turn, influenced by the education level of the population. Relative to the state and nation, Allentown has a less educated and less skilled workforce.

Table 9. College Attainment, SY2005

	Allentown	Pennsylvania	National
Percent of 18 to 64 year olds with a High School Diploma (2005)	77.3	89.5	85.8
Percent of 25 to 64 year olds with an Associate's Degree (2005)	7.4	8.2	8.2
Percent of 25 to 64 year olds with a Bachelor's Degree (2005)	17.4	28.5	28.6

Prospects for college attainment are constrained by high school graduation rates. ASD's graduation rate is lower than both state and national averages. To compound this, of those students who graduate high school, a smaller percentage of students from the ASD than from neighboring districts plan to further their education.

Table 10. Graduation Rate (SY2008) and Percent of Students Planning to Further their Education (SY2007, SY2010)

	Allentown	Pennsylvania	National
Graduation Rate ⁹¹ (2008)	59.2	77.7	71.7
Percent of students planning to further their education (2007, 2010)	39.4	68.3	75.0*

Source: Ed Week Diplomas Count 2011; Pennsylvania Department of Education; The MetLife Survey of the American Teacher, 2010

Note. The percent of students planning to further their education reported for the nation is based on the 2010 MetLife Survey. Numbers for Allentown and Pennsylvania are provided for 2007 by the Pennsylvania Department of Education.

Change over time. ASD has changed along with the demographics of the local community, and a reduced tax base from which to raise school revenues has influenced the district's transformation. This section describes how aspects of the entire district have adjusted over the past ten years.

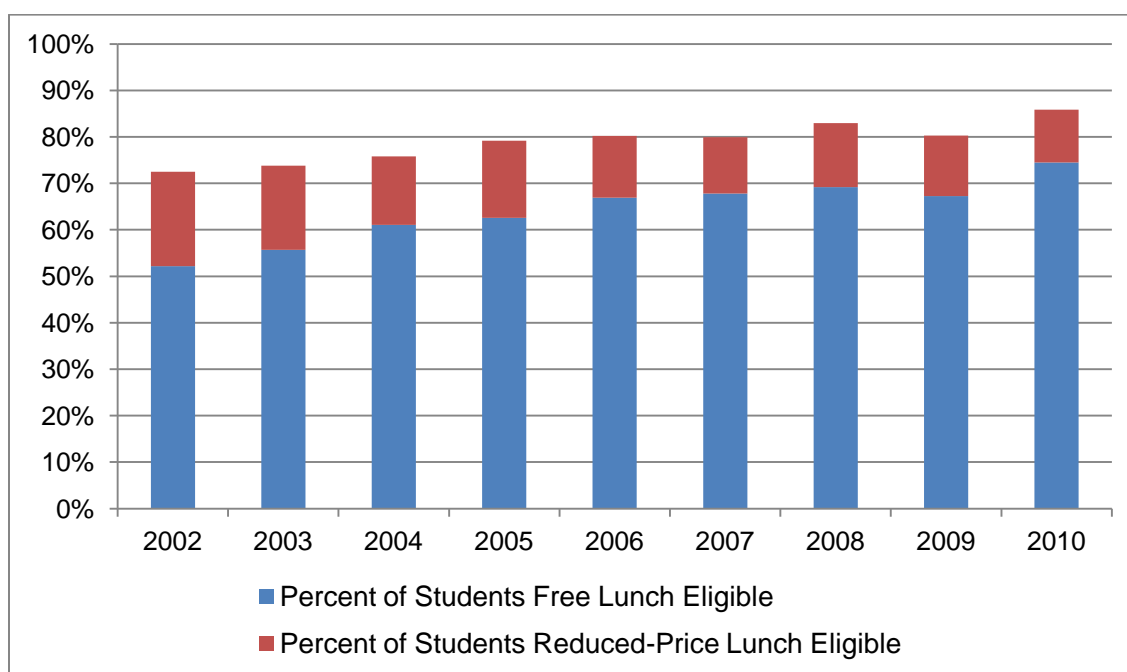
Demographic changes. The profile of the Allentown School District has changed immensely in the past 20 years, increasing in both poverty and racial/language diversity. For example, between 1990 and 2008, there was a 9.2% increase in the number of renter-occupied units and a 13.4% decrease in the number of owner-occupied units in the ASD catchment area. There was a parallel shift in the population of the student body: in 2004, 71% of students were at, or below, the poverty level. The number has increased to 85% in 2009.

⁹¹ The Cumulative Promotion Index (CPI) method is used to calculate graduation rates. $CPI_{2008} = (10^{th} \text{ graders}_{fall2008} / 9^{th} \text{ graders}_{fall2007} \times 11^{th} \text{ graders}_{fall2008} / 10^{th} \text{ graders}_{fall2007} \times 12^{th} \text{ graders}_{fall2008} / 11^{th} \text{ graders}_{fall2007} \times \text{Diploma recipients}_{spring2008} / 12^{th} \text{ graders}_{fall2007})$

Table 11. Change in Population in Renter-Occupied Units, 1990-2008

	1990	2000	2008
Percent of Households in Renter-Occupied Units	43%	47%	49%
Renter-Occupied Units	18,545	19,748	20,248
Owner-Occupied Units	24,230	22,284	20,973

Source: U.S. Census

**Figure 7. Changes in Poverty: Percentage of Students in the ASD Eligible for Free and Reduced-Price Lunch, SY2002-2010**

Source: PDE: National School Lunch Program. Retrieved from http://www.education.state.pa.us/portal/server.pt/gateway/PTARGS_6_2_121936_7487_509210_43/

In the past four years, the special education population has remained relatively flat, between 14 and 15%.⁹² However, in the 1999-2000 school year, the percentage of students identified as need special education services was 10.7%.⁹³ There has been a

⁹² Historical data is not available for most years.

⁹³ Source: Pennsylvania Department of Education Report, Finances_SEF9900.

34% increase in the percentage of special education students served in the ASD between school year 2000 and 2010.

Table 12. Special Education in ASD, SY2008-2011

	# of special education students	% of all students identified as requiring special educ. services	% of special educ. students diagnosed with Autism	% of special educ. students diagnosed with a learning disability
2007-2008	2,562	14.3%	5.0%	57.6%
2008-2009	2,524	14.2%	6.3%	56.9%
2009-2010	2,545	14.3%	6.8%	55.8%
2010-2011	2,581	14.8%	7.9%	55.4%

Source. PDE: Pennsylvania State Data Center; Special Education Data Report School Years 2007-2008, 2008-2009, 2009-2010, 2010-2011 (Retrieved from http://penndata.hbg.psu.edu/BSEReports/Data%20Preview/2010_2011/PDF_Documents/Speced_Quick_Report_SD392_Final.pdf)

Enrollment. The size of the district has changed along with the demographic profile. In the 2001-2002 school year, enrollment was just over 16,000 students. It reached a peak five years later with over 18,000 students and, as of the 2009-2010 school year, was approximately 17,500 students.

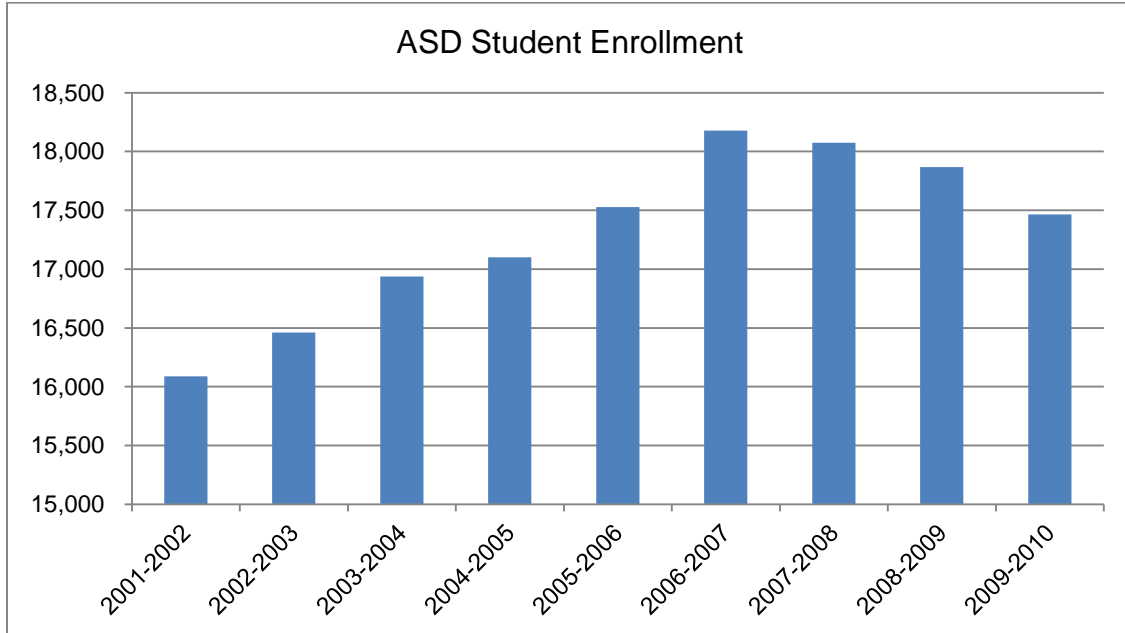


Figure 8. ASD Student Enrollment, SY2002-2010

Source. ASD Enrollment Report

Changes in human capital. The number of professional personnel in the district also increased. This is largely driven by the increase in classroom teachers. State reports indicate that the number of students per classroom teacher has decreased from 18.8 in 2001-2002 to 15.7 in 2009-2010.

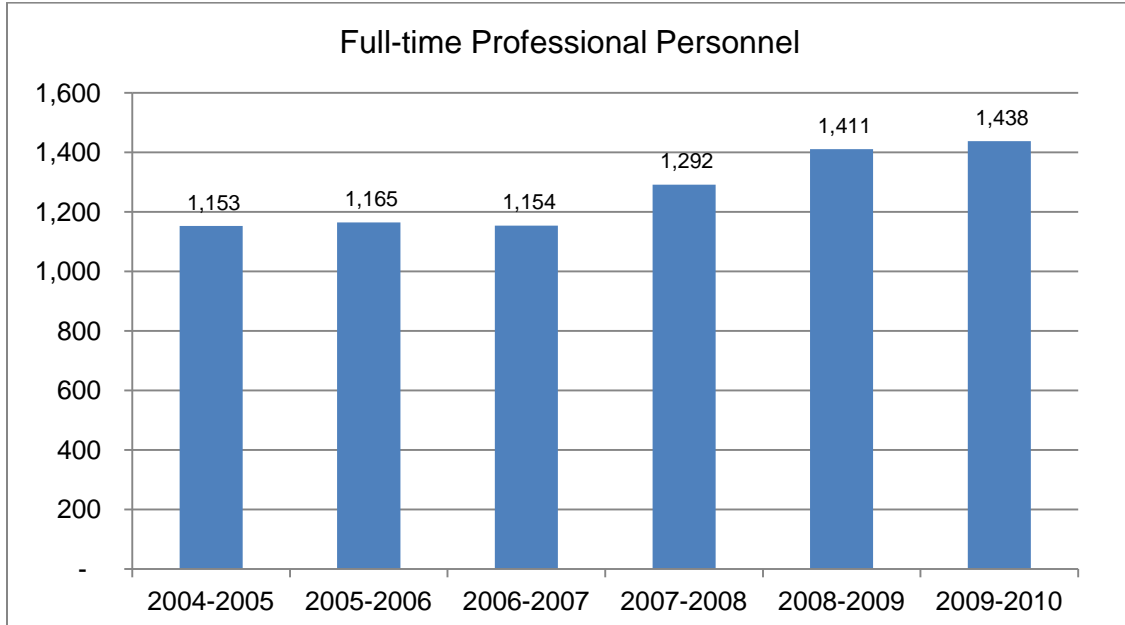


Figure 9. ASD Professional Personnel, SY2005-2010

Source: Pennsylvania Department of Education – Professional Personnel Summary of Public Schools.

Note. Professional personnel include administrators, classroom teachers, coordinators, and others, as reported by district to the state. Breakdown of personnel is provided for SY2007-2008-2009-2010: in SY2007-2008, 72% of full-time professional personnel were classroom teachers; in SY2008-2009, 79% of full-time professional personnel were classroom teachers; and, in SY2008-2009, 77% of full-time professional personnel were classroom teachers.

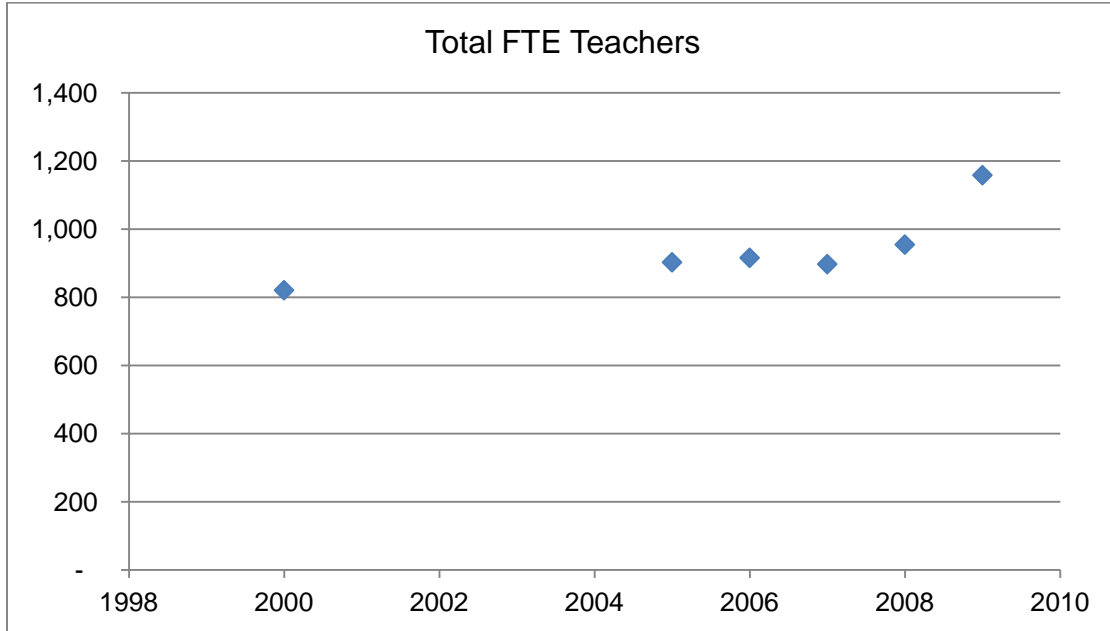


Figure 10. ASD Total Full-Time Equivalent Teachers, SY2000-2010

Source. U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), Local Education Agency Finance Survey (F-33), FY 2007, Version 1a., U.S. Bureau of the Census, American Community Survey (2005, 2006, 2007, and 2008).

Teacher average salary has also increased between 2004-2005 and 2009-2010.

The increase in number of staff in the 2007-2008 year included the addition of less experienced (and less-paid) teachers, resulting in a lower average salary for the district for a short time.

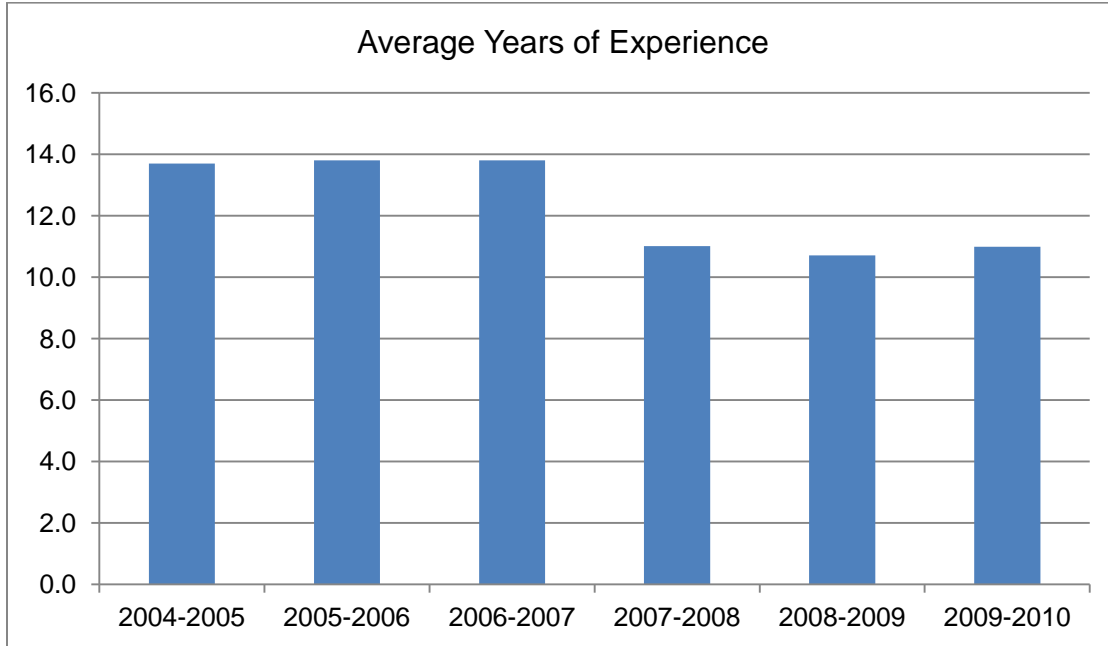


Figure 11. ASD Average Years of Teacher Experience, SY2005-2010

Source: Pennsylvania Department of Education – Professional Personnel Summary of Public Schools.

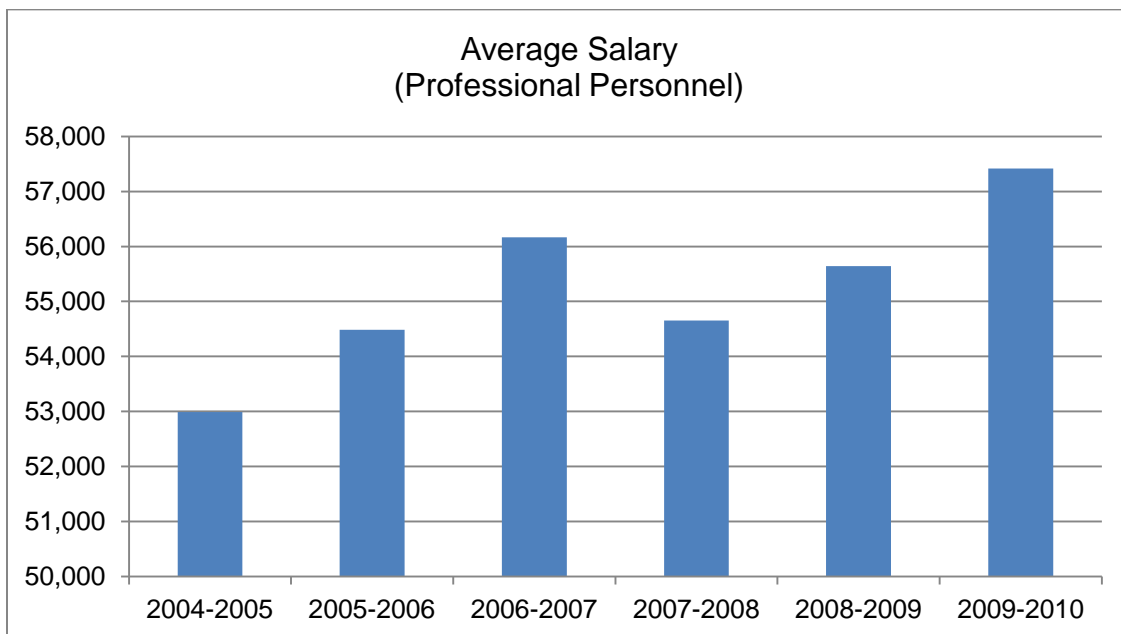


Figure 12. ASD Average Salary for Professional Personnel, SY2005-2010

Source: Pennsylvania Department of Education – Professional Personnel Summary of Public Schools.

Student outcomes. The data available on student outcomes is limited, but information on proficiency in math and reading (as measured by student test scores on the PSSA's) and graduation rates, provide some insight as to how students in the district have fared over the past ten years.

PSSA Results (District-Wide)

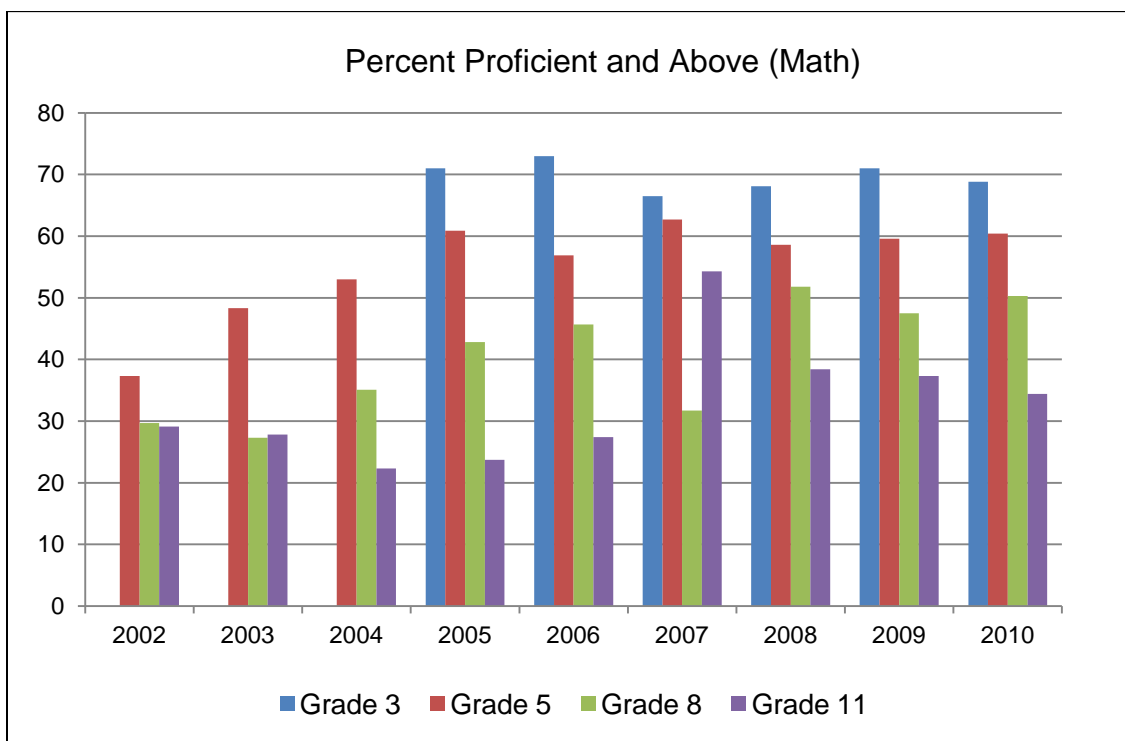


Figure 13. Percent Proficient and Above on PSSA (Mathematics), SY2001-2010
Source. Pennsylvania Department of Education – District Report Cards.

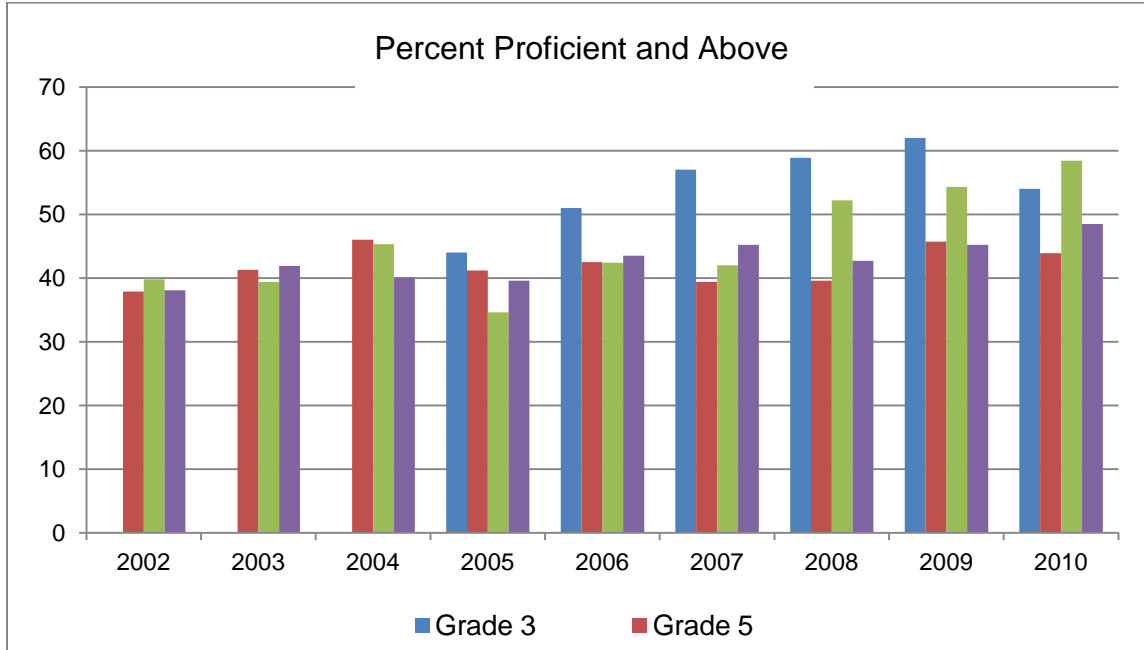


Figure 14. Percent Proficient and Above on PSSA (Reading), SY2002-2010
 Source. Pennsylvania Department of Education – District Report Cards.

Graduation Rates

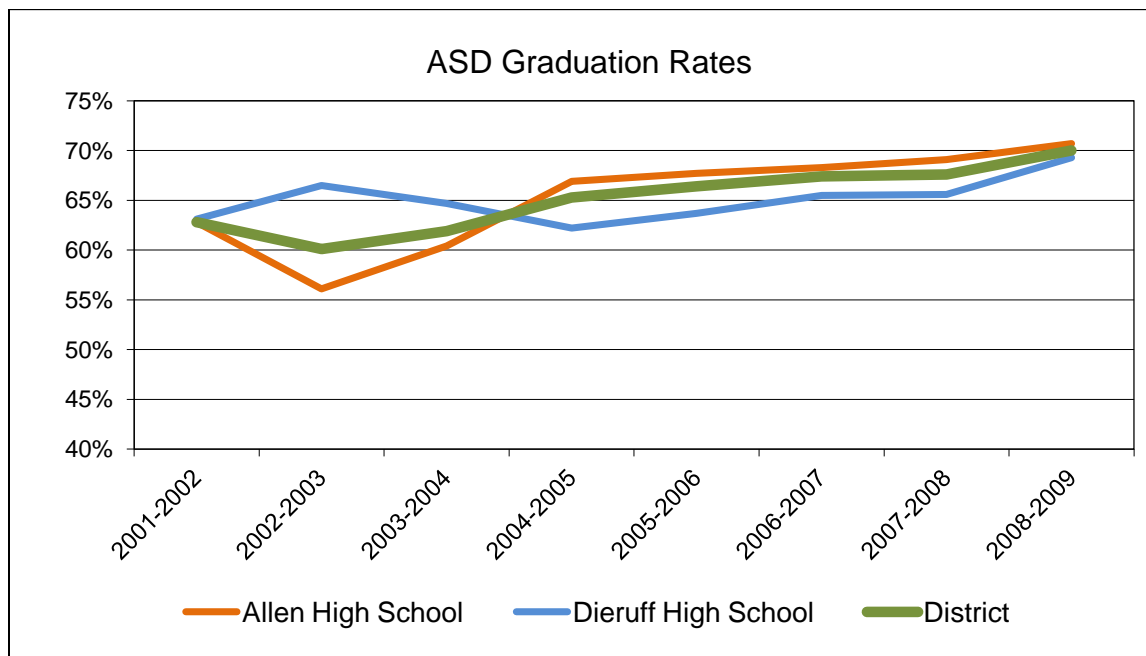


Figure 15. ASD Graduation Rates, SY2002-2009

Source. Pennsylvania Department of Education – District Report Cards.

As seen in the previous figures, test scores and graduation rates have improved overall, but at the district level ASD still struggles to make adequate yearly progress. As targets have risen, Allentown’s designation as a failing district has held since 2006-2007.

Table 13. District Adequate Yearly Progress (AYP) Status, SY2003-2010

YEAR	District AYP Status
2009-2010	Corrective Action 2 (third year)
2008-2009	Corrective Action 2 (second year)
2007-2008	Corrective Action 2 (first year)
2006-2007	Corrective Action 1
2005-2006	Making Progress
2004-2005	School Improvement 2
2003-2004	School Improvement 1
2002-2003	Warning

ASD budget. This section provides an overview of the ASD budget. I begin with a review of expenditures and revenues. I then briefly describe the budgeting process for school year 2009-2010 based on document analysis and information from my interviews with the district's Chief Financial Officer and the Executive Director of Planning and External Funding. I focus on the resource allocation process in 2009-2010 so that my qualitative and quantitative data analysis is consistent. This is followed with a review of the funding gap between the district's financial resources and the resources it would need to prepare all students to meet proficiency standards according to the State's analysis.

Expenditures. As seen earlier in this chapter, there have been increases in personnel and average salaries over the past decade. Taken together, these changes explain the rise in personnel services expenditures over time. As funding for personnel has increased, so have the district's total expenditures. Figure 16 indicates an overall increase of 175%, with non-instructional expenses growing at an even faster rate (214% total increase) than instructional expenses (162% total increase).

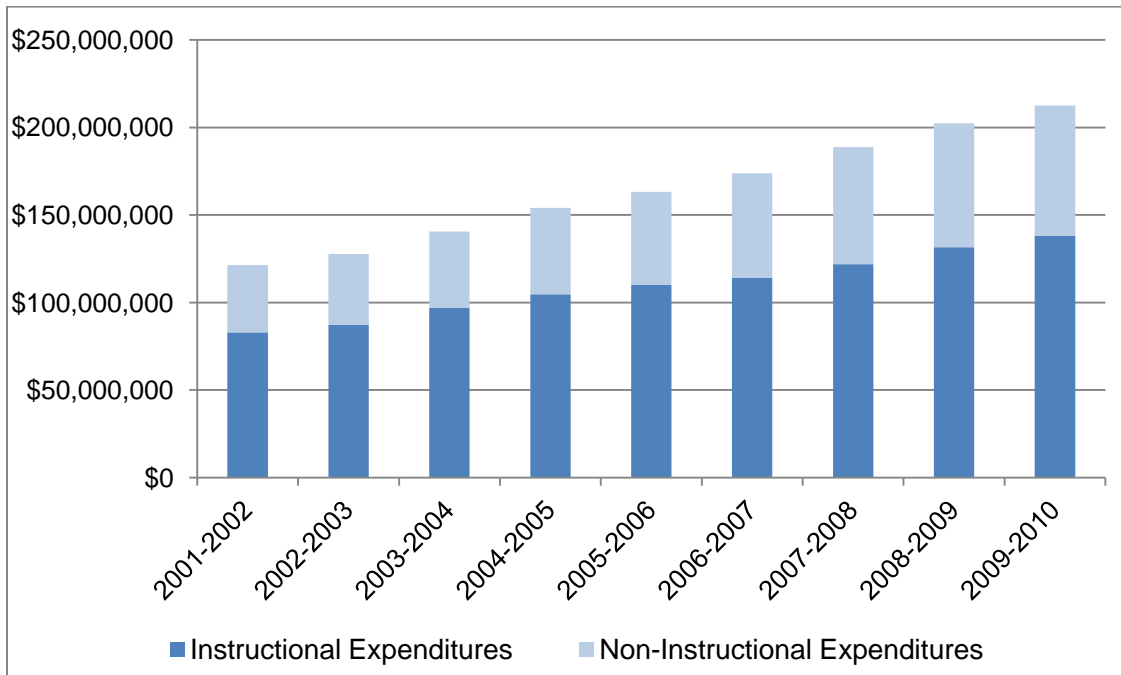


Figure 16. ASD Instructional and Non-Instructional Expenditures, SY2002-2010

Source. Pennsylvania Department of Education Reports: Finances AIE 9495-0910; Finances AFR ExpDetail 0102-0910.

Note. As defined by PDE, *Instruction* includes all those activities dealing directly with the interaction between teachers and students and related costs⁹⁴, which can be directly attributed to a program of instruction. Teaching may be provided for students in a school classroom, in another location such as a home or hospital, and in other learning situations such as those involving co-curricular activities. It may also be provided through some other approved medium such as television, radio, telephone and correspondence. Included here are the activities of aides or classroom assistance of any type (clerks, graders, teaching machines, etc.) that assist in the instructional process. Do not record administrative instructional support costs here.

In 2001-2002, personnel services (salaries and benefits) made up 75% of the entire district budget. This had decreased to 66% in 2009-2010. Interestingly, benefits, made up 19% of the personnel services expenditures in 2001-2002, increased to 26% in 2006-2007 and 2007-2008, and moved back down to 23% in 2009-2010.

⁹⁴ PDE describes *related costs* as including instructional expenditures for salaries, contracted services, travel expenses, equipment rental, supplies, books, maintenance costs directly attributable to instructional equipment and other expenses such as sabbatical leaves.

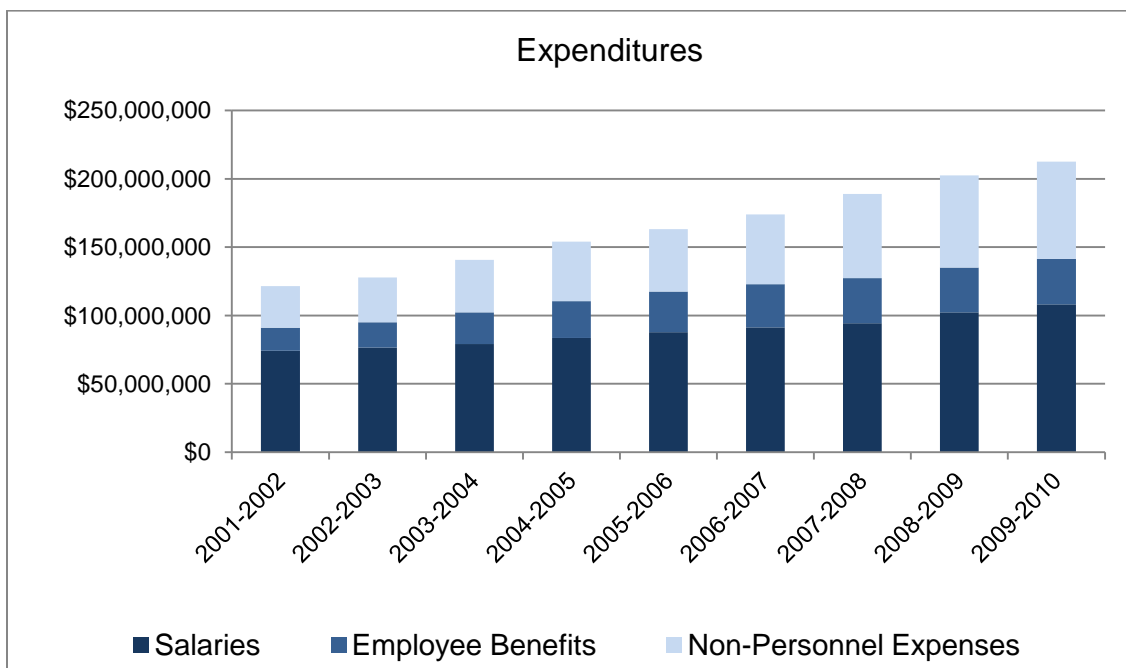


Figure 17. ASD Salaries, Employee Benefits, and Non-Personnel Expenses, SY2002-2010

Source. Pennsylvania Department of Education Report: Finances AFR ExpDetail 0102-0910.

Note. Non-personnel expenses include purchased professional and technical services, purchased property services, supplies, property, other objects, and other uses of funds.

State allocations for special and gifted education services have also grown over the last decade, with a 220% increase in expenditures from 2001-2002 to 2009-2010. In 2001-2001, special education expenditures made up approximately 12% of the budget. In 2009-2010, special education expenditures crept up to 15% of the budget. Additional local funds also contribute to special and gifted education expenditures.⁹⁵

⁹⁵ Local expenditures on special education expenditures are not reported – or readily available.

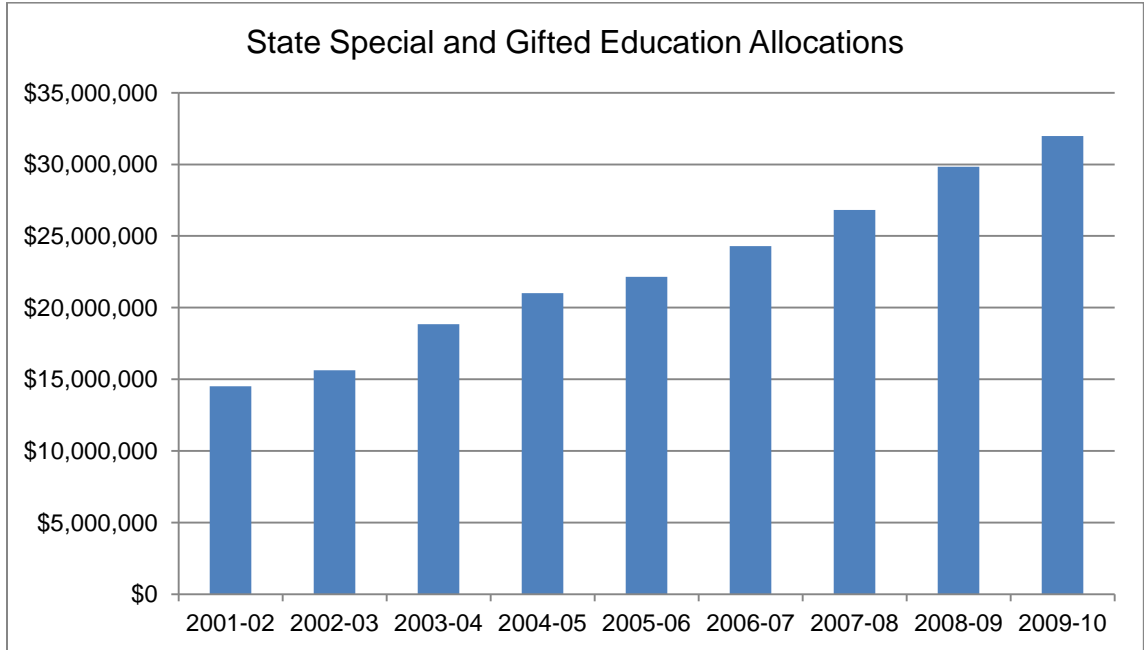


Figure 18. ASD Special and Gifted Education Expenditures, SY2002-2010

Source: Pennsylvania Department of Education reports: Finances SEF0102; Finances SEF0203; Finances SEF0304; Finances SEF0405; Finances SEF0506; Finances SEF0607; Finances SEF0708; Finances SEF0809-0910-1011

Funding sources. Revenues to the district are a mix of local tax levy, and state and federal grants and entitlements. For the 2009-2010 school year, the district raised over \$211 million in revenues: 35.6% in local revenues, 53.2% in state revenues, and 10.7% in federal revenues.⁹⁶ Figure 19 below provides an overview of revenues to the district between school year 2004-2005 and school year 2009-2010, divided by local, state and federal dollars.

⁹⁶ PDE website.

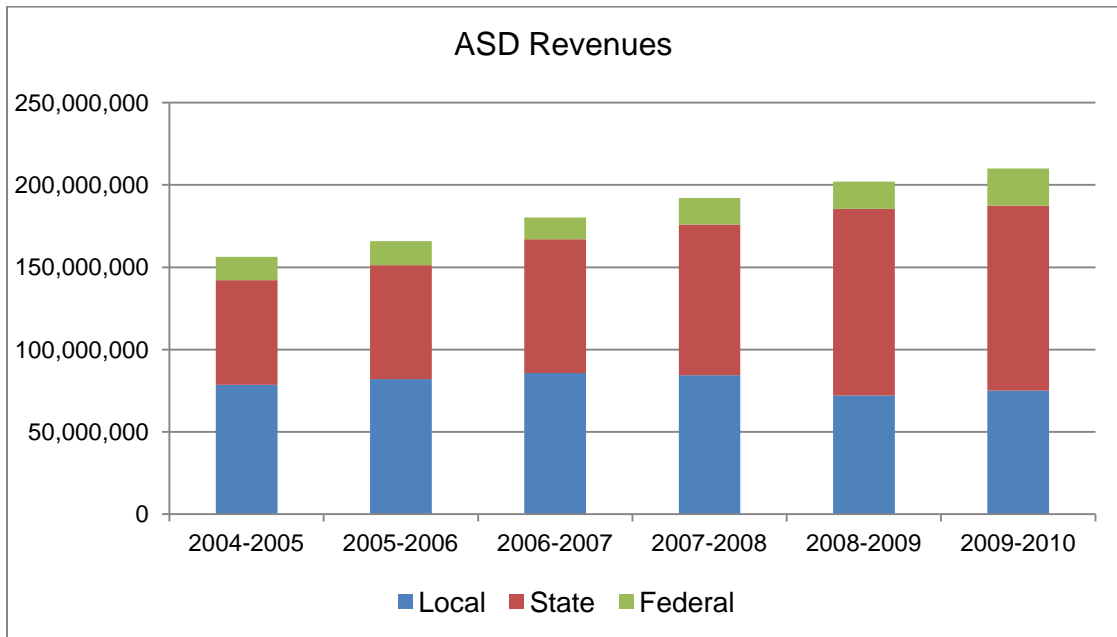


Figure 19. Local, State and Federal Revenues, SY2005-2010

Source: ASD Annual Financial Reports

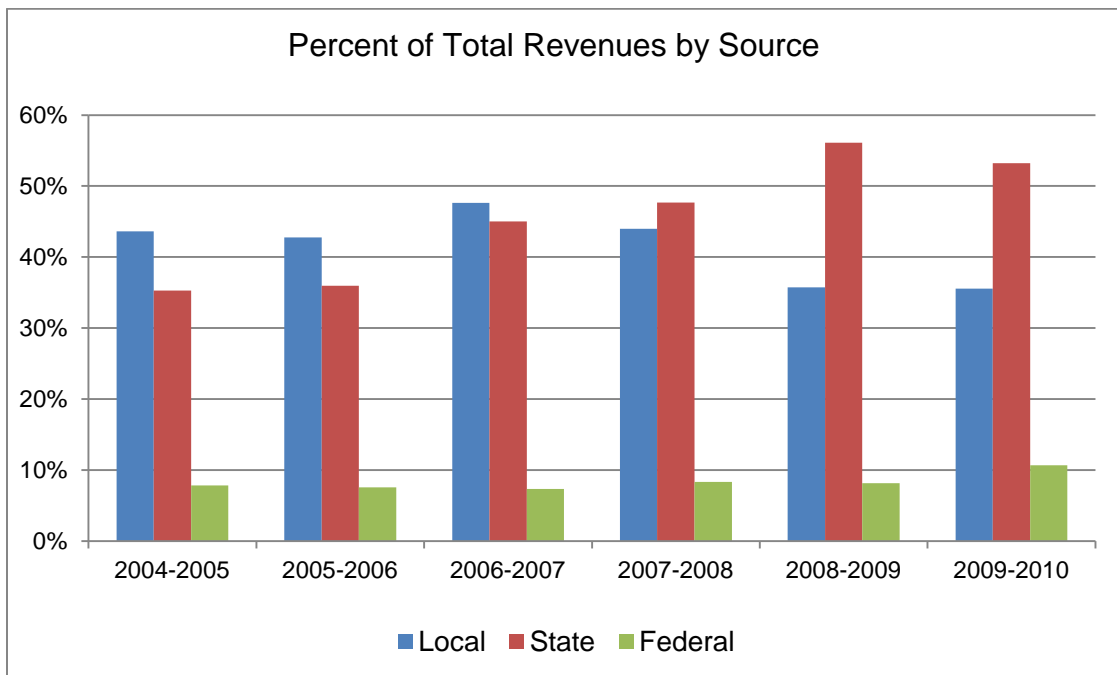


Figure 20. Percent of Total Revenues, by Source, SY2005-2010

Source: ASD Annual Financial Reports

Local revenues have no requirements attached, and are referred to as general fund dollars. State and federal revenues often do have requirements as to how grant funds should be used. There are two types of grants: categorical grants or formula-driven grants, such as Federal Title I and Pennsylvania's Accountability Block Grant, to which the district is entitled to if they meet certain criteria (e.g., serving students living in poverty) and fill out the applications correctly, and competitive grants for which the district must compete (e.g., the Federal School Improvement Grant).

The district receives the greatest portion of its total budget from the Commonwealth of Pennsylvania (53.2% in SY2010). These funds are the result of appropriations enacted by the Pennsylvania Legislature and signed into law by the Governor. They include both subsidies and grants. The district saw a significant increase in funds beginning in 2008-2009 as the result of a change in the State's funding formula providing additional state funds to under-funded districts. As a result of this change, state allocations to school districts began being referred to as "Accountability to Commonwealth Taxpayers" (ACT) funds. There was a 13.47% increase in State funding for the Allentown School District in 2009-2010. Three major programs come under the umbrella of PA-ACT funds: the state's Basic Education Fund (BEF) - the major allocation of state funds to districts; the Accountability Block Grant (ABG); and, the Educational Assistance Program (EAP). The ABG program is available to school districts to support "proven programs to improve educational achievement of students" (PDE website). School districts may use the ABG funds for pre-kindergarten, full-day kindergarten programs, and/or reduced class size in grades

kindergarten through grade three. The EAP funds tutoring programs for at-risk students. The Pennsylvania Department of Education (PDE) oversees additional state funding of programs for which school districts may be reimbursed.⁹⁷

The state's Basic Education Fund (BEF), a categorical grant tied to student enrollment and student need, makes up the largest share of state revenue in the district (76% of state revenues to ASD in SY2010). This revenue is designed to help districts meet their adequacy and equity goals and its use, for the most part, is unrestricted. The BEF allocation to ASD more than doubled between the 2003-2004 and 2010-2011 school years. While the annual increases began when Governor Rendell took office, they grew at a larger rate beginning in the 2008-2009 school year, after the PA General Assembly passed a state budget that increased all basic education funding by \$275 million and included a new state funding formula based on the recommendations of the PA legislature's costing-out study.

⁹⁷ These programs include: facilities improvement, transportation services, career and technical instruction, health services, and migratory children.

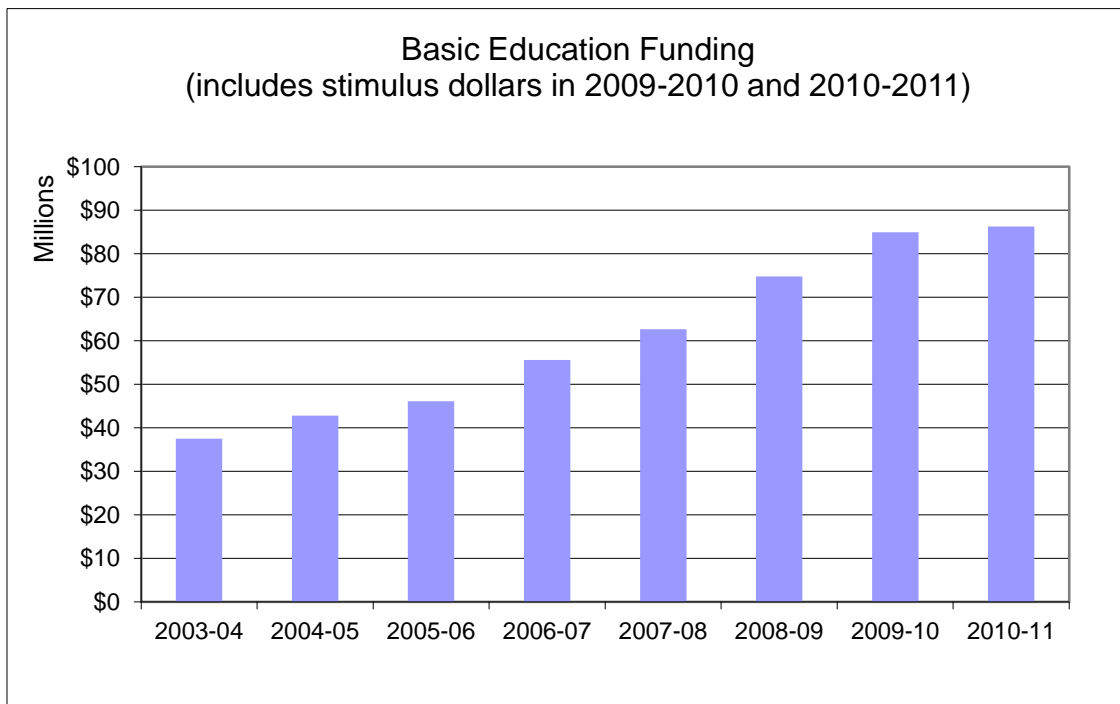


Figure 21. Basic Education Funding, SY2004-2010

Source: ASD Annual Financial Reports

Table 14. Basic Education Funds, SY2004-2011

Year	BEF State Funded	BEF Stimulus Funded	BEF Total Amount	BEF Increase	% Incr.
SY2004	37,491,079	0	37,491,079		
SY2005	42,844,964	0	42,844,964	5,353,885	14.28%
SY2006	46,158,463	0	46,158,463	3,313,499	7.73%
SY2007	55,592,389	0	55,592,389	9,433,926	20.44%
SY2008	62,658,329	0	62,658,329	7,065,940	12.71%
SY2009	74,839,643	0	74,839,643	12,181,314	19.44%
SY2010	74,857,792	10,061,554	84,919,346	10,079,703	13.47%
SY2011	76,408,137	9,869,732	86,277,869	1,358,523	1.60%

The Pennsylvania Department of Education (PDE) places the following restrictions on yearly increases in BEFs: at least 80% of funds must be dedicated to newly created, eligible programs or to expand eligible programs that are already in

existence in the school district. Also, districts such as Allentown, with schools in school improvement and/or corrective action, must submit plans which spell out the intended uses of all new state dollars. Table 15 lists all the areas in which districts could allocate resources, and describes how the ASD spent their new ACT dollars in 2008-2009. A review of spending initiatives of other large districts in the state (excluding Philadelphia) revealed great variation in the choices districts made in allocating ACT funds in terms of focus. Unlike Allentown, other districts invested more in literacy and math coaching, intensive instruction for struggling students during the school day, and early education. Districts were consistent, however, to the extent that much of the new funding went to cover salaries and benefits.

Table 15. ASD Allocation of PA-PACT Funds, SY2009**Allentown School District's Allocation of New State Funds:****(ACT Funded Initiatives: 2008-2009 ACT funding =\$531 per pupil)**

Evidence-based supports and one-time costs (20.0%)	<ol style="list-style-type: none"> 1.Assistant principals (elementary school) 2.Psychology interns 3.Technology and textbooks
Other educational support services (3.3%)	<ol style="list-style-type: none"> 1.Home school visitor 2.Psychologist 3.Parent coaches 4.Parent scholars 5.School health services chairperson
Full day kindergarten (5.6%)	<ol style="list-style-type: none"> 1.Teachers 2.Paraprofessionals 3.Supplies and materials 4.Off-site rental
High school reform (7.5%)	<ol style="list-style-type: none"> 1.Teacher salaries 2.Online dual enrollment, college level program 3.Textbooks 4.Educational software 5.PSAT costs 6.Statistics curriculum development and staff training 7.Professional development consultants 8.Technology supplies to facilitate teacher online learning
Intensive instruction for struggling students	<ol style="list-style-type: none"> 1.Special education co-teachers 2.Modular classroom 3.Read 180 technological support
Literacy and math coaching (7.8%)	<ol style="list-style-type: none"> 1.Literacy and math coaches
Other new curricula/course offerings (28.1%)	<ol style="list-style-type: none"> 1.ESL, elementary support, gifted support teacher 2.Textbooks, materials 3.District curriculum evaluation/development; reading edge start-up 4.College and career coaches
Other professional development (10.0%)	<ol style="list-style-type: none"> 1.Education and behavior coaches 2.PD consultation 3.PD travel expenses
Teacher Training (4.8%)	<ol style="list-style-type: none"> 1.Training in math, reading, writing and tech 2.RtI consulting (with resources) 3.Professional development tracking 4.Materials, books, copying, travel, rentals 5.Professional memberships
Tutoring before/after school, weekends (2.7%)	<ol style="list-style-type: none"> 1.Tutors 2.Materials
School library services (1.1%)	<ol style="list-style-type: none"> 1.School library media specialist, paraprofessionals

During the periods when new resources were invested in Allentown, the district began to show gains in student outcomes; graduation rates began to increase, as did student results on the Pennsylvania System of School Assessment (PSSA) scores. However, it is important to note that the infusion of new funds from the state was offset, in part, by a reduction in local revenue.⁹⁸

Federal revenues make up the smallest portion of the district's budget. The largest federal categorical grant program to school districts is Title I, designed to improve academic achievement of disadvantaged⁹⁹ children. Other federal dollars, which provide support for numerous programs, include: 21st Century Schools (i.e., Safe and Drug Free Schools and Communities, 21st Century Learning Communities); Title III (language instruction for limited English proficient and immigrant students); Individuals with Disabilities Education Act (IDEA) (to cover costs incurred in educating children in accordance with the IDEA); Child Nutrition Projects; and, Medical Assistance reimbursements.

The Title I program is intended to support disadvantaged children in meeting state standards in reading and mathematics. Schools with 50% or more of students identified as living in poverty may use the Title I dollars school-wide to improve educational programs; all schools in ASD meet this criterion. Title I grant dollars cover expenses at both the schools and the district level, with approximately 80% of the

⁹⁸ In SY2001, local taxes made up 53.2% of all revenue; in SY2010, local taxes made up 32.4% of all revenue.

⁹⁹ Title I of the Elementary & Secondary Education Act describes disadvantaged children as "low-achieving children in our Nation's highest-poverty schools, limited English proficient children, migratory children, children with disabilities, Indian children, neglected or delinquent children, and young children in need of reading assistance."

dollars being spent in schools.¹⁰⁰ School principals have primary responsibility for spending Title I dollars in their building. Title I dollars, however, are less flexible than school budget dollars as they must be divided among staff development, parental involvement, and academic improvement. The allocations devoted to each of these areas are mandated by federal formula, and dollars cannot be moved from one area to another. Within these designated areas, however, the school principals usually have control.

In addition to categorical grants, the district applies for, and has been successful in winning, competitive grants. The Executive Director for Grants and External Funding submits grant proposals on behalf of the district, with the stated intention to go after grants that are consistent with the district's mission. Certain grants are likely to be tied to specific buildings (written to address the needs of certain buildings - i.e., security), but buildings generally have little control of how these grant dollars are spent. The Executive Director explained, "[Program Directors] don't take their grants and say, 'Hey, Central [Elementary School], you get \$100,000. You can figure out what you want to do with it.' They ... plan for those grants district-wide."

School Improvement grants have brought federal dollars to the Allentown School District. In the 2009-2010 school year, the district applied for and was awarded over \$3 million due to poor student achievement at three elementary schools (Mosser,

¹⁰⁰ Title I allocations to schools are derived from formulas based on student poverty.

Sheridan, and Union Terrace) and one middle school (South Mountain).¹⁰¹ These grants are based on a school's performance on state assessments (AYP status) and, therefore, fluctuate from year to year. As a result, this money cannot be used for ongoing expenses, such as staff. Dollars from school improvement grants must be consistent with the student improvement plan. Also, although the building principal is involved in determining how these dollars are spent, the district must sign off on his/her allocations. The state is also required to sign off on these plans, but the building principals I interviewed were unaware of this requirement. A great deal of volatility is built into the budget because of these grants. For example, one school that made Adequate Yearly Progress this year will lose \$80,000 because it is no longer in "student improvement." The Executive Director described some smaller grants with which her office had been involved. "We worked with [the ESOL Director's] office [on a refugee grant]. It was for about \$51,000, which is really small for us. But it was, I'd say, a little bit of a passion for a couple of us that we really wanted to do it. Which is what happens in the schools, you know, when teachers have a passion for something."

Structure of budget. Funds that support school buildings within the Allentown School District can be thought of as coming from three pots. The largest pot of financial resources (at 67.3% of entire district budget) covers the expenses of teachers and support staff. The second pot of money comes from program areas in the central office and funds some staff, services, and materials in buildings, including students services (e.g., cameras), curriculum (e.g., coaches, books, training materials), English

¹⁰¹ The district received \$15 million in School Improvement grants in school year 2010-2011.

as a Second Language (ESOL) (e.g., training, teachers), and most special education services.¹⁰² These program area budgets are composed of grants and general revenues. The final pot of money is a small allotment of dollars to school principals to spend in their schools. These dollars can be used for any number of items including books and professional development. These discretionary school budget dollars are from general revenues.

Personnel budget. Although the personnel budget makes up the largest portion of funds to individual school buildings, principals have very little influence over staffing issues. The technical work of determining the size of the workforce in each school is carried out by the human resources department. Principals are neither responsible for staffing budgets nor determining the numbers of teachers and support staff in their building. (Even when site-based management was in effect in Allentown in the 1990's, principals had no control over personnel.) Staffing formulas are based on a district-wide policy on pupil/teacher ratio approved by the School Board, which the human resources office uses to generate the number of staff to be added or subtracted at each school, based on the projected enrollment for the coming year.¹⁰³ Currently, the ratio for elementary schools is 25 students per teacher, but it can go up to 27. Once that limit is reached, another teacher is added. In elementary school, the most prevalent staffing issue is usually excessively large class sizes; in high school, the problem is instead whether or not classes should be held if there only a few students sign up – such

¹⁰² Additional funds that address the needs of special education students come out of principals' discretionary budgets.

¹⁰³ Staffing formulas vary by school level (elementary vs. middle school vs. high school).

as an AP Chemistry class with four students. Since the district policy is that the number of teachers in each building is based on student enrollment, any additional teachers beyond the prescribed ratios are most likely tied to a grant or special education.

A central office administrator provided details on how staffing budgets are prepared: “It used to be pretty academic. Let's say we anticipate salaries go up four percent. So, whatever we spent on payroll last year, let's add four percent to it. That's our new budget.” Staffing normally remains the same from year to year unless there is a new program, or there is new grant money available. Then you add staff “on top of what you've been doing”, which may require hiring new staff. Ratios are also used to determine how ELL teachers are allocated to schools. This is a difficult task, as there are students in different grades, with different competencies, that must be served. The result is that some schools end up with higher pupil/teacher ratios than others. Finally, staffing budgets also include the associated benefits: health insurance, workman's compensation, retirement benefits and Social Security. All costs are based on staffing numbers.

Program area budgets. Program area budgets, often funded primarily through grants, are not presented (or conceived of) at the school level. Generally, program area directors make their purchases for the entire district, and do not consider school-level allocations. Every department (i.e., special education, student services, curriculum) puts together their own budget reflecting their needs. At times though, building principals negotiate with program area directors to get more support for their buildings, but this is only true of some principals. One principal interviewed discussed how she would seek

central funds. She offered an example of how she would deal with the need for a school camera:

“School safety would be something where, if I had the money, I could try to purchase another camera. But, I certainly would go to [the Director of Student Services] first and say: ‘Hey, for the safety of our students, really could use another monitor and camera in the back of the building.’”

Principals’ “discretionary” budgets. The final portion of school-level funding is a mix of discretionary dollars allocated to each building and Title I funds, which have strict requirements for use attached. The discretionary school budget is small, approximately \$135 per student, and covered by general funds. The Title I budget is covered by federal funds.

Funding for individual school budgets is determined each year by the Chief Financial Officer (CFO) and the Superintendent. In the 2008-2009 school year and prior, dollars were allocated to schools solely based on student enrollment in each school, regardless of need of student body or level of schooling (e.g., middle school or elementary school). In the 2009-2010 school year (the year in which data is used for the quantitative analysis) all building principals were asked to build their entire budget.¹⁰⁴ The school budgeting process begins early in the year. Schools are given their allocation in early-mid October and must determine how the dollars will be spent by the end of the month. Developing this budget for the following year in two weeks is

¹⁰⁴ In school year 2010-2011, under a new administration, the district allocated resources based on a weighted formula that took into account student needs including poverty, ELL status, and special education status. Principals were then required to develop a budget based on their allotted dollars.

difficult for principals given many unknown elements, the largest of which is student enrollment.

The Federal Title I grant dollars cover expenses at both the schools and the district level, with approximately 80% of the dollars being spent in schools.¹⁰⁵ School principals have primary responsibility for spending Title I dollars in their building. Title I dollars, however, are less flexible than school budget dollars as they must be divided among staff development, parental involvement, and academic improvement. The allocations to each of these areas are mandated by federal formula, and there can be no movement of dollars from one area to another. Within these designated areas, however, the school principals usually have control.

The funding gap. The Allentown School District is severely underfunded. This is aggravated by inadequate resources available to address the needs of disadvantaged students. ASD has the largest gap in terms of adequate resources compared to the vast majority of other schools district in the State. According to the PA Legislature's 2007 Costing-Out Study, in 2005-06 the average cost to educate a student in ASD and reach proficiency was \$13,741. At the time, ASD was spending \$8,291, and these numbers have changed very little since then. As can be seen in Table 16 and Figure 22, the gap between "adequate funding" and total expenditures is large.

¹⁰⁵ Title I allocations to schools are derived from formulas based on student poverty.

Table 16. General Fund Fiscal Gap Analysis, SY2009-2011

	Actual Expenditures	Adequacy Target	Difference
2008-2009	\$202,399,473	\$234,147,093	\$31,747,620
2009-2010	\$212,752,983	\$250,506,435	\$37,753,452
2010-2011	\$233,136,794	\$261,204,964	\$28,068,170

Source: ASD Financial Report

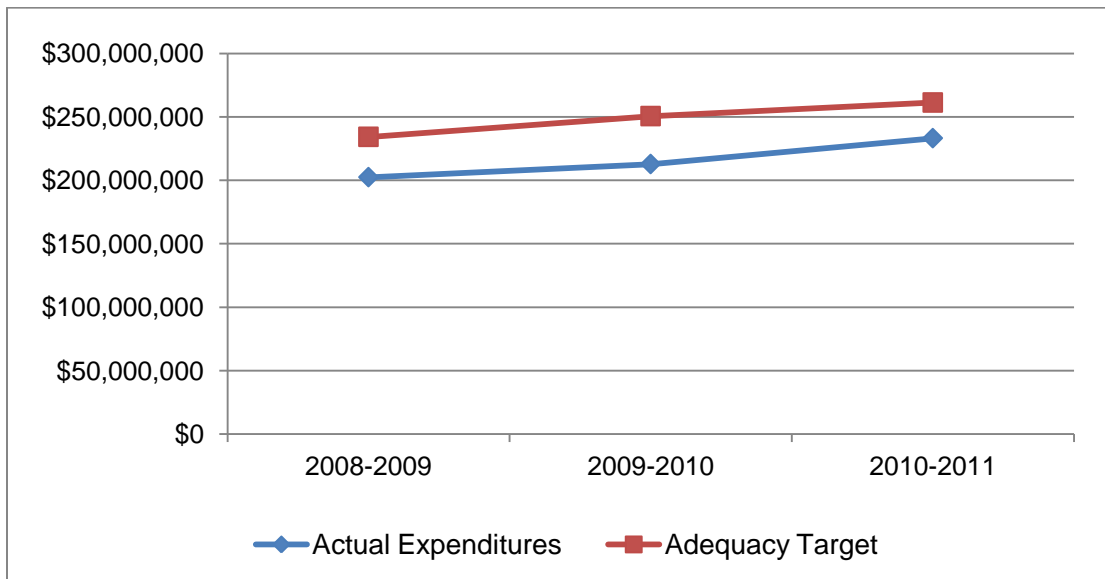


Figure 22. General Fund Fiscal Gap, SY2009-2011

Source: Allentown School District Financial Reports 2010-2011, 2009-2010, 2008-2009

This context is provided to make clear that all students in the ASD, regardless of which school they attend, are not being provided with adequate resources.

Current resource allocation in Allentown. With support from the consulting firm Cross & Joftus, I was able to obtain district and school level expenditure and personnel data for the ASD. Because my interest lies in school level data, I focused my efforts on determining the magnitude of various resources going to schools. As mentioned earlier, due to the district’s small size, only elementary and middle schools are considered in the analysis.

To conduct this analysis, I have identified a range of measurable resources that are likely to influence student learning. These resources can be categorized into expenditures and human capital resources. Expenditures include total operating funds, operating funds intended to be directed to address the needs of students in poverty, and operating funds intended to be directed to address the needs of ELL students. Expenditures also include salaries, including aggregate and specific responsibilities (i.e., instruction, support and professional development, leadership, operations and maintenance, and pupil services). Human capital resources include various measures of, or proxies for, teaching quality. The indicators identified for this study include average salaries for core, non-core, and special population teachers¹⁰⁶, professional development, FTEs (with measures of students per staff, students per teacher, students per administrator, and students per paraprofessional). Closely tied to the review of FTEs at the school level is a review of average class size at each school. Additional measures of teaching quality include teacher effect (based on teacher-level value added scores), teacher self-efficacy (for classroom management, student engagement, and instructional strategies), average years of teaching experience, the percentage of teachers in a building with less than three years of experience, the percentage of teachers in a building with more than four years of experience, and the percentage of teachers with a masters or above. Finally, three school-wide measures of teaching

¹⁰⁶ Core teachers include elementary, English, mathematics, reading, science, and social studies teachers; non-core teachers include art, music, physical education, French, German, Spanish, business, home economic, industrial arts, JROTC, and other teachers; and, special populations teachers include ESOL, IST, special education, and itinerant gifted teachers.

quality are also considered: the schools growth indices for math and reading and collective efficacy.

Table 17 provides horizontal equity statistics (i.e., means, standard deviation, range, coefficient of variation, and McLoone index) for the resources studied.

Highlighting indicates that the results fall outside the Odden-Picus standard for horizontal equity (Odden & Picus, 2008).

Table 17. Horizontal Equity Statistics for Elementary Schools in ASD, SY2010

	Elementary Schools			Coef of Var	McLoone Index
	Mean	SD	Range		
Financial Resources					
Operating Funds (PPE)	7,947	921	2,970	0.12	0.92
Poverty Spending (PPE)	916	271	1,099	0.30	0.84
ELL Spending (PPE)	427	215	804	0.50	0.63
Discretionary Bldg Funds (PPE)	132	12	56	0.09	0.95
Federal Title I (PPE)	587	210	798	0.36	0.85
Teacher Support					
Professional Development (PPE)	259	59	194	0.23	0.82
Human Capital Salaries					
Total Salaries (PPE)	5,084	608	2,034	0.12	0.89
Instruction Salaries (PPE)	4,043	492	1,827	0.12	0.90
Instruction Support/PD Salaries (PPE)	186	51	180	0.28	0.81
Leadership Salaries (PPE)	404	105	367	0.26	0.86
Operations/Maintenance Salaries (PPE)	210	67	283	0.32	0.83
Pupil Services Salaries (PPE)	240	80	276	0.33	0.89
Average Teacher Salaries					
Core Teachers	63,795	5,354	17,910	0.08	0.94
Non-Core Teachers	63,843	10,484	29,286	0.16	0.89
Special Populations Teachers	60,835	4,248	13,129	0.07	0.94
All Teachers	63,029	4,198	13,899	0.07	0.94
Full Time Equivalent (FTEs)					
Students per staff	9.7	1.2	5.1	0.13	0.90
Students per teacher	15.9	1.7	5.2	0.11	0.94

Students per administrator	309.8	57.1	207.5	0.18	0.86
Students per paraprofessional	75.0	33.8	110.6	0.45	0.71
Average class size (w/o 100% SPED)	23.6	1.7	5.8	0.07	0.93
Individual measures of Teacher Quality					
Low teacher effect (district gain)	28%	19%	70%	0.67	0.74
High teacher effect (district gain)	40%	24%	100%	0.61	0.53
Teacher Efficacy-Classroom Mgmt	7.5	0.4	1.4	0.05	0.95
Teacher Efficacy-Student Engagement	7.2	0.4	1.2	0.06	0.95
Teacher Efficacy-Instructional Strategies	7.6	0.4	1.5	0.05	0.96
Avg. years of teaching exp.	11.1	2.7	8.9	0.24	0.83
% of teachers w/ less than 3 yrs exp.	10%	4%	11%	0.39	0.81
% of personnel w/ Masters or above	43%	11%	44%	0.25	0.88
School-wide Measures of Teacher Quality					
Growth Index (Math)	10.9	3.6	13.4	0.33	0.72
Growth Index (Reading)	8.9	4.1	12.5	0.46	0.61
Collective Efficacy	526	43	150	0.08	0.97

Note: Shading in yellow indicates near horizontal equity; shading in purple indicates horizontal inequity; and, shading in red indicates extreme horizontal inequity.

Table 18. Horizontal Equity Statistics for Middle Schools in ASD, SY2010

	Middle Schools			Coef of Var	McLoone Index
	Mean	SD	Range		
Financial Resources					
Operating Funds (PPE)	8,940	403	872	0.05	0.96
Poverty Spending (PPE)	1,088	204	435	0.19	0.82
ELL Spending (PPE)	269	82	194	0.31	0.75
Discretionary Bldg Funds (PPE)	158	15	37	0.10	0.93
Federal Title I (PPE)	747	127	264	0.17	0.84
Teacher Support					
Professional Development (PPE)	113	21	49	0.18	0.92
Human Capital Salaries					
Total Salary (PPE)	5,712	374	862	0.07	0.94
Instruction Salaries (PPE)	4,686	406	876	0.09	0.91
Leadership Salaries (PPE)	361	70	168	0.19	0.85
Operations/Maintenance Salaries (PPE)	283	21	51	0.07	0.95
Pupil Services Salaries (PPE)	382	26	57	0.07	0.97
Average Teacher Salaries					
Core Teachers	60,831	2,785	6,410	0.05	0.97
Non-Core Teachers	58,635	5,610	13,384	0.10	0.92
Special Populations Teachers	60,349	3,641	7,857	0.06	0.94
All Teachers	60,293	3,163	6,634	0.05	0.95
Full Time Equivalents (FTEs)					
Students per staff	8.4	0.5	1.3	0.07	0.96
Students per teacher	13.6	1.0	2.1	0.07	0.98
Students per administrator	276.7	42.1	90.3	0.15	0.85
Students per paraprofessional	92.4	24.3	56.7	0.26	0.80
Average class size (w/o 100% SPED)	20.1	0.6	1.5	0.03	0.97
Individual measures of Teacher Quality					
Low teacher effect (district gain)	20%	11%	27%	0.57	0.70
High teacher effect (district gain)	31%	17%	39%	0.56	0.73
Teacher Efficacy-Classroom Mgmt	7.0	0.3	0.6	0.04	0.96
Teacher Efficacy-Student Engagement	6.0	0.2	0.4	0.04	0.97
Teacher Efficacy- Instructional Strategies	7.6	0.1	0.2	0.01	0.99
Avg. years of teaching exp.	9.6	1.8	3.9	0.19	0.82

% of teachers w/ less than 3 yrs exp.	18%	6%	14%	0.31	0.83
School-wide Measures of Teacher Quality					
Growth Index (Math)	8.6	1.5	3.5	0.18	0.84
Growth Index (Reading)	10.9	3.7	7.8	0.34	0.74
Collective Efficacy	416	38	71	0.09	0.92

Note: Shading in yellow indicates near horizontal equity; shading in purple indicates horizontal inequity; and, shading in red indicates extreme horizontal inequity.

Equity statistics, described in chapter four, provide a means of measuring how resources are distributed among schools. Equity statistics are provided for elementary schools (n=14) and middle schools (n=4) where available. Odden and Picus (2008) provide standards against which to evaluate these equity statistics¹⁰⁷. Using these standards, resources are seen as either horizontally equitable, meaning resources are distributed equivalently among schools, or horizontally inequitable, meaning resources are not distributed equivalently among schools. Given the small sample of schools in the ASD, I have expanded upon this definition for the purpose of my analysis. All those resources with a coefficient of variation which falls between 0.1 and 0.2 and a McLoone Index which falls between 0.8 and 0.9 are considered to be close enough to be considered as horizontally equitably distributed. Differentiations are also made between horizontal inequity and extreme horizontal inequity. Equity statistics are highlighted accordingly in the tables 17 and 18.

In considering horizontal equity statistics it is important to note that one would not expect certain resources, such as expenditures to address the needs of students in poverty or expenditures to address the needs of ELL students, to be allocated on a

¹⁰⁷ Odden and Picus (2008) have determined that a coefficient of variation of 0.1 or less, and a McLoone Index of 0.9 or greater indicates horizontal equity.

strictly per pupil basis. Rather, these expenditures, by definition, are intended to provide compensatory funds for specific students with higher needs. This point is considered further in Chapter 6, in which vertical equity is measured (as part of the equity framework discussed earlier in this paper) to determine how resources are distributed to each school according to the needs of the students in the school.

Many of the resources considered in my analysis of the ASD fall within the range, or just outside the range, defined by Odden and Picus (2008) as equitably distributed based on horizontal equity statistics. These resources include: operating funds, poverty spending and Federal Title I (middle school only), building discretionary funds, professional development funds (middle school only), total salary, instructional salary, salary for instructional support, leadership, operations/maintenance, and pupil services (middle school only), average salaries (for all categories of staff), students per staff, students per teacher, students per administrator, class size, average years of teacher experience (middle school only), teacher self-efficacy and collective efficacy, the Growth Index, representing the school's "value-add" (middle school only).

Resources that were not found to be equivalently distributed among schools on a per pupil basis include: expenditures dedicated to address the needs of students in poverty (elementary school only), Federal Title I (elementary school only), expenditures dedicated to address the needs of ELL students, professional development (elementary school only), salaries tied to instructional support (elementary school only), leadership salaries (elementary school only), operations and maintenance salaries (elementary schools only), pupil services salaries (elementary schools only), students per para-

professional, teacher effectiveness, average years of teaching experience(elementary schools only), the percentage of teachers with less than three years of experience (elementary schools only), the percentage of personnel with a masters degree or above (elementary schools only), and the Growth Index.

These findings are consistent with much of the literature on horizontal equity, whereby overall operating funds and salaries are equivalent among schools on a per pupil basis, but mask inequities such as considerable variations among schools on a range of teaching quality measures, including the percentage of inexperienced teachers in a school and educator effectiveness, measured both at the individual teacher level as well as the school level.

Variability among school outcomes. Another measure of district equity described in Chapters 2 and 4 is equivalent outcomes. As stated, equivalent outcomes are achieved if resources are allocated to students such that their outcomes are equivalent. This construct is included to provide more information about variability among schools. Conducting an analysis using an unconditional 2-level model provides a means of determining the variation in student test scores which is the result of attending a particular school. In my analysis of equivalent outcomes among ASD elementary schools, I find that the large majority of variability in student outcomes is not the result of attending a particular school. Rather, it is due to variability among students. This finding is consistent with the literature on the impact of schools on student outcomes (Konstantopoulos, 2006).

Table 19. Measure of Equivalent Outcomes for ASD Elementary Schools, SY2010

Allentown School District – Grades 3, 4, 5	PSSA	PSSA
	Math	Reading
Percent of variability that lies among schools	7%	5%
Percent of variability that lies within schools	93%	95%

Describing the process of resource allocation in Allentown

The discussion above broadly describes how school budgets are understood by administrators in the district. While there is generally consensus as to how dollars flow to schools and what funding sources provide the revenues to the district, there is less agreement on, and understanding of, the decision-making processes around resource allocation and the resulting distribution of resources to schools. Interviews with school district administrators yielded insights into the implementation of the distribution of resources among schools and shed light onto the variability in resources at the school level. Six major findings are presented and discussed based on this research:

- Resource allocation in the ASD is a black box – decisions are not transparent to school officials and administrators;
- Communication among central office administrators and school level administrators is deficient;
- No overarching mission or vision to guides resource allocation policy; 4) at the district level, teachers are not considered to be a resource;
- The need to augment resources drives school funding decisions; and,
- There is little focus on discrepancies in inputs among schools.

- The first two findings address the lack of knowledge and understanding around district resource allocation and subsequent findings address the district's focus on resource allocation.

Lack of transparency. Resource allocation among schools appears to be a black box to many administrators in the ASD. Among the building principals, there is a lack of transparency as to how much each school has – and what influenced these numbers. This lack of knowledge is shared by central office staff, including the Chief Financial Officer and the Director of Human Resources.¹⁰⁸ A common sentiment was expressed by a senior central office administrator:

“I’d just like more transparency with - I don’t mean the general fund. I get that, it's very transparent. I’m talking about Title, SIG, School Improvement. We've got too many people controlling budgets right now. And I don’t, I’m not saying that I should even know. I’m saying that, I just, I don’t get it. And if I don’t get it, who does? I don’t mean that, I’m just saying in my position I don’t get it, then who really is understanding this?”

Lack of transparency seems to exist for multiple reasons. First, people seem to accept the status quo and do not question how business is conducted. During my tenure at the ASD, I saw that new employees were discouraged from changing protocols to increase transparency. Second, district policies are often vague or non-existent – and decisions are made on an ad hoc basis. For example, no one in the district, including the Chief Financial Officer, seemed to know how large categories of support staff (e.g., secretaries, nurses, or paraprofessionals) are allocated to schools. Finally, neither human resource data, nor financial data, is readily available. Obtaining an accurate

¹⁰⁸ Most likely, this is true of teachers and students as well.

count of all employees, and their locations, was extremely difficult for the 2009-2010 school year.¹⁰⁹ Also, information on overall spending at the school level is neither collected nor reviewed by the school district on a regular basis and, for the most part, expenditures are consolidated and only available for review at the district level. The budget is extremely convoluted, making it difficult to understand where money is being spent. A number of district personnel echoed this assessment.¹¹⁰

A result of the “black box” of resource allocation is that stakeholders are unaware of inequities. For example, the School Board President assumes that schools get equivalent resources, and that budgetary differences arise only because principals choose to allocate these resources in different ways. He provided an illustration:

“At one point, the funds for high school graduation had to be taken out of the high school budgets, and Allen High School [had] always spent more money. They were the first to ... introduce videos and ... other things. And people noticed the inequality. But it wasn't really inequality. It was how the principals, how innovative they are, how they chose to spend that money. Well now, graduation has converted to a central office expense. So, and I'm sure ... that the services are all pretty much the same.”

This assumption of equitable resource allocation is likely shared by other School Board members, as district administrators, including the CFO, could provide no examples of School Board members lobbying for specific schools. And, when intradistrict equity issues arise in the community, they are most often about the two high schools, and how they compare – as demonstrated above.

¹⁰⁹ My own efforts at trying to determine the buildings in which teachers and support staff are working bear this out. Staff reductions, primarily due to changes in state policy, required an intensive review and reconciliation of payroll and human resource documents. There is a movement in the district to change this, beginning with greater position control.

¹¹⁰ This was born out by my struggles in creating holistic budgets for each elementary and middle school.

Poor communication between central office and schools. The lack of information among stakeholders in the district is reinforced by poor communications among the various players in the district. There are few systems in place to disclose information, so details are often shared informally. As a result, central office decisions are not always translated accurately to the schools. Additionally, there are limited means by which principals can provide feedback and influence budgetary decisions. My interviews provide considerable evidence of poor communications between the central office and schools, as similar questions elicited very different responses particularly about the role of district administrators in grant development and the principals' discretionary budget.

One reason that principals do not understand resource allocation is that they have not been involved in the decision-making process to any meaningful extent. Principals perceive that there is little consultation between themselves and the different program areas.¹¹¹ One principal said, "People in central office make these decisions and you wonder, how did you make that decision? You know ... they just kind of live in their own little rose-colored world. A lot of them...were never principals. So they don't really understand a building." Another principal provided this example:

"Title I spent money on these laptop cards. [They] never talked to us. Maybe three years ago. They arrived and I'm like 'OK. What do I do with these? Where do I put them?' We figured that out, where to put them. The laptops are outdated. Most of them don't hold a charge. Tons of money was spent on that. I don't think it should have been. I wanted computers for the one room that didn't have any. We could have used laptops in there. But no one talked to us. Smart boards arrived; gigantic smart boards. We don't have a library. Ours is sitting down in the custodian's office; nowhere to put it."

¹¹¹ Principals also questioned the extent to which central office staff communicated with each other.

The former Director of Elementary Education agreed with the principals, explaining that her position did not entail advocating on behalf of the principals or getting involved in the development and allocation of various grants. She explained that program area budgets are driven by program areas, such as curriculum. Principals are involved only to the extent that they have participated in conversations over the year, and so their concerns may or may not have been heard.

Central office administrators acknowledged the principals' concerns but expressed somewhat different views. The Executive Director explained that some grants, such as the technology grants, did not "get communicated as well as they should have." But she also suggested that the blame should be shared. "So some of that is us and some of it is ... principals are involved and busy [with]... the day to day management. So they might say, 'Ah, go ahead, that's sounds good.' ... and then all of a sudden, OK, well here come your ... smart boards." This problem was highlighted by the principals interviewed.

Although they account for only a small portion of school budgets, principals brought up their discretionary funds to illustrate the central office's control. The process for allocating these funds among school programs begins with the preparation of school budgets based on the allotted dollars presented to each school. Then there is some back and forth with requests from central office to make changes or justify plans. While everyone agreed on the first steps, principals have a different understanding than central office administrators as to what happens after budget requests are submitted. One principal interviewed did not appreciate the level of scrutiny proffered by the CFO.

“It does bother me that I have to ask a financial officer permission to transfer money from one code to another in order to purchase more trade books. ... That does bother me. I think I should just be able to do it. He doesn't know anything about education. But you have to ask him permission. It wasn't always like that. You just filled out a transfer form and send it down.”

There is consensus among the principals interviewed that central office maintains control over line items. As stated by one principal: “The bottom line is that the downtown people decide what that budget item will be. It could be near what we put in. It could be a lot less. It could be more.”

This view was not corroborated by central office administrators, who explained that once building budget dollars are allocated to schools, principals have discretion with regard to determining how dollars are spent within the school. Only one administrator mentioned an exception to the policy of principal discretion over school budgets:

“The only time in the last couple of years that I got involved with the school budgets was when we knew were getting cut back in our basic education funding. And we took a look at some of the school budgets to see if there was any way that a grant might be able out with some of the areas of the school budgets. A perfect example is one year, when we had PA-Pact¹¹² money, we could use that for some textbooks. So [we did that] instead of using the school budget money,”

The CFO is often caught between principals and the central office during the budgeting process. When asked about the role of the business office in oversight of school budgets, the CFO explained that he went through the school budgets and looked

¹¹² PA-Pact funds were allocated from the State to districts as the result of a change in the State funding formula. Under funded districts were the recipients of new funds tied to their students' needs. It was required that 80% of all new funds be used on “new” initiatives developed to improve student outcomes.

though everything. He also went to other central district administrators to ask for their recommendations, asking, “Is this a worthy expenditure?” He did acknowledge that he can be critical, but that he is not in the buildings enough to know what the best allocations are. The CFO pointed out that the review was not detailed. “You know, so there was still a lot of things in play that we're working on, so we didn't get caught up in the minutia of the 2 million dollars that were spread out.” Furthermore, the CFO shared his opinion that principals should control how the dollars in their schools are spent. “I think the schools need some ability to say, hey, I'm going to spend it this way. Give them some latitude with how they're going to run their building. So it's just not, we had bigger fish to fry.”

As noted earlier, there is concern among some central office administrators that the principals are not up to the task of budgeting. One interviewee made the allegation that, prior to the implementation of the zero-based budget process, “secretaries ... would do those budgets.” Principals disagreed with this characterization. One principal described the following process: “They gave us a number and then we can divide that up among different budget codes as we believe it will fit for our school. Like I can decide how much I'm putting in textbooks, how much I'm putting in technology, how much I'm putting into art.”

The allocation of PA-Pact funds provides another vivid example of the dysfunction in the relationship between school level administrators and central office administrators. None of the principals interviewed were involved in decisions regarding the allocation of these funds. They were also unaware of the link between benefits

and/or resources directed to their schools and the new PA-Pact dollars; one principal said that she thought the dollars might be tied to district-wide initiatives, like literacy and math coaches. Contrary to these reports, the CFO said that it had been necessary to involve the principals because of the strict requirements tied to the new funds. “A year ago we went through and met with every principal over their budget. So principals ... had a voice.” The conclusions that can be drawn from the interviews with both district administration, principals, and program leaders is that the former Superintendent and the Executive Director of Grants had the most authority in determining how PA-PACT funds were spent, but that there seemed to be no systematic process to involve people in decisions regarding their use. One district administrators said, “It depended on the day.”

No district agenda to guide resource allocation policies beyond horizontal equity. The default for resource allocation in the ASD is horizontal equity as staffing ratios drive funds and staff to schools. However, beyond this, the district does not have a clear focus to guide resource allocation. Additionally, human capital (e.g., teacher efficacy) is not allocated among schools with any sense of a need to provide all schools with either equivalent resources or resources tied to the needs of the school. Without a district agenda to guide their thinking and action, there is a sense of haphazardness among administrators when discussing financial and human resources planning. Beyond staffing ratios to address class size, and requirements built into Title I grants, there are no district-wide policies designed to address resource allocation. Also, while many decisions are made with the general intention of serving all students, evaluation of expenditure data for confirmation is rare. As discussed, many of the dollars that are

spent in specific schools are not tracked to these schools, making it difficult to have a true sense of school operating funds. Furthermore, new grants that come to the district are piled on top of existing budgets. These grants may be disbursed to address specific needs and/or to address deficits. When funding dries up, the district often continues to fund the program. There is also a lack of data on human capital resources at each school. Information on teachers, administrators, and support staff are not readily available for review, making it difficult to address the deficiencies in teacher quality among schools.

A central office administrator described the district as being myopic at times, driven by the immediate crisis. “[We] throw money at it, do this. Get this teacher over there, get this extra person.” The result is “[mission] creep.” With no clear district-wide mission to address resource allocation, some principals are able to fill the void by successfully advocating for their schools – and some are better at it than others.

“And some of it is about principals and how good a politician they are, and campaigners they are, for things. Because that's the way I saw my role as a principal... It's my job to get resources [for my school] just like it is the superintendent's job to get resources in this district. You get everything you can get coming this way. I mean, you just do as long as it's not ... unethical or immoral or illegal. You do everything you can do to make a favorable situation for your district or your building.”

Examples of how district policies (or, at times, lack of district policies) impact school-level resource allocation include: how principals spend their discretionary funds; how special education funds are allocated to schools; how professional development is allocated to schools; and, how teachers are hired in the district.

Principal budgets. There is no district requirement that schools spend their budget equivalently in any area, such as books, on the theory that the principal is in the best position to know what is needed in the school. Because of this, the manner in which principals allocate their school budget dollars, and what priorities drive these allocations, vary. One principal mentioned that he tried to put as much money into student materials and professional development as possible. Another principal explained how she worked with her staff to come up with a budget:

“First and foremost, I look at what does my data tell me about the needs of my children? What is the district asking me to do curricula-wise? What are the needs of my staff to implement that curriculum? So I have this and then it becomes a meeting with teachers and saying, ‘OK. Look at your needs as a teacher in order for you to run a highly effective classroom.’ And then I go to my specialized areas and say the same things, ‘what are your needs?’ And then I go into the classroom area, then I go to ... my literacy coach, ... and that's how we develop it. Making sure that everybody understands that this is driven by kids' needs and the mission of where we want this building to go.”

Some of the principals expressed a sense of inequity with regard to how school budget dollars could be spent. A female principal provided an example of one way in which principal autonomy seemed to vary by school. She explained:

“It might be a little different when you meet with some of the guys. You know, they have like flat screens in their office and it's quite interesting. ... Yeah. I don't know that I could get that. Well, first of all, maintenance wouldn't even come hang it for me. ... It's a very macho world out there; very male oriented; gender-biased. Definitely.”

Special education. Another area of the budget not guided by a strong district vision is the provision of special education services. Part of the confusion is due to the structure of the special education program, whereby principals are responsible for

some, but not all, services. One principal reported that the central office determined what special education would look like in his/her building. He explained, however, that if a teacher needed something, “I certainly find the place in the budget to take it out of.” According to the Director of Special Education, special education is an area for which principals seem to go to central office to lobby for more resources. Special education services are funded by a mix of school and special education area budgets; approximately three-quarters or more of the special education staff is paid for out for the general fund. In addition to lobbying for special education grant dollars, principals can use their school budgets to purchase materials for their special education students without the oversight of the district’s special education director.¹¹³ “Sometimes they are not the best of programs, but some salesman came by and gave them a sample. And they don’t know enough about that field” The Director of Special Education also pointed out that principals can allocate dollars in their school budgets to special education; but they also have the authority to move these dollars out of special education to other areas. The Special Education Director explained that district personnel, including building principals, are often unsupportive of special education students regardless of legal requirements. She provided an example: no one from the Special Education office had been included in building renovation discussions even though the special needs students would be heavily impacted and those making decisions were ill-informed regarding the special education students’ needs.

¹¹³ A few years ago there was discussion of setting up a centralized system where all special education budget requests would have to get approval from the Special Education Director. Although favored by the Special Education Director, it never went into operation.

Professional Development. Professional development is another area that is difficult to track to schools, or personnel within schools, because some of the funding comes from “school budgets” and some comes from central office. The central office generally funds a larger portion of all professional development offered. The magnitude of professional development provided by the central office has varied from year to year. One principal explained: “Central office has discretion regarding certain professional development. For example, they choose a program, like an Ohio State system on guided reading, and then they debit the (school) account.” Schools also have some control over professional development to the extent they use their discretionary funds. As with special education, principals are able to choose professional development programs. This adds to the variability among schools. There is no sense among principals or central office administrators of how professional development is tied to the district’s larger mission, and therefore, principals are left to their own devices.

Teacher hiring. The teacher assignment process provides an excellent example of district level policies working against equitable resource allocation. In the 2009-2010 school year, the principal was responsible for identifying potential candidates, conducting all interviews, and checking references. Human Resources Department (HR) would send principals a long list of candidates from which to choose. Alternatively, teacher candidates could send resumes directly to the principal of the school in which they wanted to work, or the principal could choose from candidates attending a job fair. Although these practices seemed to represent general practice, there were times over the years when teachers were transferred between schools. One

principal explained that over the course of his career, “sometimes HR just put people in there. Also, if there was only one candidate for a position [during the school year], you had to take that person.” Another principal felt that the unions had a great deal of control over the process because they could work with the central office to insist upon seniority privileges. Conversely, another principal interviewed said that principals had a great deal of discretion. They could interview as many or as few people for a position as they liked. Then they made a decision and the school board, and central office, rubber stamped it.^{114, 115}

Teachers are not considered a resource. While schools may recognize teachers as individuals with different abilities in the classroom, the district approaches them in a different way. Hiring practices, professional development, and teacher evaluation requirements treat teachers as interchangeable rather than as resources which can differentially impact student outcomes. Additionally, as with school level budgets,

¹¹⁴ At no time were principals involved in discussing salaries with teachers. Salary negotiation has always been conducted with the HR department. Furthermore, principals never consider the financial impacts of a new hire when determining to whom an offer should be made. One principal explained, “I want the best person for the job and if they won't take it [due to financial considerations], then I'll find somebody else.” Central office administrators echoed this point made by principals, that hires were based on “best fit” rather than financial impact. One central office administrator dismissed this approach. He said, “I don't think you could find a strategy that if we can get rid more quickly of our older teachers and get younger ones that save us a bunch of money. I will say that when I was negotiating with the teachers this year because of the economic condition, we did build in retirement incentives with that in mind. When you see retirement incentives built in, that's usually the motivation. But from an instructional point of view, from a missional point of view, from an effectiveness point of view, [this is the wrong tack to take.]”

¹¹⁵ The teacher assignment process changed in the 2010-2011 school year, moving to a centralized system designed to ensure that well-qualified candidates are hired at all schools. The current system includes an initial centralized screening process conducted by the Department of Human Resources. The Deputy Superintendent explained that candidates are awarded points “for various criteria that research demonstrates can make you a strong teacher.” This new screening process includes a writing test and an interview conducted by a team of administrators. The Department ranks candidates for each position and provides principals with a short list of candidates (usually three) from which to choose. Principals can then conduct interviews with these eligible candidates.

little information is available on teachers and their effectiveness, making it difficult to study and address the variability in teacher characteristics among schools.

As discussed earlier in this chapter, teacher hiring practices in the 2009-2010 school year are not consistent with a district mission to ensure the equitable distribution of teachers. The fact that principals had a great deal of discretion in hiring allows for large differences in teaching quality among school faculties.¹¹⁶ It is important to note that district policies are not solely responsible for the allocation of teachers among schools or students among schools. Teachers often choose to work in environments in which they feel they might be most successful, however they personally define that success. The district has no policies in place, such as incentives for working in hard-to-staff schools, to address teacher choice.

Professional development is another area in which the district could exert some influence in ensuring the equitable distribution of teachers. However, there is no effort on behalf of the district to provide professional development to teachers to address inequities in teacher effectiveness. Most often it is at the teachers' discretion as to whether or not to participate and any particular professional development program. To the extent it exists, mandatory, district-wide, professional development is usually unrelated to improving classroom practice.

With regard to staffing, the CFO acknowledged that there were significant differences in human resources costs among the schools, primarily as a result of high

¹¹⁶ A move to a more centralized hiring system, with specific requirement for all candidates, helps to level the playing field. New hiring practices in the 2010-2011 school year does begin to support a more equitable distribution of teachers.

turnover in certain schools leading to a younger, lower paid staff. He explained, “You're hiring all those new teachers at 45,000 dollars. Some schools, they've just been there every year, clicking, making their way up to the 70,000 dollars.” Interestingly, district administrators do not consider staffing costs to be strictly related to teacher quality. In fact, the allocation of teacher quality was not considered to be an issue of concern in the district, the assumption being that all hires were of an appropriate level of quality. The possibility that some teachers are more effective than others was not addressed.

The need to augment resources drives school funding decisions. The ASD is severely underfunded and the need to augment resources drives many school funding decisions. School budgets are composed of a patchwork of funding streams, generally tied to state and federal programs, and each designed to accomplish a certain goal. The goals for the various programs which may overlap, but are often not totally aligned. The range of (often extensive) requirements attached to the use of various funds is a manifestation of this misalignment. These requirements are in place to ensure that policy objectives are attained. However, as the district and the schools within the district may have different aims, the requirements of funding streams often seem arbitrary to school administrators.

The best example of this is Title I, a major revenue stream to schools. This funding source carries strict mandates that hamper the efforts of the school principals to meet their particular goals. This is not surprising, as Title I requires specific set asides for spending (i.e., staff development, parental involvement, and academic

improvement), which often frustrate principals as they may see a greater need in a certain area (e.g., professional development rather than parental engagement) or they wish to spend dollars to support children on staff. One principal remarked:

“So, I must spend 3,100 dollars on parent involvement, even if I don’t need it. And the same with PD; then, academic improvement. I can add to ...[parental involvement and professional development], but I can't take away from those two. So that's a lot of money for staff development unless you're hiring an expensive consultant, which we don't do here. You know, we have a lot of expertise right here.”

Another principal said, “I would give up all these books that are here for a good teacher who can take or find the resources and work miracles with them. OK? And sometimes that’s the problem with funding because they're categorical and you can't necessarily use them for human resources.”

A third principal, at first frustrated with the requirement to spend a certain amount of dollars on professional development, used her Title I dollars to provide staff development in the summer when it did not interfere with teachers’ classroom responsibilities. While this principal was strategic in her use of Title I dollars, her solution is unique as each individual school comes up with a different plan on how to spend their Title I professional development money. The capacity of school principals to use Title I funds most effectively to improve student outcomes seems to vary. In fact, when discussing the impact of Title I across the district, one District Administrator said, “I do think too much independence breeds inconsistency [in] what's being done.”

Another example of financial resources driving district decision making is the design of a plan to spend new state funds. In the 2009-2010 school year, new state

revenues were to be disbursed among schools. These additional funds, a result of the new state funding formula, were intended to supplement existing resources to “improve outcomes for students.” The district was given authority to devise an acceptable plan for spending the money, guided by specific criteria. The Executive Director of Grants & External Funding explained that the use of PA-Pact funds “was determined by a committee. . . . Our superintendent pulled a whole bunch of us in and we studied the rules. We did what we were allowed to do very carefully. . . . funds were supposed to be directed to new initiatives.” According to the district’s Chief Financial Officer, it was ultimately decided that the money be used “to make the district whole.” The new dollars served to “even things out – to make up for the grants that were just going to some buildings.” Another district administrator was frustrated with the focus of the new funds on the secondary schools. Since the elementary schools had received new resources over the past few years, both were likely speaking of the same issue. Despite the result, the process was guided by the objective of spending the money in compliance with the grant’s requirements.

Patchwork funding makes for a messy budget, as the budget office and the external grants and development office must evaluate the district’s revenues and determine how to fit the pieces together so that schools have the necessary resources. This requires a great deal of maneuvering to integrate outside grants into the larger budget. Sometimes, for example, grants cover teachers’ base rate and the district picks up the differential. In other instances, federal and state grants are used in any number of ways to fill holes

when possible; for example, the district figured out how to use State EAP money to pay for extended day kindergarten and tutoring.

The physical and demographic realities of the district also drive decisions regarding the allocation of grant funds. For example, extended day kindergarten programs were placed in buildings with the capacity to hold the additional classrooms, and ESL programs are situated in schools with larger non-English speaking student populations. The Deputy Superintendent explained that the requirements of the grant dictate how the dollars are allocated. "Some of that is not because people are hoarding or trying to control as much 'cause they understood the guidelines and limitations of the money, what the intent is.... And it is the grant people who understand the parameters of the grants." The final result presents a complicated picture that leaves little room for the principals' agendas.

A senior central office administrator had an additional insight: the Superintendent can drive the agenda for seeking funds and allocating them among schools and programs. In Allentown, this influence superseded a pre-determined structured process that included district personnel or a decision-making process based on evidence – from inside and outside the district.

There is little focus on discrepancies in inputs among schools. Allentown is similar to many school districts in that its goals clearly address overall student outcomes (adequacy), but do not speak to how resources can be used to impact these

outcomes.¹¹⁷ This focus on student outcomes is felt throughout the district, while there is no focus on equitable resource allocation.

The early findings of my resource assessment conducted of 2009-2010 expenditures revealed discrepancies among schools in both overall budgets and staffing. Central office administrators were neither alarmed nor surprised by these findings; in fact, they seemed to expect them.¹¹⁸ They were also quick to explain that the reason for the inequities was the “system” rather than individual players. The Deputy Superintendent elaborated this point:

“I think there's an intent to be as fair as possible. But I think there are so many, such a variety of sources of funding and conditions: some schools having the benefit of receiving [certain] grants, other schools having the benefit of [receiving] other grants. Different size[d] grants compounds that and makes it so that it's close to impossible. Theoretically you should do it in some equitable fashion. But ... even then you say, ‘you know what? We could give this school over here with no grant a dollar more because this one has a grant. And they'd still be fat and happy and this would be a little better off.’ So it's very complicated.”

¹¹⁷ ASD Board Goals are available on the school district’s website, at www.allentownsd.org.

¹¹⁸ Administrators were able to identify a number of programs and services that were unequally distributed across the schools. For the most part, administrators were able to provide explanations for the disparities. The CFO suggested that technology was unevenly distributed because the district was “putting on band-aids here and there.” Another central office administrator explained that specific programs, such as Safe Schools, Healthy Students, have a greater presence in some schools than others because the district was trying to address specific needs of the students. Administrators also spoke about staff professional development and as a resource that is not distributed by formula (e.g., number of teachers) or student need. Rather, most professional development is offered to teachers and only those who choose to participate receive the benefit. The Director of ESOL spoke about how she offered training to all teachers in best practices for dealing with English language learners, but many did not participate.

Further questioning led to the acknowledgement of additional resources that are not allocated to schools based on any system of equity. A number of titled positions, including paraprofessionals, secretaries, custodians, and security guards, fell within this category. An administrator said that while the numbers of teachers were equitably distributed among schools, the experience level of teachers is not exactly fairly distributed. She remarked, “I think that [at] some of our poorer performing schools ... there's constant teacher turnover.”

The principals had mixed reactions to questions about the distribution of resources in the district. Two principals had no idea how resources were allocated among schools – and claimed to be unaware of what resources other schools got. One admitted, “I never really thought about it, to be honest with you.” Another principal was quick to point out the uneven distribution of resources, especially support staff. She gave the following examples:

“This is a school of . . . 575 kids and I was told I would have one and a half special education teachers. Leigh Parkway has about 250 kids and they're getting one full-time. We're over twice as big. And I'm only getting 50% more? It makes no sense to me. Title I Reading, we only ever had one. Some of the schools had two and no one could ever, ever, ever give me an answer why. . . . Some schools have had two literacy coaches. We've only ever had one. Some around our size or a little bigger. But we've only ever had one.”

This principal had the sense that she was penalized because her teachers were doing great work and her students were doing well. Another school principal was not bothered by the fact that schools got more resources based on their AYP status (meaning failing schools got more support); she felt this to be an appropriate allocation of resources.

Yet another principal said that he had an advantage because his school has a strong Parent Teacher Association (PTA).

“Personally I do not have an issue because I know how lucky I am at this school. I have a PTA with a very nice budget that helps us out because they don't have Title I funds, so don't have the grant money. I do have the benefit of the PTA and they help pay for programming you know to bring you know, musical programs or art programs in that other schools might have had grant money to do.”

When pushed, all principals pointed to one elementary school as receiving a larger share of resources than the others. (Opinions on whether this was a fair allocation were mixed.) Other administrators in the district, however, felt that this elementary school was considerably under-funded, given the large number of high-need students attending this school relative to other elementary schools in the district. One administrator recalled this school's principal screaming, "Wait a minute! I know I'm the poorest performing and I don't have the same staffing that other schools do. So how is that right? And how can you hold me accountable when ... [I don't have the resources]."

When asked if they received adequate funds to run their schools, the principals interviewed offered a variety of views. One principal was satisfied with the resources allotted to his school. Also, he believed that he had the authority to use the resources as he saw fit to benefit his students.

"I try to look at the big picture. And Allentown being an urban district with ... poverty [at] 77%, whatever it is. I believe that funds are allocated fairly because the schools that need it the most should get it. What I get is adequate for our school. Would I like more? Yes, all right [INAUDIBLE] but basically everything is good. Because of the state budget and the Allentown and the federal budget[s], we are going to have less support, there's less, I won't have the Title I teachers like I had last year. And everybody is going to say the same thing to you. Those are the ones who can take the small groups, do the intensive instruction. We're not going to have those. That's going to impact scores."

Another principal reiterated her view that allocations among schools are fair.

"I mean I really do. I just have to be honest that I don't worry about what other buildings are getting or not getting. I just trust that everybody is getting what they need. I've always looked at the process as fair. I look at people as fair. I don't look at the business office or the supervisors as being unfair or supporting one school over another. If they do, I don't feel it. I'm not aware of it. Maybe they do, I don't know. ... I don't have time to really worry about that, to be honest. But I've always looked at ... [central office administrators], people in

charge of grants and money as being fair. I've never [had a] reason to think they weren't."

Other principals interviewed were less generous towards the central office and its support of the schools. One commented, "Don't cut our resources because we've done well -- and you're going to put them somewhere else. Which is what they did. They cut our reading teachers. My reading teacher gave all my kids, who were barely on grade level or a little below, an additional guided reading lesson every day. Now I don't have her."

Only two central office administrators, the Director of Special Education and the Director of ESOL and World Languages, expressed strong distress over inequities in the district. Their focus, however, is on individual students and not schools. The Director of Special Education feels that resources allocated to serve special education students are not adequate to address their needs. Similarly, the Director of ESOL and World Languages expressed her disappointment that appropriate resources are not directed to ELL students. She was especially frustrated that district officials come to her for assistance in justifying the district's need for grants based on the percentage of Latino students in the district, but then funnel this money into programs that do not support Latino students. She complained,

"Often [the ELL students] got the leftover biology books or whatever was left that no one wanted instead of saying, 'this is our demographic. We need to buy biology books which are helpful for ELLs. And then, if we need AP materials, buy those too - but the majority of our money should go to building the kids up who need a language boost rather than just throwing our resources where we feel like.'"

In my interviews with principals, none expressed the feeling that the amount of their (building budget) allocation was unfair or inadequate relative to other schools. Interestingly, the CFO reported that principals do not ask for larger budgets, perhaps because “people just learn to live with what they get.” The principals corroborated this point; one principal was typical in saying, “I just get a number.” It also seems that principals do not discuss their budget allotments amongst themselves. The CFO thought that this was due to the culture of the school district. Another principal remarked, however, that she felt that sharing this information might put her at a disadvantage.

Community involvement. Another factor that greatly impacts the focus on equity is the lack of community input and control. The public discourse around funding schools in Allentown is barely evident. This is true for the greater Allentown community as well as for the parents of students in the district.

The majority of Allentown residents, including parents, play a very small role in the governance of the school district. This leaves power in the hands of those less sympathetic to public education and to the needs of district students. In the election of school board members, for example, “you're lucky [if] you have enough people to fill the slots.” An interviewee described the electorate as “older, often without children, and concerned about taxes and [maybe] whether there are enough books [in the schools] if they're concerned about anything.” He went on to say that “the level or scrutiny for school board candidates is rather low.” One administrator pointed out that, “If you look at the composition of the school board versus the demographic in this school, it's very

interesting. I would hesitate to say that ...if our board represented our community, the system would run differently.”

Many of the families with children in the Allentown School District do not play an active role in school governance. One central office administrator said,

“[All parents], and ... I think the ELL parents particularly, are very accepting and they don't question- which is a problem. ... If some of the things happened to my child that happened to these kids, I mean just financially, I mean let's not even go into individual differences, I'd be at board members screaming. But they feel that they don't speak the language and to get up in a public forum..., they just don't complain. And they don't vote.”¹¹⁹

Only one area program director mentioned soliciting community input for decisions regarding district resources. The ESOL Director said, “We always meet with our parent group.... we discuss what we're doing with them. And if they have any suggestions, of course we take it in.” Since there is generally a very limited amount of discretionary money, the true impact of such suggestions is similarly limited.

Summary of qualitative findings. The findings presented above present a picture of how resource allocation decisions are made in Allentown. This picture is, overall, complicated and somewhat haphazard. Firstly, resource allocation can be likened to a black box, in that the district lacks standard practices to disseminate and explain information regarding resource allocation, resulting in a lack of transparency in the budgeting process and leaving stakeholders with no ability to react to funding decisions. There is also an unproductive relationship between the central office and

¹¹⁹ This was the first year (2010-2011) that the community got involved with school budgeting. Committees were set up to provide input as to what programs should be cut or reduced to deal with the large budget shortfall. This was designed to address community unrest related to impending cuts. [It was a political move that did not protect the Superintendent.]

school-level administrators, which thwarts cooperative practices that build on the strengths and knowledge of all participants in the budgeting process. The district seems to lack a clear equity goal to guide resource allocation beyond per pupil staffing ratios—though stakeholders, administration, program directors, and principals may have their own. Even with a clearly stated equity goal, numerous external and internal problems would prevent its realization. Also, the district does not consider teachers to be a resource that is differentially allocated to schools. Another important finding is that the district is driven by the need to raise revenue, and the availability of funds and restrictions on their use guide school funding decisions. Finally, very few stakeholders in the district pay attention to discrepancies among schools as there is a much greater focus on outcomes than inputs. This is reinforced by a lack of community involvement meaning that there is little political support to ensure that students are getting what they need to succeed. All this leads to real discrepancies among schools within the district.

This chapter begins with an overview of the ASD, and describes resource allocation in terms of horizontal equity. Although horizontal equity appears to be the predominant framework for allocating resources in the district, there are numerous instances in which horizontal equity is not achieved among elementary and middle schools (i.e., leadership salaries, FTEs for administrators and paraprofessionals, teacher effectiveness, average years of teaching, novice teachers, school-wide value added). A review of student outcomes by school provides additional perspective, revealing that much of the variability in student outcomes is due to variability among students rather than attending a particular school.

Following this analysis, a review of interviews with district and building administrators brings to light a number of constraints which hamper district administrators. First and foremost, there is a severe lack of resources to distribute across the entire district. Beyond this large hurdle, district policy is not designed to address student needs when allocating resources. This has meant that funding decisions are often made based on a desire to augment the budget, putting grant compliance at the center of the district's agenda for resource allocation. In addition, district policies related to human capital management are at odds with an equitable distribution of resources. Furthermore, lack of transparency and a weak relationship between building and central office administrators impede progress towards greater equity. Finally, few stakeholders inside or outside the district focus their attention on discrepancies among schools. All this plays a part in the inequity of the district's resource allocation.

The following chapter draws from a wealth of data on expenditures and human capital resources gathered from the district's budget, human resources, accountability, student services, and grants offices. In it, I add to the description of resource allocation in Allentown presented above to consider intradistrict equity using both the vertical equity framework and the comprehensive equity framework presented in Chapter Two.

CHAPTER 6 – QUANTITATIVE ANALYSIS AND RESULTS

Overview

This chapter provides an analysis of equity within the ASD. This analysis builds on the equity frameworks set forth earlier in this dissertation, presenting evaluations of adequacy, vertical equity and, lastly, comprehensive equity, which incorporates concepts of adequacy and vertical equity. In order to further test measures of equity, I conduct a simulation of resource allocation to study the school-level implications of a change in resource allocation consistent with both vertical equity and comprehensive equity. Finally, the impact of the 2009-2010 ASD resource allocation is reviewed, with additional analysis provided to clarify the relationships among school resources, school need, school-level student outcomes.

Equity Findings

Comprehensive equity integrates both adequacy and vertical equity to ensure that all students obtain the skills and competencies required to participate in a democracy and be economically and socially self-sufficient and to ascertain that, beyond the minimum standards attained, all students are similarly situated to progress according to their competencies and desires. Though the focus of this dissertation is at the district level, this framework can be used as a tool for evaluating resource allocation at various levels – federal, state, district, and school. The following section considers equity among schools within the Allentown School District using the comprehensive equity framework.

The description of resource allocation in Allentown earlier in the previous chapter presents findings on horizontal equity in ASD. While horizontal equity appears to be the predominant framework for allocating resources in the district, there are numerous instances at the elementary and middle schools in which this goal is not achieved (i.e., leadership salaries, FTEs for administrators and paraprofessionals, teacher effectiveness, average years of teaching, novice teachers, school-wide value added). Comprehensive equity requires that resource distribution meet a higher standard than horizontal equity, which calls for having all schools receive equivalent resources based on census alone. My analysis looks at three distinct measures of equity: adequacy (and relative adequacy), vertical equity, and comprehensive equity - a combined measure that assumes that resources should be allocated to ensure that all students reach a minimum threshold of competency and to address student needs that are morally arbitrary (e.g., poverty and ELL status).

Adequacy. Adequacy is achieved when all students meet a predetermined threshold. For this analysis, I compare schools against use the definition of adequacy embraced by the Commonwealth of Pennsylvania. A limitation of this approach is that the data available provides proxies for “adequacy” that may not tell the whole story of a students’ achievements and ability to be successful economically, socially, and function as a successful citizen. In lieu of the perfect measure, I use what is readily quantifiable and collectable, including a number of outcome measures that are available from the school district and/or state. The first of these outcome measures is test score results on the state assessment. As this assessment has been designed to measure student

competency as predetermined by the state, it serves as a viable proxy for academic achievement, and is intended to be a rough stand-in for economic success. The design of No Child Left Behind legislation further supports my contention that the state assessment is an appropriate measure, as the state and districts use the assessment to support the identification of students who are not “proficient” – or “not meeting adequacy requirements.”

Additional measures of adequacy include measures that are designed to fulfill other goals of public education, such as ensuring social success. Three pieces of data are readily available to provide measures of social success: in-school suspensions, out-of-school suspensions and attendance. Although these data are insufficient to address the complete range of outcomes related to the goals of public education, they do provide a starting place. Additional data on student outcomes regarding social success and citizenship would be more difficult to gather, but could be collected through student surveys and other qualitative measures.

Academic Achievement. For the purposes of this study, the primary measure of adequacy is the proportion of students who meet a pre-determined standard, such as scoring “proficient or above” on an assessment. The following figures provide data on elementary and middle schools and the percentage of their students deemed adequate. Figures 24 and 25 identify students by poverty, ELL, and special education status.

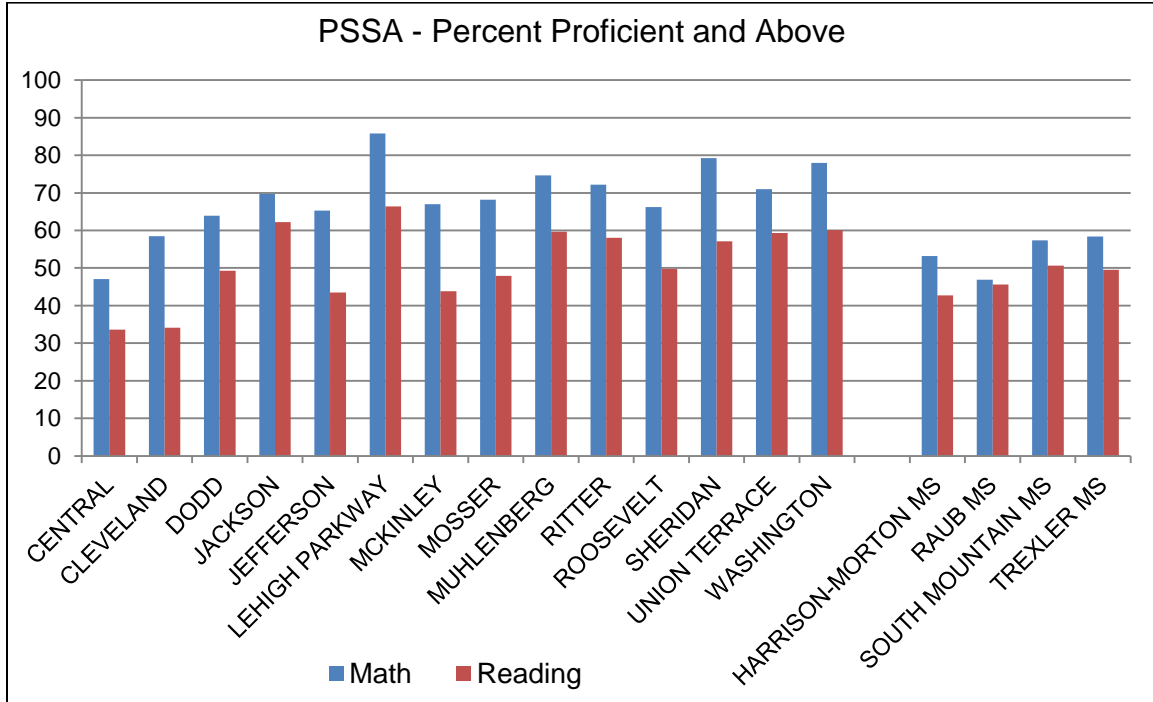


Figure 23. Percentage Proficient and Above on PSSA (Math and Reading), by School, SY2010

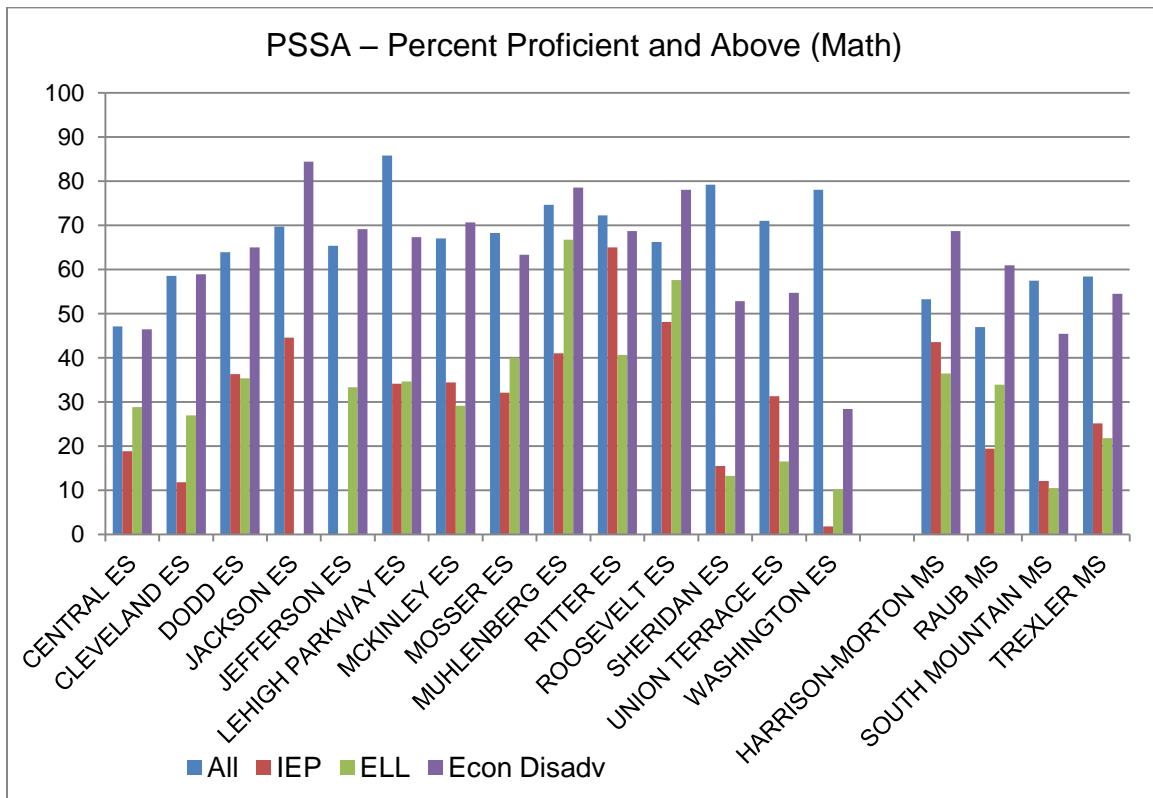


Figure 24. Percentage Proficient and Above on PSSA (Math), by School and Subgroup, SY2010

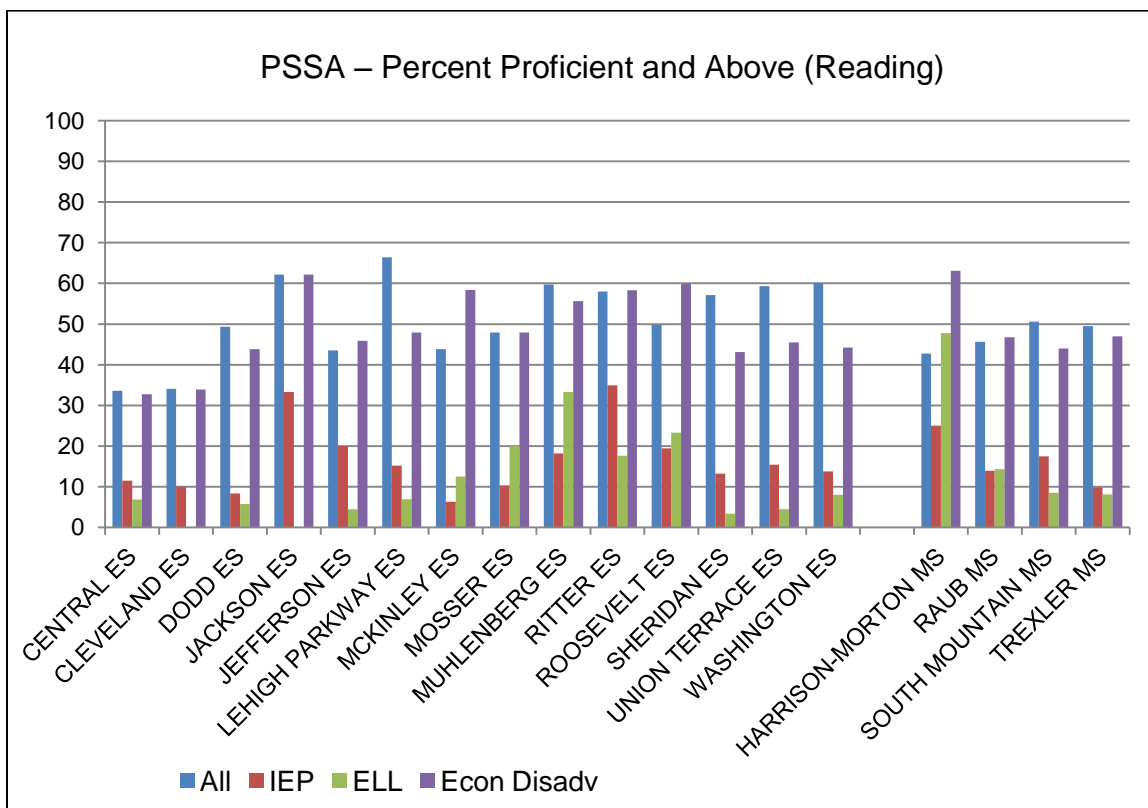


Figure 25. Percentage Proficient and Above on PSSA (Reading), by School and Subgroup, SY2010

Clearly, there is much variation among schools with regard to the academic success of their students. There is also variation among different subgroups of students within the school district. There could be many reasons for these inequities, some related to student characteristics (e.g., preparation, parental support) and some related to school inputs. Adequacy requires that the school address all the needs of the children to ensure that they attain proficiency.

Another way to measure adequacy is to take into consideration “relative adequacy.” Relative adequacy is achieved if the adequacy deficit in each school (average distance from proficiency) is equivalent. Measures of relative adequacy

include range - the difference between the value of the smallest and the largest adequacy deficit - and the Coefficient of Variation (CV) - the standard deviation divided by the mean of all adequacy deficits. This measure would be a useful tool in evaluating and comparing multiple school districts.

Table 20. Adequacy Deficit for ASD Academic Achievement, SY2010

Academic Achievement Adequacy Deficit - Math (2009-2010)				
	All students	Spec. Educ.	ELL	Econ. Disadvantage
<u>Elementary Schools</u>				
Range	38.70	65.00	66.70	56.00
CV	0.30	0.26	0.26	0.40
<u>Middle Schools</u>				
Range	11.50	31.40	25.90	23.30
CV	0.11	0.18	0.16	0.23

Academic Achievement Adequacy Deficit - Reading (2009-2010)				
	All students	Spec. Educ.	ELL	Econ. Disadvantage
<u>Elementary Schools</u>				
Range	32.80	28.60	33.30	29.50
CV	0.21	0.10	0.11	0.18
<u>Middle Schools</u>				
Range	7.90	15.20	39.70	19.10
CV	0.07	0.08	0.24	0.17

An analysis of how the adequacy deficit is distributed among schools reveals a large difference between the percentage of students reaching proficiency in the school closest to and furthest from meeting the adequacy target. Also, the gap between current proficiency levels and the adequacy target is differentially distributed among schools. Further, when looking at subgroups of students, achievement of Hispanic students and ELL students stand out as being most uneven across schools. Differential outcomes

may be driven by purposeful grouping of students (e.g., IEP). Further research could address this concern.

The following figure provides another measure of adequacy which is calculated by the state. Adequate Yearly Progress (AYP) is a measure of the number of the students in each school who meet a predetermined benchmark which the state has deemed to represent an adequate level of academic proficiency. This figure may be misleading, however, as the larger elementary schools, due to their size, are more likely to be required to report on subgroups of students that are prone to struggle with the state assessment (e.g., ELL students).

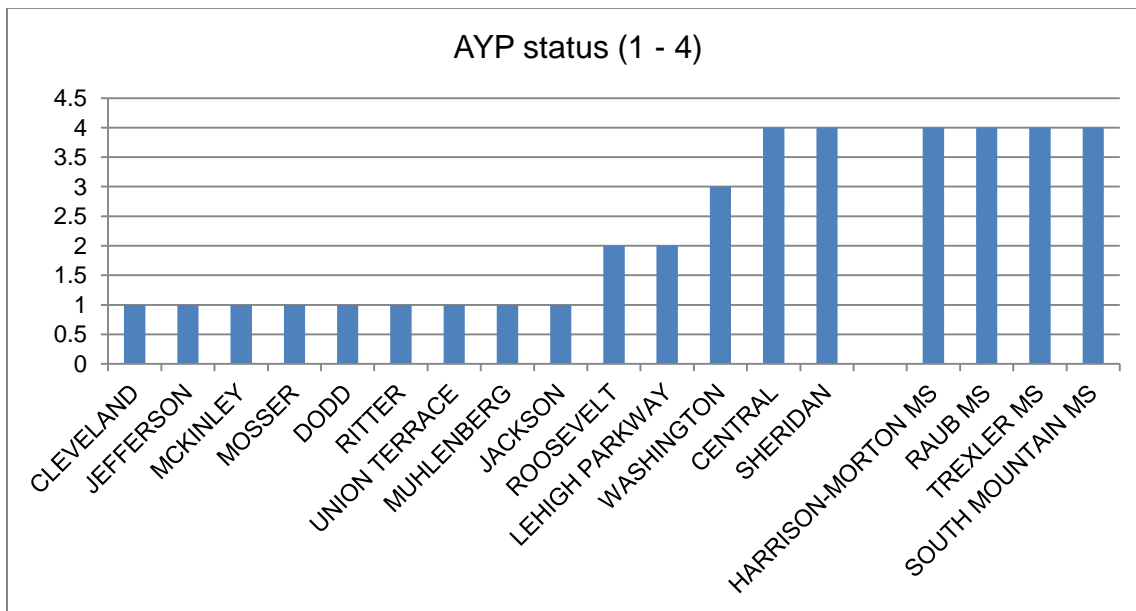


Figure 26. AYP Status, SY2010

Note. Level 1 = Making AYP; Level 2 = Making Progress; Level 3 = Warning; Level 4 = Corrective Action

Additional outcome measures considered for adequacy. Schools are expected to serve purposes beyond ensuring academic achievement, including preparing children for their adult lives as political, economic, and social beings. It is useful to consider

such purposes when determining adequacy, but this is difficult in most districts, as the available data is sparse. The only reliable outcomes data that the ASD collects is attendance and suspensions. The following table provides measures of dispersion to demonstrate the variation among schools, most notably with in-school and out-of-school suspensions.

Table 21. Adequacy Deficit for ASD Non-Academic Achievement, SY2010

	Non-Academic Achievement Adequacy Deficit (2009-2010)			
	AYP status (1-4)	In-school suspensions	Out-of-School Suspensions	% absences (ADA/ ADM)
<u>Elementary Schools</u>				
Mean (SD)	1.71 (1.14)	9.29 (13.57)	35.86 (41.46)	0.94 (0.01)
Range	3.00	45.00	150.00	0.03
CV	0.66	1.46	1.16	0.01
<u>Middle Schools</u>				
Mean (SD)	4.00 (0.00)	1018.75 (417.77)	479.50 (359.07)	0.93 (0.00)
Range	0.00	1010.00	703.00	0.01
CV	0.00	0.41	0.75	0.00

Additional adequacy measures provide a means of evaluating student outcomes that go beyond academic achievement. The outcomes measures collected by the ASD that do not directly tie to academic achievement are suspensions and absences. Figures 28 and 29 depict the how these outcomes measures vary by school. In the 2009-2010 school year, Central Elementary School had a much higher percentage of suspensions than other elementary schools and Harrison-Morton Middle School had a much higher percentage of suspensions than other middle schools. Alone, this data does not explain what is happening in the school. For example, it is not possible to discern from this data if the children in the school are more prone to serious behavior problems or if the school's discipline policy is more severe. It is also impossible to know the impact of suspending these students without looking at previous and future data. On the other

hand, the data does provide an initial indication of a potential problem that deserves investigation.

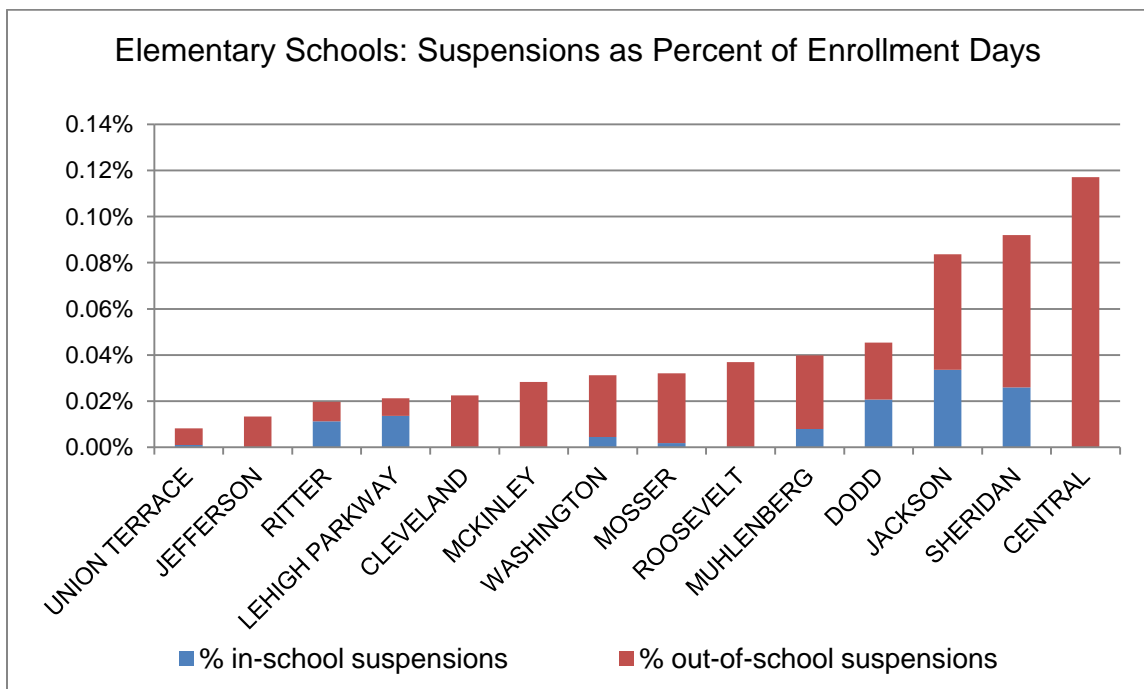


Figure 27. In-School and Out-of-School Suspensions as a Percent of Enrollment Days (Elementary Schools), SY2010

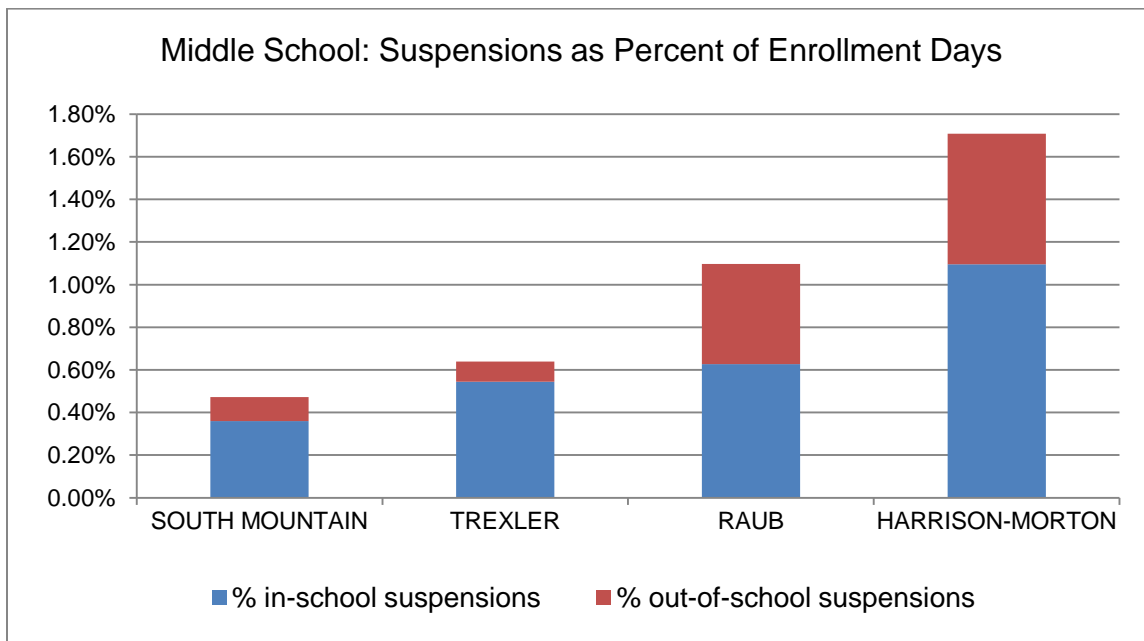


Figure 28. In-School and Out-of-School Suspensions as a Percent of Enrollment Days (Middle Schools), SY2010

School absences provide another means of evaluating schools. Students are much more likely to be successful, academically and socially, if they attend school regularly. There may be legitimate reasons for differences in absences among schools but, in instances where the variation is large, further investigation is warranted.

Although there is some variation in school absences by school, the variation is small.

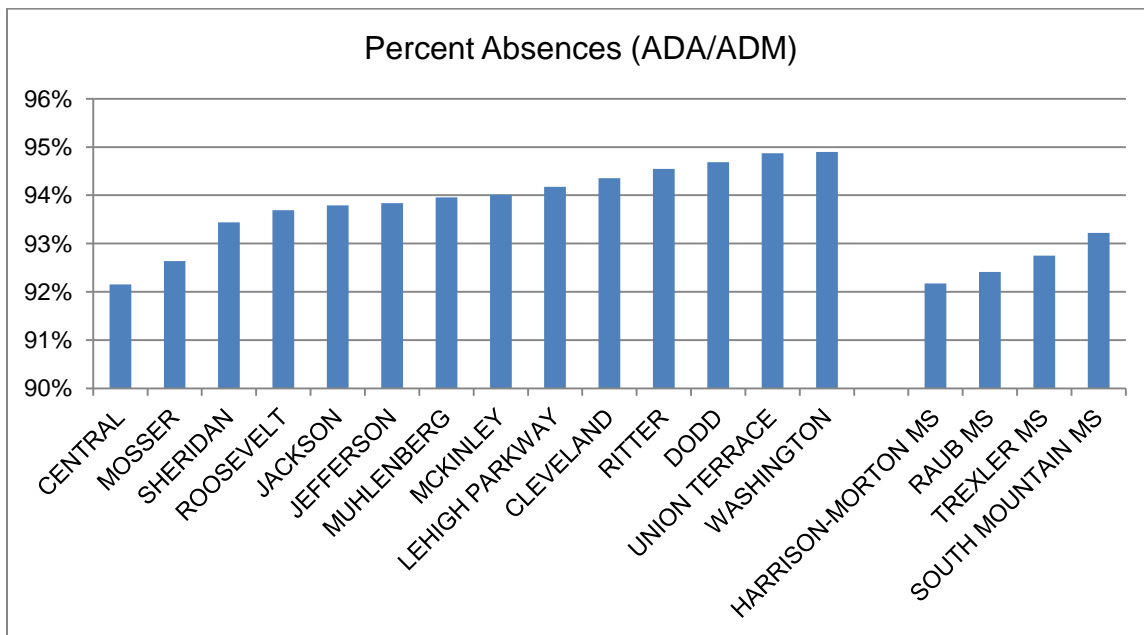


Figure 29. In-School and Out-of-School Suspensions as a Percent of Enrollment Days (Elementary Schools), SY2010

Vertical Equity. Allentown achieves vertical equity if resources are allocated to schools based on the differing needs of the students in the school. As described in Chapter 3, vertical equity is evaluated through the creation of an index of needs at each school. An index for each building was created to account for the number of students in poverty (as determined by Free and Reduced Price Lunch status), the number of ELL students, and the number of students with disabilities. I identify these particular needs – poverty, ELL status, and special education status – because they are considered by the Pennsylvania Department of Education in allocating funds to all districts within the state. In fact, this index is derived from the same weights that the state had used to

allocated public dollars.¹²⁰ This needs index is correlated with various school resources to elucidate the relationship between a school's need (as determined by the composition of the student body) and the quantity and/or quality of inputs into the child's education.

I consider the same resources when establishing the extent of horizontal equity in the Allentown School District as in the analysis of vertical equity. As stated above, these resources can be categorized into expenditures and human capital resources. Expenditures include total operating funds, operating funds intended to be directed to address the needs of students in poverty, and operating funds intended to be directed to address the needs of ELL students. Expenditures also include salaries, aggregate as well as for specific responsibilities (i.e., instruction, support and professional development, leadership, operations and maintenance, and pupil services). Human capital resources include various measures of, or proxies for, teaching quality. The indicators identified for this study include average salaries for core and non-core teachers, professional development, FTE's (with measures of students per staff, students per teacher, students per administrator, and students per paraprofessional). Closely tied to the review of FTE's at the school level is a review of average class size at each school. Additional measures of teaching quality include teacher effect (based on teacher-level value added scores), teacher self-efficacy (for classroom management, student engagement, and instructional strategies), average years of teaching experience, the percentage of teachers in a building with less than three years of experience, the percentage of

¹²⁰ These weights were put forth in the Costing-Out Study Report funded by the PA legislature and adopted by the Rendell administration.

teachers in a building with more than four years of experience, and the percentage of teachers with a masters or above. Finally, three school-wide measures of teaching quality are also considered: the schools growth index for math and reading and collective efficacy.

Vertical Equity Analysis. Two analyses were conducted to evaluate vertical equity: one among elementary schools (n=14) and one among middle schools (n=4). Due to the small sample size, there are fewer statistically significant results than might otherwise be expected; this effect is exaggerated in the analysis of middle schools. Statistically significant positive correlations would indicate that there is a measurable relationship between resources and school need, and as need increases, so do resources. Statistically significant negative correlations would indicate that there is a measurable relationship between resources and school need, but as need increases, resources decrease.

Table 22. Needs Index for Elementary and Middle Schools in Allentown, SY2010

School	Needs Index
Lehigh Parkway	1.35
Ritter	1.40
Muhlenberg	1.41
Union Terrace	1.42
Sheridan	1.42
Roosevelt	1.45
Jackson	1.46
Washington	1.50
McKinley	1.51
Dodd	1.51
Cleveland	1.51
Mosser	1.53
Central	1.54
Jefferson	1.54

Table 23. Vertical Equity among Elementary Schools in ASD, SY2010

Resources Allocated among Schools	Elementary Schools	
	Correlation Coefficients	Horizontal Equity post Vertical Equity
Financial Resources		
Operating Funds (PPE)	.24	94%
Poverty Spending (PPE)	.15	98%
ELL Spending (PPE)	.48**	77%
Discretionary Bldg Funds (PPE)	-.41*	83%
Title I Funds (PPE) - all schools	-.11***	99%
Title I Funds (PPE) - excluding Sheridan	.92***	100%
Teacher Support		
Professional Development (PPE)	.00	100%
Human Capital Salaries		
Total Salary (PPE)	.29	91%
Instruction Salaries (PPE)	.38*	86%
Instruction Support/PD Salaries (PPE)	.01	100%
Leadership Salaries (PPE)	-.22	95%
Operations/Maintenance Salaries (PPE)	-.05	100%
Pupil Services Salaries (PPE)	.22	95%
Average Teacher Salaries		
Core Teachers	-.22	95%
Non-Core Teachers	.30	91%
Special Populations Teachers	-.30	91%
All Teachers	-.22	95%
Full Time Equivalents (FTEs)		
Students per staff	-.50**	75%
Students per teacher	-.56***	69%
Students per administrator	.08	99%
Students per paraprofessional	-.21	95%
Average class size (w/o 100% SPED)	-.08	99%
Individual Measures of Teacher Quality		
Low teacher effect (district gain)	.35	88%
High teacher effect (district gain)	-.56***	69%
Teacher Efficacy-Classroom Mgmt	-.50**	75%
Teacher Efficacy-Student Engagement	-.23	95%
Teacher Efficacy-Instructional	-.36	87%

Strategies		
Avg. years of teaching exp.	-.47**	78%
% of teachers w/ less than 3 yrs exp.	-.10	99%
% of personnel w/ Masters or above	-.22	95%
School-wide Measures of Teacher Quality		
Growth Index (Math)	-.01	100%
Growth Index (Reading)	.11	99%
Collective Efficacy	-.56***	68%

Note. *** $p < .05$, ** $p < .10$, * $p < .20$

Table 24. Vertical Equity among Middle Schools in ASD, SY2010

	Middle Schools	
	Correlation Coefficients	Horizontal Equity post Vertical Equity
Resources Allocated among Schools		
Financial Resources		
Operating Funds (PPE)	.39	85%
Poverty Spending (PPE)	.54	71%
ELL Spending (PPE)	.34	89%
Discretionary Bldg Funds (PPE)	.87*	24%
Title I Funds (PPE)	.57***	68%
Teacher Support		
Professional Development (PPE)	-.74	45%
Human Capital Salaries		
Total Salary (PPE)	.37	86%
Instruction Salaries (PPE)	.57	68%
Leadership Salaries (PPE)	-.94**	12%
Operations/Maintenance Salaries (PPE)	-.91**	17%
Pupil Services Salaries (PPE)	-.24	94%
Average Teacher Salaries		
Core Teachers	-.04	100%
Non-Core Teachers	.09	99%
Special Populations Teachers	-.67	55%
All Teachers	-.17	97%
Full Time Equivalent (FTEs)		
Students per staff	-.82*	33%
Students per teacher	-.57	68%
Students per administrator	-.86*	26%
Students per paraprofessional	-.15	98%
Average class size (w/o 100% SPED)	-.47	78%

Individual Measures of Teacher Quality		
Low teacher effect (district gain)	-.20	96%
High teacher effect (district gain)	-.17	97%
Teacher Efficacy-Classroom Mgmt	-.56	69%
Teacher Efficacy-Student Engagement	-.89*	22%
Teacher Efficacy-Instructional Strategies	-.61	63%
Avg. years of teaching exp.	-.75	44%
% of teachers w/ less than 3 yrs exp.	.90**	19%
School-wide Measures of Teacher Quality		
Growth Index (Math)	.33	33%
Growth Index (Reading)	.62	62%
Collective Efficacy	-.77	41%

Note. *** $p < .05$, ** $p < .10$, * $p < .20$

Of the various financial resources allocated to schools, there are only two statistically significant findings: ELL spending is strongly, positively correlated with school need, $r(12) = .48$, $p < .10$; and the principal's discretionary funds are negatively correlated with school need, $r(12) = -.41$, $p < .20$. Categories of salaries were reviewed to determine their relationship with school need and instructional salaries (making up the bulk of school funding) are found to be positively correlated with school need, $r(12) = .38$, $p < .20$. Interestingly, the number of students per staff, and the number of students per teacher are each strongly, negatively correlated with school need, $r(12) = -.50$, $p < .10$ and $r(12) = -.56$, $p < .05$. As many students per staff or per teacher is not desired, a negative correlation is a good sign, indicating that high needs schools are more likely to have fewer students per staff and per teacher. This finding conflicts with the correlation coefficient for class size and school need, which reveals no statistically significant finding, and does not even indicate a clear direction. The fact that "teachers" are not all "classroom teachers" might explain this finding.

Teaching quality is also a resource distributed among schools considered in this analysis. The teaching quality of individual teachers and the teaching quality of the entire school are investigated, with noteworthy results. Individual measures of teaching quality include effectiveness, self-efficacy, experience, and credentials. High teacher effectiveness, as measured by value-added scores, and school need are strongly negatively correlated, $r(12) = -.56$, $p < .05$. This indicates that the most impactful teachers are less likely to be in high needs schools. Additionally, teacher self-efficacy with regard to classroom management is strongly, negatively correlated with school need, $r(12) = -.50$, $p < .10$. This indicates that teachers more certain of their classroom management skills are less likely to be in high needs schools. Also, average years of teaching experience is strongly negatively correlated with school need, $r(12) = -.47$, $p < .10$. This indicates that schools in which teachers have more years of teaching experience are less likely to be high needs schools. A school-wide measure of teaching quality, collective efficacy is strongly negatively correlated with school need, $r(12) = -.56$, $p < .05$. This indicates that greater collective efficacy is less likely to be seen in high needs schools.

Analysis of the correlations between needs and resources in ASD middle schools is difficult due to the very small sample size; there are very few correlation coefficients which are statistically significant. Of all financial resources allocated to schools, the principal's discretionary budget stands out as being very strongly, positively correlated with school need, $r(12) = .87$, $p < .20$. Leadership salaries and operations and maintenance salaries are negatively correlated with school need, $r(12) =$

$-0.94, p < .10$ and $r(12) = -0.91, p < .10$. This indicates that administrators and facility staff salaries are lower in schools with higher needs. The number of students per staff and the number of students per administrator are each strongly negatively correlated with school need, $r(2) = -0.82, p < .20$, $r(2) = -0.86, p < .20$. As explained above, a negative correlation is a good sign in this case, since it means that high needs schools are more likely to have fewer students per staff and per administrator. Two indicators of teaching quality show statistically significant correlations with school need: teacher self-efficacy with regard to student engagement and the percentage of new teachers (those with less than three years of experience). Teacher self-efficacy with regard to student engagement and school need are strongly negatively correlated, $r(2) = -0.89, p < .20$, indicating that teachers more certain of their ability to foster student engagement are less likely to be in high needs schools. The percentage of new teachers in a school and school need are strongly positively correlated, $r(2) = 0.90, p < .10$, indicating higher percentages of new teachers in high needs schools.

Another means of evaluating vertical equity (and comprehensive equity) entails looking at horizontal equity statistics after taking into account school need. The construction of the needs index allows for each school to have a weighted student count. This, in turn, can be used to considering the allocation of operating funds among schools with differing requirements due to the composition of the student body. Table 25 and Figure 30, which provide horizontal equity statistics and a graphical depiction of the allocation of operating funds, again reveal inequities among schools.

Table 25. Review of Horizontal Equity Statistics for Operating Funds per Weighted Student, SY2010

	Operating Funds per Vertical Equity Weighted Student Count	Operating Funds per Comprehensive Equity Weighted Student Count
<u>Elementary Schools</u>		
Mean	\$ 4,397	\$ 11,372
SD	\$ 3,298	\$ 2,575
Range	\$ 13,170	\$ 7,626
CV	0.36	0.23
MI	0.61	0.86
<u>Middle Schools</u>		
Mean	\$ 1,829	\$ 8,531
SD	\$ 475	\$2,155
Range	\$ 1,057	\$ 4,787
CV	0.26	0.25
MI	0.76	0.94

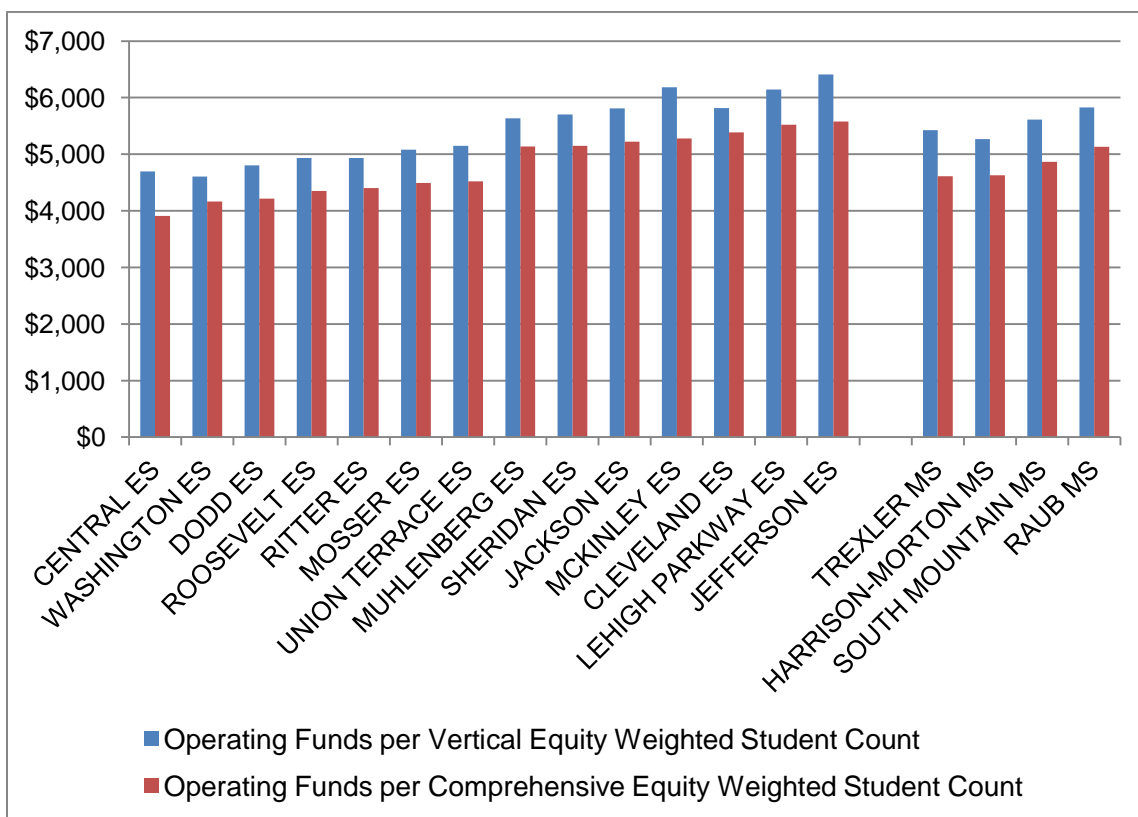


Figure 30. Operating Funds per Weighted Student Count, SY2009-2010

Considering specific needs. I conducted additional analysis to unpack the needs index by considering the number of students in a building identified in a given category (i.e., poverty, ELL status, and special education status) and the corresponding financial resources allocated to each school to specifically address the needs of these students. Simple calculations provide expenditures per student in poverty, per ELL student, and per special education student. As seen in Table 26, horizontal equity statistics demonstrate that expenditures per student in poverty and expenditures per special education student are not allocated equivalently across schools. (For expenditures per student in poverty, this lack of equivalency is more pronounced in elementary school than middle school.) Also, expenditures per ELL student in elementary schools stand out as being highly variable among schools.

Table 26. Review of Horizontal Equity Statistics for Expenditures per Student in Poverty, Expenditures per ELL Student, and Expenditures per Special Education Student, SY2010

	Expenditures per student in poverty	Expenditures per ELL student	Expenditures per special ed. student
<u>Elementary Schools</u>			
Mean	\$ 1,126	\$ 4,397	\$ 11,372
SD	\$ 276	\$ 3,298	\$ 2,575
Range	\$ 986	\$ 13,170	\$ 7,626
CV	0.25	0.36	0.23
MI	0.89	0.61	0.86
<u>Middle Schools</u>			
Mean	\$ 1,333	\$ 1,829	\$ 8,531
SD	\$ 220	\$ 475	\$ 2,155
Range	\$ 485	\$ 1,057	\$ 4,787
CV	0.16	0.26	0.25
MI	0.84	0.76	0.94

Note. Lehigh Parkway is not included in the statistics under Expenditures per ELL student. Only 3.2% of students at this school are ELL status. This outlier skews the results. (The CV = .75 and the MI = .83 with Lehigh Parkway included in the calculation.)

Figure 31 provides information on average poverty spending in each school for every student in poverty. Similarly, Figures 32 and 33 provide information on average special education spending in each school for every special education student and average ELL spending in each school for every ELL student.

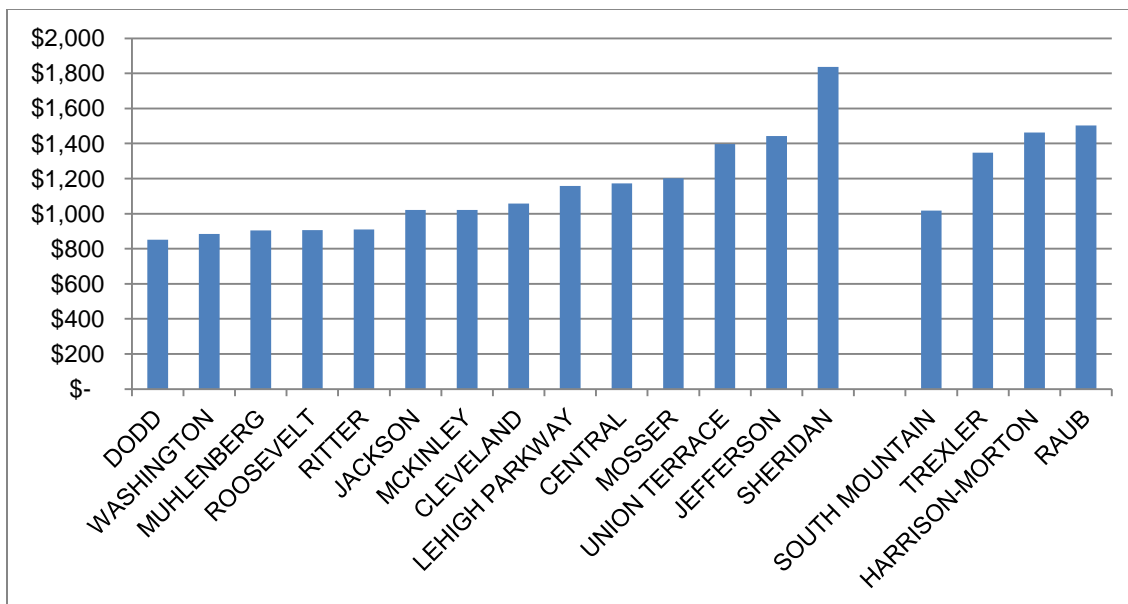


Figure 31. Expenditures per Student in Poverty, SY2010

Note. High expenditures per student in poverty at Sheridan elementary school is due to its high Title I budget (\$820 per student).

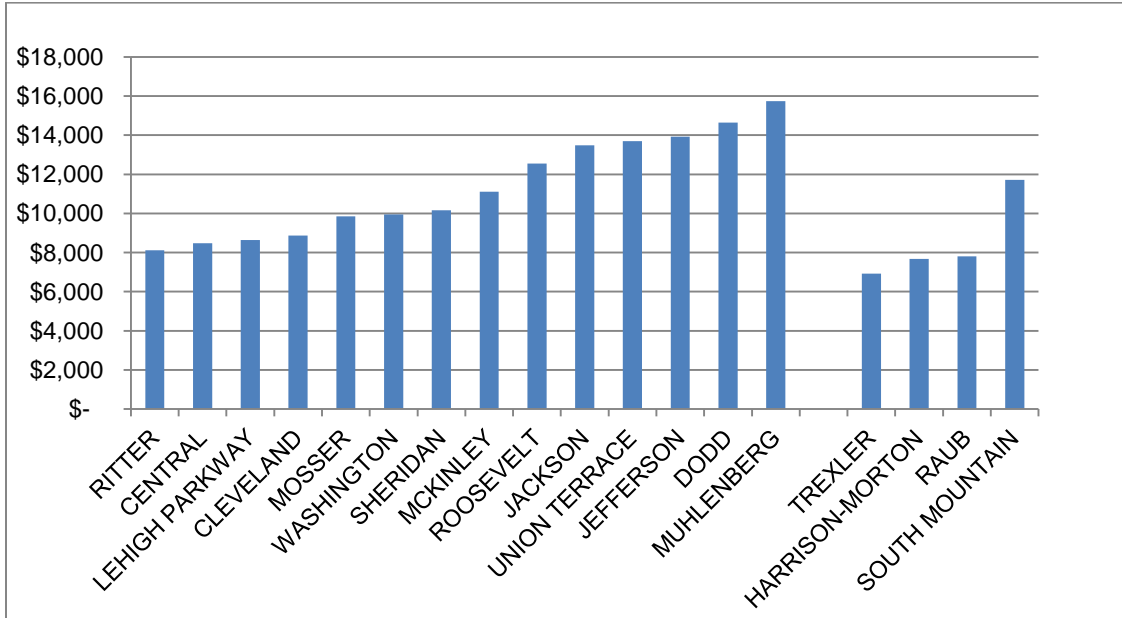


Figure 32. Expenditures per Special Education Student, SY2010

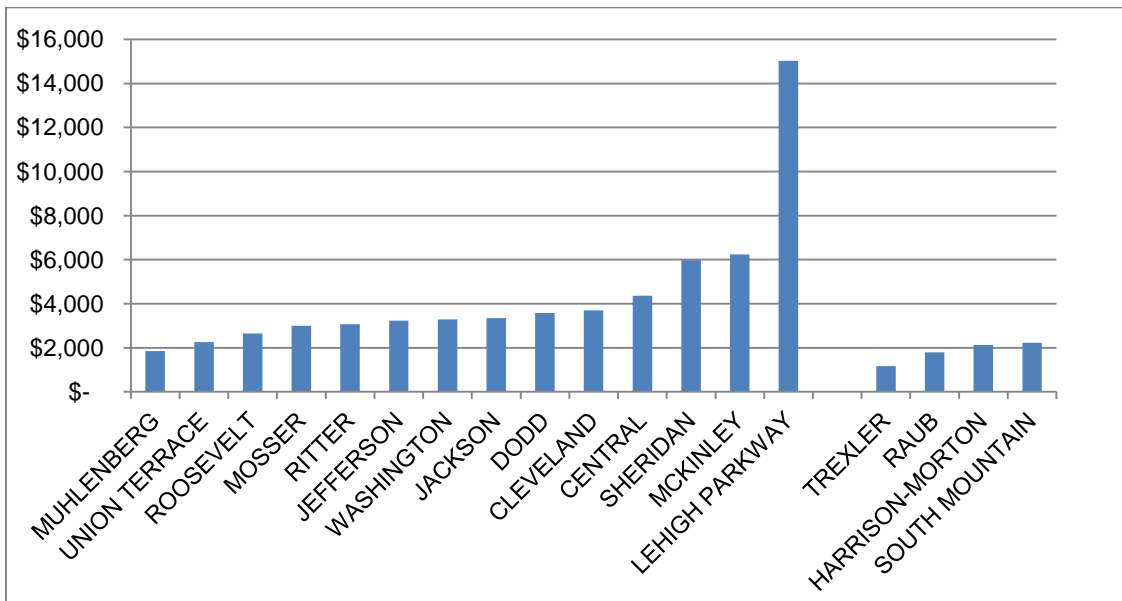


Figure 33. Expenditures per English Language Learner Student, SY2010

Note. Only 3.2% of students at Lehigh Parkway are designated as being ELL status.

My final analysis looks at the relationship between expenditures per high needs student and the percentage of high needs students. This provides a means of evaluating

the extent to which higher need schools are more or less likely to receive supports to address their needs. Correlations between expenditures for students in poverty and the percentage of students in poverty were positive, but not significant (ES: $r(12) = .21$; MS: $r(2) = .80$). This was also the case for expenditures for special education students and the percentage of special education students (ES: $r(12) = .38$; MS: $r(2) = .21$). Lastly, while there was a non-significant, slightly negative correlation between expenditures for ELL students and the percentage of ELL students in middle school ($r(2) = -.08$), there was a significant positive correlation between expenditures for ELL students and the percentage of ELL students in elementary school, $r(14) = .42$, $p < .20$.¹²¹ Only in the case of ELL in elementary schools can an argument be made that schools with greater need due to the portion of ELL students served are more likely to receive funds tied to ELL.

School budgeted dollars versus centrally budgeted dollars. As discussed earlier, analyzing school budgets within districts can be extremely difficult as many expenditures are conducted centrally, even though they are intended to address the needs of specific schools. This means that there is no accounting for where a large portion of resources go. In their analysis of ASD expenditures, Cross & Joftus identified over \$63 million (34% of the entire district budget and 37% of the funds directed to specific schools) that were not tied to specific schools in FY 2009-2010. With input from district administrators, I expanded Cross & Joftus's analysis and was

¹²¹ Lehigh Parkway elementary school was removed from this analysis due to its outlier status.

able to identify the schools in which an additional \$34 million were spent.¹²² My analysis of horizontal equity and vertical equity includes all funds to schools, including both those budgeted specifically at the schools and those budgeted centrally.

In conducting this analysis, I was concerned that centrally-budgeted dollars may be more or less equitably allocated to schools, and that this would be hidden by my aggregate analysis. To address this concern, I include in my analysis the correlation between total expenditures, school expenditures, and centrally-budgeted school expenditures and the school need index. For elementary schools, I find a non-statistically significant positive correlation between school expenditures and the school needs index, $r(12)=.25$. The correlation coefficient is smaller for centrally-budgeted expenditures, $r(12)=.16$. This finding shows more variation among school-budgeted dollars per pupil than centrally-budgeted dollars per pupil in elementary schools. At the middle school level, the correlation coefficients, while not statistically significant, are stronger. A positive correlation is shown between school expenditures and the school needs index, $r(2)=.53$, and a negative correlation is shown between centrally-budgeted school expenditures and the school needs index, $r(2)=-.38$. There is a much larger discrepancy among school-budgeted dollars per pupil and centrally-budgeted dollars per pupil in middle school than elementary school. Overall, the impact of centrally-budgeted dollars on vertical equity is mixed.

Delving into this further requires an investigation of the relationship between specific student needs and centrally-budgeted expenditures to address these needs.

¹²² This includes expenditures directed to the high schools and alternative schools which are not considered in my analysis.

Table 27 provides horizontal equity statistics to evaluate centrally-budgeted expenditures per student in poverty, centrally-budgeted expenditures per special education student, and centrally-budgeted expenditures per ELL student. In elementary schools, centrally-budgeted expenditures per student in poverty and centrally-budgeted expenditures per ELL student are indisputably not equivalently allocated to schools. This is less evident for centrally-budgeted expenditures per special education student. Middle schools reveal a different picture, with greater variation among schools for centrally-budgeted expenditures per student in poverty and centrally-budgeted expenditures per special education student.

Table 27. Centrally-Budgeted Expenditures per Student in Poverty, per Special Education Student, and per ELL Student, SY2010

	Centrally- budgeted expenditures per student in poverty	Centrally- budgeted expenditures per special ed. student	Centrally- budgeted expenditures per ELL student
<u>Elementary Schools</u>			
Mean	\$242	\$5,456	\$265
Range	\$594	\$3,643	\$778
CV	0.72	0.22	0.73
MI	0.85	0.93	0.85
SD	\$173	\$1,211	\$194
<u>Middle Schools</u>			
Mean	\$306	\$2,837	\$103
Range	\$291	\$2,900	\$60
CV	0.40	0.44	0.26
MI	0.81	0.70	0.76
SD	\$123	\$1,252	\$27

As with the review of poverty, special education, and ELL spending, Figures 34-36 provide information on average spending in each school for every student in a given classification (i.e., poverty, special education, ELL), but look specifically at the

dollars that are allocated from the central budget.

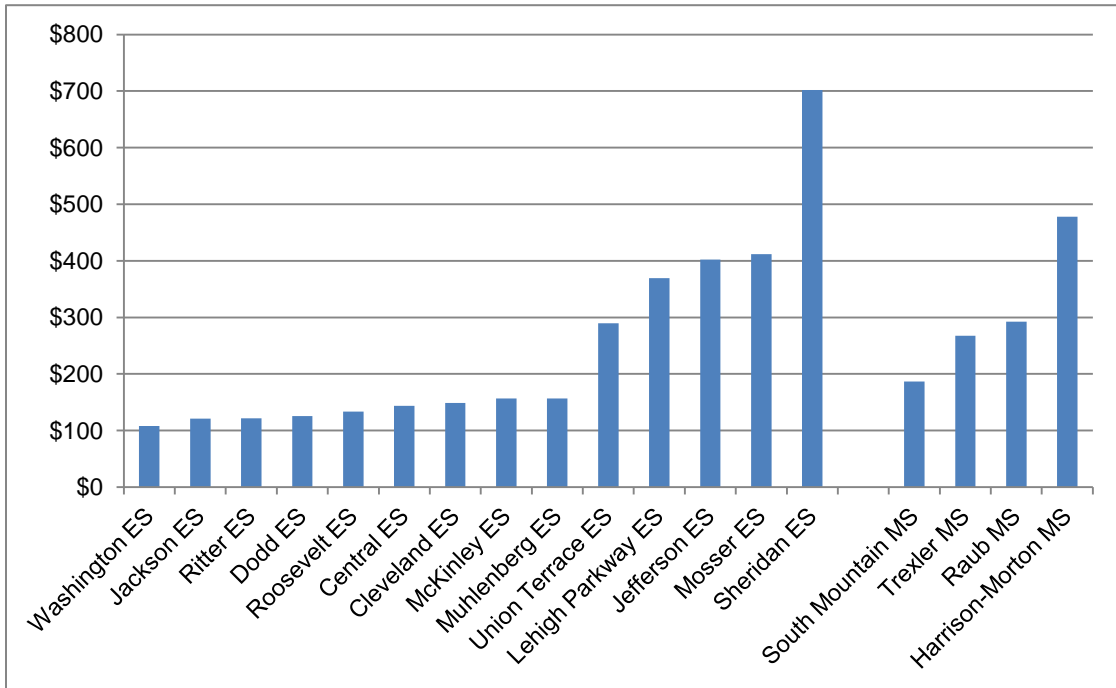


Figure 34. Centrally-Budgeted Expenditures per Student in Poverty, SY2010

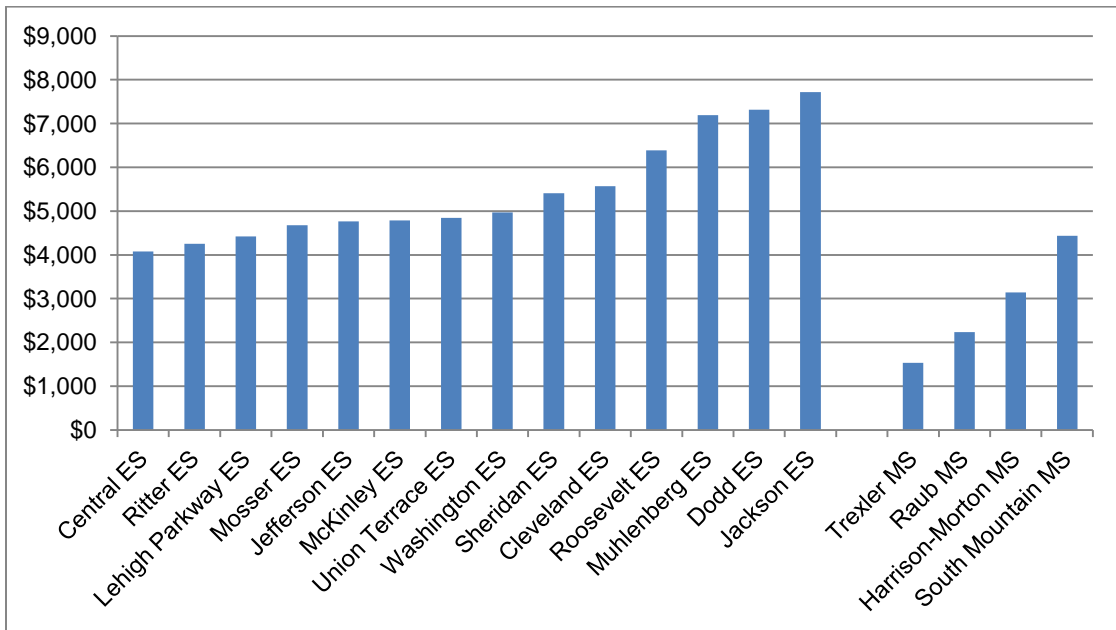


Figure 35. Centrally-Budgeted Expenditures per Special Education Student, SY2010

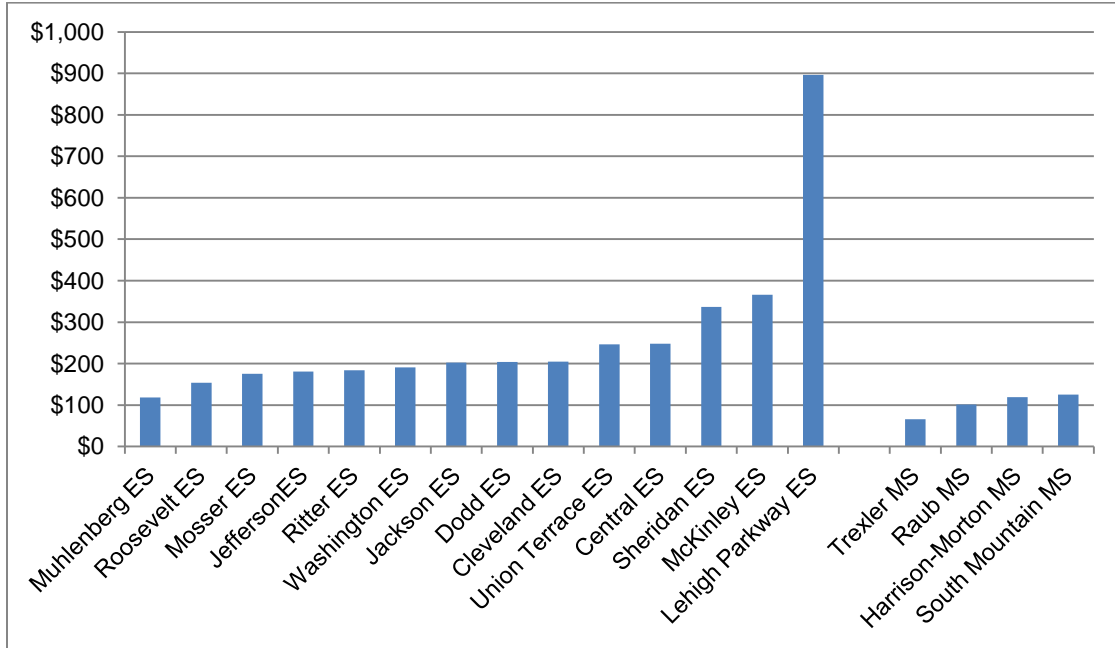


Figure 36. Centrally-Budgeted Expenditures per English Language Learner Student, SY2010

Correlation coefficients provide another means of evaluating the relationship between dollars budgeted at the school and school need and dollars budgeted centrally and school need. As seen in the table below, for elementary schools there are statistically significant, positive relationships between the percentage of students in poverty, the percentage of special education students, and the percentage of ELL students and both school budgeted expenditures and centrally budgeted expenditures dedicated to address the needs of these students. However, the correlation between students in poverty and centrally-budgeted poverty spending is weak, $r(12) = .05$, $p < .05$. At the middle school level, while positive, the correlation between ELL students and both school budgeted and centrally budgeted ELL spending are not significant.

Furthermore, the correlation between special education students and centrally-budgeted special education spending is weak, $r(2) = .03, p < .05$.

Table 28. Correlation Coefficients relating School-Budgeted and Centrally-Budgeted Expenditures to High Needs Students, SY2010

	School- budgeted expenditures	Centrally- budgeted expenditures
<u>Elementary Schools</u>		
Students in poverty	.73**	.05**
Special Education students	.79**	.76**
ELL students	.64**	.60**
<u>Middle Schools</u>		
Students in poverty	.73**	.60**
Special Education students	.79*	.03**
ELL students	.66	.66

Note. ** $p < .05$, * $p < .10$

Comprehensive Equity. The final equity measure is comprehensive equity, which incorporates both adequacy and vertical equity as a means of understanding the implications of resource allocation for students according to which school in the district they attend. Specifically, comprehensive equity can be used to determine whether resources are distributed such that schools composed of students with greater needs (including both students that are not on track to meet standards AND students that “cost” more due to poverty, ELL status, or Special Education status) receive greater resources to address those needs.

This measure is constructed in the same way as the vertical equity measure, through the use of correlation coefficients to identify relationships between school need (using a needs index) and resources allocated to the school. The innovation to the measure of vertical equity in the comprehensive model is the development of the needs index. The needs index for comprehensive equity includes a weight for prior

performance by accounting for the number of students who demonstrated inadequate performance in the recent past. Then, as with the vertical equity needs index, the comprehensive equity needs index takes into account the number of students in poverty (as determined by Free and Reduced Price Lunch status), the number of ELL students, and the number of students with disabilities within a school building. The difference between comprehensive equity and vertical equity is that comprehensive equity takes into account the fact that schools with greater numbers of struggling students will need greater resources. In essence, it seeks to address the goal of having all students achieve “adequacy” at the same time as compensating for students’ “disadvantages.” This construct provides a means of evaluating intradistrict equity as defined in the equity framework.

Once again, the resources considered in the analysis of comprehensive equity are the same as those considered when establishing the extent of horizontal and vertical equity in the Allentown School District.

Comprehensive Equity Analysis. Two analyses were conducted to evaluate comprehensive equity: one among elementary schools (n=14) and one among middle schools (n=4). Again, the small sample size results in fewer statistically significant findings.

Table 29. Comprehensive Equity among Elementary Schools in ASD, SY2010

Resources Allocated among Schools	Elementary Schools	
	Correlation Coefficients	Horizontal Equity post Vertical Equity
Financial Resources		
Operating Funds (PPE)	.17	97%
Poverty Spending (PPE)	.15	98%
ELL Spending (PPE)	.59***	65%
Discretionary Bldg Funds (PPE)	-.32	90%
Title I Funds (PPE)- all schools	-.08***	99%
Title I Funds (PPE) - excluding Sheridan	.88***	100%
Teacher Support		
Professional Development (PPE)	-.16	97%
Human Capital Salaries		
Total Salary (PPE)	.17	97%
Instruction Salaries (PPE)	.23	95%
Instruction Support/PD Salaries (PPE)	-.16	97%
Leadership Salaries (PPE)	-.34	88%
Operations/Maintenance Salaries (PPE)	.02	100%
Pupil Services Salaries (PPE)	.37*	86%
Average Teacher Salaries		
Core Teachers	-.39*	85%
Non-Core Teachers	.37*	86%
Special Populations Teachers	-.34	88%
All Teachers	-.37*	86%
Full Time Equivalents (FTEs)		
Students per staff	-.38*	86%
Students per teacher	-.51**	74%
Students per administrator	.23	95%
Students per paraprofessional	-.05	100%
Average class size (w/o 100% SPED)	-.28	92%
Individual Measures of Teacher Quality		
Low teacher effect (district gain)	.21	96%
High teacher effect (district gain)	-.42*	82%
Teacher Efficacy-Classroom Mgmt	-.65***	58%
Teacher Efficacy-Student Engagement	-.41*	83%
Teacher Efficacy-Instructional Strategies	-.53**	72%
Avg. years of teaching exp.	-.60*	65%

% of teachers w/ less than 3 yrs exp.	-.02	100%
% of personnel w/ Masters or above	-.47**	78%
School-wide Measures of Teacher Quality		
Growth Index (Math)	.22	95%
Growth Index (Reading)	.39	85%
Collective Efficacy	-.65***	58%
Note. *** $p < .05$, ** $p < .10$, * $p < .20$		

Table 30. Comprehensive Equity among Middle Schools in ASD, SY2010

Resources Allocated among Schools	Middle Schools	
	Correlation Coefficients	Horizontal Equity post Vertical Equity
Financial Resources		
Operating Funds (PPE)	.39	85%
Poverty Spending (PPE)	.55	70%
ELL Spending (PPE)	.32	90%
Discretionary Bldg Funds (PPE)	.87*	24%
Title I Funds (PPE)	.58*	67%
Teacher Support		
Professional Development (PPE)	-.74	45%
Human Capital Salaries		
Total Salary (PPE)	.38	86%
Instruction Salaries (PPE)	.57	68%
Leadership Salaries (PPE)	-.93**	13%
Operations/Maintenance Salaries (PPE)	-.92**	16%
Pupil Services Salaries (PPE)	-.24	95%
Average Teacher Salaries		
Core Teachers	-.03	100%
Non-Core Teachers	.09	99%
Special Populations Teachers	-.66	56%
All Teachers	-.17	97%
Full Time Equivalents (FTEs)		
Students per staff	-.82*	33%
Students per teacher	-.56	68%
Students per administrator	-.86*	27%
Students per paraprofessional	-.14	98%
Average class size (w/o 100% SPED)	-.48	77%
Individual Measures of Teacher Quality		
Low teacher effect (district gain)	-.20	96%
High teacher effect (district gain)	-.18	97%

Teacher Efficacy-Classroom Mgmt	-.56	69%
Teacher Efficacy-Student Engagement	-.89*	20%
Teacher Efficacy-Instructional Strategies	-.62	62%
Avg. years of teaching exp.	-.74	45%
% of teachers w/ less than 3 yrs exp.	.90*	19%
School-wide Measures of Teacher Quality		
Growth Index (Math)	.33	89%
Growth Index (Reading)	.60	63%
Collective Efficacy	-.78	40%

Note. *** $p < .05$, ** $p < .10$, * $p < .20$

Of the various financial resources allocated to elementary schools, there is only one statistically significant finding: ELL spending is strongly, positively correlated with school need, $r(12) = .59$, $p < .05$. Categories of salaries were reviewed to determine their relationship with school need and only pupil services salaries are found to be positively correlated with school need, $r(12) = .37$, $p < .20$. Unlike the relationship between the vertical equity needs index that does not take into account prior performance and average teacher salary, the comprehensive equity needs index is negatively correlated with average teacher salary, $r(12) = -.37$, $p < .20$. This indicates that average teacher salaries are lower in schools with greater needs. Interestingly, the number of students per staff, and the number of students per teacher are each strongly, negatively correlated with school need, $r(12) = -.38$, $p < .20$ and $r(12) = -.51$, $p < .10$. Since many students per staff or per teacher is not desired, a negative correlation is a good sign; high needs schools are more likely to have fewer students per staff and per teacher. As is the case with vertical equity, this finding conflicts with the correlation coefficient for class size and school need, which reveals no statistically significant finding, but indicates a similar direction. (A stronger disparity is found when prior performance is excluded from the needs index.)

This analysis investigates the teaching quality of individual teachers and the teaching quality of the entire school as resources which are allocated among schools. Individual measures of teaching quality include effectiveness, self-efficacy, experience, and credentials. High teacher effectiveness, as measured by value-added scores, and school need are strongly negatively correlated, $r(12) = -.42, p < .20$. This indicates that the most impactful teachers are less likely to be in high needs schools. Additionally, teacher self-efficacy with regard to classroom management, student engagement, and instructional strategies are all strongly, negatively correlated with school need, $r(12) = -.65, p < .05, r(12) = -.41, p < .20, r(12) = -.53, p < .10$. This indicates that teachers more certain of their skills are less likely to be in high needs schools. (This finding is more pronounced when considering students' prior performance.) Additionally, average years of teaching experience is strongly negatively correlated with school need, $r(12) = -.60, p < .10$. This indicates that teachers with more years of teaching experience are less likely to be high needs schools. A school-wide measure of teaching quality, collective efficacy, is strongly negatively correlated with school need, $r(12) = -.65, p < .05$. This indicates that greater collective efficacy is less likely to be seen in high needs schools. (Again, this finding is more pronounced when considering students' prior performance.)

Analysis of the correlations between needs and resources in middle schools is especially difficult due to the very small sample size; there are very few correlation coefficients which are statistically significant. The findings for comprehensive equity at the middle school level are almost completely aligned with the findings for vertical

equity. Of all financial resources allocated to schools, the principal's discretionary budget stands out as being very strongly, positively correlated with school need, $r(12) = .87, p < .20$. Leadership salaries and operations and maintenance salaries are negatively correlated with school need, $r(12) = -.93, p < .10$ and $r(12) = -.92, p < .10$. This indicates that administrators and facility staff salaries are lower in schools with higher needs. The number of students per staff and the number of students per administrator are each strongly negatively correlated with school need, $r(2) = -.82, p < .20$, $r(2) = -.86, p < .20$. As explained above, a negative correlation is a good sign in this case as it means that high needs schools are more likely to have fewer students per staff and per administrator. Two indicators of teaching quality show statistically significant correlations with school need: teacher self-efficacy with regard to student engagement and the percentage of new teachers (those with less than three years of experience). Teacher self-efficacy with regard to student engagement and school need are strongly negatively correlated, $r(2) = -.89, p < .20$, indicating that teachers more certain of their ability to foster student engagement are less likely to be in high needs schools. The percentage of new teachers in a school and school need are strongly positively correlated, $r(2) = .90, p < .10$, indicating higher percentages of new teachers in high needs schools.

Table 31 provides a summary of the evidence on the extent to which resource allocation is equitable according to my comprehensive equity measure. The right column indicates the school level, elementary or middle, in which the evidence for each particular resource falls.

Table 31. Summary of Evidence on Equity in ASD, SY2010

	Vertical Equity	Comprehensive Equity
<u>Evidence of equity</u>		
ELL spending per pupil is likely to be greater in high needs schools	ES	ES
Instructional salaries per pupil is likely to be higher in high needs schools	ES	
Pupil services salaries per pupil is likely to be higher in high needs schools		ES
Average non-core teacher salaries are likely to be higher in schools with greater needs		ES
The principal's discretionary budget is likely to be higher in high needs schools	MS	MS
Pupils per staff ratios are likely to be lower in high needs schools	ES, MS	ES, MS
Pupils per teacher ratios are likely to be lower in high needs schools	ES	ES
Pupils per administrator ratios are likely to be lower in high needs schools	MS	MS
<u>Evidence of strong misalignment with equity</u>		
The principal's discretionary budget is likely to be lower in schools with greater needs	ES	
Leadership salaries per pupil are likely to be lower in schools with greater needs	MS	MS
Operation and maintenance salaries per pupil are likely to be lower in schools with greater needs	MS	MS
Average teacher salaries are likely to be lower in schools with greater needs		ES
Average core teacher salaries are likely to be lower in schools with greater needs		ES
The most effective teachers are less likely to be in high needs schools	ES	ES
Teachers more certain of their skills (with regard to classroom management, student engagement, and instructional strategies) are less likely to be in high needs schools		ES
Teachers more certain of their classroom management ability are less likely to be in high needs schools	ES	
Teachers more certain of their ability to foster student engagement are less likely to be in high needs schools	MS	MS
Teachers with more years of teaching experience are less likely to be high	ES	ES

needs schools		
Novice teachers are more likely to be in high needs schools	MS	MS
Teachers with masters degrees or above are less likely to be in high needs schools		ES
Greater collective efficacy is less likely to be seen in high needs schools	ES	ES

As can be seen in this table, there are many resources for which there is either no evidence of comprehensive equity or evidence that there is strong misalignment with comprehensive equity.

Average teacher salaries. As noted in Chapter 2, previous studies on the distribution of average salaries among schools have revealed a mal-distribution of average salaries, with higher average salaries in schools with lower needs. Unlike these studies, my research finds no statistically significant negative correlations between average teacher salary and school need when only poverty, ELL status and special education status are used to define school need. When prior test scores are included in the definition of school need, however, a statistically significant negative correlation is found for core teachers, special population teachers, and all teachers.

Table 32 provides horizontal equity statistics and correlation coefficients for human capital resources to schools in the ASD.

Table 32Table 32. *Horizontal Equity Statistics and Correlation Coefficients for Human Capital**Resources in the ASD, SY2010*

	HE (CV)		VE (corr)		CE (corr)	
	ES	MS	ES	MS	ES	MS
Total salary (PPE)	0.12	0.07	+0.29	+0.37	+0.17	+0.38
Avg. tch sal(all)	0.07	0.05	-0.22	-0.17	-0.37	-0.17
Avg. tch sal(core)	0.08	0.05	-0.22	-0.04	-0.39	-0.03
Avg. tch sal(non-core)	0.16	0.10	+0.30	+0.09	+0.37	+0.09
Students per teacher	0.11	0.07	-0.56	-0.57	-0.51	-0.56
Avg. class size	0.07	0.03	-0.08	-0.47	-0.28	-0.48
Avg. teaching exp	0.24	0.19	-0.47	-0.75	-0.60	-0.74
% of novice teachers	0.39	0.31	-0.10	+0.90	-0.02	+0.90
% teachers with Masters or higher	0.25	**	-0.22	**	-0.47	**

Note: ** indicates that the data is not available. Equity statistics highlighted in yellow indicate “nearly horizontally equitable” and equity statistics highlighted in purple indicate “horizontally inequitable.” Highlighted correlation coefficients indicate statistically significant results.

Average salaries are distributed in accordance with horizontal equity, but not vertical or comprehensive equity as average teacher salaries are lower in high needs schools. This is driven by core teacher salaries given their large numbers. However, correlation coefficients indicating inequity are dampened by average non-core teacher salary which is positively correlated with need, most notably in elementary school.

Further investigation provides additional insight into this finding. Figure 37 offers a view of the distribution of teacher salaries within the two highest and lowest need schools, based on the needs index used to measure comprehensive equity. On average, Jefferson Elementary School and Central Elementary School, the higher-needs schools, have lower teacher salaries than Muhlenberg Elementary School and Lehigh Parkway Elementary School, the lower-needs schools. However, there is considerable variation in all schools. Another important note is that Lehigh Parkway is one of the schools with the highest percentage of teachers with less than three years experience.

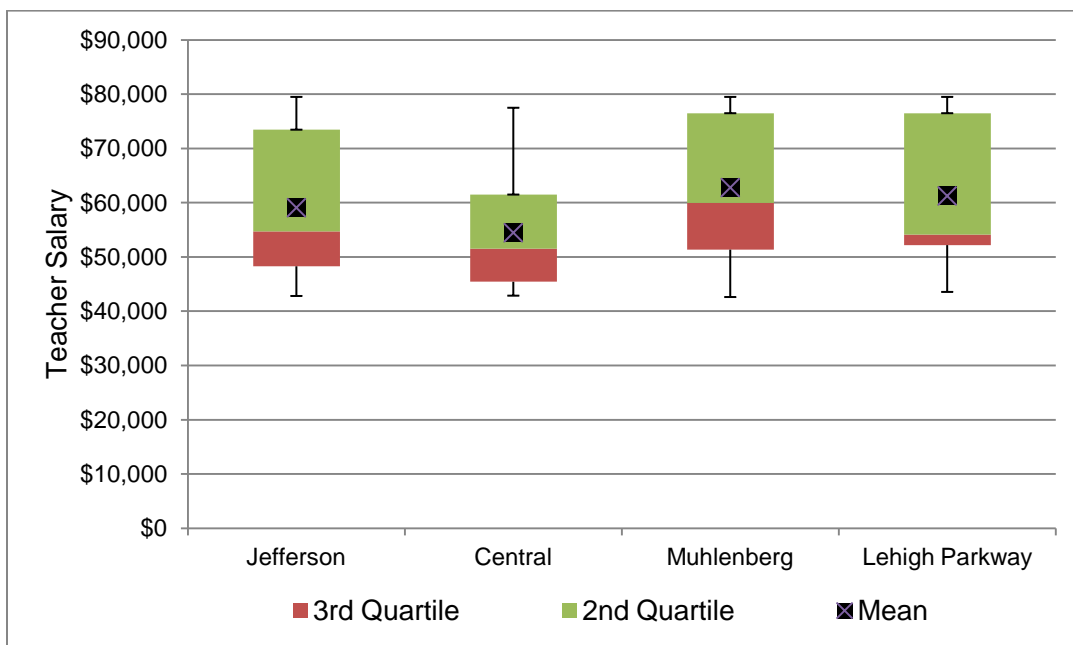


Figure 37: Distribution of Average Teacher Salary within the Two Highest and Two Lowest Need Schools, SY2010

School budgeted dollars versus centrally budgeted dollars. The possibility that centrally-budgeted dollars, as opposed to school budgeted dollars, might be driving inequities remains a concern when considering comprehensive equity. An analysis of the correlation between total expenditures, school expenditures, and centrally-budgeted school expenditures and the school need index reveals findings similar to those in the vertical equity analysis. In this analysis for elementary schools I find a non-statistically significant positive correlation between school expenditures and the school needs index, $r(12)=.20$. The correlation coefficient is smaller for centrally-budgeted expenditures, $r(12)=.15$. The correlations coefficients, while not statistically significant, are stronger at the middle school level. There is a positive correlation between school expenditures and the school needs index, $r(2)=.50$, and a negative

correlation between centrally-budgeted school expenditures and the school needs index, $r(2)=-.35$. Again, this finding indicates that centrally-budgeted expenditures are not allocated to schools in such a way as to take school need into account.

Because the school district does not consider expenditures directly tied to students' past performance, it is not possible to conduct an analysis that looks at the relationship between student needs (in a building) based on prior performance and resources allocated to buildings.

Horizontal equity post vertical equity. As part of the evaluation of vertical equity and comprehensive equity, this analysis attempts to contextualize the findings by providing a measure which quantifies how much of the relationship between the needs indexes and the various resources investigated explains the total variation among resources to schools. Originally conceived to study interdistrict equity to identify discrepancies of resource allocation among similarly situated school districts, the *horizontal equity post vertical equity* (HE_{VE}) measure conveys unexplained variance after vertical equity is taken into account (Toutkoushian and Michael, 2009).

Tables 24 and 25 present *horizontal equity post vertical equity* results. By construction, $0\% \leq HE_{VE} \leq 100\%$, and *horizontal equity post vertical equity* is achieved when $HE_{VE} = 0\%$. Across the board, HE_{VE} is quite high, revealing considerable variation among schools that is not explained by the studied relationships. Only for those statistically significant correlation coefficients is a higher percentage of variation among schools explained. This result is consistent with my qualitative findings which

indicate that allocation decisions are not driven by school need alone, but rather a mixture of policy, administrative, and personal objectives.

Implications of ASD resource allocation

My analysis of Allentown's resource allocation reveals definite inequities among schools. To understand the impact of these inequities on students, it is helpful to look more closely at what additional resources are buying, and similarly, how a reduction in resources impacts different parts of the budget.

Influence of additional resources. It is useful to consider the relationship between operating funds and salaries, since salaries make up the largest part of school resources. Figure 38 illustrates a very strong correlation between the two (elementary schools: $r(12)=.97$; middle schools: $r(2)=.93$).

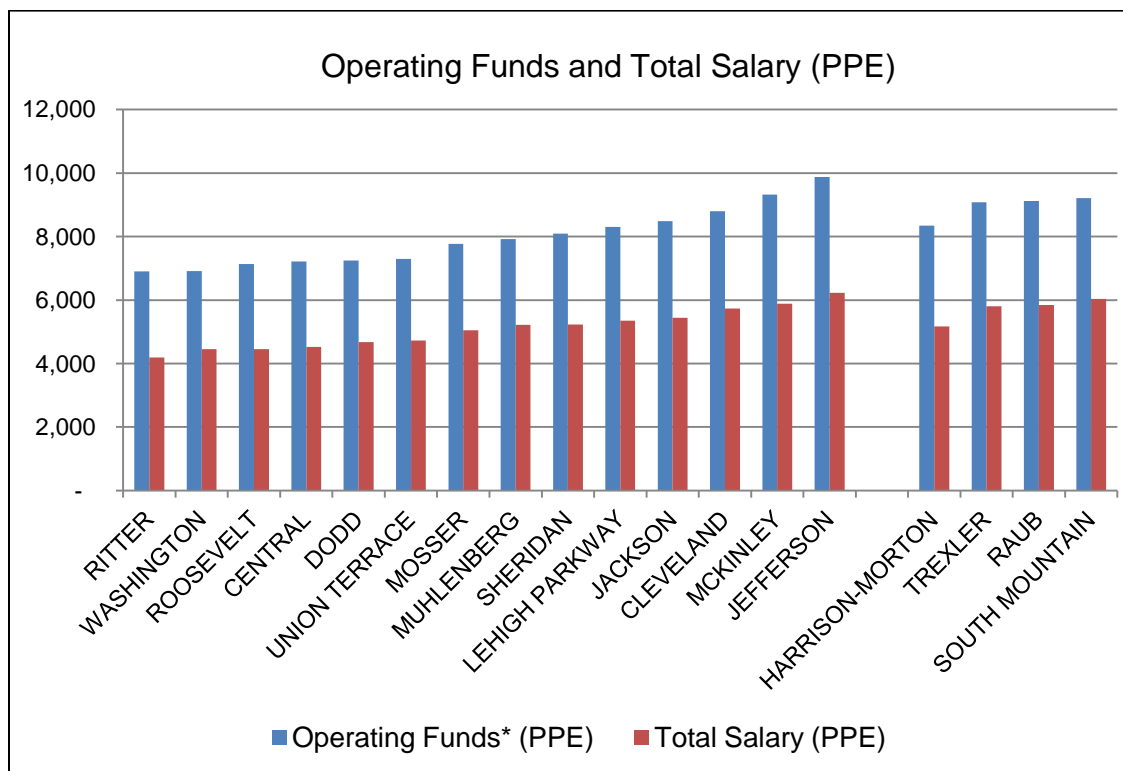


Figure 38. Operating Funds and Total Salary (PPE), SY2010

Note. Includes dollars budgeted at school level as well as dollars budgeted at central, but spent at school level. The discrepancy between total salary at schools and operating funds at schools is exaggerated due to the fact that salary data is not included in centrally budgeted dollars.

One can also consider the relationship between operating funds and other inputs. For example, there are strong negative relationships between operating funds per pupil and students per staff, $r(12) = -.89$ in elementary schools. When other teaching quality resources are tested, however, the correlations are much weaker.

Spending decisions. The data suggests that schools with lower overall financial resources (operating funds) differ from schools with higher overall financial resources in how dollars are spent.

Elementary Schools. On average, school level spending in the fourteen elementary schools in Allentown is \$7,947 per pupil – with a high of \$9,871 per pupil to a low of \$6,901 per pupil. As much of a school’s budget goes to teacher salaries

(with teachers making up a large percentage of the workforce), it is no surprise that extremely strong correlations exist between operating funds and total salaries and instructional salaries; the school with the highest per pupil operating funds also has the highest per pupil total salary; and the school with the lowest per pupil operating funds also has the lowest per pupil total salary. Per pupil salary is driven by both the number of staff in the schools and the salaries of these staff. In Allentown, there are very strong (negative) correlations between operating funds and students per staff, students per teacher, and class size, indicating that operating funds are covering more staff, more teachers, and smaller class sizes. There is also a relationship between per pupil operating funds and average salaries, though not nearly as strong as with class size measures or salaries expenditures.

The lowest funded elementary school in the district spends among the least of all the elementary schools on students in poverty and ELL students. Likewise, the school with the highest per pupil operating funds spends more per pupil for students in poverty and for ELL students.

None of the measures of teacher quality, including individual measures and school-wide measures, show strong correlations with operating funds. So, while schools may be funding teachers in line with their resources, there is no indication that they are funding efforts tied to teaching quality in line with their resources. It is interesting to note, however, that teacher efficacy is lowest in the two schools with the lowest per pupil funding.

Middle Schools. Harrison-Morton MS has noticeably fewer financial resources than the other three middle schools. Across the entire range of resources considered in this study, a number of important inputs were aligned with total operating funds, meaning that HMMS got the smallest portion of all the middle schools. These resources include: discretionary building funds per pupil, total salary per pupil, instructional salaries per pupil, and pupil services salaries per pupil. When considering additional inputs to classroom environment which are thought by to influence student outcomes (i.e., average salaries for core and non-core teachers, students per staff, students per teacher, students per paraprofessional, and class size), HMMS also has the “least” resources (e.g., lowest teacher salaries, largest class size). Additionally, a review of teaching quality measures indicates that the highest percentage of ineffective teachers and the lowest percentage of highly effective teachers, reside in HHMS. Finally, HHMS, as a school, reports the lowest score on the state’s growth index, calculated to indicate a school’s value-add to student learning. Interestingly, of all middle school teachers, teachers at HHMS report the highest self-efficacy with regard to instructional strategies.

Expenditures on staff, teachers in particular, are lowest at a school with fewer resources. Lower average salaries and few educators per student help to explain this phenomenon. One might expect that measures of teacher effectiveness and the school’s overall growth index would, in fact, be lower at a school where fewer resources are dedicated to teachers. However, my findings do not bear this out.

A Weighted Formula Approach – Implications for ASD. In the previous section I examined the variation of resources among schools by looking at the relationship between school need and resource allocation and found that ASD resource allocation, in school year 2009-2010, does not align with a vertical equity framework (based on State weights) or a comprehensive equity framework (based on state weights and weights for prior performance). Now I take another approach: I compare how funds are allocated to schools in school year 2009-2010 to how funds would be allocated to schools had the district based their disbursement of funds to schools on vertical and comprehensive equity frameworks. In essence, I conduct a simulation of what school funding would look like if the district adopted my approach to resource allocation.

School level impact. For the purposes of this simulation, only operating funds for elementary schools and middle schools are considered. This is due to data constraints, as the resource allocation study does not consider resources allocated to high schools, or the needs of their students. The following tables offer two approaches to simulating a weighted funding formula in the Allentown School District. In Table 33, all dollars spent in elementary and middle schools are re-allocated to elementary and middle schools based on the schools' need, given enrollment and characteristics of the students in each school. Table 34 separates dollars spent on elementary schools and middle schools and re-allocates all elementary school dollars to elementary schools and all middle school dollars to middle schools, again based on enrollment and the characteristics of the students in each school. Both tables provide simulation results for Vertical Equity, using the state's weights to evaluate the allocation of resources based

on need, and Comprehensive Equity, using the state's weights along with weights for prior performance. Per pupil expenditures for each school are provided to make comparisons more useful.

Simulation findings offer a hint as to what resource allocation might look like if a weighted formula were employed in ASD, rather than the current approach to resource allocation which is much less deliberate in distributing funds and human capital equitably among schools. In Table 33, where dollars are re-allocated from elementary and middle schools combined, middle schools lose more dollars than they gain under both Vertical Equity and Comprehensive Equity weighted funding scenarios, losing more under Vertical Equity. Under the Vertical Equity weighted funding scenario, ten schools lose funds, with Jefferson Elementary School losing the greatest per pupil amount at \$1,582, and eight schools gain funds, with Washington Elementary School gaining \$1,171 per pupil and Central Elementary School gaining \$1,056 per pupil. This is slightly different from the Comprehensive Equity weighted funding scenario, in which nine schools lose funding, with Jefferson Elementary School again losing the greatest in per pupil operating dollars at \$1,501 per pupil, and nine schools gaining funds, with Central Elementary School reaping the greatest rewards at \$1,513.

Table 33. Simulation of Weighted Funding - Combined Expenditures for Middle and Elementary School, SY2010

	Vertical Equity			Comprehensive Equity	
	Operating Funds (PPE)	Operating Funds (PPE) with Weighted Budget using state weights	Diff.	Operating Funds (PPE) with Weighted Budget using state weights + weights for prior performance	Diff.
<u>Elementary Schools</u>					
Central ES	7,218	8,275	1,056	8,731	1,513
Cleveland ES	8,796	8,142	(654)	7,724	(1,072)
Dodd ES	7,249	8,129	880	8,134	885
Jackson ES	8,483	7,863	(621)	7,684	(799)
Jefferson ES	9,871	8,289	(1,582)	8,370	(1,501)
Lehigh Park ES	8,308	7,280	(1,027)	7,112	(1,196)
McKinley ES	9,317	8,114	(1,203)	8,349	(968)
Mosser ES	7,766	8,226	460	8,170	404
Muhlenberg ES	7,920	7,565	(355)	7,287	(633)
Ritter ES	6,901	7,526	625	7,418	517
Roosevelt ES	7,132	7,787	655	7,755	623
Sheridan ES	8,093	7,643	(450)	7,431	(661)
Union Terrace ES	7,294	7,623	329	7,627	333
Washington ES	6,916	8,087	1,171	7,851	935
<u>Middle Schools</u>					
Harrison-Morton MS	8,340	8,523	183	8,519	179
Raub MS	9,122	9,054	(68)	9,355	233
South Mountain MS	9,212	8,510	(702)	8,492	(720)
Trexler MS	9,084	8,711	(374)	8,825	(260)

Table 34 looks at re-allocating funds within each level of schooling. This is consistent with my analysis of vertical equity and comprehensive equity with ASD as I examine the variability among elementary schools and middle schools separately. Under the Vertical Equity weighted funding scenario, nine schools lose funds, with Jefferson Elementary School losing the greatest per pupil amount at \$1,715, and nine schools gain funds, with Washington Elementary School gaining \$1,041 per pupil. Under the Comprehensive Equity weighted funding scenario, again with equal “winners” and “losers,” Jefferson Elementary School loses the greatest in per pupil

operating dollars at \$1,592 per pupil, and Central Elementary School receives an additional \$1,418 per pupil. When considering Comprehensive Equity weighted funding, Lehigh Parkway comes in second place in reduction in operating funds. This, however, may be partially due to the school's small enrollment. Two other schools with small enrollment, Cleveland Elementary School and McKinley Elementary School, also lose significant operating funds as a result of both these weighted funding formulas. While school size may help to explain inequitable resource allocation, it, by no means, explains the whole story.

Table 34. Simulation of Weighted Funding- Expenditures for Middle Schools and Elementary Schools Considered Separately, SY2010

		Vertical Equity		Comprehensive Equity	
	Operating Funds (PPE)	Operating Funds (PPE) with Weighted Budget using state weights	Diff.	Operating Funds (PPE) with Weighted Budget using state weights + weights for prior performance	Diff.
<u>Elementary Schools</u>					
Central ES	7,218	8,141	923	8,637	1,418
Cleveland ES	8,796	8,011	(786)	7,640	(1,156)
Dodd ES	7,249	7,998	749	8,046	797
Jackson ES	8,483	7,736	(747)	7,601	(882)
Jefferson ES	9,871	8,155	(1,715)	8,279	(1,592)
Lehigh Park ES	8,308	7,163	(1,144)	7,035	(1,273)
McKinley ES	9,317	7,984	(1,334)	8,259	(1,058)
Mosser ES	7,766	8,093	327	8,081	315
Muhlenberg ES	7,920	7,443	(477)	7,208	(712)
Ritter ES	6,901	7,405	504	7,337	436
Roosevelt ES	7,132	7,662	529	7,671	539
Sheridan ES	8,093	7,519	(573)	7,351	(742)
Union Terrace ES	7,294	7,500	206	7,544	250
Washington ES	6,916	7,957	1,041	7,766	850
<u>Middle Schools</u>					
Harrison Morton MS	8,340	8,793	453	8,697	357
Raub MS	9,122	9,340	218	9,551	429
South Mountain MS	9,212	8,779	(433)	8,669	(543)
Trexler MS	9,084	8,986	(98)	9,009	(75)

The 'difference' column in these tables represents the change in funding per school necessary to achieve compliance with the weighted funded formula in my equity framework. Clearly, the district would need to make considerable changes to school level funding were a weighted formula implemented.

The following figures provide graphical depictions of the changes in funding at the school level resulting from a change in the distribution of operating funds to schools.

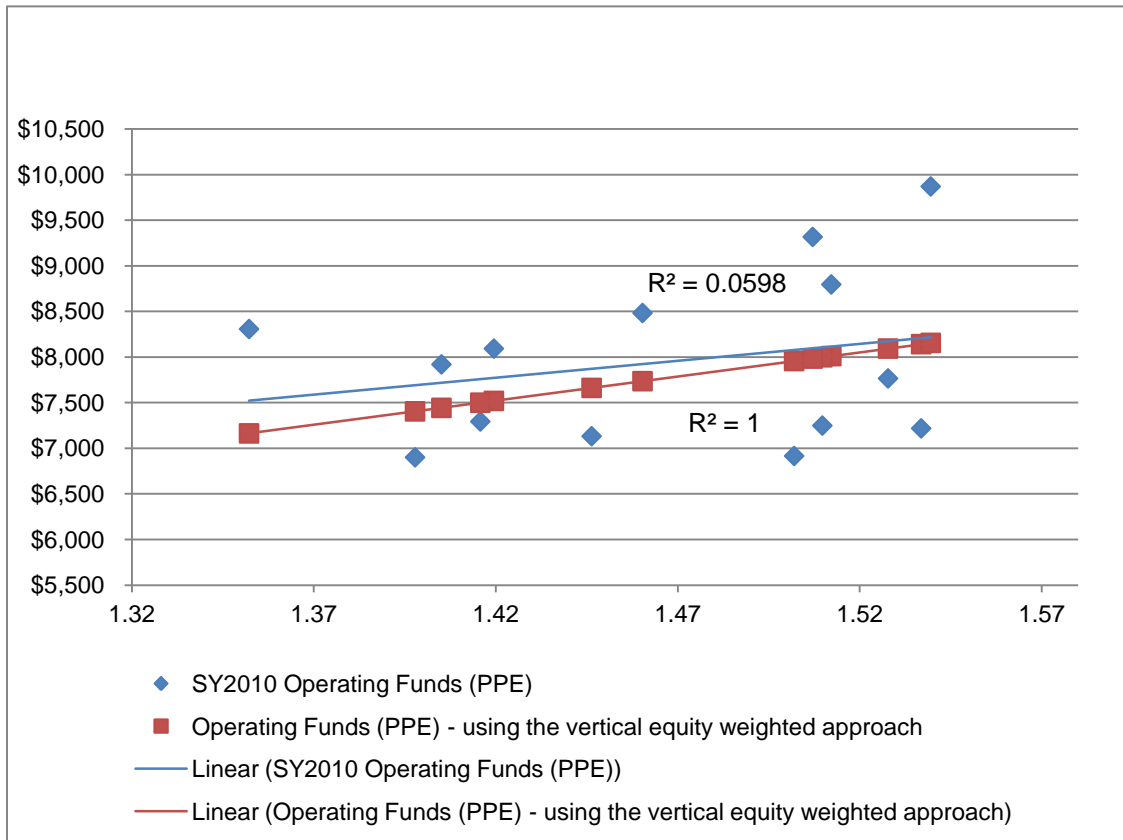


Figure 39. The Financial Impact of a Vertical Equity Weighted Formula Approach

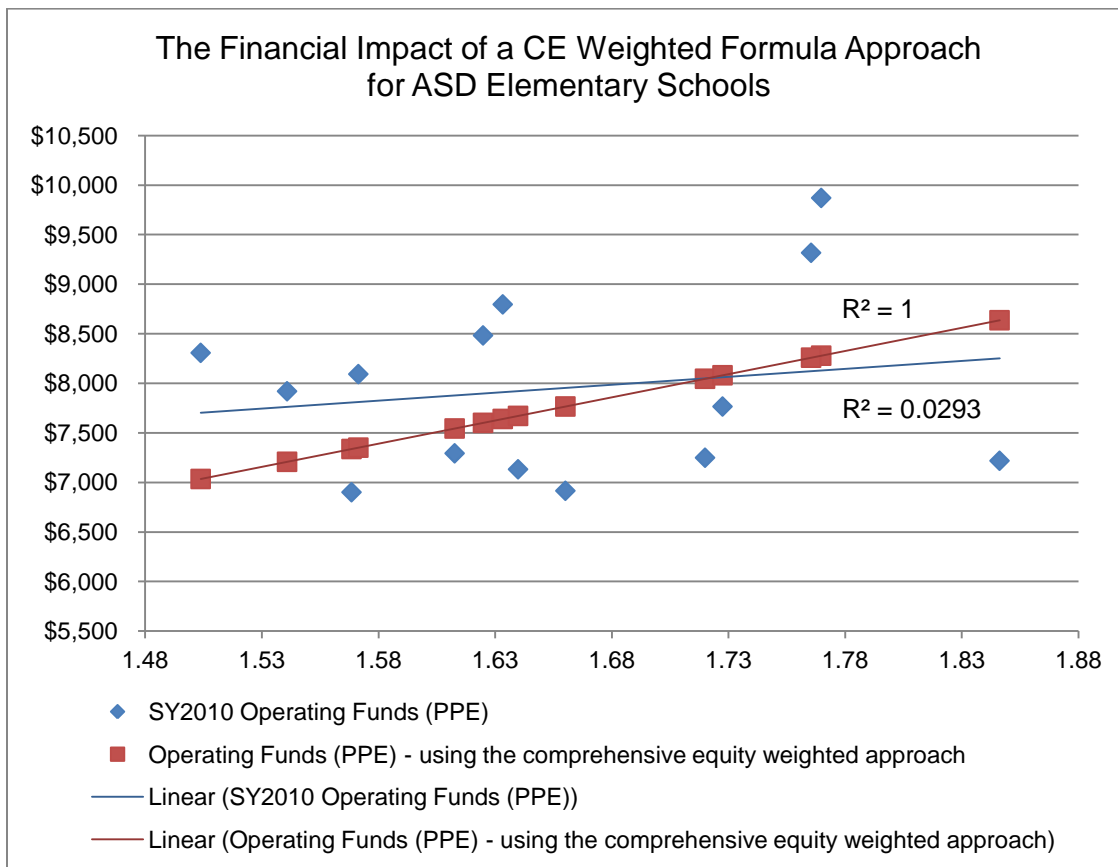


Figure 40. The Financial Impact of a Comprehensive Equity Weighted Formula Approach

These figures reveal a great deal of variability among each school's per pupil operating funds. Even with this variability, Figure 39 is more in line with ASD resource allocation than Figure 40.

Impact of current ASD budget allocation on equity. Considering the relationship between school needs, resource allocations, and student outcomes provides another way to analyze the impact of ASD's allocation of resources among schools.

Relationship between need and student outcomes. The literature on the relationship between student need and student outcomes consistently finds strong

positive correlations (Ludwig, Ladd & Duncan, 2001), and the data provided by the Allentown School District is consistent with this research. Figure 41 illustrates the relationship between school need (based on my comprehensive equity needs index) and student outcomes (as measured by the percentage of students that are proficient in math).

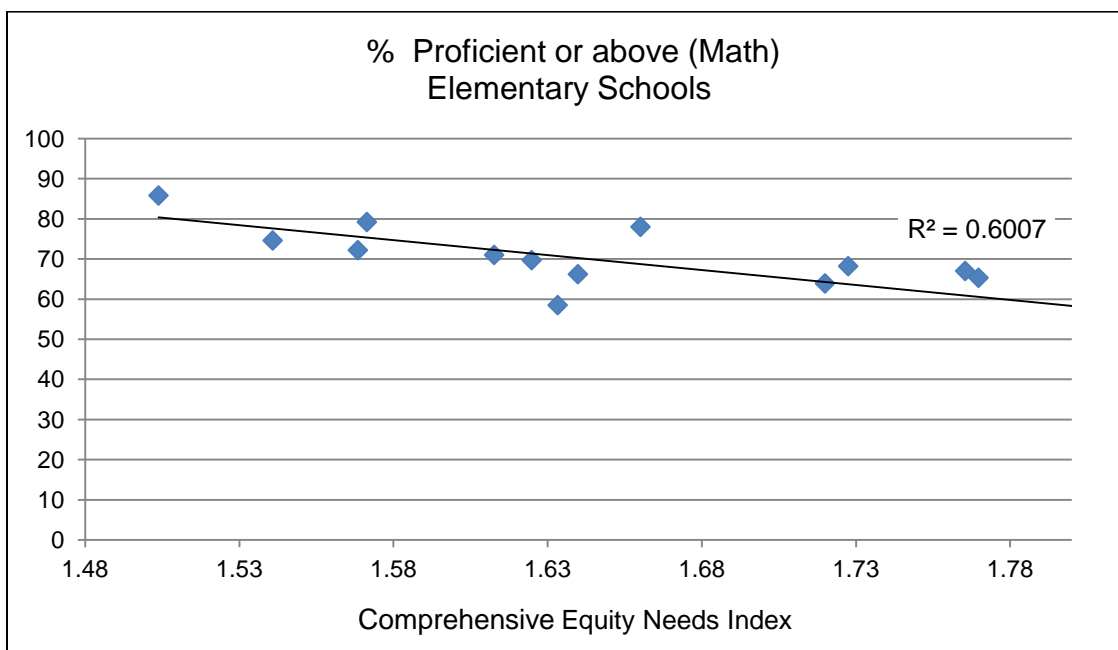


Figure 41. Relationship between Schools' Comprehensive Needs Index and the Percentage of Students in the School that Score at Proficient or Above on the PSSA (Math)

The research on outcomes also reveals that, although demographic considerations are strongly correlated with student outcomes, the progress a student makes while in school is not pre-determined by demographics. Rather, the learning environment, often characterized as the teacher effect, is the strongest indicator of student growth (Hanushek, 1997; Sanders & Rivers, 1996).

Relationship between need and resources. While there is a strong correlation between student need and student outcomes, there is virtually zero correlation between student need and school level expenditures in the ASD.

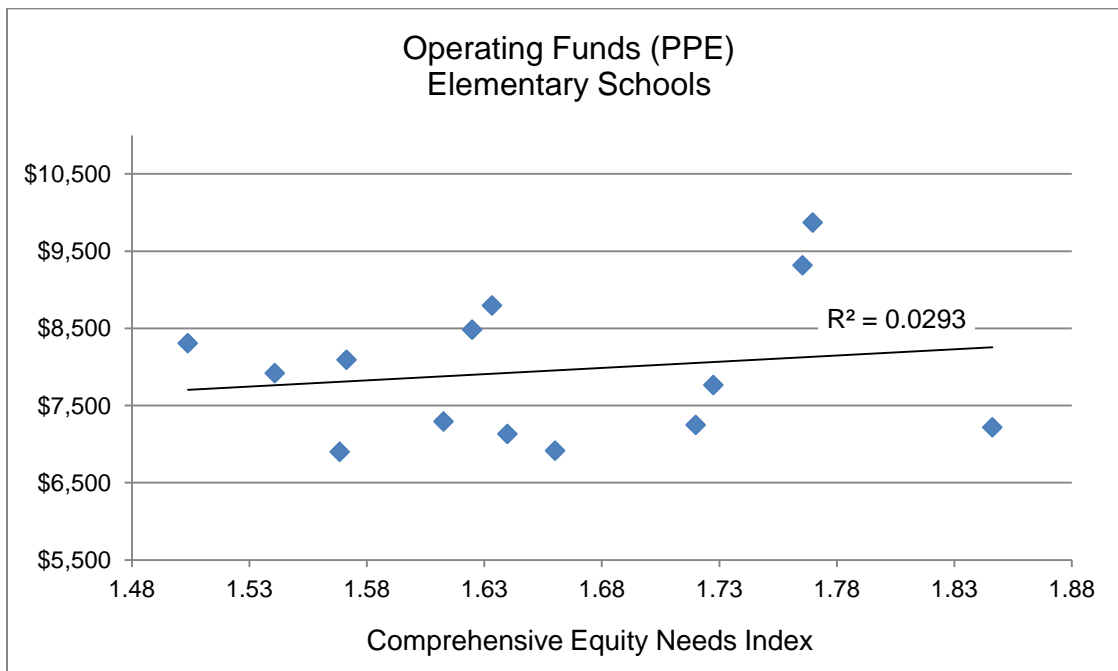


Figure 42. Relationship between Schools' Comprehensive Needs Index and Per Pupil Operating Funds in Each Building, SY2010

This finding reflects statements of district administrators, who generally assumed that funds were distributed primarily on a per pupil basis, with the exception of Title I and Special Education Funds.

Relationship between resources and student outcomes. Figure 43 demonstrates zero correlation between school level resources and student outcomes. This is not to say that money doesn't matter; as mentioned earlier, all these schools are severely underfunded. What this figure does illustrate is that, overall, dollars do not appear to be directed to schools to address concerns related to student performance.

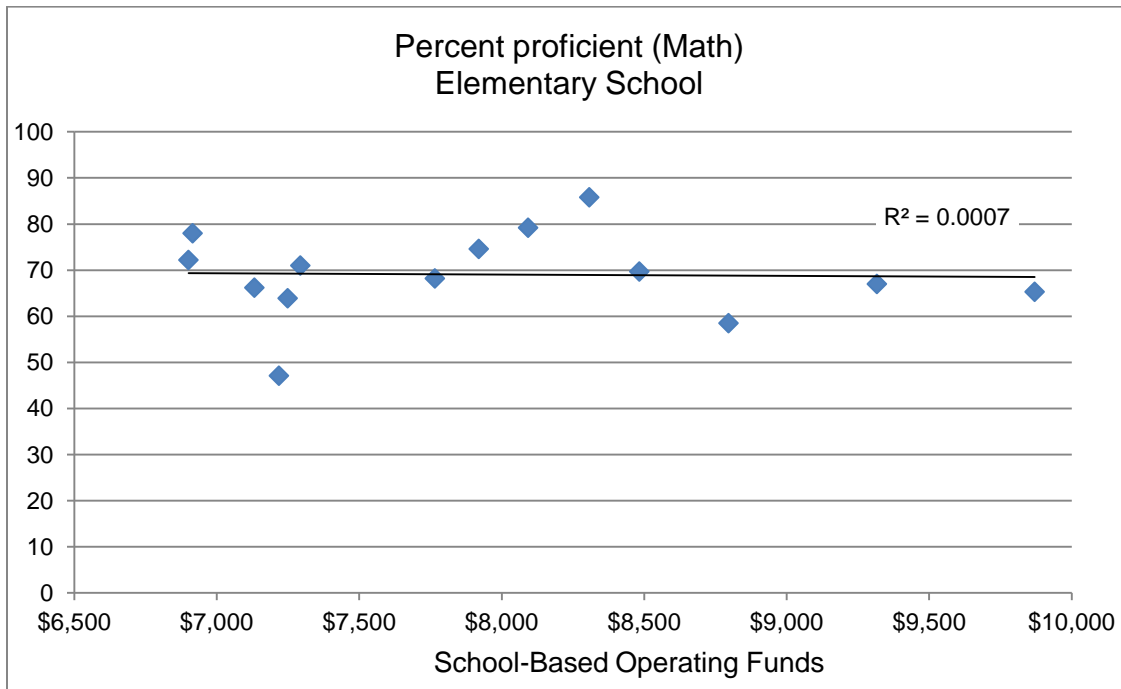


Figure 43. Relationship between School-based Operating Funds and Percent Proficient and Above on the PSSA (Math), SY2010

The data to explain what this figure would look like if dollars were tied to need does not exist. We do know, however, that while resources are necessary to support student achievement, they are not sufficient, as reported by administrators throughout the district. When one considers alternative inputs (e.g., teacher effectiveness, teacher self-efficacy), somewhat stronger correlations are found between resources and student outcomes. Figures 44-49 consider inputs which were significantly correlated with need. The strongest correlations between school need and resources are teacher efficacy with regard to classroom management ($r^2 = .42$), average years of teaching experience ($r^2 = .35$), and teachers' collective efficacy ($r^2 = .42$).

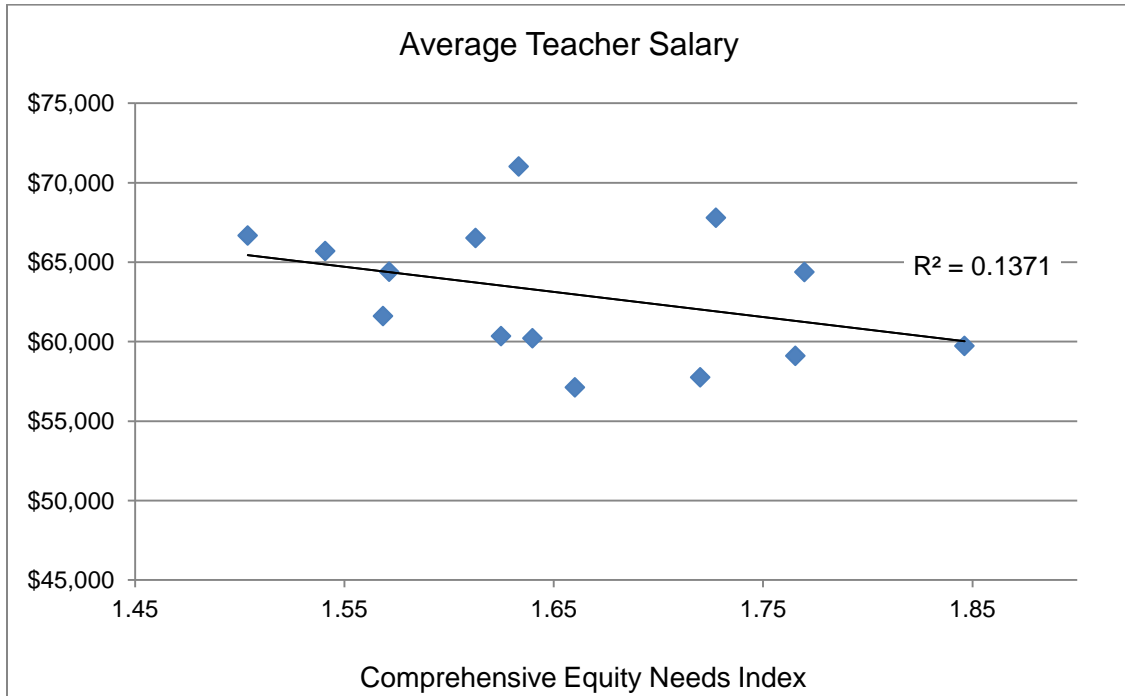


Figure 44. Relationship between each School's Comprehensive Equity Needs Index and Each School's Average Teacher Salary, SY2010

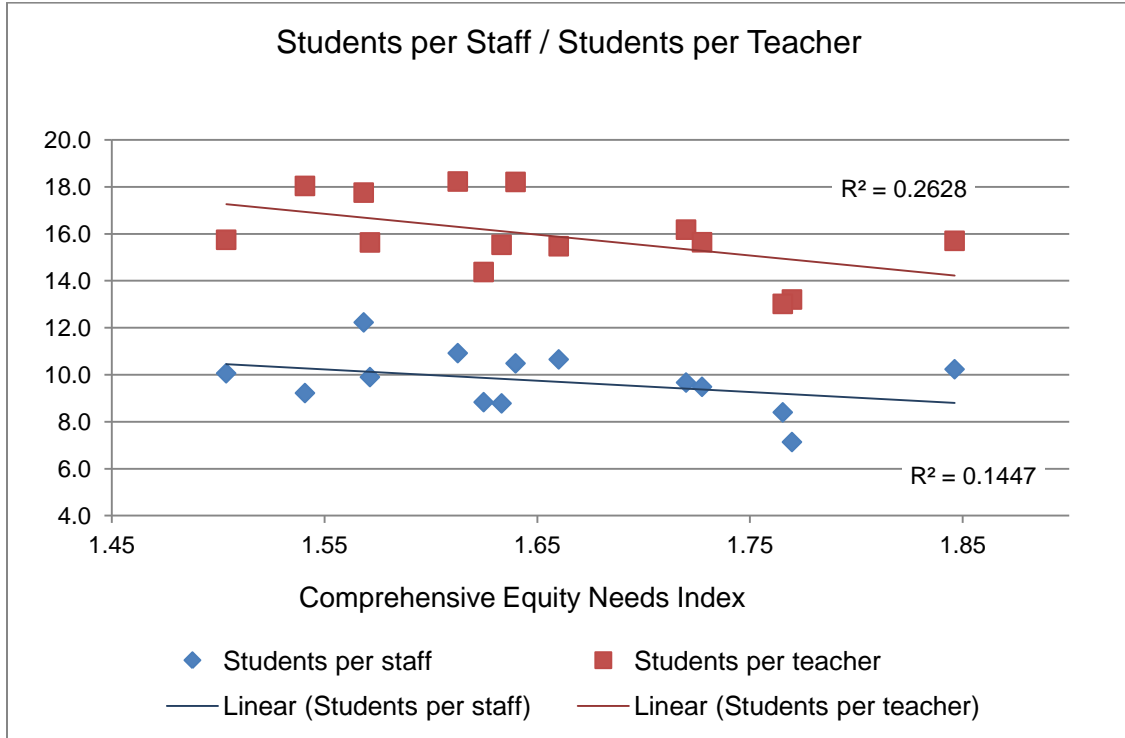


Figure 45. Relationship between Each School's Comprehensive Equity Needs Index and Each School's Students per Staff and Students per Teacher Ratios, SY2010

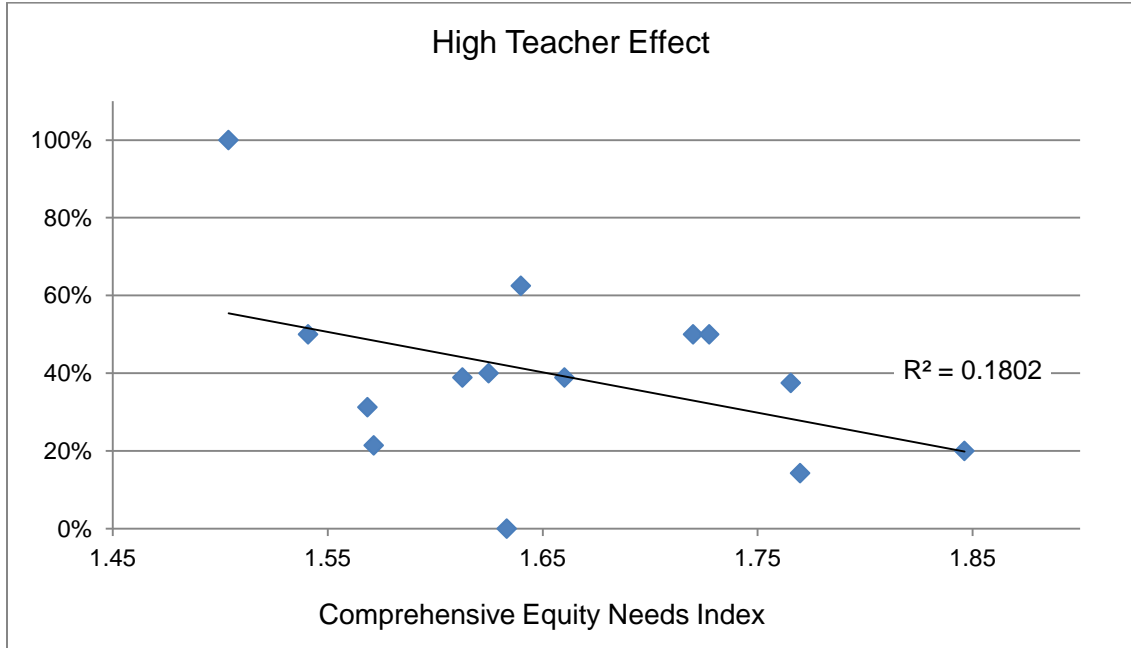


Figure 46. Relationship between Each School's Comprehensive Equity Needs Index and Each School's Percentage of Effective and Highly Effective Teachers, SY2010

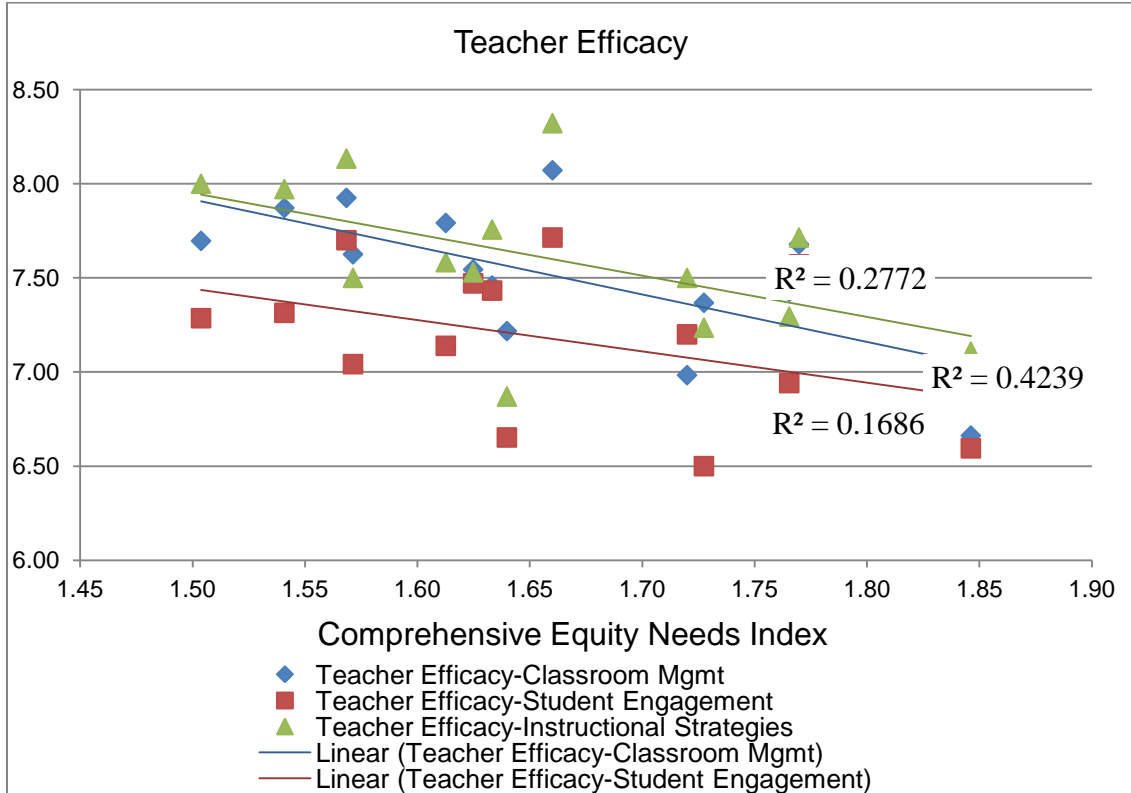


Figure 47. Relationship between Each School's Comprehensive Equity Needs Index and Each School's Average Teacher Efficacy (Classroom Management, Student Engagement, and Instructional Strategies), SY2010

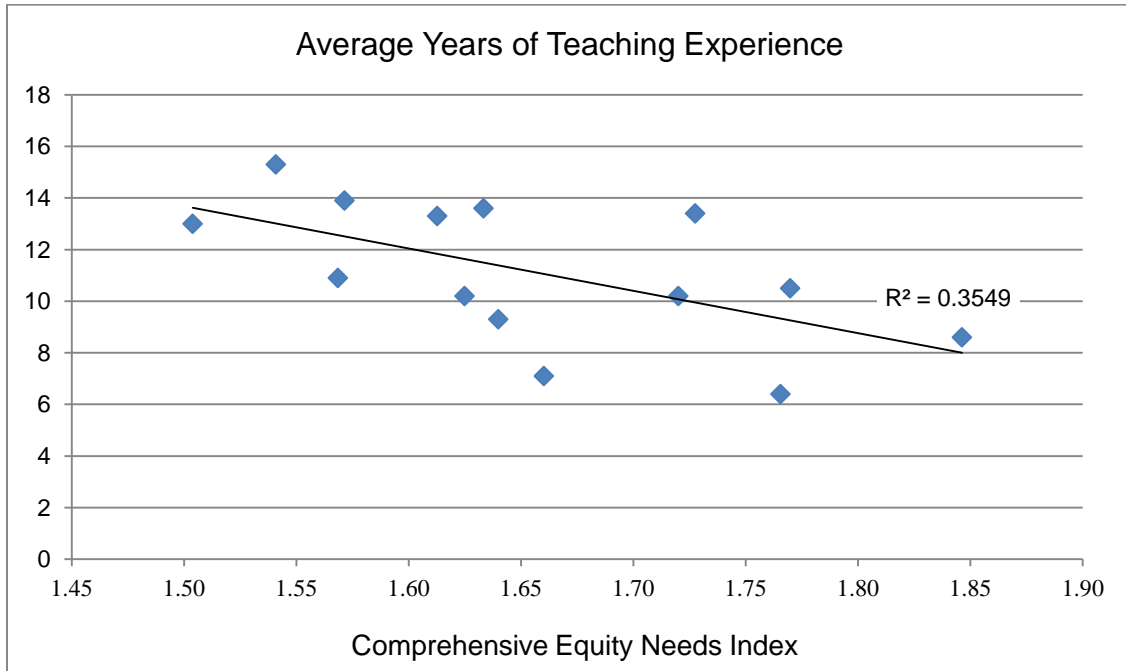


Figure 48. Relationship between Each School's Comprehensive Equity Needs Index and Average Years of Teaching Experience in Each School, SY2010

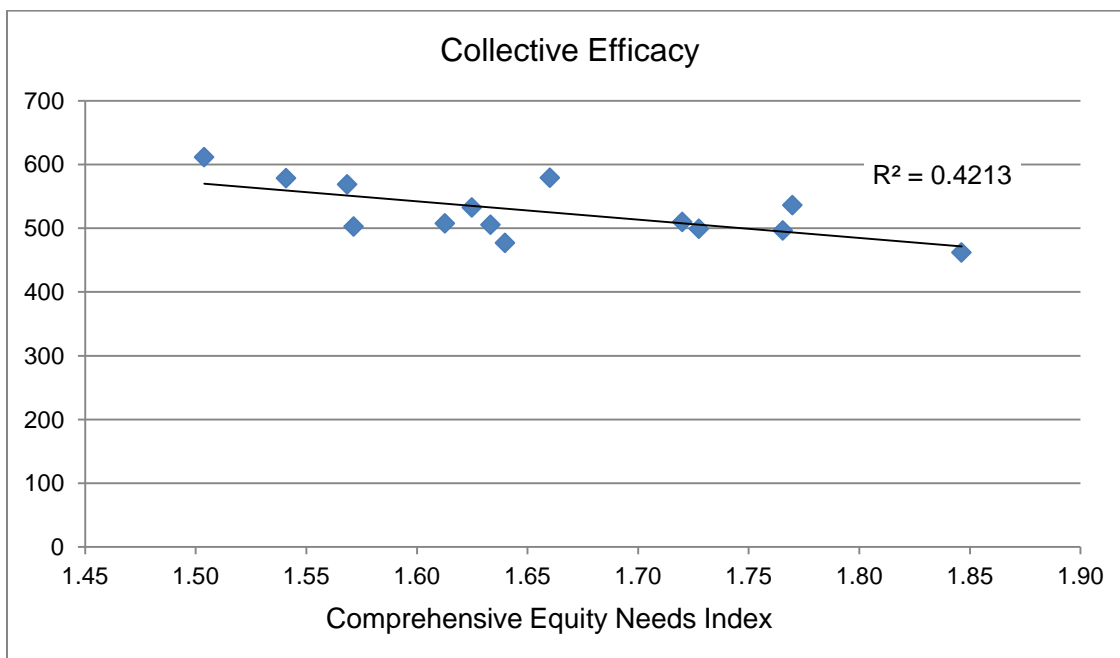


Figure 49. Relationship between Each School's Comprehensive Equity Needs Index and School-Wide Collective Efficacy in Each School as Reported on Survey of Teachers, SY2010

Summary

The findings presented in this chapter investigate how one mid-sized, urban school district allocates resources among its schools and students. The analysis evaluates equity in the district according to a comprehensive view of equity that encompasses adequacy (that all students be afforded the opportunity to meet a standard that will ensure their ability to sustain themselves economically and socially, and to be able to participate in our democracy as informed citizens) and vertical equity (that students are not penalized for morally arbitrary disadvantages).

This chapter assesses three versions of equity: adequacy, vertical equity, and comprehensive equity. A summary of major findings follows:

- Many schools do not achieve adequacy.

- Academic success of students varies greatly among schools. Different subgroups of students within the school district also achieve varying levels of academic success.
- The gap between current proficiency levels and the adequacy target is differentially distributed among schools in Allentown. Further, among student subgroups, achievement of Hispanic students and ELL students stand out as being most uneven across schools.
- The suspension rate among elementary and middle schools varies greatly.
- Some resources are allocated in accordance with vertical equity
- ELL spending per pupil is likely to be greater in high needs elementary schools
- Instructional salaries per pupil are likely to be higher in high needs elementary schools
- The principal's discretionary budget is likely to be higher in high needs middle schools.
- Pupils per staff ratios are likely to be lower in high needs schools.
- Pupils per teacher ratios are likely to be lower in high needs elementary schools.
- Some resources are not allocated in accordance with vertical equity
- The most effective teachers are less likely to be in high needs elementary schools.
- Teachers with more years of teaching experience are less likely to be in high needs elementary schools.
- Novice teachers are more likely to be in high needs middle schools.

- Greater teacher collective efficacy is less likely to be seen in high needs elementary schools.
- Expenditures per student in poverty and expenditures per special education student are not allocated equivalently across schools.
- Expenditures per ELL student in elementary schools are highly variable among schools.
- Centrally budgeted expenditures per student in poverty are not equitably distributed among schools.
- Centrally budgeted expenditures per special education student are not equitably distributed among schools.
- Centrally budgeted expenditures per ELL student are not equitably distributed among schools.
- Some resources are allocated in accordance with comprehensive equity
- ELL spending per pupil is likely to be greater in high needs elementary schools.
- The principal's discretionary budget is likely to be higher in high needs middle schools.
- Pupils per staff ratios are likely to be lower in high needs schools.
- Pupils per teacher ratios are likely to be lower in high needs elementary schools.
- Some resources are not allocated in accordance with comprehensive equity
- Average teacher salaries are likely to be lower in elementary schools with greater needs.

- The most effective teachers are less likely to be in high needs elementary schools.
- Teachers more certain of their skills are less likely to be in high needs elementary schools.
- Teachers with more years of teaching experience are less likely to be in high needs elementary schools.
- Novice teachers are more likely to be in high needs middle schools.
- Greater teacher collective efficacy is less likely to be seen in high needs elementary schools.
- There is considerable variation among schools that is not explained by vertical or comprehensive equity
- A change in policy to accommodate a weighted funding formula based on the comprehensive equity framework would result in an increase in funds for half the elementary schools and half the middle schools, and a decrease in funds for the remaining elementary and middle schools

Based on the results of these analyses, and a comparison of allocations determined by using weighted funding formulas and actual 2009-2010 school year allocations, I conclude that the Allentown School District does not achieve comprehensive equity. Although the district is engaged in efforts to improve outcomes for students, my research shows that, in many instances, these efforts are not distributed among students in a way that supports students according to their specific needs.

CHAPTER 7 – CONCLUSION

The primary goal of my dissertation was to conduct a case study of a mid-sized urban school district to evaluate equity among schools. The analyses for my dissertation build on the development of a comprehensive equity framework created to evaluate equal educational opportunity. This framework satisfies a view of equity in which students have access to resources such that their subsequent opportunities are equalized (Berne & Stiefel, 1984; Rawls, 1971). This perspective does not move away from a focus on student outcomes but instead supports student outcomes by incorporating a means of addressing the relative needs of students such that all students are able to have greater opportunities for and attain higher levels of success.

Using the comprehensive equity framework as a guide, I conclude that the Allentown School District does not allocate resources among its schools equitably. The allocation of human capital resources stands out as most incompatible with the comprehensive equity framework. Using various teacher characteristics (i.e., salary, experience, effectiveness, self-efficacy, collective efficacy) as proxies for teacher quality, I find higher teacher quality within a school to be positively related to greater need among the student population. Specifically, average teacher salaries are likely to be lower in elementary schools with greater needs; teachers with more years of teaching experience are less likely to be in high needs elementary schools; novice teachers are more likely to be in high needs middle schools; the most effective teachers are less likely to be in high needs elementary schools; teachers more certain of their skills are less likely to be in high needs elementary schools; and, greater teacher collective

efficacy is less likely to be seen in high needs elementary schools. Even as these findings show significant inequities among schools, it is important to note that these inequities are not systematic, but haphazard in nature.

I further tested the extent to which equal educational opportunity exists in Allentown by simulating a weighted funding formula based on the comprehensive equity framework. Implementation of this resource allocation strategy would have resulted in an increase in funds for half the elementary schools and half the middle schools, and a decrease in funds for the remaining elementary and middle schools. Some of this “misallocation” is likely due to economies of scale, as two of the three schools that would gain the most money are in the top three in student enrollment and three of the four schools that would lose the most money (over \$1,000 per student) have enrollments below the district average for elementary schools¹²³. However, enrollment size does not explain why Washington Elementary School stands out as lacking financial resources, with lower than average teacher salaries and the highest class size in the district. Despite this, Washington has the highest teacher efficacy and collective efficacy in the district and high growth index in math and above the district average in reading. Also, enrollment size does not explain why Jefferson Elementary School stands out among elementary schools as being richer in financial resources and having higher average teacher salaries and smaller class sizes. Jefferson is also above average in their teacher efficacy and collective scores and in their school wide growth index. Taking a broader view and recalling ASD’s “adequacy funding gap,” Jefferson’s level

¹²³ The average enrollment in ASD elementary schools in SY2010 is 573.

of funding may be appropriate, and schools with fewer and/or lesser inputs are inadequately resourced.

Qualitative research supports my conclusion that the ASD does not allocate resources among its schools equitably, as district practices related to the allocation of resources help explain the misalignment between school-level student needs and financial and human capital resources. Notably, addressing the differential needs of schools plays no part in driving resource allocation in the ASD. Considerations of vertical and comprehensive equity among schools do not influence budget priorities or human resource policies. Also, information on both the financial position of schools, and the variation among teaching quality in schools, is not readily available and, consequently, is unknown to key stakeholders. A weak relationship between building and central office administrators aggravates this situation. Lastly, with scant information available to them, few stakeholders inside or outside the district focus their attention on discrepancies among schools.

Implications

This case study has implications beyond the Allentown School District in two major ways. First, it builds on the extant literature on intradistrict resource allocation, corroborating some previous findings and adding new human capital “resources” to the range of inputs considered in resource allocation. Second, this case study provides district and state policy makers with a viable approach to evaluating resource allocation within school districts.

Adding to the research. For the most part, the equity findings from my dissertation research are consistent with the findings of other studies and reports, not only examinations of intradistrict equity, but examinations of interdistrict equity, as well. However, there are notable differences. A comparison of my findings to those of other policy-makers and researchers bears this out.

As states are constitutionally responsible for ensuring that all students are provided with an adequate education, many analyses of equity consider distributions of funds from the state to school districts. A number of these equity reviews focus on expenditures and/or revenues, and do not separately consider human capital resources. Quality Counts, *Education Week's* annual report on state-level efforts to improve public education, provides indicators annually of the status of education finance at the state level. This report presents two school finance indicators which evaluate horizontal equity: the coefficient of variation and the McLoone Index, providing measures for each state as well as an average across all states.¹²⁴ The most recent publication included school finance indicators based on 2009 data. The following table presents horizontal equity statistics for the ASD based on my calculations alongside horizontal equity statistics for Pennsylvania, and the U.S. average included in the Quality Counts report.

¹²⁴ Hawaii is not included in this analysis as the state has only one school district.

Table 35. Comparison of Equity Statistics from Quality Counts 2012 and the ASD

	Allentown School District		PA	United States
	ES	MS	ES+MS+HS+Central	
Coefficient of Variation	0.12	0.05	0.15	0.17
McLoone Index	0.92	0.96	0.91	0.91

Note: The CV and MI provided for the ASD are based on per-pupil expenditures for operating funds and elementary and middle schools are presented separately. The Pennsylvania and U.S. measures are based on per-pupil expenditures obtained from the U.S. Department of Education's 2008-2009 Common Core of Data and U.S. Census Bureau's Public Elementary-Secondary Education Finance Data for 2009, and include funds that fall outside the category of operating funds. Also, the Quality Count report considers funds at the district level, and therefore combines all school levels as well as central administration.

As seen in Table 35, horizontal equity statistics are similar across the state and the district. In this comparison, ASD middle schools stand out as being more horizontally equitable when considering per pupil expenditures. Looking at the entire country, the Quality Count reports that only three of 49 states achieve horizontal equity based on the level of variability in funding across all districts; 36 of 49 states fall within a range which approaches horizontal equity, and ten of 49 states are far from horizontal equity. However, when the definition of horizontal equity is based on the number of districts spending well below the mean in the state, 33 of 48 states achieve horizontal equity and 15 of 49 states fall within a range which approaches horizontal equity.

In another review of interdistrict equity, Baker, Sciarra, and Farrie (2010) investigate the fairness of the distribution of state funds by looking at both the absolute dollars disbursed to school districts, as well as the ratio of high poverty to low poverty revenue per pupil. When analyzing states' vertical equity using this ratio, 13 of 48 states were found to be progressive, six of 48 states were found to be regressive, and 12

of 48 states, no relationship between poverty and variation in spending was found.¹²⁵

While there are no statistically significant results among the remaining 17 states, a large number of these states appear more similar to the regressive states. These findings are similar to findings in the ASD, where statistically insignificant correlations indicate that resource allocation is asystematic.

Analysis of the vertical equity of financial resources in two states, Indiana and Kentucky, provide additional examples of state-level equity studies to consider alongside the district-level equity study in Allentown. The state of Indiana considers five factors in determining how to allocate funds to districts: the percentage of adults who did not graduate from high school; the percentage of single-parent families; the percentage of population below the poverty level; the percentage of students receiving free lunch; and, the percentage of students with limited English proficiency.

Toutkoushian and Michael (2007) compute bivariate correlations between these vertical equity factors and per-pupil revenues. The researchers propose that, by looking at these correlations over time, policy makers could determine if vertical equity is improving in the state.

Statistically, it was not possible to disaggregate vertical equity factors in Allentown due to the number of schools in the district. Therefore, I created an index of need for evaluating vertical equity. Because of the large numbers of economically disadvantaged students in the ASD, poverty (measured by the percentage of students receiving free and reduced price lunch) has the greatest influence on my Needs Index.

¹²⁵ These findings are all statistically significant.

Thus, it is reasonable to compare Indiana's correlation between poverty and revenues. Using 2007 data, Toutkoushian and Michael's (2007) find a correlation of +0.61 between the percentage of students receiving free lunch and revenues. This can be compared to the correlation between operating funds and the Needs Index in the ASD which is +0.24. While both are positive, these metrics indicate that the state of Indiana is allocating resources more equitably to economically disadvantaged populations than is the ASD.

A study of equity in Kentucky, conducted by Picus, Odden, and Fermanich (2004), analyzed vertical equity by computing horizontal equity statistics for the state by weighting district enrollments to account for the additional needs of subgroups of students. This approach is similar to the weighted funding approach utilized in my simulations of resource allocation in the ASD. The coefficient of variation computed for Kentucky in the 1999-2000 school year was +0.10 and the McLoone Index was +0.96. When computing similar horizontal equity calculations on weighted student enrollment in the ASD in the 2009-2010 school year, the coefficient of variation was +0.11 and the McLoone Index was +0.91. Vertical equity findings in the ASD are far closer to those in Kentucky than in Indiana. Additional research is necessary to validate the usefulness of comparing equity among districts in a state to equity among schools in a district. However, the intention of serving all students fairly guides equity analyses at multiple levels.

Considerations of equity have gone beyond the study of overall expenditures, and include more targeted studies of the allocation of personnel expenditures. One

means of evaluating how the ASD measures up to others in terms of the equitable allocation of personnel expenditures would be to examine the debates around Title I comparability. A report issued by the U.S. Department of Education finds that “more than 40 percent of Title I schools had lower personnel expenditures than non-Title I schools in the same district” (Heuer & Stullich, 2011, p.1).¹²⁶ As discussed in Chapter Two, while Title I currently requires that schools be comparable prior to receiving compensatory federal funds, this requirement can be met with measures that are far less stringent than the equivalent allocation of total personnel expenditures. According to Heuer and Stullich (2011), if the rules were to change, and Title I comparability required that district resource allocation minimally be horizontally equitable, approximately 18 to 28% of all Title I schools would be out of compliance, depending upon the specific requirements for comparability.

If compliance with Title I comparability were to require an “average-to-average” measure, whereby the average per pupil spending on personnel of all “high needs” schools is compared to the average per pupil spending on personnel of all schools in the district, then the ASD would be in compliance. However, if the requirement is that the average per pupil spending on personnel in each “high needs” school individually meets the average per pupil spending on personnel of all schools in the district, then the ASD would not be in compliance. This would remain true even if

¹²⁶ For school districts in which all schools are classified as Title I schools, this report assumes that these districts would still be required to conduct this comparability analysis, in order to ensure that lower poverty schools are not further disadvantaged by lower spending on personnel expenditures.

the threshold were higher and each “high needs” school individually had to meet only 90% of the average per pupil spending on personnel of all schools in the district.

Based on a simulation conducted to evaluate the impact of revising the Title I comparability requirement, the Department of Education report finds that “low spending Title I schools and higher-poverty schools would see their per-pupil expenditures rise by an average of four to fifteen percent” (Heuer & Stullich, 2011, p.1). In the ASD, three of seven higher needs elementary schools would see an average increase of 11%. It is important to note that in Allentown not all schools with higher needs are under-spending relative to the district average. This appears to be consistent with the findings of the Department of Education report, as only 28% of all Title I schools would be out of compliance with the strictest revisions to the comparability requirement.

At the district level, studies of equity have looked at horizontal equity, vertical equity, and adequacy. My literature review provides more detail, but a brief synopsis of 34 studies of intradistrict equity reveals that overall expenditures are often distributed according the principles of horizontal and vertical equity, with equivalent or greater financial resources being allocated to schools and students with greater needs. Although there is some indication that vertical equity exists in many of the districts studied, there is a question as to the sufficiency of the additional resources directed to disadvantaged schools and students to achieve vertical equity. My study of horizontal equity in Allentown was consistent with this research. Operating funds per pupil were allocated relatively equivalently among elementary and middle schools. Also, I found a weak, yet

positive, relationship between school need and operating funds per pupil, $r(14) = 0.24$.

This relationship was not statistically significant.

Another finding among many of the studies of intradistrict resource allocation is that human resources, as opposed to financial resources, are less likely to be distributed equitably. Disparities in teacher quality – as defined by measurable indicators such as years of experience, certification status, and content and pedagogical knowledge – are most often perversely related to school and student characteristics (i.e., schools with more disadvantaged students often have more teachers with less experience, fewer qualifications). A number of these measures of teacher quality were evaluated in Allentown and the findings were similar to those of the 34 studies. For example, average years of teaching experience is negatively correlated with school need, indicating that less experienced teachers are more likely to be in schools with students with greater needs. Additional measures of teacher quality, not considered in the 34 studies but evaluated in the ASD, include teacher effectiveness, as measured by value-added scores, and teacher efficacy, as determined by the survey responses of teachers. These measures provide additional evidence that human capital resources, or teacher quality, is not distributed across schools in the district in alignment with vertical equity or comprehensive equity.

While the large majority of studies on intradistrict equity evaluate equity in large districts, Miller and Rubenstein (2007) provide an analysis of equity in four mid-sized districts in New York State. The table below looks at the areas of overlap in the

studies to compare findings in the ASD alongside the findings presented in the study of New York districts.

Table 36. Comparison of Bivariate Correlation Coefficients from ASD study and NYS study

	Average Salary	Pupil-teacher ratio	Avg. teacher experience
District A	-0.367**	-0.135	-0.278*
District B	-0.255	0.018	-0.366
District C	-0.619*	0.549	-0.508
District D	0.020	0.154	-0.596*
Mean (SD) of A-D	-0.306 (0.265)	0.147 (0.293)	-0.437 (0.142)
ASD	-0.219	-0.561**	-0.469*

Note. **p<0.05; *p<0.10

As seen in Table 36, the correlation coefficient indicates that the distribution of average salary in Allentown is negative but not statistically significant. Therefore, there may be a weak inverse relationship between average salary and school need. This ASD finding is close to the mean of four mid-sized districts evaluated, and quite similar to two of them considered individually. Similarly, average teacher experience in the ASD is distributed in the same way as it is in all four districts in the Miller and Rubenstein study. When considering pupil-teacher ratio, however, a major difference arises between the ASD and the four New York districts. It appears that the ASD is more successful in addressing vertical equity as there are fewer students per teacher as the school need increases. That being said, the distribution of average class sizes, with a correlation of +0.08, does not follow. In fact, we see that there is virtually no relationship between school need and class size. Having additional teachers in some buildings does not impact the school's class size.

Situating Allentown's resource allocation among other mid-sized districts, in addition to larger districts and states, provides greater context for understanding school-

level equity. The work I have done in Allentown adds to this existing knowledge base by providing an additional study of resource allocation. It also provides a framework for policy makers to use as they consider where to add and where to cut resources.

Providing a framework. As an IES pre-doctoral fellow in Allentown, I worked with the Superintendent and central office administrators to support the district through better use of data. ASD proved to be an interesting site to conduct my study. While the small size of the district prevented the use of sophisticated statistical methods, I was able to learn a great deal about how districts operate. In the 2009-2010 school year, the district served almost 18,000 students in 22 buildings with a budget of \$212.6 million. Outcomes for the students were mixed, but often weak, with a low graduation rate and too many students earning low scores on state assessments. This environment is not unique; many school districts struggle with high needs students and inadequate resources.

Another commonality between ASD and other school districts is that their data systems have not been designed to evaluate resource allocation. This is consistent with the fact that most school districts have not been acculturated to use data to inform policy making. As a researcher in the district, I took on the task of investigating resource allocation. The data I used in this study includes reports and documents from both the ASD and the Pennsylvania Department of Education. It also includes newly computed measures on teacher quality: survey results from a large majority of ASD teachers and teacher level value-added scores provided by the district through its contract with the state's value-added provider, SAS EVAAS. Additional data was

compiled by the consulting firm Cross & Jofus, Inc., who conducted a complementary investigation of district resources. My research also relies on interviews with school level and district level administrators to provide context and a greater understanding of how and why resource allocation decisions were made.

As a result of my analysis, I was able to demonstrate the value of accessible information and provide actionable data to district administrators. It is my hope that the systems I helped to develop will be used in the future to inform the district's agenda.

As school districts gain access to data systems which are more integrated, and more comprehensible, the use of data should become more prevalent, allowing administrators and the public to construct better-informed policies.

My study has the potential to act as a tool kit for districts intent on embracing the vision of equal educational opportunity developed in this dissertation. This approach would be a definite shift from current practice, in which systems only focus on student outcomes. By taking into account both the relative position and the absolute achievement of students, district administrators would be better able to rectify inequities and provide for the equal educational opportunity of all students.

Recommendations

As districts continue to struggle to meet the needs of their student populations' increasingly limited resources, it becomes even more important to use those resources to the greatest advantage of all students. The findings of this dissertation are relevant to this goal, and include the following recommendations:

- Districts' missions should incorporate the goal of comprehensive equity, whereby students have access to resources such that their subsequent opportunities are equalized.
- Based on this mission, districts should develop resource allocation policies which support equal educational opportunities for all students.
- Districts should regularly collect and examine data on inputs (financial and human capital resources) and outcomes (academic and other) at the school level in order to assess intradistrict equity.
- Districts should collect new indicators on teacher quality (i.e., measures of efficacy, measures of effectiveness). No single measure should be used.
- Based on the review of the data, districts should investigate the relationship between inputs and outcomes – to learn how resources are impacting outcomes.
- Districts should ensure that resource allocation data is transparent so that school administrators educators can make informed decisions.
- Districts should ensure that resource allocation data is available so that key stakeholders, including parents and policy makers, can advocate for equity.

Study Limitations

There are several limitations to my research. First, my findings are based on a case study of only one district, which prevents the reader from generalizing the results of the study to the larger population of school districts. Related to this limitation in scope, the Allentown School District is considerably under-funded, which may

influence the distribution of resources¹²⁷. For example, in a district with fewer funds, one school may receive a disproportionate allocation to keep middle class families in the school system. Also, the demographic make-up of the district, with high poverty rates in all schools, somewhat limits my ability to discern patterns that demonstrate inequitable resource allocation.

Another weakness of this study is that it is difficult to test adequacy. With the data available, it is possible to describe some inputs and outcomes, and compare these variables across schools. To truly understand how resources impact outcomes, it would be necessary to conduct a much more comprehensive investigation, including in-depth classroom observations, to better understand the true relationship between resources and student outcomes.

Additional issues which cause concern have to do with the variables used to measure resources and outcomes. The available measures of one resource I have investigated, teacher quality, including certification and years of experience beyond year four, have not been found to be strongly related to improved student outcomes (Clotfelter et al., 2007; Goldhaber, 2008; Rice, 2003; Rockoff, 2004). Student outcomes also present a problem as the metrics most often used are state assessments which represent only a portion of the learning that takes place in the school.

Another potential problem with my study is the construction of the needs index I use to measure vertical and comprehensive equity. The needs index is based on

¹²⁷ According to Pennsylvania's Costing-Out Study, the funding gap – the difference between an adequate education and actual spending - was \$5,625 per pupil in the Allentown School District in 2006.

Pennsylvania's costing out formula, designed to allocate state dollars to districts. It is not clear that this formula translates seamlessly to the district-school environment.

Additional omissions on my part include a lack of attention to school size or concentrations of poverty.

A last concern is that, as an intern in the Allentown School District, I am closely identified with the Superintendent, Dr. Zahorchak. This may have compromised my ability as a researcher because key informants may have been reluctant to share information with me which they think may reflect negatively on them with their boss.

Future Research

Additional research is necessary to help policymakers understand the implications of different resource allocation policies, including impacts on opportunities and outcomes for students, so that they may make informed decisions that will support the learning of all children. Two areas that I identify as fruitful for this project are resource allocation as it pertains to special education students, and to students in poverty. In the present analysis, I had to use very blunt measures to look at these groups of students and although I had wanted to analyze resource allocation for special education students according to the hours they received pull-out services, I was unable to access useful data. Another area which deserves attention is student mobility. As in many high poverty, urban districts, I found high student mobility in Allentown, which should be taken into consideration when using measures such as teacher effectiveness based on student outcomes. It would be very useful to understand the impact of student mobility on both the students that are moving in and out of schools

and the students in classrooms with shifting populations. Similarly, I had no useful data to investigate the impact of varying levels of poverty and its relationship to school resources. As the current study shifts the scale from districts to buildings, another important analysis would be to look at how resources are allocated to classrooms within each building. Finally, the manner and degree to which race is related to resource allocation should be investigated, to inform understanding of the variation of outcomes across schools for various subgroups of students, as well as for all students.

Two additional research agendas follow from my findings. Qualitative research reveals a great deal of misinformation among building principals as a result of an incoherent district mission around equity and weak communication between the schools and the central office. Much could be learned from an investigation of the relationship between schools and district central offices. A second issue is related to “rectifying” inequitable allocation of human capital resources, specifically teachers. Further work is necessary to develop strategies for ensuring that all students have access to effective teachers without redistributing teachers that are reluctant to move.

Finally, I hope to develop this work to provide greater focus on implications for policy and practice, answering the question: “What criteria should district leaders employ when determining how to best allocate resources?”

This dissertation weaves together a theoretical discussion of equity with the practical application of theories of equity through the use of various measurement tools. In so doing, it offers scaffolding for policy makers and scholars alike to understand the requirements of equal educational opportunity.

APPENDIX A: STUDIES OF INTRADISTRICT RESOURCE ALLOCATION

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Ajwad, M.I. (September 2006). Is intrajurisdictional resource allocation equitable?: An analysis of campus-level spending data for Texas elementary schools. The Quarterly Review of Economics and Finance, 46(4), 552-564.	vertical equity	Elementary schools (3664) within Texas school districts (908). (The school campus-level data for 1996–1997 came from the Texas Education Agency Academic Excellence Indicator System. School neighborhood information came from the 1990 Census of Population and Housing.)	Discretionary resources: total expenditures per pupil; instructional expenditure per pupil; expenditure on school leaders per pupil; other expenditures per pupil; teacher experience; teacher tenure; and pupil-teacher ratio.	Low-income, minority neighborhoods: median family income; % Black; % Hispanic; % Other; % of population with college degree; % of population who lived in same housing unit since 1985; and, % of population aged 5-17. Also, information on % LEP, % economically disadvantaged, % special education, and % gifted/talented.	Estimation of a district fixed-effects model.	The discretionary resources of school districts are skewed toward schools in low-income, minority neighborhoods, beyond the amounts that would be allocated based on the state aid formula. The combined effect of poor students and a poor neighborhood is to raise school spending per pupil. Districts are skewing resources toward Black students, but not Hispanic and other races. Neighborhoods that are better educated and exhibit lower population turnover also receive more school funds.
Baker, B. D. (2009). Within-district resource allocation and the marginal costs of providing equal educational opportunity: Evidence from Texas and Ohio. Education Policy Analysis Archives. 17(3).	vertical equity	Elementary schools in Texas and Ohio large city school districts and in their surrounding metropolitan areas	Weighted Student Funding, elementary school budgets	Greater resource equity, special education populations, poverty rates, and school size	Conventional expenditure function approach	Widely reported WSF success stories provide no more predictable funding with respect to student needs than other large urban districts in the same state. In some cases, resource levels in urban core elementary schools are relatively insufficient for competing with schools in neighboring districts to achieve comparable outcomes.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Baker, B.D. & Green, P.C. (2009). Equal Educational Opportunity and the Distribution of State Aid to Schools: Can or Should School Racial Composition Be a Factor? <i>Journal of Education Finance</i> . 34(3). 289-323.	vertical equity			Black student population	Education cost-function approach for estimating the sensitivity of cost models and predicted education costs to the inclusion of school district level racial composition variables.	Strong, consistent evidence across settings that black student concentration is associated with higher-predicted costs of achieving constant outcomes, and that those cost differences are quite large for majority black school districts.
Baker, B.D. (2003). State Policy Influences on the Internal Allocation of School District Resources: Evidence from the Common Core of Data. <i>Journal of Education Finance</i> . 29(1) 1-24.	vertical equity	District-level data on state revenues and financial and human resource allocation were gathered from the Common Core of Data of the National Center for Education Statistics.	Financial allocations to core instruction, administration, and central administration, and data on human resources, including teachers, support staff and administrators (including classroom teachers per pupil; all instruction related staff per pupil, district level administrators) district staffing levels; classroom teachers, allocations to instruction and instruction-related staff, including librarians and school counselors; administrative expenses, central office staffing levels, shares of administrative staffing.	District size; increased prevalence of students with disabilities; Limited English proficient and low-income populations	Statistical tests of the relationship between state policies and practices and resource allocation across districts and across states using a national dataset.	A range of additional external factors, such as student population characteristics, have an influence on internal resource allocation practices; increased prevalence of students with disabilities was tied to significant increases in district staffing levels, from the classroom to the central office, though some findings were inconsistent. Limited English proficient and low-income populations, on the other hand, led to increased allocations to instruction and instruction-related staff, including librarians and school counselors, but not to increases in classroom teachers. Further, higher levels of limited English proficient student populations led consistently to higher administrative expenses and higher central office staffing levels, though not higher total administrative staffing shares.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Berne, R. & Steifel, L. (1994). Measuring equity at the school level: The finance perspective. <i>Education Evaluation and Policy Analysis</i> . 16(4). 415-421.	vertical equity	32 community subdistricts and 800 schools	Average teacher salary statistics	Poverty	Regression analysis assesses the relationship between the resource (budget, expenditure, or position) data and poverty.	All variables except positions are distributed in higher per-pupil amounts to low poverty sub-district (and school)... On the other hand, the coefficients for middle/junior high schools show that all variables except average teacher's salary are distributed in higher per-pupil amounts to high poverty schools.
Betts, J.R., Rueben, K.S. & Danenberg, A. (2000). Equal Resources, Equal Outcomes? The Distribution of School Resources and Student Achievement in California. Public Policy Institute of California.	adequacy, horizontal equity, vertical equity	California (1997-1998 census of all schools); 1998 Stanford 9 achievement tests.	Detailed measures of resources at the school and classroom levels (i.e., class size, teacher preparation, curriculum)	Economically disadvantaged students; student performance	Variation	California schools exhibit considerable inequality in teacher preparation and curriculum offered and relatively little inequality in average class size. Schools that have less of one resource tend to have less of many other resources as well. Inequalities in teacher preparation among schools are large, and they matter for student outcomes, whether measured in terms of test scores or course-taking patterns.
Burke, S.M. (1999). An analysis of resource inequity at the state, district, and school levels. <i>Journal of Education Finance</i> , 24(4). 435-458.	horizontal equity, vertical equity	Data on the student/teacher ratio for the school years 1987/1988 through 1992/1993 via the U.S. Department of Education. The sample contains 1,204 unified school districts located in 37 states. School districts with less than 10 total schools in the 1991/1992 school year were not included.	Teacher-pupil ratio (used as a proxy for educational resources)	Variation from perfect equality	Gini coefficient analysis	School level inequalities exist in the distribution of educational resources within and across districts. However, the intra-district distribution of education resources appears to be equitable. Only 75 of the 1,204 total school districts (6.23 percent) had school level Gini coefficients that were above 0.10 - the standard established by Odden and Picus (2008) accepted in the literature.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Boyd, D.J., Lankford, H., Loeb, S., Rockoff, J.E. and Wyckoff, J.H. (September 2007). The Narrowing Gap in New York City Teacher Qualifications and Its Implications for Student Achievement in High Poverty Schools (Working Paper 10). Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research.	adequacy, horizontal equity, vertical equity	Data on New York City teachers, students, and schools between 2000 and 2005. The database is constructed from administrative data from the New York City Department of Education, the New York State Education Department, alt. certified teacher programs, and the College Board.	Observed teacher characteristics: SAT scores, certification status, teacher experience, teacher demographics, undergraduate, test performance, pathway, college recommended.	Student growth using student performance (statewide student exams). Poverty status, minority status, expenditures per pupil.	Using value-added analysis to measure student growth, regression models are developed to estimate the relationships between student performance and teacher characteristics.	Changes in these observed qualifications of teachers (i.e., SAT scores or certification status) account for a modest improvement in the average achievement of students in the poorest schools.
Carr, M., Gray, N., & Holley, M. (2007, September 20). Shortchanging disadvantaged students: An analysis of intra-district spending patterns in Ohio. Policy Report No. 14. Columbus: The Buckeye Institute for Public Policy Solutions.	vertical equity	Ohio - 72 high-poverty school systems during the 2005-06 school year		Students who are disadvantaged, in special education programs, or gifted.		Districts, especially larger ones, tend to use staffing allocations to distribute funding. However, these allocations are often a result of central office decisions and collective bargaining agreements, which do not necessarily reflect student need." In our study of 72 high-poverty school systems during the 2005-06 school year, the difference between what individual school buildings should have spent based on the demographics of their student population and what they actually spent per pupil resulted in nearly \$300 million being diverted from students who are disadvantaged, in special education programs, or gifted.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Clark, C. (1998). Using School-Level Data to Explore Resources and Outcomes in Texas. <i>Journal of Education Finance</i> . 23(3). 374-89.	vertical equity	8 large school districts in TX from 1994-1995 school year (from the Academic Excellence Indicator dataset).	Resources	Students who are disadvantaged	Students who are disadvantaged	School districts in Texas allocate approximately 60 percent of operating expenses to the school. They also showed that although teacher costs are a strong determinant of resource levels in schools, the nature of the relationship is complicated by policies and practices that are unique to each school district. Moreover, the results indicated that even in a large Texas district that seems to be distributing more resources to schools serving students with the greatest need, there is little measurable effect from the resources.
Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2005). Who Teaches Whom? Race and the Distribution of Novice Teachers. <i>Economics of Education Review</i> . 24(4). 377-392.	horizontal equity	A micro-level data set provided by the North Carolina Department of Public Instruction - focus on 7th grade students (2000 - 2001 school year)	Teacher experience	Minority status	Descriptive data analysis	Black students are much more likely than white students to face a novice teacher, and that much of the differential exposure reflects differences across schools and across classrooms within districts.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2006). Teacher-student matching and the assessment of teacher effectiveness. <i>Journal of Human Resources</i> , University of Wisconsin Press. 41(4).	Adequacy	Administrative data on teachers and school administrators in North Carolina provided by the North Carolina Department of Public Instructions through the North Carolina education Research Center at Duke University. - 5th grade data is used	Teacher experience, licensure test scores, teacher performance in math and reading	Student performance, socio-economic status	Descriptive analysis of data, chi-squared tests were conducted to test the relationships	There is a tendency for more highly qualified teachers to be matched with more advantaged students. Also, the authors consistently find significant returns to teacher experience in both math and reading and to licensure test scores in math achievement. They also find that the returns in math are greater for socioeconomically advantaged students. Also, Black teachers and teachers of other races teach students with significantly lower test scores. And teachers with degrees from less competitive institutions teach students with significantly lower test scores, and teachers with advanced degrees show a slight but insignificant tendency to teach students with higher test scores. Higher licensure test scores are associated with higher-test scores.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Clotfelter, C., Ladd, H. F., Vigdor, J. L., & Wheeler, J. (2007). High-poverty schools and the distribution of teachers and principals (Working Paper 1). Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research.	horizontal equity	Administrative data on teachers and school administrators in North Carolina provided by the North Carolina Department of Public Instructions through the North Carolina Education Research Center at Duke University.	Measures of teacher quality: <ul style="list-style-type: none"> • Experience - % under 3 years of teaching • Quality of undergraduate institution - a competitive ranking based on information for the 1997-98 freshman class from the Barron's College Admissions Selector. (the percentage of teachers who graduated from uncompetitive institutions) • Licensure type - the percentage of teachers who do not have a regular license. • Average licensure test scores • National Board Certification - % of Board Certified Teachers. 	Poverty (percentage of students who apply for and were found eligible for the federally sponsored free lunch program (those with incomes below 130 percent of the poverty line)		Students in the high poverty schools are served by school personnel with lower qualifications than those in the lower poverty schools (in many cases the differences are large).
Clotfelter, C.T., Ladd, H.F., & Vigdor, J.L. (2007). Teacher Credentials and Student Achievement in High School: A Cross-Subject Analysis with Student Fixed Effects (Working Paper 11). Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research.	horizontal equity	Test scores on the five EOC tests typically taken by North Carolina students in either the ninth or the tenth grades. Those test scores are matched with detailed administrative data on teacher characteristics and credentials.	Teacher credentials, experience	Student performance, race, socio-economic status	Student fixed effects in the context of a model estimated across subjects	There is an uneven distribution of teacher credentials by race and socio-economic status of high school students.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
DeAngelis, K.J., Presley, J.B. & White, B.R. (2005). The Distribution of Teacher Quality in Illinois (IERC 2005-1). Edwardsville, IL: Illinois Education Research Council.	horizontal equity	140,000 teachers in 2002-2003 among Illinois' public schools (from the Teacher Service Record data maintained by the Illinois State Board of Education.	A composite measure of school teacher quality including college competitiveness, years of experience, type of credential, performance on the Basic Skills test and ACT score.	Poverty and minority status, student performance; % minority students; % low-income students; % high-performing students	Descriptive analysis of data	Most of the variation in teacher quality is found among schools within districts. Students in high minority and high income schools throughout the state typically face teachers with lower quality attributes than their peers in other schools – but other characteristics of schools also affect teachers' decisions about where to work.
The Education Trust. (2005) California's Hidden Teacher-Spending Gap: How State and District Budgeting Practices Shortchange Poor and Minority Students and Their Schools.	vertical equity	Data on teacher salaries and teacher characteristics came from the annual California Basic Educational Data System (CBEDS) and 2003-2004 California Department of Education data on district salary schedules and bonuses	Percentage of teachers with fewer than three years of teaching experience; teacher salaries	Poverty and minority status	Descriptive analysis of data	There are significant gaps in spending on teacher salaries between high- and low-poverty high schools within eight of the ten largest school districts in California. Forty-two of the 50 largest districts spend significantly more on teachers in their schools serving the fewest numbers of African-American and Latino students. In most cases (31 out of 50), "minority gaps" in a given district exceed the "poverty gap." These gaps range from \$85,534 to \$574,387.
The Education Trust. (2008) Their Fair Share: How Texas-Sized Gaps in Teacher Quality Shortchange Poor and Minority Students.	vertical equity	School district data came from the Texas Education Agency's Academic Excellence Indicator System	Percentage of teachers with fewer than three years of teaching experience; teacher salaries	Poverty and minority status	Descriptive analysis of data	Year after year, Hispanic, African-American and low-income students are less likely to be assigned to teachers who know their subject matter, less likely to be in classrooms with experienced teachers and less likely to attend schools with a stable teaching force. Their teachers are paid less, too.

Study	Equity	Data Source	Relationship between Resource (Inputs) Variable of Interest		Methodology	Findings
<p>Hertert, L. (1995). Does Equal Funding for Districts Mean Equal Funding for Classroom Students? In Picus, L.O. and Wattenbarger, J.L. (Eds.) Where Does the Money Go? Resource Allocation in Elementary and Secondary Schools. Thousand Oaks, CA: Corwin Press: 71-84.</p>	<p>vertical equity</p>	<p>California (1990-1991) unified districts, and the "regular" schools within them - includes 190 districts with ADA of 3,012,498. - Twenty-five districts serve as a representative sample from this population. Expenditure data from the sample districts.</p>	<p>Dollars spent for regular instruction in 1990 to 1991: money and a number of educational resources that money buys.</p>	<p>Equity measured at the school level (pupil ethnicity data)</p>	<p>Summary statistics are used to measure the variation in per-pupil expenditures: the range, the restricted range, the federal range ratio, the coefficient of variation, the Gini coefficient, and the McLoone index. The association of school-level characteristics with per-pupil expenditures is assessed by stepwise multiple regression.</p>	<p>School-level variations are virtually unrelated to the ethnicity of pupils in the majority of sampled districts. There was less variation in the amount of money spent per pupil at different schools within a given district than was spent at different schools in different districts. (With some notable exceptions.) However, the distribution of educational resources--teacher-pupil ratios, teacher experience, teacher education, and course offerings in higher-level math and science--was less equitable across schools than was the allocation of money used to buy these resources. Further, the level of equity varied by resource, with teacher-pupil ratiosdistributed as fairly as educational funding but with course offerings varying widely both across districts and among schools.</p>

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Iatarola, P. & Rubenstein, R. (2007). New Stakes and Standards, Same Ol' Spending? Evidence from New York City High Schools. Education Finance and Policy. 2(1). 74-99.	Adequacy	New York city high schools	Re-allocation patterns	Low-performing students; graduation rates	Regression analysis - controlling for unchanging school characteristics through school fixed effects, and for changes affecting all schools through year effects. Analysis includes a series of time variables to represent the year of the resource data (post-implementation) and school fixed effects to capture unobserved time-invariant characteristics of the school that could affect resource allocation patterns.	Some evidence of changes in spending levels and resource allocation patterns in New York City high schools following the implementation of new state graduation requirements. In particular, per pupil spending on direct services increased significantly over the period; the largest increases occurred in schools with the largest gaps in graduation rates. The analyses also presented evidence of small resource reallocation following the reforms.
Iatarola, P. & Stiefel, L. (2003). Intradistrict Equity of Public Education Resources and Performance. Economics of Education Review. 22(1). 69-78.	horizontal equity, vertical equity	840 elementary and middle schools in NYC	Expenditures, teacher resources	Minority status, percent special need students	Equity measures	Horizontal equity distributions are more disparate than what would be expected relative to results of other studies, vertical equity is lacking, especially in elementary schools, and equality of opportunity is at best neutral but more often absent. Middle schools exhibit more equity than elementary schools.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Lankford, H., Loeb, S. & Wyckoff, J. (2002). Teacher Sorting and the Plight of Urban Schools: A Descriptive Analysis. Educational Evaluation and Policy Analysis. 24(1). 37–62.	horizontal equity	New York - elementary schools	Teacher certification, teacher experience	Minority status, urbanicity, student poverty, student English proficiency, and student performance on state assessment exams		Systematic sorting of New York State's elementary school teachers in 2000. Non-white students were four times more likely than white students to have a teacher who was not certified in any of the courses he or she taught and 50 percent more likely to have a teacher with no prior experience. The sorting of teacher qualifications within districts can also be substantial. In New York City elementary schools in 2000, non-white students were 40 percent more likely to have a teacher who was not certified in any of the courses she taught and 40 percent more likely to have a teacher with no prior experience.
Miller, L. & Rubenstein, R. (2008). Examining the Nature and Magnitude of Intradistrict Resource Disparities in Mid-Size School Districts. Public Budgeting & Finance. 28(4). 26-51.	horizontal equity	1050 elementary and middle schools in four larger NY State school districts (not including NYC)	Teacher experience, teacher salary	Student poverty		Clear relationships between student poverty and teacher characteristics, with more experienced and therefore higher paid teachers disproportionately represented in lower poverty schools in three of four districts.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Monk, D. & Hussain, S. (2000). Structural influences on the internal allocation of school district resources: Evidence from New York State. Educational Evaluation and Policy Analysis. 22(1). 1-26.	???	1991-1992 data collected by the New York State Education Department (School Financial Master File, Institutional Master File, Personnel Master File of the Basic Ed. Data System (BEDS) for revenue, expenditure, enrollment, and staffing information. Sample of 645 districts.	Spending levels per pupil, full-value property wealth per pupil, the incidence of poverty as measured by the percentage of students in the free and reduced-price lunch program, staffing resources	Property wealth, poverty, and size	Estimation of a district fixed-effects model (elasticity estimates as well as the results of a simulation where they calculate the changes in share ratios associated with a 10% increase in spending in the average district within the sample.)	Differences in spending have substantially larger effects on staffing levels than do differences in property wealth, poverty, or differences in school district size. Also, there is a tendency for higher property wealth to shift staffing resources into secondary academic areas along with some indication of the tendency for higher poverty levels to not be associated with larger allocations of professional staff into the academic program. Differences in spending, property wealth, poverty and school district size were positively related to the total net supply of resources into administration. Finally, increases in spending, poverty, and size all translate into reduction in the academic share of the secondary program (with the opposite result for property wealth).

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Owens, J.D. (1972). The distribution of educational resources in large American cities. <i>Journal of Human Resources</i> . 7(1). 26–38.	horizontal equity, vertical equity	9 large cities - elementary schools	Teacher salary expenditures, teacher experience, verbal ability	Low-income and non-white neighborhoods	Regression analysis was used to measure the extent to which a school-expenditure variable and a number of school-quality variables were influenced by within-city variations in the economic and racial character of the families served by each school.	Educational resources are distributed unequally within large American cities, with poor and nonwhite neighborhoods receiving less than their share.
Owens, T. & Maiden, J. (1999). A Comparison of Interschool and Inter-district Funding Equity in Florida. <i>Journal of Education Finance</i> . 24(4). 503-518.	horizontal equity	A school district in Florida	Instructional expenditures (includes teacher salaries and benefits, purchased services and classroom materials) for basic programs; interschool funding	Racial/ethnic composition and household income	Regression analysis controlling for size differences among the schools	When expenditures without federal compensatory funds were considered, there is clear evidence that the percentage of African American students in a school and the percentage of students on free/reduced lunch programs are negatively associated with instructional expenditures.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Pan, D., Rudo, Z., & Smith-Hansen, L. (2003). Resource Allocation Does Matter in Improving Student Performance. Paper presented at the Annual Conference of the American Education Finance Association, March 27-29, 2003.	Adequacy, ???	Data from low- and high-performing school districts in four states in the Southwest (Arkansas, Louisiana, New Mexico, and Texas) and 12 districts with consistent gains in student performance. Data sources include: NCES, Annual Survey of local Government Finances: School Systems for 1994-95 to 1998-99; Common core of Data, Local Education Agency (School District) Universe Survey and Public Elementary/Secondary School Universe Survey for school years 1995-96 to 1999-2000. Performance data came from State Departments of Education.	Fiscal and staffing data	Student performance	To examine the differences between the high- and low-performing groups in fiscal and human resource allocation, group means of the five years of data were compared using an analysis of variance (ANOVA) and Tukey post-hoc tests.	High-performing districts spent more money and employed more staff in certain instructional categories when compared to low-performing districts. The resource allocation patterns of the 12 improvement districts showed that they had a focus on instruction, and also re-allocated resources toward instructional areas over time, more than districts of similar size.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Roza, M. (2008). Allocation Anatomy: How District Policies that Deploy Resources Can Support (or Undermine) District Reform Strategies. University of Washington: Center on Reinventing Public Education.	vertical equity		Funds per pupil		Coefficient of variation computed on the total dollars received per pupil.	Funds doled out through central budgets were less equitable than those allocated in school budgets in both districts; Among formulaic allocations, those distributed by student counts were more equitable than those distributed by staff counts or by school. Among the non-formulaic allocations, those deployed on the basis of central staff discretion were the most inequitable in both districts. Those allocated as a function of demand were also highly inequitable, but less so.
Rubenstein, R. (1998). Resource Equity in the Chicago Public Schools: A School-level Approach. Journal of Education Finance. 23(4). 468-489.	horizontal equity, vertical equity	1994-95 line-item school-level budgets for every public school in Chicago, provided by the Chicago Panel on School Policy.	School level spending	Student poverty	Univariate dispersion measures such as the Gini coefficient, the McCloone index, the coefficient of variation, the range, and the standard deviation; regression analysis to examine the relationship between school-level spending and student poverty	The distribution of base funding for both high schools and elementary schools is horizontally equitable to some degree. Horizontal equity decreases as various special and categorical funds are included in the analysis. The findings regarding vertical equity are somewhat less clear, though. In Chicago elementary schools, different patterns of resource distribution emerge depending upon the object used in the analysis: schools with higher levels of student poverty receive lower funding per pupil; distribution of General Fund resources to elementary schools is not strongly related to poverty; and schools with higher levels of student poverty tend to employ lower-paid teachers.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Rubenstein, R., Schwartz, A.E., & Stiefel, L. (2007). From Districts to Schools: The Distribution of Resources across Schools In Big City School Districts. <i>Economics of Education Review</i> . 26. 532-545.	vertical equity	New York City, Cleveland, and Columbus, Ohio	Resource measures	School and student characteristics	Estimating de facto expenditure equations relating resource measures to school and student characteristics.	Schools that have higher percentages of poor pupils receive more money and have more teachers per pupil, but the teachers tend to be less educated and less well paid, with a particularly consistent pattern in New York City schools.
Schwartz, A. E. (1999). School Districts and Spending in the Schools. In William J. Fowler, (Ed.), <i>Selected Papers in School Finance, 1997-99</i> . Washington, DC: National Center for Education Statistics. 55-83.	vertical equity	1995-96 school and district level data for Ohio (3,284 schools and 586 districts)	Number of teachers, teacher experience	Test scores, demographic and socioeconomic status (% of non-white students and % eligible for FRPL)	Analysis of de facto formula that should explain school spending.	The patterns of spending across and within school districts in the state of Ohio vary substantially. These differences are driven by both differences in the schools and by differences in the districts in which these schools operate. The regressions indicate that the combination of interdistrict variation in the overall level of spending and the intradistrict variation in the allocation across schools results in a spending system in which only about 30 percent of the variation in spending is explained by a set of factors that should play an important role in any spending formula that might be adopted— enrollment, the grade level served by the school (elementary, middle or high school), and the percentage of non-white students or those eligible for free lunch.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Schwartz, A.E., Stiefel, L., & Rubenstein, R. (2008). Why Do Some Schools Get More and Others Less? An Examination of School-Level Funding in New York City. Conference paper prepared for the 20th Annual Conference of the Association for Budgeting and Financial Management.	vertical equity	Dataset includes elementary and middle schools in New York City from school years 2000-01 to 2003-04. This includes information on student performance and demographics, teacher characteristics, and school and grade-level enrollment (from NYC DOE Annual School Reports), and expenditures and sources of funds (from School Based Expenditure Reports).	Expenditures per pupil, revenues (tax levy and state operating funds)	Poverty status, percent of limited English proficiency students, performance, percent of special education students, holding constant school size and grade level	A series of models regress school-level per-pupil funding variables on school-level characteristics.	The relationships between per-pupil funding and observable school characteristics, particularly student needs, are not as strong. Second, funding does not respond crisply to changes in characteristics of schools, even over a three year period (2001 – 2004). In fact, previous year funding levels account for a large share of current year funding. Third, the relationship between funding and the percentage of the students who are poor (based upon their free lunch eligibility), are of limited English proficiency, and are full-time and part-time special education students, is positive.

Study	Equity	Data Source	Relationship between Resource (Inputs) Variable of Interest		Methodology	Findings
Steifel, L., Rubenstein, R., & Berne, R. (1998). Intra-district equity in four large cities: Data, methods, and results. <i>Journal of Education Finance</i> . 23(4). 447-467.	horizontal equity	Chicago, New York, Rochester and Fort Worth	General education funds, compensatory funds	All students, students in poverty, non-white students; location	Coefficient of variation, a negative relationship between the percentage of minority students and funding	In general, schools in these cities are in a horizontally equitable range. For vertical equity with respect to the percentage of students in poverty, Chicago and New York show some vertical equity (positive relationships between these funds and poverty). For general education or total funds, all cities show mixed results--some positive relationships and some weak negative relationships. Overall, in these cities, there are only a few instances of a lack of equal opportunity (as indicated by a negative relationship between the percentage of minority students and funding). Dollar allocations and average teacher salaries tend to favor schools with lower poverty levels. There is a negative relationship between average teacher salaries and percentages of poor, and sometimes minority, students. This relationship appears to be compensated at times by putting relatively more positions in schools with higher percentages of poor students. Without further evidence on the trade-off between what higher salaries buy and what smaller class sizes buy in terms of achievement or other outcomes, it is difficult to make an equity judgment about this trade-off.

Study	Equity	Data Source	Relationship between		Methodology	Findings
			Resource (Inputs)	Variable of Interest		
Summers, A.A. & Wolfe, B.L. (1976). Intra-district Distribution of School Inputs to the Disadvantaged: Evidence for the Courts. <i>The Journal of Human Resources</i> . 11(3). 328-342.	horizontal equity	Philadelphia	Measurements of teacher and principal quality; salaries per pupil	Poverty and race		There is little evidence to support the proposition that such "rational" distribution occurs.
Tennessee Department of Education. (2007). Tennessee's most effective teachers: Are they assigned to the schools that need them the most? (Research Brief). Nashville, TN: Author.	horizontal equity	Tennessee Department of Education data	Teacher quality	Poverty and race		Students in the high poverty schools are served by school personnel with lower qualifications than those in the lower poverty schools.

APPENDIX B: CENTRALLY-BUDGETED EXPENDITURES ALLOCATED TO SCHOOLS

SCHOOL	Total Central Budget Allocated to Schools	SpEd	EAP	Title I	Title III	Substitute Teachers	Tuition Reimbursement	Total SS budget	Benefits
HM MS	\$ 1,763,167	\$ 377,093		\$ 77,049	\$ 14,202	\$ 94,860	\$ 41,394	\$ 256,164	\$ 902,406
Raub MS	\$ 1,782,244	\$ 312,852		\$ 110,492	\$ 16,991	\$ 137,647	\$ 23,400	\$ 95,157	\$ 1,085,704
SM MS	\$ 2,551,225	\$ 851,592		\$ 27,507	\$ 16,952	\$ 173,929	\$ 53,271	\$ 132,822	\$ 1,295,153
Trexler MS	\$ 1,689,247	\$ 251,811		\$ 105,822	\$ 7,866	\$ 135,181	\$ 27,679	\$ 98,134	\$ 1,062,754
Central	\$ 1,205,299	\$ 220,025	\$ 823	\$ 20,933	\$ 34,212	\$ 84,052	\$ 17,695	\$ 79,106	\$ 748,453
Cleveland	\$ 550,169	\$ 144,737	\$ 823	\$ 9,701	\$ 8,185	\$ 33,770	\$ 7,770	\$ 27,903	\$ 317,280
Dodd	\$ 1,521,704	\$ 614,587	\$ 823	\$ 1,545	\$ 19,794	\$ 41,273	\$ 21,815	\$ 70,783	\$ 751,084
Jackson	\$ 793,097	\$ 293,256	\$ 823	\$ 3,452	\$ 7,488	\$ 33,186	\$ 8,590	\$ 35,287	\$ 411,016
Jefferson	\$ 1,703,239	\$ 452,362	\$ 121	\$ 156,703	\$ 14,461	\$ 99,595	\$ 23,873	\$ 56,786	\$ 899,338
L. Parkway	\$ 543,118	\$ 154,664	\$ 823	\$ 44,366	\$ 8,067	\$ 25,865	\$ 7,770	\$ 26,594	\$ 274,968
McKinley	\$ 623,661	\$ 95,770	\$ 823	\$ 9,655	\$ 12,811	\$ 38,954	\$ 11,695	\$ 22,099	\$ 431,854
Mosser	\$ 1,169,522	\$ 495,764	\$ 943	\$ 10,577	\$ 13,877	\$ 115,311	\$ 21,788	\$ 235,021	\$ 276,240
Muhlenberg	\$ 1,263,819	\$ 597,221	\$ 823	\$ 4,348	\$ 4,379	\$ 76,433	\$ 16,160	\$ 55,271	\$ 509,185
Ritter	\$ 1,095,184	\$ 216,920	\$ 823	\$ 1,946	\$ 7,920	\$ 45,131	\$ 32,560	\$ 49,953	\$ 739,932
Roosevelt	\$ 1,157,878	\$ 338,433	\$ 121	\$ 11,792	\$ 11,384	\$ 46,648	\$ 26,380	\$ 61,885	\$ 661,234
Sheridan	\$ 1,263,190	\$ 286,723		\$ 186,197	\$ 18,513	\$ 72,190	\$ 13,785	\$ 228,532	\$ 457,250
U. Terrace	\$ 1,236,375	\$ 334,425	\$ 121	\$ 100,221	\$ 16,283	\$ 65,585	\$ 29,521	\$ 75,426	\$ 614,792
Washington	\$ 993,356	\$ 203,661	\$ 823	\$ 9,784	\$ 16,597	\$ 40,717	\$ 23,400	\$ 52,232	\$ 646,143
TOTALS	\$34,127,809	\$ 8,455,221	\$ 8,949	\$ 1,010,228	\$ 319,346	\$ 1,953,198	\$ 567,656	\$ 2,289,803	\$ 18,515,427

APPENDIX C: INTERVIEW PROTOCOL

My research examines allocation for resources among schools. In order to explain and contextualize the current resource allocation practices in the Allentown School District (ASD), interviews will be conducted to gather information about the approach to allocation of resources across schools. These interviews seek to identify the specific methods (i.e., formulas) and procedures that have been used in the District. Also, interview responses should provide the rationale for the current resource allocation policies.

1. Who is involved in decision making regarding the school budgets? How and to what extent (e.g., budget office, Superintendent, central office staff, school leaders, School Board members, parents/community members)?
2. What is the budget process as it relates to allocating resources to schools? (Who does what when? Or, Which decisions are made at the central office versus the schools?)
3. How are budgeting decisions made (e.g., formulas, requests from buildings)? Why?
4. How are formulas used? For what portion(s) of the budget? What is allocated by formula (e.g., dollars, staff, programs)? What remains at the central office? How much and how are these dollars used at the school level?
5. Have there been changes to the budget process in recent years? Why?
6. What resources are distributed equally to all schools?

7. What resources are not distributed equally to all schools? (Do certain programs/staff exist only at certain schools? What are these programs/staff?)
8. Is there differentiation between schools when allocating resources? If so, what is this based on? Why?
 - a. Enrollment
 - b. Grade level
 - c. Student characteristics (ED status, ELL status, Special Education, student performance, etc.)
 - d. Prior practice
 - e. Other
9. How do federal, state and local requirements impact the budget process in terms of allocating resources to schools? Are you aware of any requirements (legal or otherwise) regarding intra-district resource allocation? How does the district measure comparability for Title I?
10. Where do categorical grants factor in? How are they allocated? Are they used to supplement expenditures?
11. ASD has received new funds due to the revision to the State's funding formula. How is the district spending these additional funds? Are they being directed to certain schools and/or certain students? Why? How was it decided what schools receive the additional resources? Do these new funds influence intra-district resource allocation? Do you think they were meant to impact intra-district resource allocation?

12. How are teachers assigned to buildings? Are there seniority transfer privileges built into the teachers' labor contract?
13. Do you find that teachers sort themselves into particular schools? If so, based on what characteristics (of both the teachers and the schools)?
14. How are students assigned to schools (i.e., by neighborhood, parent choice, achievement level, other)?
15. Is there any anecdotal evidence that students move because of the schools?
16. Has the distribution of resources among schools ever been an issue? For whom (e.g., which constituencies)?
17. What do you think of the current allocation system? Is it equitable? What might you do to strengthen this system?

APPENDIX D: SURVEY ON TEACHER EFFICACY

Dear Principals:

Please forward to all teachers working in, or affiliated with, your building:

As you know, ASD is working to expand its thoughtful use of data to best support our teachers in their efforts to improve student outcomes. To this end, I am having Stephanie Levin, Institute of Educational Sciences Pre-doctoral Fellow, work with Susan Lozada, Executive Director of Community & Student Services, to collect and analyze information from teachers on teacher and school efficacy. The link (<https://www.surveymonkey.com/s/5X8KCCV>) will take teachers to a 25 question survey designed to help us gain a better understanding of the kinds of things that create difficulties for teachers (individually and collectively) in their school activities.* All responses to this survey are confidential.

Please click on the following link to access the survey:

<https://www.surveymonkey.com/s/5X8KCCV>

Thank you!

*If you would like additional information on this survey, please contact Stephanie Levin at levins@allentownsd.org.

Teachers' Sense of Efficacy Scale₁ (short form)

Teacher Beliefs

Directions: This questionnaire is designed to help us gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Please indicate your opinion about each of the statements below. Your answers are confidential.

Nothing (1), Very Little (3), Some (5), A Great Deal (7), Quite a Bit (9)

1. How much can you do to control disruptive behavior in the classroom?
2. How much can you do to motivate students who show low interest in school work?
3. How much can you do to get students to believe they can do well in school work?
4. How much can you do to help your students value learning?
5. To what extent can you craft good questions for your students?
6. How much can you do to get children to follow classroom rules?
7. How much can you do to calm a student who is disruptive or noisy?
8. How well can you establish a classroom management system with each group of students?
9. How much can you use a variety of assessment strategies?
10. To what extent can you provide an alternative explanation or example when students are confused?
11. How much can you assist families in helping their children do well in school?
12. How well can you implement alternative strategies in your classroom?

Collective Efficacy Scale (short form)

Teacher Beliefs

Directions: Please indicate your level of agreement with each of the following statements about your school from strongly disagree to strongly agree. Your answers are confidential.

Strongly Disagree (1), Disagree (2), Somewhat Disagree (3), Somewhat Agree (4), Agree (5), Strongly Agree (6)

1. Teachers in the school are able to get through to the most difficult students.
2. Teachers here are confident they will be able to motivate their students.
3. If a child doesn't want to learn teachers here give up.
4. Teachers here don't have the skills needed to produce meaningful student learning.
5. Teachers in this school believe that every child can learn.
6. These students come to school ready to learn.
7. Home life provides so many advantages that students here are bound to learn.
8. Students here just aren't motivated to learn.
9. Teachers in this school do not have the skills to deal with student disciplinary problems.
10. The opportunities in this community help ensure that these students will learn.
11. Learning is more difficult at this school because students are worried about their safety.
12. Drug and alcohol abuse in the community make learning difficult for students here.

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Promax-rotated Standardized Regression Coefficients

(Includes responses for ES and MS teachers – same factors for total sample)

	Factor 1 - Efficacy in Classroom Management	Factor 2 - Efficacy in Instructional Strategies	Factor 3 - Efficacy in Student Engagement
How much can you do to control disruptive behavior in the classroom?	0.92425	-0.06701	-0.02909
How much can you do to motivate students who show low interest in school work?	0.23488	-0.03233	0.72676

How much can you do to get students to believe they can do well in school work?	0.18123	0.04226	0.73353
How much can you do to help your students value learning?	0.05672	-0.03054	0.86670
Can what extent can you craft good questions for your students?	0.01548	0.82380	-0.02486
How much can you do to get children to follow classroom rules?	0.83829	0.02118	0.04853
How much can you do to calm a student who is disruptive or noisy?	0.77372	-0.02741	0.14208
How well can you establish a classroom management system with each group of students?	0.69143	0.34004	-0.08284
How much can you use a variety of assessment strategies?	-0.02365	0.81531	0.08179
To what extent can you provide an alternative explanation or example when students are confused?	-0.00522	0.86497	-0.03660
How much can you assist families in helping their children do well in school?	-0.17224	0.12285	0.75629
How well can you implement alternative strategies in your classroom?	0.09622	0.67144	0.19170

Correlation Between Factors

	Factor 1	Factor 2	Factor 3
Factor 1	1.00000	-0.29793	-0.46398
Factor 2	-0.29793	1.00000	-0.28160
Factor 3	-0.46398	-0.28160	1.00000

BIBLIOGRAPHY

- Abbott v. Burke* 153 NJ 480 (1998) (*Abbott V*)
- Ajwad, M. I. (2006). Is intrajurisdictional resource allocation equitable?: An analysis of campus-level spending data for Texas elementary schools. *The Quarterly Review of Economics and Finance*, 46, 552-564.
- Alexander, K. (1991). The common school ideal and the limits of legislative authority: The Kentucky case. *Harvard Journal on Legislation*, 28, 341-366.
- Allentown School District Board Brochure. Retrieved on December 1, 2010 from <http://www.allentownsd.org/233410820121755220/lib/233410820121755220/boardbrochure.pdf?233410820121755220nav=|&nodeid=196>.
- Ashenfelter, O. & Rouse, C. (2000). Schooling, intelligence, and income in America. In K. Arrow, S. Bowles, & S. Durlauf (Eds.), *Meritocracy and economic inequality* (pp. 89-117). Princeton, NJ: Princeton University Press.
- Augenblick, J.G., Myers, J.L. & Anderson, A.B. (1997). Equity and adequacy in school funding. *The Future of Children, Financing Schools*, 7, 63-78.
- Augenblick, Palaich and Associates, Inc. (2007). Costing-Out the Resources Needed to Meet Pennsylvania's Public Education Goals.
- Baker, B. D. (2005). The emerging shape of educational adequacy: From theoretical assumptions to empirical evidence. *Journal of Education Finance*. 30, 259-87.
- Baker, B. D. (2003). State policy influences on the internal allocation of school district resources: Evidence from the common core of data. *Journal of Education Finance*. 29, 1-24.
- Baker, B. D. (2009). Within-district resource allocation and the marginal costs of providing equal educational opportunity: Evidence from Texas and Ohio. *Education Policy Analysis Archives*. 17(3). Retrieved November 14, 2009 from <http://epaa.asu.edu/epaa/v17n3/>.
- Baker, B. D. & Green, P. C. (2008). Conceptions of equity and adequacy in school finance. In H. F. Ladd & E. B. Fiske (Eds.), *Handbook of Research in Education Finance and Policy* (pp. 203-221). New York: Routledge.
- Baker, B. D. & Green, P. C. (2009). Equal educational opportunity and the distribution of state aid to schools: Can or should school racial composition be a factor? *Journal of Education Finance*. 34, 289-323.

- Baker, E.L., Barton, P.E., Darling-Hammond, L., Haertel, E., Ladd, H.F., Linn, R.L., Ravitch, D., Rothstein, R., Shavelson, R.J. & Shepard, L.A. (2010). *Problems with the use of student test scores to evaluate teachers (Briefing Paper #278)*. Washington, DC: Economic Policy Institute.
- Baker, B.D., Sciarra, D.G., & Farrie, D. (2010). Is school funding fair? A national report card. Education Law Center, Newark, N.J. Retrieved on February 1, 2012 from www.schoolfundingfairness.org.
- Ballou, D. (1996). Do public schools hire the best applicants? *Quarterly Journal of Economics*, 111, 97-134.
- Ballou, D. & Podgursky, M. (1997). *Teacher pay and teacher quality*. Kalamazoo, MI. W.E. Upjohn Institute.
- Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior*, 4, 71-81. New York: Academic Press.
- Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.
- Barth, P. (2003). A new core curriculum for all. *Thinking K-16* 7(1). 3-19.
- Berne, R. & Stiefel, L. (1999). Concepts of school finance equity: 1970 to the present. In H. F. Ladd, R. Chalk, and J. S. Hansen, (Eds.), *Equity and Adequacy in Education Finance*. Washington, D.C.: National Academy Press.
- Berne, R. & Stiefel, L. (1999). Issues in school site-based financing in large cities in the United States. In M. E. Goertz & A. Odden (Eds.), *School-Based Financing (Twentieth Annual Yearbook of the American Education Finance Association)* (pp. 3-21). Thousand Oaks: Corwin Press.
- Berne, R. & Stiefel, L. (1984). *The measurement of equity in school finance*. Baltimore, MD: Johns Hopkins University Press.
- Berne, R. & Stiefel, L. (1994). Measuring equity at the school level: The finance perspective. *Education Evaluation and Policy Analysis*, 16, 415-421.
- Betts, J. R., Rueben, K. S. & Danenberg, A. (2000). *Equal resources, equal outcomes? The distribution of school resources and student achievement in California*. Public Policy Institute of California.
- Biegel, S. & Slayton, J. (1997). Policy issues and prospects: Regarding the potential breakup of the Los Angeles unified school district. *Access to Equal Educational Opportunity*. Retrieved on October 20, 2009 from <http://www.gseis.ucla.edu/gseisdoc/study/equal3.html>.

- Bill & Melinda Gates Foundation. (2010). *Research Paper: Learning about teaching - Initial findings from the Measures of Effective Teaching project*. Retrieved on January 15, 2011 from http://www.metproject.org/downloads/Preliminary_Findings-Research_Paper.pdf
- Boyd, D. J., Grossman, P.L., Lankford, H., Loeb, S., & Wyckoff, J. H. (2008a). *The narrowing gap in New York City teacher qualifications and its implications for student achievement in high poverty schools (Policy Brief 6)*. Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved on November 18, 2009 from <http://www.caldercenter.org/publications.cfm>.
- Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. H. (2008b). *Overview of measuring effect sizes: The effect of measurement error (Policy Brief 2)*. Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved on November 18, 2009 from <http://www.caldercenter.org/publications.cfm>.
- Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. H. (2008c). *Teacher preparation and student achievement (Working Paper 20)*. Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved on November 18, 2009 from <http://www.caldercenter.org/publications.cfm>.
- Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. H. (2008d). *Who leaves? Teacher attrition and student achievement*. National Bureau of Economic Research: NBER Working Paper No. 14022.
- Boyd, D. J., Lankford, H., & Loeb, S. (2004). *Improving student outcomes: The role of teacher workforce policies. 2004 symposium on education finance and organizational structure in NYS schools*. Education Resource Finance Research Consortium. 99-132.
- Boyd, D. J., Lankford, H., Loeb, S., Rockoff, J. E. & Wyckoff, J. H. (2007). *The narrowing gap in New York City teacher qualifications and its implications for student achievement in high poverty schools (Working Paper 10)*. Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved on November 18, 2009 from <http://www.caldercenter.org/publications.cfm>.
- Boyd, D. J., Lankford, H., Loeb, S. & Wyckoff, J. H. (2003). *Analyzing the determinants of the matching of public school teachers to jobs: Estimating compensating differentials in imperfect labor markets*. National Bureau of Economic Research: NBER Working Paper No. 9878.

- Boyd, D. J., Lankford, H., Loeb, S. & Wyckoff, J. H. (2005). The draw of home: How teachers' preferences for proximity disadvantage urban schools. *Journal of Policy Analysis and Management*, 24(1), 113-132.
- Braun, H. (2005). *Using student progress to evaluate teaching: a primer on value-added models*. Princeton, NJ: Policy Information Center, Educational Testing Service. Retrieved January 16, 2011 from <http://www.ets.org/Media/Research/pdf/PICVAM.pdf>
- Brighthouse, H. & Swift, A. (2008). Putting educational equality in its place. *Education Finance and Policy*, 3(4), 444-466.
- Burke, S. M. (1999). An analysis of resource inequity at the state, district, and school levels. *Journal of Education Finance*, 24(4). 435-458.
- Burtless, G. (Ed.). (1996). *Does Money Matter: The Effect of School Resources on Student Achievement and Adult Success*. Washington, DC: The Brookings Institution.
- California Department of Education. (2007). *Evaluating progress toward equitable distribution of effective educators [Toolkit]*. Sacramento, CA: Author. Retrieved from <http://www.cde.ca.gov/nclb/sr/tq/documents/toolkit.doc>
- California Department of Education. (2009). *Equitable education: Equity plan criteria for LEAs*. [Website]. Sacramento, CA: Author. Retrieved from <http://www.cde.ca.gov/nclb/sr/tq/equityplan.asp>
- Campaign for Fiscal Equity. *Summary of the Decision by the Court of Appeals in Campaign for Fiscal Equity, Inc. v. State of New York*. Campaign for Fiscal Equity, Inc. Retrieved on February 17, 2008 from <http://www.cfequity.org/CrtofAppeals2003.pdf>
- Card, D., & Krueger, A. B. (1992). Does school quality matter? Returns to education and the characteristics of public schools in the United States. *Journal of Political Economy*, 100, 1-40.
- Carr, M., Gray, N., & Holley, M. (2007). *Shortchanging disadvantaged students: An analysis of intra-district spending patterns in Ohio. Policy Report No. 14*. Columbus: The Buckeye Institute for Public Policy Solutions. Retrieved December 20, 2009 from http://www.buckeyeinstitute.org/docs/Shortchanging_Disadvantaged_Students.pdf
- Chambers, J. G., Levin, J. D., & Shambaugh, L. (2010). Exploring weighted student formulas as a policy for improving equity for distributing resources to schools: A

case study of two California school districts. *Economics of Education Review*, 29(2), 283-300.

- Chambers, J., Shambaugh, L. Levin, J., Muraki, M., & Poland, L. (2008). *A tale of two districts; A comparative study of student-based funding and school-based decision making in San Francisco and Oakland unified school districts*. American Institutes for Research. Retrieved June 10, 2010 from http://www.air.org/files/A_Tale_of_Two_Districts_Final.pdf
- Clark, C. (1998). Using school-level data to explore resources and outcomes in Texas. *Journal of Education Finance*, 23(3), 374-89.
- Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2007a). *How and why do teacher credentials matter for student achievement? (Working Paper 2)*. Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved on November 18, 2009 from <http://www.caldercenter.org/publications.cfm>.
- Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2007b). *How and why do teacher credentials matter for student achievement?* NBER Working Paper No. 12828.
- Clotfelter, C. T., Ladd, H.F., & Vigdor, J. L. (2007c). *Teacher credentials and student achievement in high school: A cross-subject analysis with student fixed effects (Working Paper 11)*. Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved on November 6, 2009 from http://www.caldercenter.org/PDF/1001104_Teacher_Credentials_HighSchool.pdf
- Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2005). Who teaches whom? Race and the distribution of novice teachers. *Economics of Education Review*, 24(4), 377-392.
- Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2006). Teacher-student matching and the assessment of teacher effectiveness. *Journal of Human Resources*, 41(4).
- Clotfelter, C. T., Ladd, H. F., Vigdor, J. L., & Wheeler, J. (2007d). *High-poverty schools and the distribution of teachers and principals (Working Paper 1)*. Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved August 21, 2009, from http://www.caldercenter.org/PDF/1001057_High_Poverty.pdf
- Cohen, M. C. (1997). Issues in school level analysis of education expenditure data. *Journal of Education Finance*, 22(3), 255-279.
- Cohn, E. & Geske, T. G. (1990). *The economics of education* (3rd ed.). Oxford: Pergamon Press.

- Coleman, J. S. (1975). What is meant by 'an equal educational opportunity'? *Oxford Review of Education*, 1(1), 27-29
- Coleman, J. S. & Marjoribanks, K. (1975). Equal educational opportunity: A definition. *Oxford Review of Education*, 1(1), 25-26.
- Constantine, J., Player D., Silva, T., Hallgren, K., Grider, M., & Deke, J. (2009). *An Evaluation of Teachers Trained Through Different Routes to Certification, Final Report* (NCEE 2009- 4043). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Coons, J. E., Clune, W. H., & Sugarman, S. D. (1970). *Private wealth and public education*. Cambridge, MA: Harvard University Press.
- Corcoran, S. P., Evans, W. N., & Schwab, R. M. (2004). Changing labor market opportunities for women and the quality of teachers, 1957-2000. *American Economic Review*, 94(2), 230-235.
- Corcoran, T. & Goertz, M. (2005). The governance of public education. In S. Fuhrman & M. Lazerson (Eds.), *The public schools* (pp. 25-56). Oxford University Press.
- Crampton, F. E., & Bauman, P. (1998). *A new challenge to fiscal equity: Educational entrepreneurship and its implications for states, districts, and schools*. Paper presented at the American Educational Research Association, San Diego, Calif.
- Cuban, L. (1975). Hobson v. Hansen: A study in organizational response. *Educational Administration Quarterly*, 11(2), 15-37.
- Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives*, 8(1), 1-44.
- DeAngelis, K. J., Presley, J. B. & White, B. R. (2005). *The distribution of teacher quality in Illinois (IERC 2005-1)*. Edwardsville, IL: Illinois Education Research Council.
- DeArmond, M., Gross, B. & Goldhaber, D. (2008). *Is it better to be good or lucky? Decentralized teacher selection in 10 elementary schools*. CRPE Working Paper No. 2008-3. University of Washington: Center on Reinventing Public Education.
- Dee, T. S. (2004). Teachers, race, and student achievement in a randomized experiment. *Review of Economics and Statistics*, 86(1), 195-210.
- Denison, D. V., Stiefel, L., Hartman, W., & Deegan, M. M. (2009). *Accounting for resource Use at the school-level and below: The missing link in education administration and policy making*. IESP Working Paper #09-06.

- Downes, T. (2004). *What is adequate? Operationalizing the concept of adequacy for New York. 2004 Symposium on education finance and organizational structure in NYS schools*. Education Resource Finance Research Consortium. 61-88.
- Education Needs Index. (2008). *Education needs index state report 2008: Pennsylvania*. Retrieved August 8, 2011 from Education Needs Index Web site: <http://www.educationalneedsindex.com/admin/pdfs/PA2.pdf>
- The Education Trust. (2008). *Core problems: Out-of-field teaching persists in key academic courses and high-poverty schools*. Washington, D.C.: Author.
- The Education Trust. (2008). *Their fair share: How Texas-sized gaps in teacher quality shortchange low-income and minority students*. Retrieved on April 15, 2010 from <http://www.theirfairshare.org/resources/TheirFairShareFeb08.pdf>
- The Education Trust–West. (2005). *California's hidden teacher spending gap: How state and district budgeting practices shortchange poor and minority students and their schools* (Special Report). Oakland, CA: Author.
- Elis, R. (2006). *Intradistrict inequality in American public schools: Exit, voice and strategy*. Paper presented at the annual meeting of the American Political Science Association, Marriott, Loews Philadelphia, and the Pennsylvania Convention Center, Philadelphia, PA. Retrieved on May 24, 2009 from http://www.allacademic.com/meta/p152094_index.html.
- Evans, W. N., Murray, S. E., & Schwab, R. M. (1999). The impact of court-mandated school finance reform. In H. F. Ladd, H.F., Chalk, R. and Hansen, J. S. (Eds.). *Equity and adequacy in education finance*. Washington, D.C.: National Academy Press.
- Federal Education Budget Project, retrieved from New America Foundation website on November 28, 2010 at <http://febp.newamerica.net/k12/pa/all>.
- Ferguson, R. F. (1991). Paying for public education: New evidence of how and why money matters. *Harvard Journal on Legislation*, 28. 465-98.
- Ferguson, R. F. (2010). Student perceptions of teaching effectiveness. Discussion Brief. National Center for Teacher Effectiveness and the Achievement Gap Initiative. Harvard University.
- Ferguson, R. F. & Ladd, H. F. (1996). How and why money matters: An analysis of Alabama schools. In: H.F. Ladd (Ed.), *Holding schools accountable*. Brookings Institution Press.

- Filardo, M. W., Stein, T., Sung, P., & Vincent, J. M. (2006). *Growth and disparities: A decade of U.S. public school construction*. Building Educational Success Together (BEST). Retrieved on June 2, 2010 from <http://www.edfacilities.org/pubs/GrowthandDisparity.pdf>.
- Firestone, W. A., Goertz, M. E., Nagle, B. & Smelkinson, M. F. (1994). Where did the \$800 million go? The first year of New Jersey's quality education act. *Educational Evaluation and Policy Analysis*, 16(4), 359-373.
- The Forum for Education and Democracy. (2008). *Democracy at Risk: The Need for a New Federal Policy in Education*. Washington, D.C.: Author.
- Fuhrman, S. H. & Elmore, R. F. (2004). *Redesigning accountability systems for education*. New York: Teachers College Press.
- Fordham Institute. (2006). *Fund the child: Tracking inequality and antiquity in school finance*. Washington, D.C.: Author.
- Glazerman, S., Loeb, S., Goldhaber, D., Staiger, D., Raudenbush, S. & Whitehurst, G. (2010). *Evaluating Teachers: The Important Role of Value-Added*. The Brookings Brown Center Task Group on Teacher Quality. Washington DC: Brown Center on Education Policy at Brookings.
- Goddard, R.D. (2002). A theoretical and empirical analysis of the measurement of collective efficacy: The development of a short form. *Educational and Psychological Measurement*.
- Goddard, R. D., Hoy, W. K., & Woolfolk Hoy, A. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal*, 37, 479–508.
- Goe, L. (2007). *The link between teacher quality and student outcomes: A research synthesis*. National Comprehensive Center for Teacher Quality.
- Goertz, M. E. (1997). The challenges of collecting school-based data. *Journal of Education Finance*, 22(3), 291-302.
- Goertz, M. E. & Duffy, M. C. (1999). Resource allocation in reforming schools and school districts. In M.E. Goertz & A. Odden (Eds.). *School-based financing (Twentieth annual yearbook of the American Education Finance Association)*. (pp. 215-241). Thousand Oaks: Corwin Press.
- Goertz, M. E. & Edwards, M. (1999). In search for excellence for all: The courts and New Jersey school finance reform. *Journal of Education Finance*, 25(1), 5-32.

- Goertz, M. E. & Hess, G. A. (1998). Process and power in school budgeting across four large urban school districts. *Journal of Education Finance*. 23(4). 490-506.
- Goertz, M. E. & Levin, S. (2008). *Strategic management of human capital in New York City*. Strategic Management of Human Capital – Consortium for Policy Research in Education.
- Goertz, M. E. & Odden, A. (1999). *School-based financing (Twentieth annual yearbook of the American Education Finance Association)*. Thousand Oaks: Corwin Press.
- Goertz, M. E. & Natriello, G. (1999). Court-mandated school finance reform: What do the new dollars buy? In H. F. Ladd, R. Chalk, & J. S. Hansen (Eds.). *Equity and adequacy in education finance*. Washington, D.C.: National Academy Press.
- Goertz, M. E. & Stiefel, L. (1998). School-level resource allocation in urban public schools. *Journal of Education Finance*. 23(4). 435-446.
- Goldhaber, D. (2008). *Addressing the teacher qualification gap*. Washington D.C., Center for American Progress. Retrieved on November 9, 2009 from http://www.americanprogress.org/issues/2008/11/pdf/teacher_qualification_gap.pdf
- Goldhaber, D. (2007). *Everyone's doing it, but what does teacher testing tell us about teacher effectiveness? (Working Paper 9)*. Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved on November 18, 2009 from <http://www.caldercenter.org/publications.cfm>.
- Goldhaber, D. (2006). *Teacher Pay Reforms - The Political Implications of Recent Research*. Center for American Progress.
- Goldhaber, D. & Anthony, E. (2007). Can teacher quality be effectively assessed? National board certification as a signal of effective teaching. *Review of Economics and Statistics*, 89(1). 134-150.
- Goldhaber, D. & Brewer, D. (2000). Does teacher certification matter? High school teacher certification status and student achievement. *Educational Evaluation and Policy Analysis*, 22(2), 129-145.
- Goldhaber, D., Brewer, D. J., & Anderson, D. (1999) A three-way error components analysis of educational productivity. *Education Economics*, 7(3), 199–208.
- Goldhaber, D., Gross, B., & Player, D. (October 2007). *Are public schools really losing their best? Assessing the career transitions of teachers and their implications for the quality of the teacher workforce (Working Paper 12)*. Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research.

Retrieved on November 18, 2009 from
<http://www.caldercenter.org/publications.cfm>.

- Goldhaber, D. & Hansen, M. (2010). *Using Performance on the Job to Inform Teacher Tenure Decisions (Brief 10)*. Washington DC: National Center for Analysis of Longitudinal Data in Education Research.
- Good Schools PA. (2011). *Pennsylvania's costing-out study*. Retrieved November 12, 2011, from <http://goodschoolspa.org/issues/education-finance-accountability/costing-out-study/>
- Gradstein, M. Justman, M., & Meier, V. (2005). *The political economy of education: Implications for growth and inequality*. The MIT Press, Cambridge, MA.
- Green, P. (1996). Equity, adequacy and efficiency in New York City school finance litigation. *Journal of Education Finance*, 22, 96-113.
- Grissmer, D., Flanagan, A., & Williamson, S. (1998). Does money matter for minority and disadvantaged students? Assessing the new empirical evidence. In W. J. Fowler, Jr., (Ed.). *Developments in school finance*, 1997 (NCES 98-212). Washington, DC: U.S. Department of Education, National Center for Education Statistics.
- Gross, B. & Goertz, M. E. (2005). *Holding high hopes: How high schools respond to state accountability*. Consortium for Policy Research in Education. University of Pennsylvania.
- Grubb, W. N. (2009). *The money myth: School resources, outcomes and equity*. New York : Russell Sage Foundation.
- Guarino, C., Santibanez, L., & Daley, G. A. (2006) Teacher recruitment and retention: A Review of the recent empirical literature. *Review of Educational Research*, 76(2), 173-208.
- Guthrie, J. & Rothstein, R. (1999). Enabling adequacy to achieve reality: Translating adequacy into state school finance distribution arrangements. In H. F. Ladd, R. Chalk, & J. S. Hansen (Eds.). *Equity and adequacy in education finance*. Washington, D.C.: National Academy Press.
- Gutmann, A. (1987). *Democratic education*. Princeton, New Jersey: Princeton University Press.
- Hakel, M. D., Koenig, J. A., & Elliott, S. W. (2008). *Assessing accomplished teaching: Advanced-level certification programs*. National Research Council, National Academies of Science.

- Hannaway, J. (2005). Poverty and student achievement: A hopeful review. In J. Flood & P.L. Anders (Eds.) *Literacy Development of Students in Urban Schools*, (pp. 3-21). Newark, DE: International Reading Association.
- Hanushek, E. A. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis*, 19(2), 141-164.
- Hanushek, E. A. (1994). The economic returns from educational investment. In E. A. Hanushek (Ed.). *Making Schools Work: Improving Performance and Controlling Costs*, (pp. 13-23). Washington, DC: Brookings.
- Hanushek, E. A. (1989). The impact of differential expenditures on school performance. *Educational Researcher*, 18(4), 45-64.
- Hanushek, E. A. (2006). *The single salary schedule and other issues of teacher pay*. Draft paper presented at the 2006 University of Arkansas, Department of Education Reform Conference, Kansas City, MO (10/20/06).
- Hanushek, E. A., Kain, J. F., O'Brien, D. M., & Rivkin, S. G., (2004). *The market for teacher quality*. Paper prepared for the American Economic Association Meetings.
- Hanushek, E. A. & Rivkin, S. G. (2008). *Do disadvantaged urban schools lose their best teachers?* (Policy Brief 7). Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved on November 18, 2009 from <http://www.caldercenter.org/publications.cfm>
- Harr, J. J., Parrish, T., & Chambers, J. (2008). Special education. In H. Ladd & Fiske (Eds.). *Handbook of research in education finance and policy*.(pp. 573-589). Routledge.
- Harris, D. N. & Sass, T. R. (2008). The effects of NBPTS-certified teachers on student achievement. *Journal of Policy Analysis and Management*, 28(1), 55-80.
- Harris, D. N. & Sass, T. R. (2007). *Teacher training, teacher quality and student achievement* (Working Paper 3). Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research. Retrieved on November 18, 2009 from <http://www.caldercenter.org/publications.cfm>.
- Harris, D. N. & Sass, T. R. (2009). *What Makes for a Good Teacher and Who Can Tell?* (Working Paper 30). Washington, DC: National Center for the Analysis of Longitudinal Data in Education Research.
- Hartman, W. T., Bolton, D. G. & Monk, D. H. (2001). A synthesis of two approaches to school-level financial data: The accounting and resource cost model approaches.

- In W. J. Fowler, Jr. (Ed.). *Selected papers in school finance, 2000-01*. Washington, DC: National Center for Education Statistics (ED).
- Haycock, K. (2001). Closing the achievement gap. *Educational Leadership*, 58(6), 6-11.
- Haycock, K. (2004). The elephant in the living room. In D. Ravitch (Ed.). *Brookings papers on education policy*. (pp. 229-263). Washington, DC: Brookings Institution Press.
- Hedges, L. V. & Greenwald, R. (1996). Have times changed? The relation between school resources and student performance. In G. Burtless (Eds.). *Does money matter? The effect of school resources on student achievement and adult success*. (pp. 74-92). Washington, D.C.: Brookings Institution Press.
- Hedges, L. V., Laine, R. D. & Greenwald, R. (1994). Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher*, 23(3), 5-14.
- Henson, R.K. (2001). Teacher self-efficacy: Substantive implications and measurement dilemmas. Invited keynote address given at the annual meeting of the Educational Research Exchange, January 26, 2001, Texas A&M University, College Station, Texas.
- Hershberg, T., Simon, V. A. & Lea-Kruger, B. (2004). Measuring what matters. *The American School Board Journal*, 191(2), 27-31.
- Hertert, L. (1995). Does equal funding for districts mean equal funding for classroom students? In L. O. Picus, & J. L. Wattenbarger (Eds.). *Where does the money go? Resource allocation in elementary and secondary schools*. (pp. 71-84). Thousand Oaks, CA: Corwin Press.
- Hess, F. (2009). Humility is the watchword for feds hoping to “fix” teacher distribution. *Teachers College Record*.
- Heuer, R. & Stullich, S. (2011). Comparability of state and local expenditures among schools within districts: A report from the study of school-level expenditures. U.S. Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service. Retrieved on February 1, 2012 from <http://www.ed.gov/about/offices/list/opecpd/ppss/reports.html#title>.
- Hill, M. (2008). Funding schools equitably: Results-based budgeting in the Oakland unified school district. In *Ensuring equal opportunity in public education - How local school district funding practices hurt disadvantaged students and what federal policy can do about it*. Center for American Progress. 79-107. Retrieved on October 22, 2009 from <http://www.americanprogress.org/issues/2008/06/pdf/comparability.pdf>.

- Hill, P. (2006). The cost of collective bargaining agreements and related district policies. In J. Hanaway, & A. Rotherham (Eds.). *Collective bargaining in education*. (pp. 89-110). Harvard Education Press.
- Hill, H. C., Rowan, B. & Ball, D. L. (2005). Effects of teachers' mathematical knowledge for teaching on student achievement. *American Educational Research Journal*, 42(2). 317-406.
- Hobson v. Hansen*. (1967). 269 F. Supp. 401. (D.C. District Court).
- Hobson v. Hansen: Judicial supervision of the color-blind school board. (1968). *Harvard Law Review*, 81(7), 1511-1527.
- Hochschild, J. L. (2003), Social class in public schools. *Journal of Social Issues*, 59(4), 821-840.
- Hochschild, J. & Scovronick, N. (2003). *The American dream and the public schools*. New York, NY: Oxford University Press.
- Iatarola, P. & Rubenstein, R. (2007). New stakes and standards, same ol' spending? Evidence from New York City high schools. *Education Finance and Policy*, 2(1), 74-99.
- Iatarola, P. & Stiefel, L. (2003). Intradistrict equity of public education resources and performance. *Economics of Education Review*, 22(1), 69-78.
- Illinois Education Research Council (IERC). (2005). *The distribution of teacher quality in Illinois*. Policy Research Report: IERC 2005-2.
- Imazeki, J. & Goe, L. (2009). *TQ research & policy brief: The distribution of highly qualified, experienced teachers: Challenges and opportunities*. National Comprehensive Center for Teacher Quality.
- Ingersoll, R. M. (2002). *Out-of-field teaching, educational inequality, and the organization of schools: An exploratory analysis* (Research Report No. R-02-1). Seattle, WA: Center for the Study of Teaching and Policy.
- Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Education Research Journal*, 38, 499-534.
- Ingersoll, R. M. (2004). *Why do high-poverty schools have difficulty staffing their classrooms with qualified teachers?* Center for American Progress and Institute for America's Future.
- Intermediate Unit 5. (2011). Pennsylvania value-added assessment system (PVAAS): Public reporting site.

- Jencks, C. (1998). Whom must we treat equally for educational opportunity to be equal? *Ethics*, 98(3), 518-533.
- Kaestle, C. F. (2007). Federal education policy and the changing national polity for education, 1957-2007. In C. F. Kaestle & A. E. Lodewick (Eds.). *To educate a nation- Federal and national strategies of school reform*. University Press of Kansas.
- Katz, M. B. (1987). *Reconstructing American education*. Harvard University Press.
- Kauffman, A. (2004). *Equity and adequacy concepts as considered in school finance court cases*. Intercultural Development Research Association. (Texas). Retrieved on November 15, 2009 from http://www.idra.org/IDRA_Newsletters/March_2004_Self_Renewing_Schools_Early_Childhood_Education/Equity_and_Adequacy_Concepts_as_Considered_in_School_Finance_Court_Cases/.
- Konstantopoulos, S. (2006). Trends of school effects on student achievement: Evidence from NLS:72, HSB:82, and NELS:92. *Teachers College Record*, 108(12), 2550-2581.
- Koski, W. S. & Horng, E. L. (2007) Facilitating the teacher quality gap? Collective bargaining agreements, teacher hiring and transfer rules, and teacher assignment among schools in California. *Education Finance and Policy*, 2(3), 262-300.
- Ladd, H. F. (2008). Reflections on equity, adequacy, and weighted student funding. *Education Finance and Policy*, 3(4), 402-423.
- Ladd, H. F. & Fiske, E. B. (Eds.). (2007). *Handbook of research in education finance and policy*. Routledge.
- Lankford, H., Loeb, S. & Wyckoff, J. (2002). Teacher sorting and the plight of urban schools: A descriptive analysis. *Educational Evaluation and Policy Analysis*, 24(1), 37-62.
- Levin, J. & Quinn, M. (2003). *Missed opportunities: How we keep high-quality teachers out of urban classrooms*. The New Teacher Project.
- Ludwig, J, Ladd, H.F., & Duncan, G.J. (2001). Urban poverty and educational outcomes. Brookings-Wharton Papers on Urban Affairs: 2001. 147-201.
- Marrero v. Commonwealth of Pennsylvania*. (1998). 709 A.2d 956
- McCaffrey, D. F., Han, B. & Lockwood, J. R. (2008). *From data to bonuses: A case study of the issues related to awarding teachers pay on the basis of the students' progress*. A paper presented at the conference on Performance Incentives: Their

Growing Impact on American K-12 Education, Feb. 28-29, 2008, National Center on Performance Incentives at Vanderbilt University.

McClure, P. (2008). The history of educational comparability in Title I of the Elementary and Secondary Education Act of 1965. In *Ensuring equal opportunity in public education - How local school district funding practices hurt disadvantaged students and what federal policy can do about it*. Center for American Progress. 9-32. Retrieved on October 22, 2009 from <http://www.americanprogress.org/issues/2008/06/pdf/comparability.pdf>.

McLaughlin, M. W. (1987). Learning from experience: Lessons from policy implementation. *Educational Evaluation and Policy Analysis*, 9(2), 171-178.

Merriam, S. B. (1998). *Qualitative Research and Case Study Applications in Education*. San Francisco, CA: John Wiley & Sons, Inc.

The MetLife Survey of the American Teacher: Preparing Students for College and Careers. (2010). Retrieved on December 20, 2010 from http://www.edleadernews.com/wp-content/uploads/2011/03/MetLife_Teacher_Survey_2010.pdf

Miles, K. H. (1995). Freeing resources for improving schools: A case study of teacher allocation in Boston public schools. *Educational Evaluation and Policy Analysis*, 17(4), 476-493.

Miles, M. B. & Huberman, A. M. (1994). *An expanded sourcebook: Qualitative data analysis*. Second edition. Thousand Oaks, CA: Sage.

Miller, L. & Rubenstein, R. (2008). Examining the nature and magnitude of intradistrict resource disparities in mid-size school districts. *Public Budgeting & Finance*, 28(4), 26-51.

Miller, L., Roza, M., & Swartz, C. (2004). *A cost allocation model for shared district resources: A means for comparing spending across schools*. Center on Reinventing Public Education. http://www.crpe.org/cs/crpe/download/csr_files/wp_sfrp_costall_sep04.pdf

Miller, R. T. (2010). *Comparable, schmomparable - Evidence of inequity in the allocation of funds for teacher salary within California's public school districts*. Center for American Progress. Retrieved on June 13, 2010 from http://www.americanprogress.org/issues/2010/05/pdf/comparable_schmomparable.pdf

Moe, T. (2007). *Collective bargaining and the performance of the public schools*. Retrieved on April 3, 2010 from <http://politicalscience.stanford.edu/faculty/moe.html>.

- Monk, D. H. (1994). Subject area preparation of secondary mathematics and science teachers and student achievement. *Economics of Education Review*, 13(2), 125-145.
- Monk, D. & Hussain, S. (2000). Structural influences on the internal allocation of school district resources: Evidence from New York State. *Educational Evaluation and Policy Analysis*, 22(1), 1-26.
- Monk, D. H. & King, J. A. (1994). Multi-level teacher resource effects on pupil performance in secondary mathematics and science: The role of teacher subject matter preparation. In R. G. Ehrenberg (Ed.). *Contemporary policy issues: Choices and consequences in education*. Ithaca, NY: ILR Press: 29-58.
- Morgan, M. I., Cohen, A. S., & Hershkoff, H. (1995). Establishing education program inadequacy: The Alabama example. *University of Michigan Journal of Law Reform*, 28(3), 559-598.
- Moser, M. & Rubenstein, R. (2002). The equality of public school district funding in the United States: A national status report. *Public Administration Review*, 62(1), 63-72.
- Murnane, R. J., Singer, J. D., Willett, J. B., Kemple, J. J., & Olsen, R. J. (1991). *Who will teach? Policies that matter*. Cambridge, MA: Harvard University Press.
- National Access Network. (n.d.). New Jersey. Retrieved from http://www.schoolfunding.info/states/nj/lit_nj.php3
- National Center for Education Statistics. (2010). Common Core of Data: School Year 2008-2009. Washington, DC: U.S. Department of Education. Retrieved on January 13, 2011 from <http://nces.ed.gov/ccd/bat/output.asp>
- National Center for Education Statistics. (2010). *Digest of education statistics: 2009. Table 180*. Washington, DC: U.S. Department of Education. Retrieved on June 3, 2010 from http://nces.ed.gov/programs/digest/d09/tables/dt09_180.asp?referrer=list
- National Center for Education Statistics. (2003). *Financial accounting for local and state school systems: 2003 Edition*. Washington, DC: U.S. Department of Education.
- National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. U.S. Department of Education.
- National Research Council, Board on Testing and Assessment. (2009). *Letter report to the U.S. Department of Education on the Race to the Top Fund*.

- Nelson, F. H. (2006). *The impact of collective bargaining on teacher transfer rates in urban high-poverty schools*. American Federation of Teachers. Retrieved on April 3, 2010 from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/2d/80/1f.pdf
- New America Foundation. (n.d.). No child left behind act – Title I distribution formulas. *Federal Education Budget Project*. Retrieved on June 17, 2010 from <http://feb.newamerica.net/background-analysis/no-child-left-behind-act-title-i-distribution-formulas>
- Odden, A. (2003). Equity and adequacy in school finance. *Phi Delta Kappan*, 85 (2).
- Odden, A., Archibald S., Ferminick, M., & Gross, B. (2003). Defining school-level expenditure structures that reflect educational strategies. *Journal of Education Finance*, 28(3), 323-56.
- Odden, A., Goetz, M., & Picus, L. (2008). Using available evidence to determine educational adequacy. *Education Finance and Policy*, 3(3), 374-397.
- Odden, A., Goertz, M., Goetz, M., Archibald, S., Gross, B., Weiss, M., & Mangan, M. T. (2008). The cost of instructional improvement: Resource allocation in schools using comprehensive strategies to change classroom practice. *Journal of Education Finance*, 33(4), 381-406.
- Odden, A., Monk, D., Nakib, Y., & Picus, L. O. (1995). The story of the education dollar: No academy awards and no fiscal smoking guns. *Phi Delta Kappan*, 77(2), 161-168.
- Odden, A. & Picus, L. O. (2008). *School finance: A policy perspective*. McGraw-Hill Companies, Inc.
- Orfield, G. & Lee, C. (2005). Why segregation matters: Poverty and educational inequality. *The Civil Rights Project*. Retrieved on June 3, 2010 from http://www.civilrightsproject.ucla.edu/research/deseg/Why_Segreg_Matters.pdf
- Owen, J. D. (1972). The distribution of educational resources in large American cities. *Journal of Human Resources*, 7(1), 26–38.
- Owens, T. & Maiden, J. (1999). A comparison of interschool and inter-district funding equity in Florida. *Journal of Education Finance*, 24(4), 503-518.
- Pan, D., Rudo, Z., & Smith-Hansen, L. (2003). *Resource allocation does matter in improving student performance*. Paper presented at the Annual Conference of the American Education Finance Association, March 27-29, 2003.

- Patton, M. Q. (2002). Purposeful sampling. In *Qualitative research & evaluation methods*. Thousand Oaks, CA: Sage. 230-46.
- Paulson, A. (2010). No child left behind embraces 'college and career readiness.' *The Christian Science Monitor*. (Retrieved on July 17, 2011 from <http://www.csmonitor.com/USA/Society/2010/0323/No-Child-Left-Behind-embraces-college-and-career-readiness>)
- Peske, H. G. & Haycock, K. (2006). *Teaching inequality: How poor and minority students are shortchanged on teacher quality*. Washington, DC: The Education Trust.
- Peterson, P. E. & Woessmann, L. (2007). Introduction: Schools and the equal opportunity problem. Edited by Ludger Woessmann and Paul E. Peterson, Cambridge, MA: MIT Press.
- Peysner, J. & Costrell, R. (2004). Exploring the costs of accountability – No child left behind is no unfunded mandate. *Education Next*, 4(2), 23-29. Retrieved on June 9, 2010 from <http://educationnext.org/exploringthecostsofaccountability/>
- Picus, L. O. (1999). Site-based management: A nuts and bolts approach for school administrators. In M.E. Goertz and A. Odden (Eds.). *School-Based Financing (Twentieth Annual Yearbook of the American Education Finance Association)*. (pp. 22-39). Thousand Oaks: Corwin Press.
- Picus, L. O. (1997). Using school-level finance data: Endless opportunity or bottomless pit? *Journal of Education Finance*, 22(3), 317-330.
- Picus, L. O. (1995). *Where does money go? Resource allocation in elementary and secondary schools*. Newbury Park, CA: Corwin Press.
- Picus, L.O., Odden, A., and Fermanich, M. (2004). Assessing the equity of Kentucky's SEEK formula: A 10-year analysis. *Journal of Education Finance*. 29,4 315-336.
- Quality counts. 2012: The global challenge. Education Week. Retrieved on February 14, 2012 from www.edweek.org/go/qc12.
- Podesta, J. & Brown, C. (2008). Introduction and summary. In *Ensuring equal opportunity in public education - How local school district funding practices hurt disadvantaged students and what federal policy can do about it*. Center for American Progress. 1-8. Retrieved on October 22, 2009 from <http://www.americanprogress.org/issues/2008/06/pdf/comparability.pdf>
- Podgursky, M. (2002, August 14). *The single salary schedule for teachers in K-12 public schools, A brief discussion paper prepared for the Center for Reform of School*

Systems. Retrieved on April 2, 2010 from http://web.missouri.edu/~podgurskym/papers_presentations/reports/teacher_salary_schedules.pdf.

- Rawls, J. (2001). *Justice as fairness: A restatement*. Cambridge, MA: Harvard University Press.
- Raudenbush, S. W. & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*, 2nd Ed. Sage Publications, Inc.
- Rawls, J. (1971). *A Theory of Justice*. Cambridge, MA: The Belknap Press of Harvard University Press.
- Rebell, M. A. (2002). Educational adequacy, democracy, and the courts. In *Achieving high educational standards for all: conference summary*. National Academies Press. 218-267.
- Rebell, M. A. (2008). Equal opportunity and the courts. *Phi Delta Kappan*, 89(6), 432-439. Retrieved on September 12, 2009 from http://www.pdkintl.org/kappan/k_v89/k0802reb.htm.
- Rebell, M. A. (2007). *From adequacy to comprehensive educational equity: Toward a realistic agenda for equity and excellence*. Annenberg Institute for School Reform. Retrieved on December 15, 2009 from http://www.annenberginstitute.org/equity/html/pdf/EEF_Essay2_Rebell.pdf
- Rebell, M. A. (2008). Sleepless after Seattle? There's still hope for equal educational opportunity. *Education Week*, 32-33.
- Rebell, M. A. & Baker, B. D. (2009). Commentary: Assessing 'success' in school finance litigations. *Education Week*. 28(36).
- Reich, R. (2006). *Equality and adequacy in the state's provision of education: Mapping the conceptual landscape*. Prepared for Getting Down to Facts: A Research Project Designed to Inform Solutions to California's Education Problems. Retrieved on March 20, 2010 from [http://irepp.stanford.edu/documents/GDF/STUDIES/01-Reich/1-Reich\(3-07\).pdf](http://irepp.stanford.edu/documents/GDF/STUDIES/01-Reich/1-Reich(3-07).pdf).
- Reich, R. (2008). Introduction to the symposium on equality and adequacy. *Education Finance and Policy*, 3(4), 399-401.
- Reich, R. & Koski, W.S. (2006). When adequate isn't: The retreat from equity in educational law and policy and why it matters. *Emory Law Review* 56(3), 547-618.
- Reschovsky, A. (1994). Fiscal equalization and school finance. *National Tax Journal*, 47(1), 185-197.

- Reschovsky, A. & Imazeki, J. (1998). The development of school finance formulas to guarantee the provision of adequate education to low-income students. In W. J. Fowler, Jr. (Ed.). *Developments in school finance, 1997* (NCES 98-212). Washington, DC: U.S. Department of Education, National Center for Education Statistics.
- Rice, J. K. (2003). *Teacher quality: Understanding the effectiveness of teacher attributes*. Washington, DC: Economic Policy Institute.
- Riddle, W. (2004). *Education for the disadvantaged: Overview of ESEA Title I-A Amendments under the No Child Left Behind Act*. Congressional Research Service. 17-31.
- Rivkin, S. G., Hanushek, E. A. & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica, Econometric Society*, 73(2), 417-458.
- Rockoff, J. E. (2004). The impact of individual teachers on students' achievement: Evidence from panel data. *American Economic Review*, 94(2), 247-252.
- Rodriguez v. Los Angeles Unified School District. (1992). No C 6 11-3 5 8. Los Angeles County Sup. Ct.
- Roos, P. (1998). Intradistrict resource disparities: A problem crying out for a solution. In M. J. Gittell (Ed.). *School equity/strategies for creating productive schools in a just society*. Yale University Press. New Haven & London. 40-52.
- Rothstein, R. (2004). *Class and schools: Using social, economic, and educational reform to close the black-white achievement gap*. New York, NY. Teachers College Press.
- Rouse, C.E. & Barrow, L. (2006). U.S. elementary and secondary schools: Equalizing opportunity or replicating the status quo? *The Future of Children*, 16(2), 99-123.
- Roza, M. (2008). *Allocation anatomy: How district policies that deploy resources can support (or undermine) district reform strategies*. University of Washington: Center on Reinventing Public Education.
- Roza, M. (2005). *Many a slip 'tween cup and lip: District fiscal practices and their effect on school spending*. University of Washington: Center on Reinventing Public Education.
- Roza, M. (2008). What if we closed the Title I comparability loophole? In *Ensuring equal opportunity in public education - How local school district funding practices hurt disadvantaged students and what federal policy can do about it*. Center for American Progress. 59-78. Retrieved on October 22, 2009 from <http://www.americanprogress.org/issues/2008/06/pdf/comparability.pdf>.

- Roza, M. & Hawley-Miles, K. (2004). *Understanding student-based budgeting as a means to greater school resource equity*. University of Washington: Center on Reinventing Public Education.
- Roza, M., & Hill, P. T. (2004). How within-district spending inequities help some schools to fail. In D. Ravitch (Ed.). *Brookings papers on education policy*. (pp. 201-228). Washington, DC: Brookings Institution Press.
- Roza, M. & McCormick, M. (2006). Where the money goes: District allocation practices harming high-poverty schools. *School business affairs*, 70(1), 6-10.
- Rubenstein, R. (1998). Resource equity in the Chicago public schools: A school-level approach. *Journal of Education Finance*, 23(4), 468-489.
- Rubenstein, R., Ballal, S., Stiefel, L., & Schwartz, A. E. (2008). Equity and accountability: The impact of state accountability systems on school finance. *Public budgeting & finance*, 28(3), 1-22.
- Rubenstein, R., Schwartz, A. E., & Stiefel, L. (2006). Weighting for adequacy. *Education Week*, 25(44), 33.
- Rubenstein, R., Schwartz, A. E., Stiefel, L., & Hadj Amor, H. B. (2007). From districts to schools: The distribution of resources across schools in big city school districts. *Economics of Education Review*, 26(5), 532-545.
- Rubenstein, R., Stiefel, L., & Schwartz, A. E. (1999). Using adjusted performance measures for evaluating resource use. *Public Budgeting and Finance*, 19(3), 67-87.
- Rubenstein, R., Stiefel, L., & Schwartz, A. E. (2006). *Rethinking the intradistrict distribution of school inputs to disadvantaged students*. Paper prepared for the conference "Rethinking Rodriguez," Boalt Hall School of Law, Berkeley, CA, April.
- Rudalevige, A. (2005). *Adequacy, accountability, and the impact of "No Child Left Behind"*. Paper prepared for presentation t the "Adequacy Lawsuits: Their Growing Impact on American Education" conference of the Program on Education Policy and Governance, John F. Kennedy School of Government, Harvard University, October 2005.
- Rumberger, R. W. & Gandara, P. (2008). Resource needs for educating linguistic minority students. In H. Ladd & Fiske (Eds.). *Handbook of research in education finance and policy* (pp. 591-611). Routledge.
- Sanders, W. L., Ashton, J. J. & Wright, S. P. (2005). *Comparison of the effects of NBPTS certified teachers with other teachers on the rate of student academic progress*.

Arlington, VA: National Board for Professional Teaching Standards. Retrieved on April 9, 2010 from http://www.nbpts.org/UserFiles/File/SAS_final_NBPTS_report_D_-_Sanders.pdf.

- Sanders, W. L. & Horn, S. P. (1998). Research findings from the Tennessee value-added assessment system (TVAAS) data base: Implications for educational evaluation and research. *Journal of Personnel Evaluation in Education*, 12(3), 247-256.
- Sanders, W. L. & Rivers, J. C. (1996). *Cumulative and residual effects of teachers on future student academic achievement*. University of Tennessee Value-Added Research and Assessment Center. Knoxville, Tennessee. Retrieved on April 5, 2010 from <http://www.mccsc.edu/~curriculum/cumulative%20and%20residual%20effects%20of%20teachers.pdf>.
- Satz, D. (2008). Equality, adequacy, and educational policy. *Education Finance and Policy*, 3(4), 424-443.
- Sawchuk, S. (2009). Education department to demand school pay data. *Education Week*. Retrieved on June 12, 2010 from <http://www.edweek.org/ew/articles/2009/11/18/12stim-comparability.h29.html?qs=ESEA+school+level+expenditures>
- Scafidi, B., Sjoquist, D. L. & Stinebrickner, T. R. (2007). Race, poverty, and teacher mobility. *Economics of Education Review*, 26(2), 145–159.
- Schwartz, A. E. (1999). School districts and spending in the schools. In W. J. Fowler (Ed.). *Selected papers in school finance, 1997-99*. Washington, DC: National Center for Education Statistics. 55-83. <http://nces.ed.gov/pubs99/1999334/text3.html>
- Schwartz, A. E., Stiefel, L. & Rubenstein, R. (2008). *Why do some schools get more and others less? An examination of school-level funding in New York City*. Conference paper prepared for the 20th Annual Conference of the Association for Budgeting and Financial Management. (Draft – need permission of authors) Retrieved on November 11, 2009 from <http://spa.asu.edu/abfm2008/new/Rubinstein2008.pdf>
- Serrano v. Priest*. 5 Cal.3d 584 (1971)
- Skaalvik, E.M. & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teacher and Teacher Education*, 26, 1059-1069.
- Smith, T. & Ingersoll, R. (2004). What are the effects of induction and mentoring on beginning teacher turnover? *American Educational Research Journal*, 41(3), 681–714.

- Soodak, L., & Podell, D. (1996). Teaching efficacy: Toward the understanding of a multi-faceted construct. *Teaching and Teacher Education*, 12, 401–412.
- Stiefel, L., Rubenstein, R., & Berne, R. (1998). Intra-district equity in four large cities: Data, methods, and results. *Journal of Education Finance*, 23(4), 447-467.
- Strauss, R., Bowes, L. R., Marks, M. S., & Plesko, M. R. (2000). Improving teacher preparation and selection: Lessons from the Pennsylvania experience. *Economics of Education Review*, 19(4), 387–415.
- Strike, K. (2008). Equality of opportunity and school finance: A commentary on Ladd, Satz, and Brighthouse and Swift. *Education Finance and Policy*, 3(4), 467-494.
- Stullich, S., Eisner, E., & McCrary, J. (2007). *National assessment of Title I final report. Volume I: Implementation (2007)*. Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, US Department of Education. 16-21.
- Summers, A. A. & Wolfe, B. L. (1976). Intra-district distribution of school inputs to the disadvantaged: Evidence for the courts. *The Journal of Human Resources*, 11(3), 328-342.
- Tennessee Department of Education. (2007). *Tennessee's most effective teachers: Are they assigned to the schools that need them the most?* (Research Brief). Nashville, TN: Author.
- Tournaki, N. & Podell D. M. (2005). The impact of student characteristics and teacher efficacy on teachers' predictions of student success. *Teaching and Teacher Education*, 21, 299-314.
- Toutkoushian, R. K., & Michael, R. S. (2007). An alternative approach to measuring horizontal and vertical equity in school funding. *The Journal of Education Finance*, 32(4), 395-421.
- Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17, 783-805.
- Tschannen-Moran, M., Woolfolk Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research*, 68, 202-248.
- Underwood, J. (1994). School finance litigation: Legal theories, judicial activism, and social neglect. *Journal of Education Finance*, 20(2), 143-162.
- U.S. Census Bureau. (2009). *Public Education Finances, 2007*.

- U.S. Department of Education. Elementary & Secondary Education. (2003). *Local educational agency identification and selection of school attendance areas and schools and allocation of Title I funds to those areas and schools*. Retrieved on June 17, 2010 from www2.ed.gov/programs/titleiparta/wdag.doc
- U.S. Department of Education. Elementary & Secondary Education. (2008). *Title I fiscal issues: Maintenance of effort – comparability - supplement, not supplant – carryover – consolidating funds in schoolwide programs – grantback requirements*. Retrieved on June 17, 2010 from www2.ed.gov/programs/titleiparta/fiscalguid.doc
- U.S. Department of Education. Elementary & Secondary Education. *Title I – Improving the Academic Achievement of the Disadvantaged*. Retrieved on April 3, 2010 from <http://www2.ed.gov/policy/elsec/leg/esea02/pg1.html>.
- U.S. Department of Education, National Center for Education Statistics (2009). *Digest of Education Statistics, 2008* (NCES 2009-020), [Table 3](#).
- U. S. Department of Education. Lead & manage my school – Growth models. Retrieved on January 18, 2011 from <http://www2.ed.gov/admins/lead/account/growthmodel/index.html>
- Unnever, J. D., Kerckhoff, A. C. & Robinson, T. J. (2000). District variations in educational resources and student outcomes. *Economics of Education Review*, 19(3), 245-259.
- Verstegen, D. (1994). The new wave of school finance litigation. *Phi Delta Kappan*, 76(3), 243.
- Walzer, M. (1991). Education. In D. Verstegen and J. G. Ward (Eds.), *Spheres of Justice* (pp. 239-268). New York: Harper Business.
- Weiner, R. (2008). Strengthening comparability: Advancing equity in public education. In *Ensuring equal opportunity in public education - How local school district funding practices hurt disadvantaged students and what federal policy can do about it*. Center for American Progress. 33-58. Retrieved on October 22, 2009 from <http://www.americanprogress.org/issues/2008/06/pdf/comparability.pdf>.
- Wohlstetter, P. and Van Kirk, A. (1995). Redefining school-based budgeting for high-involvement. In L. O. Picus (Ed.), *Where does money go? Resource allocation in elementary and secondary schools* (pp. 212-235). Newbury Park, CA: Corwin Press.
- Woolfolk, A. E. (2003-2004). *Self-efficacy in college teaching*. *Essays on Teaching Excellence*, 15(7).

- Wyckoff, J. H. (1992). The intrastate equality of public primary and secondary education resources in the U.S., 1980-1987. *Economics of Education Review, 11*, 19-30.
- Yin, R. K. (1994). *Case study research: Design and methods*. Second edition. Thousand Oaks, CA: Sage.
- Yin, R. K. (2003). *Case study research: Design and methods*. Third edition. Thousand Oaks, CA: Sage.
- Zimmer, R., Krop, C. Kaganoff, T. Ross, K., & Brewer, D. (2001). *Private giving to public schools and districts in Los Angeles*. Santa Monica, Calif.: RAND, MR-1429-EDU.