EXAMINING THE COSTS OF PROVIDING AN ADEQUATE EDUCATION FOR MICHGAN'S K-12 PUBLIC SCHOOL STUDENTS

by

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INTRODUCTION

There are a little over 1100 elementary and secondary public schools and public school academies responsible for educating approximately one and a half million students in the State of Michigan (Michigan Department of Education, 2011a). All of them are required by the Federal No Child Left Behind Act of 2001 to ensure their students reach 100% proficiency in both reading and math by the year 2014("No Child Left Behind Act," 2001). This mandate has been cited by many to be next to impossible to attain without the necessary resources to adequately support this objective (Haas, Wilson, Cobb, & Rallis, 2005; Hoff, 2006; Stern, 2005; Wiley, Mathis, & Garcia, 2005). Regardless, states are required to demonstrate a minimum prescribed level of student progress towards meeting this goal annually (Gamble-Risley, 2006). The term used to describe this process of meeting annual student proficiency targets is called Adequate Yearly Progress or AYP.

The primary purpose or intent behind NCLB is to hold schools more accountable for their students' academic achievement. Additionally, it was established in an effort to erase the learning gap between black and white students which has beleaguered the United States since it was revealed through research conducted during the 1950's and early 1960's (Coleman, 1966; Haas et al., 2005). Recently, many states have applied for waivers from NCLB's performance mandates as they move closer to the 100% proficiency deadline. However, the procedure to obtain one has been difficult as several states have applied two or more times (Riddle, 2012). Presently, thirty two states and Washington D.C. have obtained a waiver from one or more provisions outlined under the act (Resmovits, 2012). State proposals that have been accepted include: Arizona, Arkansas, Colorado, Connecticut, Delaware, Florida, Georgia, Indiana, Kansas, Kentucky, Louisiana, Maryland,

Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Jersey, New Mexico, New York,

North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee,

Utah, Virgina, Washington, Washington D.C., and Wisconsin (Resmovits, 2012).

   Although the NCLB law is Federal, states were given the authority to set the measuring

standards by which to meet the act's accountability criterions. Michigan utilizes its state

standardized testing instrument called the Michigan Educational Assessment Program or MEAP to

accomplish this task. This assessment annually evaluates the knowledge and understanding of third

through eighth grade students in both math and reading. Additionally, assessments in writing are

given to fourth grade students each year as well as science to children in the fifth grade. In the past,

Michigan elementary students have been considered proficient in both reading and math by

answering approximately 34% of the questions correctly on the MEAP (Wilkinson, Chambers, &

Donnelly, 2011). Recently, Michigan's State School Board of Education, which is comprised of an

8 member elected panel, voted to raise the performance standards on these tests requiring students to

respond to nearly 65% of the questions correctly in order to be considered proficient. It is expected

that fewer students will meet these higher expectations resulting in fewer schools meeting their

target student academic outcomes thus failing to make AYP. Members of the State School Board

support this decision citing it is a necessary step to ensure better student preparedness for future

academic success and employment opportunities (Martin, 2011). However, districts have been vocal

in their disapproval regarding these changes citing the increased possibility of their students not

being able to meet these new proficiency standards. Approximately forty eight percent of state

districts did to not meet annual AYP standards in 2011 as compared to roughly seven percent the

year previous (Ackley, 2012).

Another potential reason why it will be increasingly difficult for Michigan's public schools and public school academies to reach these expected achievement levels is because of the limited resources available to achieve them. Many states, similar to Michigan, have been forced to initiate reductions to public services and programs to help balance their budgets (Farkas & Duffett, 2012; McNeil, 2012). The root cause for these budget cutbacks is attributed to the prolonged recession and poor economy that has beleaguered the United States since 2008 (Hanushek, 2009). This has especially proven to be true in Michigan as its economy has suffered through one of the most difficult financial periods in its history since the Great Depression of the 1930's (Scorsone & Zin, 2010)

One of the best gauges of a state's overall economic health can be measured by ascertaining the average level of income per person (Scorsone & Zin, 2010). In 2008, Michigan's total personal income was valued at approximately \$350 billion dollars, making it the 9th largest economy in the United States (Scorsone & Zin, 2010). However, after calculating the average level of income per person, Michigan ranked 39th with its workforce earning an average of \$35,288 annually (Bureau of Business and Economic Research, 2012). This steady income decline has occurred since 2000 when the state ranked a respectful twentieth in national per capita income (Bureau of Business and Economic Research, 2012). One of the major contributing factors to this decline in average income has been the number of jobs that have been lost during the recession as well as higher levels of unemployment. Michigan has lost an estimated 18% of its past employable jobs as compared to only 0.7% across the rest of the nation with most of those declines occurring in manufacturing, construction and the information sectors of the job market (Scorsone & Zin, 2010).

This prolonged recession, dependency on the auto industry and the loss of jobs has made it increasingly difficult for the State of Michigan to generate enough tax revenue to continue to

sufficiently subsidize essential government services such as municipal fire, police, libraries, parks and public schools. As a result, many of them have been consolidated, reduced or shared between communities. In some cases, they have been completely eliminated because of the lack of revenue available to maintain them (e.g Pontiac, Benton Harbor, Flint, etc.). Over the past few years, schools have been fortunate not to have encountered these drastic reductions in operating expenses. The primary reason they have not experienced these significant budget reductions is because of the subvention provided by the United States Federal Government under the American Recovery and Reinvestment Act of 2009 or ARRA of 2009 (Rentner & Usher, 2012; The Recovery Accountability & Transparency Board, 2009).

The purpose of the AARA was to help create new jobs, spur economic growth as well as help make government more transparent in how they document their usage of citizens tax dollars. Approximately $840 billion was allocated to states by Congress under this act to accomplish the aforementioned goals. Of this amount, Michigan was awarded a little over $8.8 billion. Of that amount, $1.2 billion was earmarked specifically for K-12 public education (The Recovery Accountability & Transparency Board, 2009). These extra dollars helped keep thousands of teachers on the job between FY 2009-2011 and helped stabilize Michigan's School Aid Fund. However, these monies are no longer available through the Federal Government which is not good news for Michigan's schools or for those around the country who have made use of them to help subsidize public education services (Picus & Odden, 2011). This has forced Michigan lawmakers into having to make some very difficult decisions in prioritizing funding for various state services and programs.

The State of Michigan has two major accounts that are used to assign fiscal resources to provide various public services: The School Aid Fund and the General Fund. The School Aid Fund generates the majority of its revenue through sales and property taxes while the General Fund uses

monies raised through individual and business income taxes to pay for other municipal services. These two revenue sources have proven to be very volatile during the past few years as incomes have fallen steadily resulting in fewer sales of goods. This income loss has materialized into a 10% reduction in taxable revenue for the state which has placed tremendous strain on both the School Aid and General Fund (Scorsone & Zin, 2010). Hence, as personal incomes have fallen, the revenue used to support K-12 public education has correspondingly dropped. This has left schools hard pressed to find the resources necessary to provide the essential services and programs their students need to continue making academic progress. Despite lower incomes, the primary factor contributing to the decline in revenue available for schools can be attributed to the state's current funding system.

Michigan's current school finance system provides funding to schools based on student enrollment. The amount of money each district receives for a child attending one of their schools is based on an set level of funding established by legislators. This amount, which is referred to as a district's per pupil foundation allowance or PPFA, varies by district. Some receive higher levels with the majority receiving the minimum provided by the state. Presently, three quarters of all public schools and public school academies receive the minimum PPFA (Arsen & Plank, 2003). In FY 2010-2011 the minimum PPFA was $7146. However, in FY 2011-2012 that amount decreased to $6,846 as districts in the state endured a $300 reduction in their allotted per pupil foundation allowances. Although Michigan's economy has shown some signs of recovery, similar reductions will likely persist until Michigan's economy becomes more stable or until other sources of revenue can be raised by the state or local municipalities to subsidize their schools. This represents a substantial change from past practices, as schools have often received more or the same level of funding even in difficult economic times (Picus & Odden, 2011).

Overall funding levels in Michigan have fluctuated over the past ten years. After adjusting

for inflation, the minimum Per Pupil Foundation Allowance has quickly eroded, leaving schools

with less revenue to utilize in providing educational services and programs for their students which

can be seen in Figure A. (Agency, 2012a, 2012b; Calculator, 2012).

**Figure A.** *Michigan Minimum Per Pupil Foundation Allowance Adjusted for Annual Inflation Rates (MPPFA)*
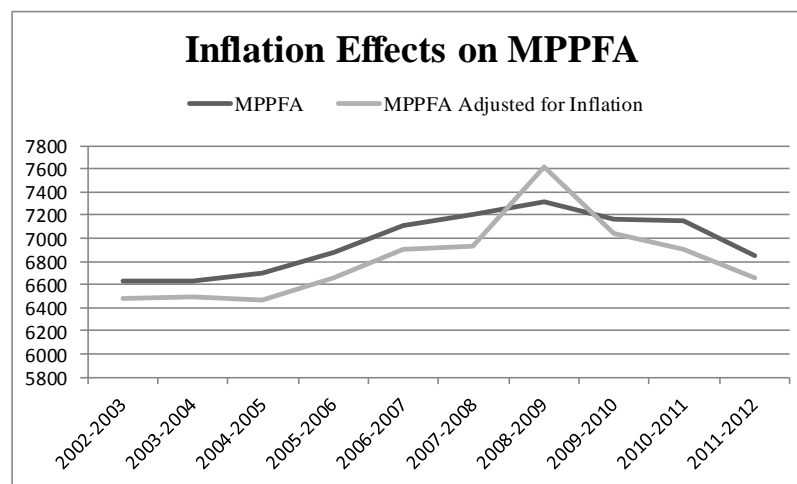
Inflation Rates obtained from http://www.usinflationcalculator.com/inflation/historical-inflation-rates/ and investigators own calculations (*see appendices Table II.)

Although the state has approved of several annual increases, they have not kept up with the

costs of inflation. Equally staggering are the declines Michigan has seen in student populations

attending public schools since 2008 which can be viewed in Figure B (Michigan Department of

Education, 2012). The primary reason for this gradual decline in student population has been

credited to the poor economy and recession Michigan has been experiencing. As a result, families

have left the state in search of other opportunities for work around the country or abroad (Michigan

Department of Education, 2012; Michigan Department of Information Technology, 2009). This

statistic is pertinent because school expenditures are allocated by the State based on a per pupil basis

which has a direct impact on the available resources schools and districts have to provide educational services and programs for their students. The combined result of all these factors: inflation, legislative budget cuts and reduced student populations has been devastating to schools (Addonizio & Kearney, 2012; Arsen & Plank, 2003). As a result, many districts are operating under budget deficits. Presently, 28 districts in the state are under financial duress in FY 2012-13 (MI School Data, 2012). This number is expected to climb in subsequent years as costs to provide essential services and school personnel rise while available revenue drops.

Figure B. *Michigan Student Enrollment 1990-2012*
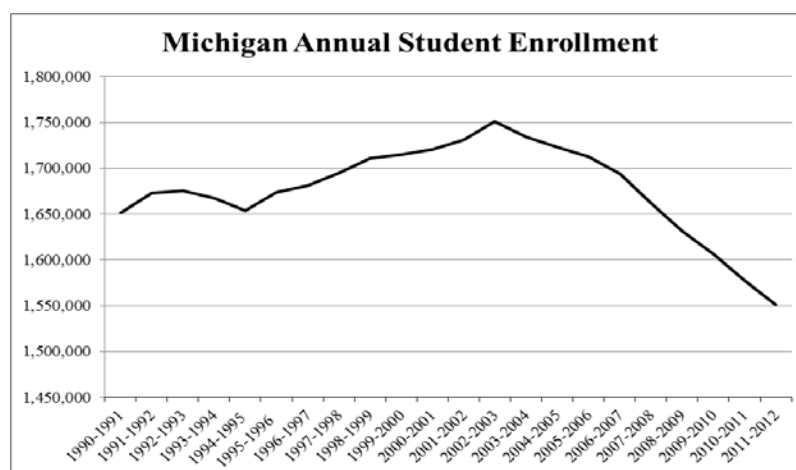
Pupil count information for FY 2011-2012 was obtained from Center for Educational Performance and Information (CEPI) website, http://www.michigan.gov/cepi/0,4546,7-113-21423_30451_30460---,00.html, accessed 5-21-12
(**see appendices Table III.)

Michigan legislators have attempted to create more equity between their schools through its present funding system by slowly closing the equity gap between poor and wealthy districts which can be viewed in **Figure C**. Although the funding equity gap between poor and wealthy districts has narrowed, the range between the highest and lowest districts is still considerably wide having more than a $5,000 difference. Because schools are primarily funded through student enrollment, those schools with declining student populations have had more difficulty maintaining adequate funding

levels to provide essential educational services. This has been especially problematic for urban and even some rural districts in the State which have seen considerable losses in student enrollment. This problem has compromised the overall effectiveness of attempting to close the funding equity gap as it has placed districts who are already struggling to provide essential services and programs with even fewer resources to accomplish this task.

Figure C. *Michigan Funding Equity Gap*
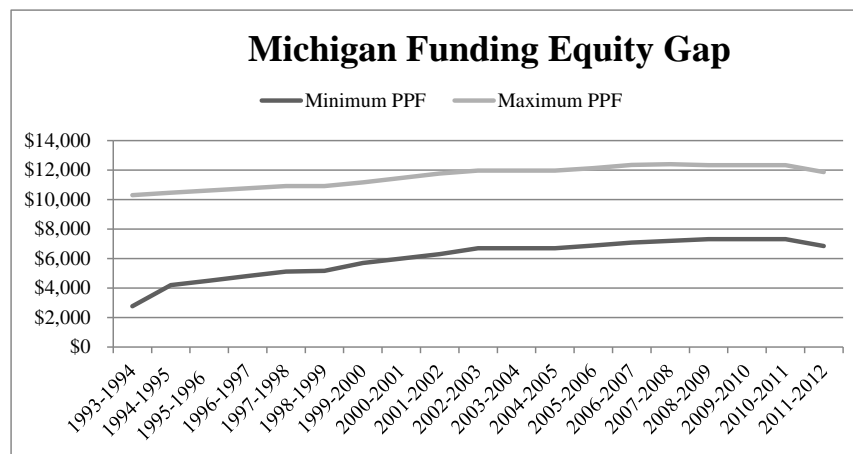
*Source: Information obtained for Figure C. was acquired from actual minimum and maximum per pupil foundation amounts which can be found at: http://www.senate.michigan.gov/sfa/Departments/DataCharts/DCk12_BasicFoundationHistory.pdf (*see appendices Table IV.)

As policymakers implement cuts to address revenue losses, schools have been forced to reduce educational services in an attempt to offset funding reductions. These reductions have increased concern over the level of resources needed to adequately fund educational programs to meet expected student proficiency goals (A. Odden, M. E. Goetz, & L. O. Picus, 2008). This dilemma has brought about a key question that has been the focus of deliberation by state policymakers, courts and education community which is: *How much money is enough to adequately educate a child to achieve mandated academic standards?* This question is relevant because it helps bridge the connection between educational inputs, costs of educational programs and services, with outputs,

student academic outcomes (Lynn, 2011). Much of the dialogue and effort directed at addressing this question has been shaped through federal and state policy initiatives brought about because of school finance litigation surrounding educational equity and adequacy over the past 30 years. Additionally, researchers have also made progress attempting to identify an adequate level of funding to subsidize expected levels of student performance.

In order to find solutions to the aforementioned question, researchers have developed ways to observe the relationships between education inputs, processes and student achievement outcomes. Four "costing out" methods have been developed by education policy analysts to identify adequate spending levels needed to in order for students to achieve at a defined standard of academic performance. The four methods utilized by researchers to accomplish this task include: Statistical Modeling, Empirical Observation/Successful School, Professional Judgment, and Evidence-Based (Addonizio, 2003a; Daniel, 2010; Hanushek, 2007a; Ochalek, 2008; Odden, 2003). The following is a brief description of each approach in achieving the goal of calculating the costs of providing an adequate education.

The *Statistical Modeling* method, also referred as the *Econometric* or *Cost Function* approach, is the most analytical and complicated of the four models. Investigators engaged in this research technique attempt to quantify the factors that influence the cost of an education using multiple measures of student performance (Rebell, 2006). This method first identifies a satisfactory level of student academic performance and then uses multiple regression analysis to approximate the dollar cost figure of multiple education inputs thought to influence student achievement outcomes (Addonizio, 2003a; Rebell, 2006). Once these costs are obtained, they are used to determine the level of funding necessary for schools to educate their students to the prescribed levels of academic performance (Rebell, 2006).

Another more practical method attempting to identify an adequate level of resources to achieve a set educational standard is the *Successful Schools* method. This costing out approach, also known as the *Empirical Observation* method, attempts to estimate the costs in providing an adequate education based on student academic achievement objectives and actual spending of school districts (Addonizio, 2003a; J. Augenblick & Myers, 2001; Ochalek, 2008; Picus, 2001; Rebell, 2006; Rucker, 2010). This model seeks to identify school districts where academic performance is seen as being satisfactory based on criteria established by the researcher (Addonizio, 2003a, 2003b; Lefkowits, 2004; Ochalek, 2008; Picus, 2001; Rucker, 2010). However, in order to determine this, an operational definition of satisfactory student performance must be established. To accomplish this, typically investigators will use preexisting state student proficiency standards established to meet NCLB achievement provisions on state standardized testing instruments. Once this has been accomplished, the researcher uses a regression analysis to relate district inputs (e.g. teacher salary, teacher experience, student characteristics, district resources, student to teacher ratios) to outputs (student outcomes) (Addonizio, 2003a; J. Augenblick & Myers, 2001; Ochalek, 2008; Picus, 2001; Rucker, 2010). Successful districts are then identified by the investigator based on the results of the regression analysis. A model district is then selected from this group to serve as a benchmark to establish a cost to educate students in the state. This method assumes that any district or school can reproduce another's results with the same per pupil resources adjusted for differences in resource costs and pupil needs (Addonizio, 2003a, 2003b; Ochalek, 2008; Rebell, 2006).

An additional approach attempting to quantify an adequate level of funding for education has been explored through the *Professional Judgment* approach. This approach relies on the judgment of professional educators in helping identify essential educational services and programs needed to assist students to perform at high levels of achievement (Addonizio, 2003a; Picus, 2001; Rebell,

2006; Rucker, 2010). Researchers employing this method select a body of educational experts and ask them to identify the most effective educational programs and services for elementary, middle and high school students (Odden, 2003). The ingredients needed to implement the recommended programs and services are then costed out to ascertain a final cost (Addonizio, 2003a; Odden, 2003; Picus, 2001; Rebell, 2006).

The final approach that researchers have utilized to calculate the resources required to provide a high quality education is the *Evidence-Based* approach. This cost analysis model attempts to identify an adequate level of resources needed to promote improved student outcomes by making use of current and past research. Investigators attempting to accomplish this goal review the results documented from auspicious education studies and select those that have the potential to best influence learning (Hanushek, 2007b; Picus, Odden, & Goetz, 2009). Once these programs and services have been identified, the researcher determines an adequate expenditure level based on their components and aggregates them to produce a total budget (Odden et al., 2007). Researchers also attempt to estimate the expected student achievement gains schools should realize if the education programs and services they recommend are implemented by a school. Investigators calculate these academic gains based on the results and findings obtained from research utilizing specific education programs, teaching strategies and professional training aimed at improving student outcomes. Researchers employing the Evidence-Based method contend schools should be able to reasonably attain similar academic gains if the same or comparable programs and services are offered (Hanushek, 2007b, p. 75).

Statement of Problem

Because of the multiplicity of state school funding systems and legislative education policies throughout the United States, this study will focus on schools in the State of Michigan. In 1994 Michigan taxpayers voted to eliminate the use of property taxes as the primary source of income to pay for public education. Instead, they elected to increase the state sales tax from 4% to 6% which would be used as their main source of revenue to fund schools (Kearney & Addonizio, 2002). This new funding system helped reduce the property tax burden for both homeowners and businesses by approximately 22% as well as generated a net 4% increase in K-12 revenue when compared to monies levied in 1993 (Kearney & Addonizio, 2002). Additionally, the financial obligation of paying for public education shifted from local municipalities to the state.

Prior to 1994, the majority of school revenue was generated through local property taxes. Since then, the State of Michigan has become responsible for providing nearly 75% of the needed funding for public schools with the remaining portion obtained through local and federal sources (Kearney & Addonizio, 2002). This proportion has remained relatively constant. However, in recent years, this increased fiscal responsibility has become a problem for the state largely because of the lack of stability of this new funding system, especially in poor economic times when there is less retail sales volume resulting in less revenue used to subsidize education in Michigan (Kearney & Addonizio, 2002). Additionally, political debates over policy decisions made at the state level have a direct impact on the level of resources made available to schools as legislator wrestle over prioritizing budget items.

Michigan, similar to other states, has been going through a very difficult financial period which is attributed to its heavy reliance on the auto industry as its primary source of jobs and income. Currently, the state ranks 45th with 9.4 percent of its workforce unemployed as compared to

the 8.1 percent national average (Statistics, 2012). The flaws in Michigan's funding system has become more critical to resolve because schools are required by law to demonstrate their level of competency each year towards meeting the 100% proficiency target in both reading and math by 2014 as mandated under NCLB. This objective will be increasingly difficult to attain if an adequate level of funding cannot be identified by the state. Additionally, it will be more remote for schools to achieve under the State's current economic circumstances. Presently, fewer dollars have been appropriated to K-12 public education as compared to previous years. This has resulted in schools needing to consolidate, prioritize and cut education programs and services to students. This practice may pose a larger problem for Michigan's future as students lack the skills and training necessary to become successful contributing members of the greater society.

School funding policy concerns have been the center of court proceedings since the decision of *Brown v Board of Education* was handed down by the U. S. Supreme Court in 1954. The outcome of this court case, along with those that followed, has influenced school finance legislation over the past 50 years. The emphasis of these funding systems has shifted from equity (equal distribution of funds) to adequacy (the minimum amount of funding necessary to support academic achievement levels). This shift has also been influenced by federal and state government standards based education reform policies aimed at improving the performance of students.

There have been numerous adequacy costing out studies designed to reveal the amount of funding necessary to provide all students with the opportunity for an adequate education (Addonizio, 2003a, 2003b; Imazeki, 2008; "N.J. Const.," 1947; Picus, 2001; Rebell, 2006). Since 1990, 30 states have conducted their own adequacy cost studies with many of them done as a result of court decisions relating to school funding lawsuits (e.g, Arizona, Arkansas, New York, Ohio & Wyoming) (Duncombe, 2006). However, critics argue that these adequacy costing out studies are simply forms

of "alchemy" that have very little to do with science because they fail to answer the basic question:

What level of funding would be needed to attain a designated level of student academic performance

(Hanushek, 2005; Rebell, 2006)? Researchers who have engaged in these studies agree that no

economic analysis can fully establish a definite causal connection between an exact funding amount

and a specific educational outcome (Hanushek, 1994a, 2005, 2007a; Rebell, 2006). This is primarily

because educational processes are influenced by so many individual and environmental factors

(Hanushek, 1994a, 2005, 2007a; Rebell, 2006). Additionally, it has been difficult for researchers to

identify positive relationships between resources and educational programs and services because of

the way districts are required to report their expenditures to states (Duncombe & Yinger, 2011).

However, contemporary adequacy costing out studies, even with their imperfections, provide a more

rational and suitable approach to education budget planning than past ad hoc political deal-making

(J. Augenblick, Palaich, & al., 2007; Duncombe, 2006; Rebell, 2006).

   All state legislatures have been faced with the challenge of adjusting their education finance

systems so they are more aligned with their education accountability standards (Duncombe &

Yinger, 2011; Imazeki & Reschovsky, 2005). Michigan legislators have yet to initiate a cost

analysis study of their own to see if the funds they are providing schools are adequate enough for

students to achieve at the standards to which schools are being held accountable. If an adequate

amount of money can be identified to ensure desired student academic achievement levels, state

legislators will be able to better determine a consistent budget for K-12 public education in which

every child will be afforded the opportunity to be successful in the classroom.

   It is the purpose of this study to estimate an adequate per pupil foundation allowance to educate

all school aged children in the State of Michigan so they will perform at the minimum proficiency

standards on the Michigan Educational Assessment Program (MEAP) as outlined by the State

Department of Education. In order to accomplish this goal, this research study will attend to the following questions:

1. What variables best predict district academic proficiency on the MEAP?
2. Who are Michigan's exemplary districts?
3. What are "adequate" per pupil funding levels for school districts, conditional on educational costs and needs?

This study will use of the Successful Schools or Empirical Observation approach. It is the most practical and reliable of the four costing out methods because the results are based on actual past student performance data and the resources utilized to obtain them. Additionally, it also takes into consideration the added costs needed to educate students with special needs as well as those who are at risk for failing based on the model district's student characteristics. Because it is essential for the researcher to establish a standard of achievement in order to calculate the costs of providing an adequate education when utilizing this costing out method, for the purposes of this analysis achievement standards in both the Fifth Grade Reading and Math portions of the MEAP will be based on current State proficiency levels established by the Michigan Department of Education for the 2011-2012 school year. Other factors that will be taken into consideration include: state per pupil foundation allowance, percentage of low socio-economic student population, district demographics, teacher/student ratios, teacher salary, & teacher longevity.

Assumptions and Potential Limitations

This study assumes that the amount of funding a school district receives impacts the level of student achievement either negatively or positively depending on the level of efficiency with which the funds are managed. For the purpose of this analysis, efficiency will be defined as the least amount of resources utilized to achieve prescribed student achievement levels (Hanushek, 2007a). With that, it is assumed the more efficiently a district allocates its resources, the better its students will perform on state standardized testing instruments. Conversely, the less efficiently a district utilizes its resources, the lower will be student academic achievement. Hence, schools that have students who perform two standard deviations above the mean in both the Reading and Math portions of the Fifth Grade MEAP will be considered efficient districts. This approach presumes any district or school can reproduce another's results with the same per pupil revenue adjusted for variations in student needs and the cost of educational resources (Addonizio, 2003a). Additionally, this research design may be limited because it will encompass data from public school districts and academies with not less than 500 students attending. Finally, this research will analyze data for the 2012-13 academic school year.

Definition of Terms

For the purposes of this study, the following definitions of terms will be used.

The *Michigan Education Assessment Program* or *MEAP* is a criterion-referenced state assessment test used to assess students in grades 3-11 annually in Math and English Language Arts developed by the Michigan Department of Education (Ochalek, 2008, WSU Dissertation). It will be used to identify the overall level of achievement school districts are attaining for this research design in both Math and Reading.

Per Pupil Foundation Allowance refers to the amount of money a school district receives from the State of Michigan for each child attending their schools (Kearney & Addonizio, 2002). The amount of money a school district receives varies from district to district. This term will be used to help determine the level of efficiency a district is utilizing their revenue to provide services and programs to students.

Minimum Per Pupil Foundation Allowance is established by Michigan Legislature annually and refers to the minimum amount of money a school district could receive for each child attending their schools.

The term *Adequate Funding* refers to the level of funding necessary to allow all students the opportunity to achieve at minimum standards of academic performance as measured by state assessment devices (Addonizio, 2003a; Daniel, 2010; Imazeki, 2008; Kearney & Addonizio, 2002; Ochalek, 2008; Odden, 2003; A. R. Odden, M. E. Goetz, & L. O. Picus, 2008; Picus et al., 2009; Rebell, 2006). This term will be used to help identify a minimum level of funding necessary to educate all children, including those coming from low socio-economic communities, in the State of

Michigan to perform at minimum academic achievement levels as prescribed by the Michigan Department of Education.

Adequacy Grants are proposed grants for schools based on student educational need and costs. (Addonizio, 2003a; Ochalek, 2008).

Efficiency will be defined as the least amount of resources required to achieve prescribed student achievement standards (Hanushek, 2007a).

At-risk are students who come from low socioeconomic backgrounds and qualify for Federal free and reduced lunch benefits under Title I of ESEA.

Adequate Yearly Progress (AYP) is the term used to describe student academic performance working towards meeting the 100% proficiency objective in both Reading and Math by the year 2014 as prescribed under the provisions of the No Child Left Behind Act of 2001 ("No Child Left Behind Act," 2001).

Michigan Education Assessment Program or *MEAP* refers to the State of Michigan's standardized testing program utilized to measure student academic progress towards meeting annual AYP targets established under the NCLB act of 2001.

Student proficiency standards refer to the standards of proficiency established by the Michigan Department of Education for students taking the fifth grade MEAP

Exemplary Districts are districts that have been identified to have exceeded their predicted student achievement levels by at least one standard deviation based on the regression analysis conducted for this study (Ochalek, 2008).

Value added measure refers to the annual change in student performance outcomes (Imazeki & Reschovsky, 2004).

This study will estimate an adequate level of funding to financially support school districts in the State of Michigan to perform at the academic standards outlined by the No Child Left Behind Act. It may also provide state legislators with insight as to how much additional revenue is needed to achieve educational adequacy. It could also lead to further inquiry of how schools that are exceeding their predicted levels of student achievement with the resources they are allocated.

CHAPTER 2

LITERATURE REVIEW

Introduction and Overview of Chapter 2

In light of today's economic climate many have argued the most central issue surrounding the success or failure of public education today in the United States involves the concept of adequacy (Odden, Picus, & Goetz, 2010; Picus & Odden, 2011; Rebell, 2004). There is a lot of merit to their argument as schools need adequate resources to provide quality educational services to their students. This need to adequately fund public education is likely more important today than ever before because of the expectations that have been placed on schools to ensure their students achieve at prescribed academic standards established by both federal and state government legislators.

Over the past three decades there has been increasing pressure put on schools to improve the quality of educational programs and services they offer and provide students ("No Child Left Behind Act," 2001; Rebell, 2008). The primary driving force behind this push to improve educational quality stems from the concern over the competitiveness of our nation's children and the United States in the future global economy (Guthrie & Springer, 2004; "A Nation at Risk: The Imperative for Educational Reform," 1983; Rebell, 2008). However, worries over the level of resources needed by schools to achieve these standards have brought about some concerns which are centered on two questions: How much money is needed to accomplish this task? and to what degree are the federal and state governments liable for providing these resources? The answer to these questions has been shaped through years of rigorous debate and analysis in many arenas which include the courts, research community and political realm.

In an effort to better understand the importance of adequacy and how it has evolved as a central theme in the overall success or failure of students obtaining an education in today's public schools, it is essential to review and understand past court litigation involving key issues of equity which has been identified as the precursor to the concept of adequacy (McDonald, Kaplow, & Chapman, 2006). In addition to reviewing the central court cases that have helped bring about and shape the concept of adequacy, some of the important policies that have been established by both the Federal and state governments which have furthered the need to consider adequacy as a valuable tool in developing more effective education funding systems will be discussed. Furthermore, many of the resolutions devised by researchers attempting to identify an adequate level of funding will also be examined along with the methods they have employed to obtain their results and recommendations. Finally, because this research design is specific to Michigan, information explicit to its history and background will also be reviewed in an attempt to reveal the importance of identifying an adequate level of funding to meet the needs of their diverse student population.

State Fiscal Responsibility Takes Hold

The United States Constitution makes no reference to education. Rather, this duty was reserved for states to undertake which was addressed in the drafting of their constitutions. Education is possibly the most important responsibility of state and local governments (Dayton & Dupre, 2006). It is essential in providing people with the training and skills needed to know and exercise their responsibilities in a democratic society. In general, education helps to provide people the opportunity to obtain skills needed to succeed in life (Dayton & Dupre, 2006). Today, all states, with the exception of Mississippi, have provisions in their state constitutions describing how they will provide public education (Lynn, 2011; Thro, 1993). The vast majority of these provisions have

language explaining the organization and development of a "system of free common schools" (Rebell, 2002). Additionally, most state education clause language includes information relative to the state's degree of commitment they would provide these services by including phrases such as "thorough and efficient" (CO, ID, IL, KN, MD, MN, NJ, OH, PA, TX, WV), "general and uniform" (AZ, ID, IN, MN, NC, OR, SD, WA), "adequate public education" as well as other specific language (GA) (Hunter, 2011; McDonald et al., 2006; Rebell, 2002, 2008). These clauses established both the states' and local taxpayers' obligation to provide and thereby fund public education (McDonald et al., 2006). However, state fiscal obligation did not immediately take hold after education language was added to state constitutions. Rather it gradually occurred as early education systems in the United States were chiefly supported through private and religious sources (Rebell, 2008; Sutton, 2008). It was not until the latter half of the nineteenth century that broad publicly supported and financed educational institutions were established by state governments through the help of Horace Mann and the "Common School" movement (Rebell, 2008; Sutton, 2008).

The problem with the vast majority of these state public school systems, however, was they were minimally funded, which resulted in providing a minimal education. This practice changed over time as the fiscal responsibility of state governments' role in education persistently increased (Sutton, 2008). In 1919, state governments accounted for roughly 16% of all financial support for public elementary and secondary education in the United States with the majority coming from local revenue sources (Hall, 2006). By the 1950's, that figure more than doubled to 40% and increased further to almost 50% by the year 2002 (National Center for Education Statistics, 2010a). Today, that figure is even higher, depending on the state. For example, nearly 60% of the revenue used to fund Michigan's public schools and public school academies is supported by the state with the remaining coming from local (33%) and federal (7%) sources (National Center for Education

Statistics, 2010b). Of all the states, Vermont and Hawaii contribute the most to their schools by providing approximately 85% of their states total expenditures towards public education (National Center for Education Statistics, 2010b). Their remaining revenue is generated from local and federal sources. In contrast, the state of Illinois contributes the least. It generates the majority of its funds to subsidize their schools primarily through local revenue sources which account for nearly 60% of their total expenditures with the remaining balance provided by the state (31%) and federal government (8%) (National Center for Education Statistics, 2010b).

There are a number of factors that have contributed to this marked increase in state fiscal responsibility which includes: successful school finance lawsuits, federal education initiatives as well as findings disclosed from important educational research. Of these factors, the most influential stems from successful school finance litigation. Arguments surrounding the fairness in the amount of funds provided to schools and how they should be distributed has been the subject of contention in both federal and state courts for decades (National Research Council, 1998). Early cases centered arguments over issues of equity and equal educational opportunity. These cases set the framework for later court proceedings which helped define the concept of adequacy. The decisions that were handed down in these influential school finance trials directly impacted how schools are funded as well as how education policy is initiated in the United States. The following is a brief history documenting the leading cases that have made the biggest impact on the interdependence between adequate financial resources and student outcomes in both federal and state litigation. Other influential factors, such as federal education initiatives as well as important educational research findings will also be shared.

The Infancy of Adequacy:

In 1954 *Brown v. Board of Education of Topeka* was the first landmark court case that set precedence for later litigation which centered on issues of race and equal educational opportunity for children (Dayton & Dupre, 2006; McDonald et al., 2006; Rebell, 2008). It is strongly believed this court case marked the beginning of the modern school funding revolution (Dayton & Dupre, 2006; McDonald et al., 2006). This case was brought to trial on behalf of a young African American girl, Linda Brown, who was denied admission to her local elementary school in Topeka, Kansas because of her skin color ("Brown v. Board of Education of Topeka," 1954). Prior to the *Brown* litigation, many states had laws, known as *Jim Crow Laws*, making it illegal for people of minority races to use the same public facilities and services as whites ("Plessy v. Ferguson," 1896). These laws were permitted based on the verdict rendered in 1896 by the United States Supreme Court under *Plessy v. Ferguson* where the "separate but equal" doctrine was established. Under this doctrine, it was permissible for states to pass laws which segregated their citizens, in particular blacks and whites, as long as these separate facilities and services were equal. However, it was revealed African American facilities and services were far from equal in comparison to those of whites. As a result, these laws systematically produced inferior opportunities and inequity for blacks living in the United States which became an increasing problem. It wasn't until the *Brown* verdict that this issue was addressed. The Supreme Court Justices verdict found that racial segregation of public educational facilities was unconstitutional. Additionally it was established that no child, regardless of race or national origin, would be deprived equal protection of the laws based on the Fourteenth Amendment of the U.S. Constitution ("Brown v. Board of Education of Topeka," 1954). Hence, the *Brown* decision effectively overturned *Plessy v. Furguson* and the *Jim Crow Laws* in the United States.

Brown also brought national attention to educational inequity. However, the courts did not tie its verdict to how schools were funded. Instead it required states to allocate more money to them to address these inequalities (National Research Council, 1998). Regardless, the *Brown* decision helped motivate future litigation aimed at addressing inequity in school finance (Rebell, 2008). Its verdict, along with other cases that followed, helped guarantee schools provide equitable offerings for all students as well as prohibited the legal basis for racial segregation in schools and other municipal facilities (McDonald et al., 2006). Additionally, it established broader fiscal responsibility of states in providing their children with a public education (McDonald et al., 2006). As states became more active in financing their schools, state policymakers began to undertake the task of designing funding systems, which are a set of formulas and rules established by state legislatures that use publicly collected revenues to pay for K-12 public education, that would distribute monies to districts (McDonald et al., 2006; National Research Council, 1998). Although the intended outcome of states' school finance systems was aimed at providing equitable educational opportunities for all children, their funding mechanisms produced a wide variation in the level of resources distributed between districts (McDonald et al., 2006). They systematically failed to address the problem of ensuring that financial resources used to supply these offerings would be distributed equitably. The idea of equity as it relates to school finance refers to the fairness with which public schools are funded (National Research Council, 1998).

Over the past 40 years, judicial arguments based on equal educational opportunity began to shift their emphasis to concerns over equitable distribution of resources (McDonald et al., 2006; Rebell, 2008). These arguments eventually transcended into claims embedded in the concept of adequacy. However, the exact point at which this occurred is difficult to identify (West & Peterson, 2007). However, legal scholars and educational researchers have generally characterized this

development to have taken place in three waves (Daniel, 2010; Ochalek, 2008). Each of these waves

has been classified based on the legal strategies and arguments employed by its litigants (Daniel,

2010; West & Peterson, 2007). Furthermore, each wave experienced varying levels of success in

court proceedings as well as implementation by legislative bodies required to comply with verdicts

handed down (Daniel, 2010). In addition to court litigation, other important happenings were also

occurring during these periods which played an active role in how schools would be funded.

The 1st Wave-1960-1973

The first wave of school finance litigation occurred between 1960 and 1973. It was a period

where equity in school finance was closely being examined. In addition to the active school finance

litigation that occurred during this period, other outside influences helped reveal the importance of

providing more equitable funding to schools, in particular, those schools educating poor minority

students. These influences were wrought based on the tumultuous political and social era of the

1960's. During this period the United States witnessed the assassination of President John F.

Kennedy, the involvement in the Vietnam War and the emergence of the Civil Rights Movement led

by Dr. Martin Luther King, who also was assassinated. The eventual passage of the Civil Rights Act

of 1964, along with the *Brown v Board of Education Topeka* decision, prompted the passage of a

number of Federal government initiatives aimed at providing interventions to assist minority and

impoverished groups living in the United States. One of the most important and costly of these

initiatives was the passage of the Elementary and Secondary Education Act of 1965 or ESEA.

Elementary and Secondary Education Act of 1965

This act, which was established during Lyndon B. Johnson's presidency as part of his attempt

to address the persistence of poverty in the United States, provided the legal authority for the Federal

Government to provide financial support to the nation's public schools and institutions (Eversley-

Gilling, 2011). There were five components to ESEA that Congress allocated approximately one

billion dollars annually over a period of 5 years (Eversley-Gilling, 2011; Milkis & Mileur, 2005).

One of the most far reaching and costly of these was Title I. It provided funds to states who in turn

disbursed them to public schools and districts who educate large concentrations of children who

come from poor socioeconomic conditions (Eversley-Gilling, 2011). The funds were intended to be

used to provide additional educational programs and services to help less affluent children improve

their academic skills and knowledge (Rebell, 2008). It was expected this added help would supply

less fortunate children the opportunity to compete with their more affluent peers in the classroom as

well as in the job market once they completed high school. This was the first time in history the

Federal Government provided financial support to schools on such a grand scale in the United States

(Eversley-Gilling, 2011; Kosters & Mast, 2003). However, like many other Federal initiatives and

programs that came before it, there were strings attached. Specifically, the money could only be

used to help students who were categorized as coming from low income families. Another

stipulation outlined under Title I. was the specific evaluation requirements made by Congress

holding states accountable for receiving these additional funds (Eversley-Gilling, 2011). Many

believe this marked the beginning of the broad educational evaluation systems that we have come to

know today (Eversley-Gilling, 2011; Fitzpatrick, Sanders, & Worthen, 2011).

Since the inception of ESEA in 1965, it has been reauthorized by Congress 7 more times.

With each of these reenactments, the amount provided to states also increased. This trend of

providing increased revenue to schools is consistent with those of the states. In FY 1961-1962 the country spent on average $393 in unadjusted dollars on each child attending a public school (National Center for Education Statistics, 2012). That amount more than doubled by FY 1970-1971 to $842. Much of the reason attributed to the significant increase in spending on education during this timeframe was because of the aforementioned influences. However, a report written just one year after the enactment of ESEA would change the perspectives of many regarding the role and level of influence financial resources play in providing children with an education.

The Coleman Report and its influence on school finance

The need to address inequity in education was reinforced further with the findings disclosed in a research study conducted and written by John's Hopkins University sociologist James C. Coleman in 1966 entitled the Equality of Educational Opportunity Study. This study, which later became known as the Coleman Report, was commissioned by the United States Department of Health, Education and Welfare. It was initiated in response to the Civil Rights Act of 1964 in an effort to better understand the inequality of school resources as well as their effects on student achievement (Ladd, Chalk, & Hansen, 1999b). The purpose of this research design was to analyze the equity of educational offerings provided to children of differing races, color and national origins (Coleman & et al., 1966). The data collected for this report came from a national sample of schools involving over 600,000 students and teachers.

The research method for this study was multivariate regression analyses which attempts to measure the degree of association between potential variables of educational inputs (e.g. total district revenue, teacher experience, teacher salary, student demographics, teacher to student ratios, etc.) and their outcomes or outputs (e.g. student academic achievement) (Rucker, 2010; Wenglinsky, 1997).

This type of analysis has been referred to by researchers as a production function. One of the key findings revealed from this study was how little influence even the best designed schools and other public programs had in overcoming the negative influence poverty has over educational success (Coleman & et al., 1966; Schrag, 2005). Equally compelling was the revelation that a child's socioeconomic background (i.e. parent's income level, parent's education level, student peer group influence etc.) impacts a child's level of academic achievement more than anything a school could offer in terms of remediation and educational services (Coleman & et al., 1966). Researchers have verified this observation and depending upon the study, this influence accounts from anywhere between 66-80% of a child's total academic performance (Schrag, 2005). Another dismal statistic exposed by the Coleman report relates to the black-white test score gap. Findings disclosed in the report revealed black children enter kindergarten well behind their white peers in their early literacy and math skills. This delayed academic proficiency was found to persist and even increase over the course of a child's years in school.

The findings of the Coleman Report led many to assert that money didn't matter in education (Minorini & Sugarman, 1999b). However, the report also revealed that schools and the resources used to fund them also influence student achievement, albeit not as momentous. As a result, many scholars and policymakers maintained that schools and the resources used to fund them do have a positive influence on student outcomes. This led many to become concerned over how equitably resources were being distributed to schools and the differences in educational opportunity it afforded students (Minorini & Sugarman, 1999b). These issues and concerns were primarily examined and addressed through litigation as the courts did not buy into the argument that money does not play an influential role in providing a child's education.

School Finance Litigation

During the 1960's and early 70's, legislative changes to school finance law often occurred as

a result of successful court litigation (Ladd et al., 1999b). Plaintiffs seeking remuneration during

this time frame claimed their right in obtaining an equitable education was being denied because of

the way their state's funding systems appropriated educational resources to districts.   They argued

this policy violated their equal protection rights established under each state's constitutional equal

protection clause and the 14th Amendment of the United States Constitution (Minorini & Sugarman,

1999b; Ochalek, 2008; Rucker, 2010; West & Peterson, 2007).

One of the first important challenges to school finance systems occurred in an Illinois Federal

District Court in 1968 with *McInnis v. Shapiro* (Ladd et al., 1999b). The suit was brought to trial on

behalf of a large number of disadvantaged high school and elementary students seeking to equalize

expenditure variations between local school districts ("McInnis v. Shapiro," 1968; Salmon &

Alexander, 1976). Plaintiffs argued their current state's funding system was ineffective in meeting

the educational needs of poor and disadvantaged students (Addonizio, 2004; Rebell, 2002).

Furthermore, plaintiffs contended funding disparities created by this system prevents poor and

disadvantaged children from obtaining a quality education ("Burruss v. Wilkerson ", 1969;

McDonald et al., 2006; "McInnis v. Shapiro," 1968). They maintained there was a federal

constitutional obligation for their education finance system to provide resources to districts based on

student educational need (Rebell, 2002).

The theory behind this argument held that both wealthy and poor students have the right to

have their educational needs met equally which would necessitate unequal spending (Minorini &

Sugarman, 1999b). The case was found to be nonjusticiable because the court had no discoverable

and manageable standards by which to determine if the states funding system statues were in violation of the plaintiffs' constitutional rights (Addonizio, 2004; "McInnis v. Shapiro," 1968; Minorini & Sugarman, 1999b; Rebell, 2002; Salmon & Alexander, 1976). In particular, the court had no way to ascertain what the educational needs were for both wealthy or poor children nor were they able to decipher whether they were being sufficiently met (Minorini & Sugarman, 1999b). The court also justified their decision because there was no language in the United States Constitution declaring how public school expenditures should be provided.

A subsequent case tried in Virginia Federal District Court, *Burruss v. Wilkerson*, with nearly identical claims made by plaintiffs was also dismissed by the court supporting the same ruling made in the *McInnis* trial (Addonizio, 2004; "Burruss v. Wilkerson ", 1969). Both cases were appealed to the United States Supreme Court who upheld the lower courts decisions without comment (Minorini & Sugarman, 1999b; Rebell, 2002).The primary reasons why both of these cases' were unsuccessful was because there was no broadly accepted definition of what educational need meant and the courts had no standard by which to measure the effectiveness of state school funding mechanisms that were established and being utilized(Addonizio, 2004; Minorini & Sugarman, 1999b).

Although both *McInnis* and *Burruss* were unsuccessful in proving their states' school finance systems were in violation of the United States Constitution, other legal strategies aimed at confronting school finance inequities were devised (Addonizio, 2004; Minorini & Sugarman, 1999b; Rebell, 2002). These strategies avoided the difficult task of trying to find a way to connect education resources to student need. Rather, they centered their arguments on how current funding systems, which were primarily subsidized through local property taxes, created a system of inequity especially between schools located in communities of low property wealth. Additionally, they attempted to establish that education was a fundamental interest. *Serrano v. Priest* was the first case

that applied these strategies which later paved the way for similar school finance litigation in other states (Addonizio, 2004; Minorini & Sugarman, 1999b; Rebell, 2002).

Unlike *McInnis and Burruss*, the plaintiffs in *Serrano* were able to provide the court with the manageable standards needed to support their testimony (Addonizio, 2004; Daniel, 2010; McDonald et al., 2006; Ochalek, 2008; Rebell, 2002). The plaintiffs in this State of California case focused their argument on revealing the unfairness of the funding disparities between local districts (Addonizio, 2003a, 2003b, 2004; "Serrano v. Priest," 1971). Like most states during this period, California's funding system generated the majority of its revenue to pay for public educational services through local property taxes (Addonizio, 2004; Daniel, 2010; Rebell, 2002; "Serrano v. Priest," 1971). Hence, people living in affluent neighborhoods had more available resources to support their local schools as compared to those located in less affluent areas.

This system of funding was declared unconstitutional by the California Supreme Court because it was established it violated the state's equal protection clause. The court based their judgment on the "fiscal neutrality principle" which was devised by Northwestern University law professor John Coons and two law students, William Clune and Stephen Sugarman (Addonizio, 2003b; Coons, Clune, & Sugarman, 1970; Minorini & Sugarman, 1999b; Rebell, 2002). Much of their strategy was founded based on earlier research conducted by Arthur Wise in his doctoral dissertation entitled Rich Schools, Poor Schools: The Promise of Equal Educational Opportunity for the University of Chicago (Schrag, 2005; Wise, 1968). The theories he presented in his investigation, which were primarily aimed at analyzing equity of educational resources between schools, were central to the success of this historic school finance equity case (Ladd et al., 1999b). In particular, his theory which states "the quality of a child's education in the public schools of a state should not depend upon where he happens to live or the wealth of his local community" was

paramount to the overall success of the case (Ladd & Hansen, 1999a; Wise, 1968, p. xi). Clune, Coons & Sugarman made use of Wise's work when they formulated the "fiscal neutrality principal" which supports the funds available for a child's education should not be based on the wealth of the community they live in, but rather on the wealth of the state as a whole (Addonizio, 2004; Rebell, 2002). That is, the state has a constitutional responsibility to equalize the taxable resources shared between districts (Rebell, 2002). The verdict rendered in *Serrano* was unlike others that had occurred earlier. The California Supreme Court determined education was a fundamental right based on the language found in its equal protection clause of their State Constitution.

Unlike other previous cases, *Serrano* avoided the difficult task of trying to link a connection between educational funding and student need. Instead, it focused its efforts on revealing the financial disparities between wealthy and poor districts (Rebell, 2002). This approach proved successful because it provided a way of determining if equal treatment for each school district was being met based on the State of California's Constitutional Equal Protection Clause regardless of the wealth of their community (West & Peterson, 2007).

In the wake of the *Serrano* case, similar lawsuits began to be filed on behalf of poorer districts throughout the United States seeking remuneration and changes to state funding systems(Addonizio, 2003a). Because of the precedent set in the *Serrano* case, many states struck down and initiated changes to their funding systems in an attempt to equalize financial disparities between wealthy and poor districts (e.g. Texas, Minnesota, Kansas, New Jersey, Arizona and Michigan) (Rebell, 2002; Tractenberg, 1974). Additionally, challenges to similar school finance statutes were brought to trial in more than 43 other states resulting in many school finance statues being overturned (Addonizio, 2003a; Tractenberg, 1974). However, these victories were intermittent as many states were reluctant to make these changes and those that did had little effect

on equalizing the disparity across districts (Addonizio, 2003a, 2003b; Ladd & Hansen, 1999a). Much of the rationale behind this attitude has been attributed to the 1973 United States Supreme Court verdict which was handed down in *Rodriguez v. San Antonio Independent School District*.

Much like the *Serrano* case, plaintiffs' in *Rodriguez* challenged the constitutionality of the State of Texas's education finance system because of the severe inequities it created between poor and wealthy school districts (Rebell, 2002; Sutton, 2008). However, it was filed in federal court and did not make use of the "fiscal neutrality principle" which helped establish a means or standard by which the court could measure the level of disparity between wealthy and poor districts. Initially, federal district court judges in Texas ruled in favor of the plaintiffs' arguments, stating the Texas' education finance system was in violation of the federal equal protection clause cited under the Fourteenth Amendment (Rebell, 2002; "Rodriguez v. San Antonio Independent School District," 1971; Sutton, 2008). However, this ruling was later reversed by the United States Supreme Court in a contentious 5-4 vote ("Rodriguez v. San Antonio Independent School District," 1971; Sutton, 2008).

The Supreme Court majority opinion held that education was not among the afforded rights explicitly protected under the Federal Constitution (Daniel, 2010; Minorini & Sugarman, 1999a; Rebell, 2002; "Rodriguez v. San Antonio Independent School District," 1971). Additionally, the court ruled that wealth does not create a suspect class since students were not being denied an education despite differences in educational resources (Rebell, 2002; "Rodriguez v. San Antonio Independent School District," 1971). This ruling ended the Federal Court's role in future school finance litigation(Addonizio, 2003b, 2004; Sutton, 2008). However, the outcome of this decision led to the development of new school finance litigation strategies which were centered on testing the constitutionality of state equal protection clauses (Daniel, 2010; Rebell, 2002; Sutton, 2008; Wood,

2004). This methodology opened a new wave in school finance litigation which occurred between 1973 and 1988 (Daniel, 2010; Ochalek, 2008).

The 2nd Wave-1973-1988

Although the federal courts were no longer sympathetic to school finance reform, new challenges were taken up in state courts as plaintiffs continued to seek out a solution to resolve the financial disparities between poor and wealthy districts (Addonizio, 2003b; McDonald et al., 2006; West & Peterson, 2007). Plaintiffs in these cases continued to argue their right to a quality education was being denied because existing state school finance systems failed to provide adequate funding to schools located in property poor communities. Their claims were again founded in equal protection language written in both the federal and state constitutions (Hunter, 2011). However, with the recent *Rodriguez* ruling, which eliminated the potential for school finance reform at the federal level, lawyers readdressed their litigation strategy by testing if fiscal policies of states satisfied state education clauses which describe their responsibility in providing educational services to citizens (Addonizio, 1992; McDonald et al., 2006). The first case to employ arguments based on both federal and state constitutional equal protection rights as well as language found in state education clauses occurred in New Jersey in 1973 with *Robinson v. Cahill,* whose verdict was reached barely two weeks after the *Rodriguez* decision (Addonizio, 1992; Daniel, 2010; Dayton & Dupre, 2006; Ochalek, 2008; Tractenberg, 1974).

Arguments presented in the *Robinson* case were filed in New Jersey Superior Court on behalf of students, parents, taxpayers and city municipalities claiming the unconstitutionality of the state's current school finance system (Goertz, 1983; "Robinson v. Cahill," 1973; Tractenberg, 1974). Additionally, litigants argued the funding system was unlawful because it violated the State's

"thorough and efficient" education clause (Addonizio, 1992; Goertz, 1983; "N.J. Const.," 1947; Tractenberg, 1974). The foundation for the claims made in the *Robinson* case is very reminiscent of those employed in *Serrano*. At the time, the primary source of revenue raised for public education in the State of New Jersey came from local property taxes. This policy broadened the range of financial disparity between high and low spending districts. This was especially true for schools located in urban property poor communities where revenue is roughly one third less than the then current average state per pupil expenditure (Goertz, 1983).

Not surprisingly, the decision handed down by the New Jersey Supreme Court relative to violations of both federal and state equal protection clauses were not found to be unconstitutional as the court had very little room to deviate from the *Rodriguez* opinion (Dayton & Dupre, 2006; Goertz, 1983; "Robinson v. Cahill," 1973; Tractenberg, 1974). However, the court did declare the New Jersey school finance system unconstitutional based on its "thorough and efficient" education clause found in its state constitution which reads: "The Legislature shall provide for the maintenance and support of a thorough and efficient system of free public schools for the instruction of all the children in the State between the ages of five and eighteen years" ("N.J. Const.," 1947). This decision was asserted because the current funding system was proven to not provide all of the State's children with the opportunity to obtain a "thorough and efficient" education (Addonizio, 1992; Goertz, 1983; "Robinson v. Cahill," 1973). As a result, the court ordered the New Jersey legislature to replace the existing school finance system with one that would better prepare students to become citizens that could readily compete in the job market (Goertz, 1983; "Robinson v. Cahill," 1973; Tractenberg, 1974). Furthermore, court justices required state legislators to devise a definition of what "through and efficient" meant (Goertz, 1983).

Other than the requirements handed down by the court, no direction was provided to the New Jersey legislature in devising a solution to the school funding problem (Addonizio, 1992; Goertz, 1983). Instead, this responsibility was left up to the legislative branches to resolve. In 1976, three years after the Cahill verdict, new school finance legislation was enacted to meet the courts objections which included changes to its state school funding system (Addonizio, 1992; Goertz, 1983). Despite these changes, disparities between poor and wealthy districts remained and in some cases even increased under the new funding system's provisions. In response to this, another lawsuit was filed in 1981, *Abbott v Burke*, on behalf of all students attending poor and urban schools in New Jersey (Education Law Center, 2011-2112a). This case helped maintain the momentum of school finance legal proceedings aimed at finding a solution to ending the fiscal disparity between poor and affluent districts. After nearly ten years, the New Jersey Supreme Court rendered its verdict in 1990 under *Abbott v Burke II* ordering the state to provide funding to poorer districts on par with those found in more affluent suburban communities (Education Law Center, 2011-2012b). Over the years, several other decisions were rendered by the New Jersey Supreme Court, with the most recent in 2011, to ensure state compliance with the *Abbott II* ruling.

Results of school finance litigation in the 2nd Wave

Since 1971, the majority of states were challenged over the way their education funding systems were structured (J. G. Augenblick, Myers, & Anderson, 1997). These cases were brought to trial based on state constitutional language in hopes of obtaining greater equity in funding among school districts or an assured level of funding for public schools to provide an adequate education (Sims, 2011). Numerous state supreme courts handed down decisions striking down their education funding systems and formulas because they were found to be unconstitutional (Harpalani, 2010).

This occurred in over 20 of 29 states that had their education clauses challenged (Harpalani, 2010). Those states whose school finance structures were found to be unconstitutional after court litigation included: Arkansas, California, Connecticut, New Jersey, Washington, West Virginia and Wyoming (McDonald et al., 2006). Legislators in these states began researching and developing more fiscally neutral ways to finance their schools (e.g. Connecticut, Wyoming & Arkansas) (Rebell, 2002). Their resolution came in the form of foundation formulas. Foundation formulas were created to ensure a minimum level of per pupil revenue for each child (Addonizio, 2004). Forty-four out of fifty states opted to fund their schools utilizing foundation formulas or incorporated foundation formula components into their school funding designs (Addonizio, 2003a; Sielke, Dayton, Holmes, & Jefferson, 2001). The idea behind this finance approach is to provide a more equitable distribution of revenue to support public schools. However, despite efforts to equalize funding levels between local districts, disparities still persisted (Addonizio, 2003a). In addition to this, little focus was placed on the impact these formulas had on student academic achievement.

States whose finance systems were upheld in the highest courts during this volatile period were Colorado, Georgia, Illinois, Maryland, Michigan, Oregon and Pennsylvania (Hunter, 2003). One of the primary reasons why many of the courts in these states were reluctant to rule in favor of plaintiffs is because there was no working definition of what encompasses an adequate or thorough education. The notion that state finance systems should consider need-based differences between student populations across districts and should provide adequate, rather than equitable, funding for all students was initially explored in *Robinson v Cahill,* 1973 (Sims, 2011). However, years would pass before this issue would be resolved as no significant school finance litigation occurred between 1983-1989.

A Nation at Risk

In addition to school finance litigation, increased public concerns over the quality of American schools surfaced during this period. This occurred primarily because of a publication produced at the request of President Ronald Reagan's then Secretary of Education T.H. Bell, seeking to analyze the status and quality of education in America ("A Nation at Risk: The Imperative for Educational Reform," 1983). This report, which later became known as A Nation at Risk, identified several areas of concern in student achievement. In particular, the report indicated students in the United States were lagging behind those in other industrialized nations, especially in the areas of math and science (Minorini & Sugarman, 1999a; "A Nation at Risk: The Imperative for Educational Reform," 1983; Rebell, 2008). It also documented students in the United States were performing lower on 19 academic tests as compared to those living in other industrialized nations. Furthermore, U.S. students did not finish first or second on any of these tests and finished last 7 times ("A Nation at Risk: The Imperative for Educational Reform," 1983). Investigators also estimated 13% of all 17 year olds in the United States were categorized as being functionally illiterate, having reading and writing skills insufficient to perform real-world daily applications ("A Nation Accountable: Twenty-Five Years after "A Nation at Risk"," 2008; "A Nation at Risk: The Imperative for Educational Reform," 1983). This percentage was estimated to be higher amongst minority students with approximately 40 percent being considered functionally illiterate.

The concerns that were disclosed in *A Nation at Risk* led to the perception that the economic competitiveness and future of the United States was in jeopardy because of the poor education students were receiving (Addonizio & Kearney, 2012; Minorini & Sugarman, 1999a; Rothstein, 2008). However, the findings of this report were later refuted by researchers. It was revealed *A Nation at Risk* investigators based their conclusions primarily on average SAT college entrance test

score data (Rothstein, 2008). Despite this data revealing an approximate one-half standard deviation decline by students between the years of 1963 and 1980, more careful analysis has attributed this decline to a larger and more diverse population of students taking the exam as compared to those who took it in 1963 (Rothstein, 2008). Other assessments during the time *A Nation at Risk* was published paint a much different picture of education during this period. The National Assessment of Educational Progress (NAEP) test, which is a national norm referenced test used to assess student achievement, reveals test scores during this timeframe were actually on an upward trend for both black and white children (Rothstein, 2008). Furthermore, it was later revealed by researchers and analysts the true reason for the stagnant economy experienced by American industries during the early to mid-1980's was due to poor planning and investment decisions made by business leaders in both the private and public sectors (Addonizio & Kearney, 2012; Guthrie & Springer, 2004; Rothstein, 2008). Additionally, increased international trade, the transferring of jobs overseas and political influences were also found to be contributing factors (Addonizio & Kearney, 2012).

A National Education Summit occurred in 1989 as a result of the findings disclosed in *A Nation at Risk* (Rebell, 2008). Participants of this summit included governors from all 50 states as well as the then president, George Bush (Rebell, 2008). Among the other attendees participating in the summit were a number of prominent business CEO's. The objective of the conference was to establish a number of education and achievement goals for all states (Rebell, 2008). This summit has been recognized as the beginning of the standards-based education reform movement which places emphasis on student outputs (Rebell, 2008). Another outcome resulting from the release of *A Nation at Risk* was the attention public education received from legislators, educators and parents to address the issues and concerns that were raised (Guthrie & Springer, 2004). It also garnered the urgency of issuing fundamental changes in our system of education as well as the need to develop a

system of accountability (Guthrie & Springer, 2004). Despite these positively viewed aspects of this report, it diverted attention away from other more important issues effecting school quality such as the issue of educational adequacy. This issue would finally be addressed in the 1989 landmark Kentucky school finance case *Rose v. Council for Better Education*. This case marked the beginning of the third wave of school finance litigation.

The 3rd Wave 1989-Present

By the end of the 1980's nearly every state had changed how they distributed their funds to schools, paying more attention to how equitable they were between districts (Hoxby, 2001). However, disparities persisted despite state legislative efforts to eliminate them. It was evident that a definition of what necessitates an adequate education would be necessary to help with the next step in determining an adequate level of funding to provide it.

In 1985 a lawsuit was filed in Kentucky Circuit Court on behalf of plaintiffs representing 66 local school districts along with several other school boards charging the State's school funding system was inadequate because it created a wide disparity in available resources between schools (Minorini & Sugarman, 1999a; Rebell, 2002; "Rose v. Council for Better Education," 1989). This was especially true between those located in more urban and rural communities as compared to those in more affluent suburbs. The main cause for their concern was that the state utilized property taxes as their primary source of revenue to subsidize their schools ("Rose v. Council for Better Education," 1989). Plaintiffs based the validity of their position on their state's education clause found under Section 183 of its constitution, which reads: "The General Assembly shall, by appropriate legislation, provide for an efficient system of common schools throughout the State" (Kentucky Legislative Research Commission, 2010, p. 55). Additionally, plaintiff arguments made claims of

violations based on the due process clause of the United States Constitution's 14th Amendment as well as equal protection language found under its own state constitution ("Rose v. Council for Better Education," 1989).

After four years of deliberation, The Kentucky Supreme Court dismissed claims of Federal violations. However, it did acknowledge the state "failed to establish an efficient system of common schools" and therefore needed to redesign and rebuild a new structure of common schools ("Rose v. Council for Better Education," 1989). The court asserted that education is a basic, fundamental right that should be available to all children within the state ("Rose v. Council for Better Education," 1989). The Rose decision brought about many reforms, one of which involved changing their education funding system which relied heavily on local property taxes. By 1990 a new funding system was implemented by the Kentucky legislature which provided significantly more resources to its public schools. The courts also provided guidance in developing a description of what constitutes an adequate education which included several learning goals (Minorini & Sugarman, 1999a; National Educatoin Access Network, 2008; "Rose v. Council for Better Education," 1989):

1. Sufficient oral and written communication skills to enable students to function in a complex and rapidly changing civilization;

2. Sufficient knowledge of economic, social, and political systems to enable the student to make informed choices;

3. Sufficient understanding of governmental processes to enable the student to understand the issues that affect his or her community, state, and nation;

4. Sufficient self-knowledge and knowledge of his or her mental and physical wellness;

5. Sufficient grounding in the arts to enable each student to appreciate his or her cultural and historical heritage;

6. Sufficient training or preparation for advanced training in either academic or vocational fields so as to enable each child to choose and pursue life work intelligently; and

7. Sufficient levels of academic or vocational skills to enable public school students to compete favorably with their counterparts in surrounding states, in academics or in the job market.

Although equity and adequacy claims often coexist in arguments presented by plaintiffs engaged in school finance litigation, researchers have identified Kentucky's 1989 Supreme Court verdict in *Rose v Council for Better Education* as the beginning of contemporary school finance litigation (Minorini & Sugarman, 1999a). The primary reason for this is the court's decision to define the concept of educational adequacy (Sims, 2011). These seven learning goals helped serve as a benchmark for other similar school finance litigation cases around the United States and established precedence that money does matter when providing children with an education (Minorini & Sugarman, 1999a; National Educatoin Access Network, 2008; Sims, 2011). With the success of the Rose case, many other states encountered school finance litigation. Between 1989 and 2002, there were numerous court decisions involving disputes over state school finance systems and how resources are distributed (Minorini & Sugarman, 1999a; Sims, 2011). Notably, nearly two thirds of all these cases happened during this 14 year period (Sims, 2011). The verdicts handed down in these cases were evenly distributed with 18 verdicts being decided in favor of the plaintiff and the other 18 in favor of the state (Sims, 2011).

An analysis initiated by David P. Sims was conducted to see if the lawsuits that occurred between 1989-2002 resulted in more resources provided to districts having student populations with higher needs (Sims, 2011). He identified higher need schools based on their populations qualifying for free and reduced lunch benefits, ethnicity and eligibility for special education services. Sims

made use of regression estimates as his primary method to investigate his question. His results verified what other previous research analyses indicated relative to the level of resources distributed between districts following the *Rose* decision. He confirmed that very little change in resource distribution occurred between schools as a result of court decisions handed down during this period. However, plaintiff victories in states involved in litigation during this period did result in more resources diverted to districts with higher need students. Sims also reported that most districts, even those considered highly affluent, showed some gains in additional monies as a result of these cases. He also concludes that spending on education is a relative measure of school resources and is not of primary importance when the goal is to provide an adequate education (Sims, 2011). Instead, he suggests resources be given to schools based on students' needs rather than providing equitable funding for everyone. Sims contends this goal should be one of the primary objectives for future contemporary adequacy litigation.

Adequacy advocates found additional support for their legal disputes through education policy legislation passed during this period, in particular, the No Child Left Behind Act (NCLB) of 2001 approved by Congress and President George W. Busch on January 8th, 2001 (Hanushek, 2007a; Rudalevige, 2007; E. Smith, 2005).

No Child Left Behind Act of 2001

The No Child Left Behind Act (NCLB), which obtained much of its content from the ESEA of 1965, tied Federal Title I categorical funding to student academic performance standards (Rudalevige, 2007; E. Smith, 2005). This marked a fundamental change in how Federal Title I resources were distributed as compared to previous reauthorizations of ESEA. It brought about standards based education reform linking the distribution of funding to testing and student

achievement (E. Smith, 2005). It did so by requiring states to develop assessment systems to evaluate the progress and performance of third through eighth grade students annually in both Reading and Mathematics and at least once for students in ninth through twelfth grade (E. Smith, 2005). To comply with this new law, 48 states established standardized testing instruments in both of these curricular areas and made it a part of their statewide school accountability programs (Phelps & Addonizio, 2006; E. Smith, 2005). Furthermore, NCLB had much more ambitious provisions that emphasized improving the academic achievement levels of minority and disadvantaged students as compared to other previously reauthorized versions of ESEA(E. Smith, 2005). Hence, closing the achievement gap between black and white students was a high priority. This was accomplished by requiring states to set a baseline threshold for measuring student growth on their standardized testing instruments. This threshold was then used as a basis to monitor student progress of meeting the goal of 100% academic proficiency by the year 2014 as outlined under the provisions of NCLB (Rudalevige, 2007; E. Smith, 2005). If public schools receiving Federal funds do not demonstrate improved academic proficiency annually towards this goal (Adequate Yearly Progress or AYP) on state standardized testing instruments, sanctions would be placed on them based on the guidelines prescribed under the new act (E. Smith, 2005). These sanctions would commence if a school or district failed to meet AYP two consecutive years and would progressively become harsher with each successive year of inadequate performance. Some of the sanctions that schools would have to endure include: withholding of funds, developing a school improvement plan, offer parents with children in the district transportation to another school, provide supplemental services to struggling students or school closure (E. Smith, 2005).

The concept of adequacy combined with accountability, as prescribed under NCLB, has helped plaintiffs present their arguments in school funding lawsuits (Hanushek, 2007a; Rudalevige,

2007). It has done so by helping them affirm their position of states failing to meet their constitutional obligations of providing a public education based on their individual education clauses (Hanushek, 2007a; Rudalevige, 2007; Sims, 2011).

Defining Adequate Funding

Although there is some consensus as to what an adequate education should include, there is no uniform standard by which to determine what the costs are to provide one (Sims, 2011). There has been a series of methods developed by researchers to estimate the costs associated with meeting various student needs to achieve prescribed levels of academic performance. However, these methods have produced a broad range of results making it difficult to ascertain what level of spending would feasibly produce an adequate education. This has especially been challenging for diverse student populations (Imazeki & Reschovsky, 2004; Sims, 2011). Generally, it has been stated by experts that adjustments made to resources can lead to academic gains (J. Augenblick et al., 2007; Greenwald, Hedges, & Laine, 1996a, 1996b; A. Odden et al., 2008; Rebell & Wardenski, 2004). However, it is uncertain which inputs under which circumstances can lead to improved student academic outcomes (Ferguson & Ladd, 1996; Hanushek, 1986, 1997; Ladd & Hansen, 1999a; Mosteller, 1995).

It has been difficult for researchers to pinpoint a causal relationship between school expenditures and student achievement (Greenwald et al., 1996b). Many of the investigations seeking to do so over the past 30 years have utilized the same research methods employed by the Coleman Report to measure the connections between school inputs and student outcomes (Greenwald et al., 1996b; Rucker, 2010). These early research studies made use of *production function* statistical models which measure associations between various educational inputs and student outputs. These

education production function studies have also produced mixed results concerning the relationship between school resources and student academic achievement (Greenwald et al., 1996b; Hanushek, 1981, 1986, 1997). Initial findings from the Coleman Report suggested that resources have a relatively small impact on student achievement (Coleman & et al., 1966). Many researchers reviewing the data collected from the Coleman Report revealed opposing findings while others supported its legitimacy. Eric Hanushek, who has conducted numerous production function studies over the past 15 years concludes, based on the data he has reviewed, there is no consistent evidence showing student achievement is linked to school resources (Hanushek, 1981, 1986, 1997). However, there has been some criticism over the methodology that Hanushek and other researchers have employed which has placed serious doubt on the validity of their findings (Greenwald et al., 1996a, 1996b; Hanushek, 1997; Hedges, 1994; Schrag, 2005). Many of the studies reporting no connection between school expenditures and student outcomes were conducted utilizing small sample sizes which significantly lowers the reliability of its results (Greenwald et al., 1996a, 1996b; Hedges, 1994). Additionally, Hanushek and other researchers have been accused of giving more weight to studies providing multiple estimates rather than larger studies with single pooled estimates (Greenwald et al., 1996a, 1996b; Hedges, 1994; Schrag, 2005). They did this by treating each reported subgroup result as its own individual and separate study (Greenwald et al., 1996a; Schrag, 2005).

Other analyses conducted by researchers using different statistical techniques yielded much different results showing resources do in fact correlate with student academic achievement (Greenwald et al., 1996a, 1996b; Schrag, 2005). A meta-analysis conducted by Greenwald, Hedges & Laine that was directed to reexamine a comprehensive body of production function studies revealed this to be the case. After careful examination of a broad range of inputs (e.g. teacher

quality, student to teacher ratios, teacher salary, per pupil expenditures, socioeconomic factors, class size, ethnicity, etc.), it was concluded that school resources are systematically related to student achievement (Greenwald et al., 1996b). Furthermore, it was deduced that moderate increases in spending on educational services may be associated with significant increases in student achievement (Greenwald et al., 1996b). In particular, Greenwald, Hedges and Laine report that an increase of approximately $500 in per pupil expenditures potentially could increase student achievement by 1/6 of one standard deviation (Greenwald et al., 1996b). Additionally, they suggest increases in teacher salaries as well as retaining experienced teachers could also boost student academic performance by 1/6 of one standard deviation correspondingly.

However, some research investigating the impact teacher salaries have on student achievement has shown very little influence (Lin, 2000; Miller, 2000; Talibah, 2001). The smallest plausible increase in student achievement was attributed to using additional revenue to reduce class sizes. However, Greenwald, Hedges and Laine contend their analysis did not accurately reflect true teacher/pupil ratios because much of the data they reviewed comparisons that included all teaching staff working within a school (social workers, psychologists, speech pathologists, special education, physical education, art, etc.). Regardless, their data provided evidence to support the idea that class size reductions do produce greater student academic gains, which is consistent with other studies (Bingham, 1993; Mosteller, 1995; Nye, 1992). These findings were contested by Hanushek, but were later acknowledged with him recognizing that money could indeed matter, albeit somehow (Hanushek, 1994b). But to what extent is still relatively unknown.

The level of financial responsibility for public education has significantly increased for a good number of states because of court mandated decisions as well as federal education initiatives (Hanushek, 2006a; Hanushek & Lindseth, 2009). As a result, state policymakers have reacted

accordingly by increasing education budgets. However, these increases have also garnered demands for more accountability from schools and control over educational offerings and services (e.g. increased achievement levels on standardized tests, all-day kindergarten, class size reductions, additional teacher training, etc.) (Hall, 2006; Timar & Roza, 2010). The rationale behind these expectations is to ensure that funds are spent more efficiently and wisely by school districts.

However, there is evidence documenting this initiative does not lead to improved student outcomes (Hanushek, 2006a). A study conducted by Joshua Hall verifies this fact in his analysis of Ohio public school districts (Hall, 2006). His investigation involved looking at the relationship of school district characteristics (e.g. community demographics, teacher certification, student to teacher ratios, size of school, teacher quality, per pupil expenditures, differences in total funding allotments, etc.) and student academic performance outcomes (e.g. graduation rates & 10th Grade math proficiency scores) of the 1999-2000 school year. His research revealed that the most important factors influencing a school district's graduation rate and test performance are the education level of adults living within the district, the percentage of students eligible for free and reduced lunch and a school district's attendance rate. Interestingly, all of these variables, with the exception of student attendance, do not rely on district resources or finances. Rather they are variables that cannot be controlled for by schools or state policymakers.

One variable that schools could potentially have some level of control over relates to student attendance. Based on Hall's results, the higher a school district's attendance rate, the more students graduate. Additionally, his results suggest if a district raised its attendance rate by only 1 percentage point, a district could potentially expect to see an increase in their graduation rate of almost 2.5 percentage points. However, the researcher also cautions on placing too much emphasis on any one result largely because there are "few one size fits all solutions" (Hall, 2006, pp. 184-185). He states

this because not all districts have the same problems or issues. Different districts have different problems that need to be addressed which is why Hall encourages a decentralized finance model where financing decisions should be made by those who know their students educational needs. He also suggests that policymakers have had very little control over these variables with a state centralized education system. This finding has been supported by other researchers (Hanushek, 2006a).

Although it has been difficult to assign a cost to provide an adequate education, there have been attempts to accomplish this task which have proven to be very controversial. Those attempts have been conducted through investigations conducted by the research community.

Costing Out Studies:

Over the past 10 years there has been a number of independent and publicly funded costing out analyses aimed at determining the costs needed for a child to obtain an adequate public education. Many of these studies came as a result of court litigation requiring state legislators to change their funding systems because they were found to be insufficient (Ochalek, 2008; Rebell, 2006). Several legislatures have relied on the results of these costing out studies to help them formulate their education funding systems to calculate appropriate budget levels to meet all student needs (Hanushek & Lindseth, 2009; Rebell, 2006). Courts have also utilized the results from costing out studies to determine the constitutionality of state funding systems based on individual state education clauses(Hanushek & Lindseth, 2009; Rebell, 2006).

These studies, however, have also come under scrutiny from others in the research community citing that they are not scientifically valid since they do not answer some of the basic scientific questions such as: What level of funding would be required to achieve a given level of

student performance (Hanushek, 2005, 2006b; Ochalek, 2008)? Researchers and scholars would admit it would be difficult to produce a precise or exact amount based on these economic analyses to answer this question (Duncombe & Yinger, 2011). However, critics have been unable to provide alternative models to accomplish this task either (Duncombe, 2006; Duncombe & Yinger, 2011; Rebell, 2006). Despite potential flaws with costing out studies, they provide a rational basis for their findings that is supported by research and empirical evidence (Duncombe & Yinger, 2011). Additionally, they also attempt to calculate the added expenses necessary to provide adequate funding amounts to students based on their backgrounds and educational needs. This process is very different from what has traditionally been done by policymakers in the past where political deal making and deliberation were key components in developing education budgets (Rebell, 2006, 2007).

As the science of costing out studies improves its methods and statistical accuracy, more precise estimates will be able to be calculated, which will provide legislators and the courts with more reliable guidance when developing future education budgets to meet student needs (Ochalek, 2008). Currently, there are 4 costing out methods used by researchers to determine adequate funding amounts. These include: Professional Judgment, Evidence-Based, Statistical Modeling or Econometric, and Empirical Observation or Successful Schools Methods (Addonizio, 2003a; Daniel, 2010; Minorini & Sugarman, 1999a; Ochalek, 2008; Odden, 2003; Rebell, 2006). Each one of these methods has positive and negative aspects to the process they employ in calculating the costs of providing an adequate education.

Professional Judgment Approach:

The Professional Judgment approach is one of the most widely used costing out study methodologies (Rebell, 2006). This method developed by James Guthrie and Richard Rothstein and has close ties to earlier research conducted by Jay Chambers through his Resource Cost model (Ochalek, 2008). States that have made use of this method to estimate the costs of providing an adequate education include Kansas, Maryland, Oregon and Wyoming (Odden, 2003). This approach relies primarily on the knowledge and experience of professional educators to identify programs, services as well as strategies aimed at improving student achievement (Addonizio, 2003a; Lefkowits, 2004; Odden, 2003; Rebell, 2006). Once this has been done, the costs to provide these services are estimated based on the ingredients needed to implement them (Odden, 2003). Additional expenditures are also calculated to provide appropriate academic support to students who have special learning problems or needs (e.g. low income, disabilities, language barriers, etc.). Once a comprehensive education model has been developed and estimated, economists and researchers ascertain the costs of the inputs required to achieve the desired outcomes by conducting a series of economic investigations to produce an accurate target cost (Augenblick Palaich and Associates Inc., 2003; Myers & Silverstein, 2002; Rebell, 2006).

The following sections present two research studies incorporating the Professional Judgment method. The objective of both is to identify an adequate funding level to support improved student performance.

Professional Judgment Example: *Kentucky*

As a result of the landmark school finance court decision, *Rose v. the Council for Better Education,* Kentucky developed a three-tiered finance system to financially support their K-12

public schools (Verstegen, 2004). This new funding system was established under the Kentucky Education Reform Act of 1990 (KERA) which has been referred to as one of the most comprehensive educational reforms ever adopted in the United States (Verstegen, 2004). This new funding system provided a minimum level of funding per pupil and issued additional funds to schools who have students with higher needs. In response to the *Rose* decision, numerous research designs have been undertaken aimed at identifying the cost of an adequate education in Kentucky. One of those was steered by Deborah Verstegen and her associates who utilized the Professional Judgment method to ascertain the funding levels needed for school districts in the state to meet the rigorous academic standards and objectives defined by the courts. The costs to achieve these academic performance standards were also calculated based on students meeting the 100% proficiency target on the State's CATS (Commonwealth Accountability Testing System) standardized test by the year 2014 as required under NCLB.

Verstegen made use of three Professional Judgment panels in this process with each one focusing on specific tasks. The first two panels utilized for the study were established at the building and district level. Members of the building level panel consisted of professional educators (e.g. veteran teachers, principals and curriculum specialists). They helped identify the programs and services needed to provide an adequate education for students at the elementary, middle and high school levels. These panelists were also directed to make their recommendations taking into account Kentucky's student demographics and differing building sizes (small, medium, and large). The second panel commenced at the district level which encompassed other highly qualified school and district educators and administrators. These members reviewed the recommendations made by the previous panel of educators and were asked to make adjustments and changes, if deemed necessary, in areas of programs and their costs. They were provided with actual district budgets to better

determine expenditures with the exception of transportation. This expense was specifically left out because the State initiated their own analysis to ascertain these costs. The final or expert panel convened and was asked to review the work done by the other previous two groups. These committee members were invited by the researcher and her associates to accomplish this task. They issued refinements and finalized estimated costs and figures to meet the State's objectives.

The results of the research indicated that the State of Kentucky would need to increase their current K-12 budget of $4.102 billion to $5.199 billion to accomplish its task of providing an adequate education to its children. The guaranteed per pupil base amount provided to schools under Kentucky's new three tiered funding formula was $3,066 in fiscal year 2001-02. That amount would more than double based on the research presented by Verstegen and her associates depending on the size of the district. Small districts would require $7,186 as compared to moderate to large districts who would require $6,788 and $6,551 respectively to accomplish their objectives. The primary reason why smaller districts would need these additional funds is despite having fewer students, costs to provide recommended programs and services would still require funding. Moderate to large districts can offset these costs much more readily because of the money they receive based on their higher student enrollment levels. The researcher also made accommodations for costs related to educating students with higher needs for support. These cost adjustments were added to the base per pupil amount provided under Kentucky's finance system. Students who were identified as being "at risk" or Limited English Proficient would receive $858 in small, $834 moderate, and $817 in large districts. Conversely, those categorized needing special education services would receive $1,449 in small, $1,550 in moderate and $1,679 in large districts.

Professional Judgment Example: *California*

Another example of a Professional Judgment costing out study was conducted by the American Institutes for Research (AIR). The purpose of this analysis was to assist California lawmakers in identifying the amount of resources needed to adequately educate students in the state to achieve at designated proficiency levels established by the California Department of Education (Chambers, Levin, & DeLancey, 2006). A team of researchers, Chambers, Levin and DeLancy, coordinated this analysis which made use of two independently selected panels comprised of highly qualified professional educators. Their responsibility was to devise an education plan that would promote improved student achievement. Additionally, the costs to implement these programs would be projected. The members of these panels met together over a three day period to deliberate and make their recommendations. They produced multiple plans which were guided based on specific criteria established by the research team. In particular, education programs were designed taking into account student demographics, school size, and instructional level (e.g. Elementary, Middle or High). Once these programs were devised by the panels they were then asked to specify the level of funding necessary to provide them. Members of the panels allocated additional resources to reduce class sizes, extend the length of the school day and year, and included specialized ancillary staff. Resources were also earmarked for early childhood intervention programs as well as teacher professional development and training.

The results of the study indicated that California would need to spend an additional $24 to $32 billion dollars, on top of the already $45 billion currently spent in 2004-05. This increase would necessitate allocating approximately 53 to 71 percent more funds to the State's K-12 annual public education budget. Researchers contend that students will be more likely to achieve at the education standards prescribed by the state in all major content areas as if these added funds were provided.

They also report that of the 984 public school districts in the state, only 15 to 28 were currently spending at a level high enough to achieve at these standards. On average, California spends $7,246 per pupil. Based on the results of this analysis, that amount would need to increase from $11,094 to $12,365 in order for the students in the state to perform at proficient levels.

The investigators acknowledge the wide range in recommended additional costs associated with the results of this study. Much of the discrepancy in costs has been attributed to the differences in recommended education programs selected by the two panels. Chambers, Levin and DeLancy also admit that "costing out educational adequacy is not an exact science" and that some of the added expenses in these types of studies rely on assumptions making them open to criticism such as those associated with building operations, maintenance, transportation, and utility costs (Chambers et al., 2006, p. x.). It is because of this that the examiners emphasize full transparency of this process in order to share the rationale behind the choices and decisions that were made. This would encourage further analysis and dialogue between constituents in coming to a consensus as to what is feasible.

Positive and negative aspects of the Professional Judgment Approach:

One of the positive aspects of this approach is it can be tailored to meet the needs of differing school sizes as well as varying student populations (Odden, 2003). Additionally, the education programs selected to be implemented to support student learning in this research method are made by highly qualified practitioners (Rebell, 2006). Of the four methods, the Professional Judgment methodology has proven to be the most effective in identifying the academic needs of students who are at risk for failing because of socioeconomic and family circumstances (Rebell, 2006). Additionally, costs associated with these programs have been justified and calculated because of the

recommendations of professional judgment panels that have firsthand knowledge of their academic

needs (Rebell, 2006).

Despite the positive aspects of the Professional Judgment method, there have been some

reported drawbacks utilizing this design. One of those drawbacks, which has also been cited as being

one of its strengths, stems from the level of influence coming from those professionals who help

design the program (Rebell, 2006). Because this design method relies so heavily on the knowledge

and input of the professionals who are selected, the credentials of those making recommendations

and proposals could be considered suspect depending on the panel members' qualifications (Rebell,

2006). Furthermore, there has been some evidence suggesting panel members have at times had

difficulty coming to a consensus when agreeing upon prescribed educational services and

programs(Addonizio, 2003b). Another potential downfall to this method is its expense. Analysts

employing this research model often do not limit costs (Hanushek, 2005, 2007b). Without placing

restraints on costs or focusing on realistic financial budgeting, results produced using the

Professional Judgment model are a less practical way to estimate true educational costs. The main

reason for this is because they invariably produce inflated estimates which are contrary to efficiently

utilizing resources (Hanushek, 2005). Finally, researchers employing the Professional Judgment

method suggest that student achievement will improve significantly if the programs and services

recommended are employed by schools. However, no evidence has been documented indicating the

resources spent on providing the recommended programs have lead or will lead to improved student

academic gains (Hanushek, 2005, 2007b; Odden, 2003).

Evidence Based Approach:

Another research approach aimed at identifying effective education programs and their costs is the Evidence Based costing out method. This research design was developed by University professors Allan Odden and Lawrence Picus and has been utilized by several states seeking to determine adequate funding levels to meet specified student academic performance outcomes(Ochalek, 2008). Some of the states that have utilized this approach include: Wisconsin, Kentucky, Arkansas, Wyoming and Arizona(Hanushek, 2007b). This method attempts to identify a set of ingredients that are necessary in delivering a quality school wide education at all grade levels (Odden, 2003). The selection of these ingredients (e.g. educational strategies and programs) is different from the procedure used in the Professional Judgment approach. Instead of relying on the presumptions and recommendations of professional educators, selections of education programs and teaching strategies are based on past and current research whose results support improved student achievement (Odden, 2003; Odden, Picus, & Fermanich, 2003a). Once ingredients or programs have been identified by the researcher (e.g. smaller student to teacher ratios, full-day kindergarten, summer school, teacher professional development and training, etc.), the costs to implement them are calculated (Odden, 2003; Odden et al., 2003a; Odden, Picus, & Fermanich, 2003b). When undertaking this task, investigators take into account the costs associated with student academic needs, staffing, materials, supplies, and equipment(A. R. Odden et al., 2008). Furthermore, facility maintenance and utility costs are also factored into the final approximation of total expenditures (Odden, 2003).

Two examples of the Evidence-Based approach, conducted by independent companies, are provided to illustrate how this method is utilized to assist in identifying the costs associated in providing an adequate education to students in the states of Wisconsin and California.

<u>Evidence Based Example</u>: *Wisconsin*

Allen Odden, Lawrence Picus, et al. conducted an Evidence Based costing out analysis for

the Wisconsin School Finance Adequacy Initiative.   This purpose of this task force, which was

comprised of lawmakers, educators and citizens, was to focus on how to best improve student

academic outcomes.   What prompted the study were recent results produced by students on the

National Assessment of Educational Progress (NAEP) which is a national test used to compare

students with one another in the United States as well as those from other countries.   Approximately

35 percent of Wisconsin students scored proficiently on this exam which raised serious concerns

over the lack of skills students have to compete in a global society.   As a result, the Wisconsin task

force issued an objective of doubling student academic outcomes on the NAEP (Odden et al., 2007).

To achieve this, strong instructional programs and strategies would need to be employed by all

Wisconsin's public schools and adequate resources would be necessary to implement them (Odden

et al., 2007). Several schools in the state were already performing at the desired level.   The

education programs and teaching methods of these schools were carefully analyzed by the

investigators and compared to those strategies and education programs supported by educational

research. Odden, Picus, et al. identified several practices that would be necessary to double student

outcomes.   Some of these included: analyzing test data to determine weaknesses and strengths, set

higher academic standards and goals, research evidence of effective teaching and curriculum, invest

heavily in teacher professional development, provide extra help for students beyond regular school

hours, establish lower class sizes in early primary grades, and adjusting the daily schedule to create

more instructional time. Once these were identified, the researchers determined the costs that would

be necessary to provide these programs and services.   This was done by establishing the inputs

necessary to carry out the desired programs.   Therefore, costs were established based on essential

components such as: school characteristics (e.g. level of school, school size, and student demographics), personnel (tutors, paraprofessionals, ancillary staff, teachers, principal, substitutes, and secretary), central office expenditures (staff, building operations and maintenance, transportation, food services), and equipment and supplies. Teacher and administrator salaries and benefits were also estimated in this process to assist in identifying an accurate cost.

The findings provided by the researchers to fund these programs to assist students in doubling their performance levels on the NAEP test totaled $9,820 per student. This amount included a base per pupil allocation of $8,520 with the additional $1,300 provided to at risk students and those who have special learning needs. These added coasts amount to $719 above the 2005-06 per pupil base amount which was $9,001. Under this proposal, the total increase in expenditures to the State of Wisconsin would equate to $786.1 million which is a 9.2 percent increase in the total revenue for K-12 public education in Wisconsin. The researchers disclose this increase is one of the lowest estimates that have been provided under an adequacy study.

Critics of this study have pointed out some of the potential problems with this model. One of those involves the objective of doubling student performance levels on the NAEP. This would prove to be a very ambitious outcome since the cut scores on the NAEP are very high. Very few countries in the world have had half of their student populations score proficiency on this assessment (Samberg, 2007). Hence, the costs this study reports to improve student performance would invariably be much higher than what was recommended. Another identified issue of the study involved the level of funding that investigators provided for middle and high school programs; in particular, the cost of providing non-core subject classes. The funds that were allocated to secondary education were estimated much lower than the costs needed to efficiently run a high school(Samberg, 2007).

<u>Evidence Based Example</u>: *California*

An independent Evidence Based adequacy research design was conducted by Ryan Douglas Smith entitled Making the Golden State Glitter Again: How the Evidence Based Adequacy Model Can Save Struggling Schools In Difficult Times (R. D. Smith, 2010). The purpose of this investigation was to identify how lower achieving high schools in the State of California are utilizing their resources to improve student academic outcomes. In particular, how they were coping with budget reductions made by the state. Additionally, the researcher intended to reveal if the services and programs provided by these struggling schools were being implemented based on proven education strategies and programs that have been validated through research. Smith made use of a mixed methods approach, utilizing both quantitative and qualitative data, to obtain his results. Information was collected from a sample of five public high schools located in Southern California identified as underperforming. The criteria established by Smith qualifying a school as underperforming, thus making them eligible to be potentially included in the study, was based on two standards. The first involved whether the high school received Federal Title I funding. The second involved if the high school failed to achieve Adequate Yearly Progress, as outlined under the Federal No Child Left Behind Act of 2001, for two consecutive years. Once the schools were identified for the research analysis, quantitative data was input showing how funds and staff were allocated at the building level. The information obtained for this portion of the analysis originated from data sets collected by the state and made available to the public. Additionally, qualitative data was obtained of how funds were assigned at the building level to reinforce academic programs and services provided by the schools. This was done with the assistance of other researchers who interviewed administrative members of the selected high schools asking them questions about the

academic programs and services they provide their students. This was done to allow the researcher to make comparisons between schools to help identify similarities and differences.

Smith made use of previous research to assist him in identifying 8 areas that have shown to improve student academic outcomes (Odden, Picus, Goetz, Mangan, & Fermanich, 2006). These areas include: Instructional leadership, curriculum improvements, professional development and teacher training, use of data to drive instruction, parent involvement, instructional time, interventions to assist struggling students, and teacher collaboration. It was concluded that none of the schools selected for the analysis were allocating sufficient resources to reinforce the recommended areas to improve student achievement. All the schools had fewer core and specialized instructors, larger class sizes, and little funds allotted for teacher training and professional development. It was also revealed that all of the buildings had insufficient staff levels to assist students struggling in core subjects. Specifically, this was true for students who are English Learners and those with disabilities. All of the schools included in the study had large Hispanic populations which would attest to this problem. Other areas that were of concern relate to the support programs provided to struggling students. None of the schools make use of certified tutors to assist students both during and after school hours. Additionally, remedial programs, such as after school tutoring and summer school, were not adequately staffed. Finally, the 8 areas that have demonstrated to improve student performance were minimally or ineffectively implemented. Part of the reason for this issue is because of reductions made to school resources which have resulted in teacher layoffs, increased class size as well as elimination of student support services.

Smith reported the reductions these schools have experienced have not had a negative impact on student performance measures. He states this because most schools have shown some growth in student achievement despite having fewer dollars to spend on programs and services. This likely

would be attributed to the level of efficiency these schools are allocating their resources, keeping only the most essential and crucial education services in place. The investigator concludes it is highly unlikely, under the current economic conditions, this trend will continue. He suggests this because schools in California will not be able to follow the recommendations of Evidence Based researchers until more funds can be allocated to schools. Unless this is done, districts will not be able to effectively implement the suggested evidence based programs and services to meet the mandated education standards set by the State of California. Additionally, more resources are needed for student intervention programs in California schools for at-risk students, especially in areas of math and reading.

Smith revealed a number of concerns that need to be addressed in California if students are to make academic gains. However, he failed to provide a cost or figure attached to these needs which makes his argument less valid in terms of assessing an adequate level of resources to implement the recommended Evidence Based programs. Additionally, students in all five of these schools have shown upward trends in academic outcomes on the state's standardized assessment which would tend to lead others to believe that what these schools are doing is working in favor of the learner despite having fewer resources.

Positive and negative aspects of the Evidence-Based Approach:

The Evidence-Based approach is appealing to many because if its overall simplicity in design, transparency and versatility in organizing the interaction of a broad range of educational inputs and outputs (Odden, 2003; Rebell, 2006). It also makes use of research that has shown evidence of improving student achievement, thus helping schools focus where to spend their resources efficiently (Odden, 2003). Investigators utilizing this approach also emphasize and

attempt to quantify the level of improved student achievement and its effect size, the measurement of change in standard deviations of achievement, based on the implementation of recommended programs and services that are supported by research (Hanushek, 2007b, 2007c). Finally, this approach also employs the use of comprehensive school reform methods emphasizing best practices as well as establishes a basis for accurate cost estimates from the building level up(Addonizio, 2003b; Odden, 2003). These aspects, along with its focus on obtaining results, help make the Evidence-Based approach one of the more appealing costing out methods used to estimate the resources needed to support improved student achievement.

Despite these positive aspects, one of the biggest disadvantages to this approach is the potential for researchers to base their selection of education programs on studies that are suspect (Hanushek, 2007a, 2007c). In particular, it has been reported that investigators utilizing this method have made program recommendations based on results coming from studies with very narrow sample sizes as well as from research conducted two or three decades ago (Hanushek, 2007c). Hence, the potential for lower than expected student gains is highly plausible (Hanushek, 2007b, 2007c). Another shortcoming of the Evidence-Based research is the potential for districts to spend resources inefficiently by using funds to implement education programs that may not produce the results investigators claim they will reach (Hanushek, 2007c). Based on these shortcomings, there is little reason to expect that student academic gains would correspondingly improve with the level of spending researchers have projected (Hanushek, 2007c).

Statistical Modeling Approach:

The Statistical Modeling method or Cost Function approach is the most analytical and complicated of the four models due to the vast number of variables or ingredients included in the

research design (Addonizio, 2003b; Odden, 2003). Its primary objective is to determine what different levels of achievement would cost a particular district based on set performance goals while taking into consideration differences in district and student characteristics (Ochalek, 2008; Odden, 2003; Rebell, 2006). Prior to beginning the analysis, the researcher utilizing this method identifies the level of (or improvement in) student performance they consider to be adequate or satisfactory (Addonizio, 2003b). Once this level (or improvement) is determined, the investigator uses multiple regression analysis to approximate the dollar cost of each of the ingredients potentially influencing the prescribed student performance goals (e.g. academic programs, special services, student characteristics, district characteristics, teacher experience, student/teacher ratios, family characteristics, etc. (Addonizio, 2003b; Ochalek, 2008; Odden, 2003). Two examples of this method are described below.

Statistical Modeling Example: *Kansas*

The Legislative Post Audit Committee of the State of Kansas, which is comprised of five senators and five state representatives, initiated a statistical costing out analysis to determine the estimated expenses of K-12 public education. This was accomplished with the help of the audit agency of the State of Kansas which is called the Legislative Division of Post Audit. The audit department conducted the research for this study using an output based approache to determine their estimates. In particular, they explored the base costs associated with providing students with a "regular education" (Kansas Legislative Division of Post Audit, 2006, p. 17). Costs were calculated based on various class size distribution models. The following averages were calculated in the study: 25 students per class, 18-23 students per class, 20 students per class. Considerations were also made to costs associated with educating students with special needs. Finally, costs to maintain

vocational training and district transportation were also factored in the study as well as variation in teacher salary based on geographic location.

The output methods used to estimate the base costs of providing a "regular education" revealed that more funding is necessary to provide essential programs and services to students under all 3 class size models. The current per pupil base funding level for fiscal years 2005-2007 was established at $4,257 by state legislators. In comparison, the results obtained from the statistical modeling method yielded slightly lower costs. The base per pupil cost under this model for FY 2005-2006 was $4,167. This estimate, which was identified as a cost level for a student to be able to obtain a "regular education", was based on the State Board of Education's student performance index on the State's standardized assessment. However, based on future projections, that amount would need to increase in the subsequent year to $4,659. The primary reason cited for this increase was because expected student academic performance outcomes would be raised. Hence the costs necessary to achieve this standard increased.

The study also revealed the expenses used in providing services to at-risk students would also need to increase in order to perform at the academic levels required by the State. In FY 2005-2007, Kansas allocated a 1.193 weight to help pay for the added costs needed to educate their students who qualify for free and reduced meal benefits. Furthermore, no additional monies were provided for at-risk students attending inner city school districts. Results from this analysis yielded a much higher weighted measure for both these student populations. Researchers recommended a 1.484 weight be assigned to students qualifying for free and reduced meal benefits and 1.726 measure for similar students attending urban school districts.

Special education costs were also revealed to be higher than what was currently budgeted. The state allocated $10,736 in 2005 and $12,185 in 2006 per FTE student. Based on the auditors'

results, these amounts would need to increase to $14,232 in 2005 and $15,159 in 2006. However, the additional resources provided by the state for vocational training, which are funds provided to schools in excess of the base per pupil amount, was recommended to be reduced by the investigators. The state provided $2,129 for each student receiving vocational training in both 2005 and 2006. This amount was suggested to be reduced to $1,375 in FY 2005 and $1,420 in FY 2006. Finally, it was disclosed that teacher salaries be adjusted to a range between -2% and +5%. This information obtained based on the comparable variables analyzed between districts in the state. Some of the variables that were controlled for in the analysis to determine this calculation included: district location, teacher experience and education level, cost of living, school working conditions, and district efficiency in spending. Higher salary increases were recommended to be given to staff employed in districts located in poor urban communities.

Based on the findings of this study using the statistical modeling method, the total costs for K-12 public education in the State of Kansas would need to increase between $316.2 to 399.3 million to meet the prescribed academic outcomes of its Board of Education. Additionally, as levels of academic performance expectations increase, the costs associated with meeting them was estimated to also increase. This is further reinforced by the studies final results citing a 0.83 percent increase in spending would garner a 1 percent increase in district student performance outcomes. The confidence level of this finding was established at 0.01.

Statistical Modeling Example: *California*

Another example of a costing out study utilizing the Statistical Modeling method was conducted by Jennifer Imazeki entitled Assessing the Costs of K-12 Education in California Public Schools: A Cost Function Approach (Imazeki, 2008). This study was one of several conducted for

the Getting Down to Facts California school finance project. The purpose of the analysis was to estimate the costs needed for district students to meet the State of California's assessment standards. Additionally, the researcher examined the cost differences of districts with diverse student characteristics (Imazeki, 2008). The dependent variable utilized in this analysis was per pupil expenditures in FY 2004-2005. The independent variables used for the study include: overall student achievement indexes for the State of California's student assessments, regional teacher salary indexes, district enrollment, percentage of students in poverty, percentage of non-English speaking students and percentage of student with special needs. The final independent variable utilized in this analysis involved the concept of efficiency. The researcher examined how to best quantify this variable. The Statistical Modeling method assumes that districts utilize their resources efficiently to maximize academic achievement (Imazeki, 2008). However, the investigator points out that many researchers make the mistake of evaluating a district's level of efficiency through a comparison of total district expenditures and student achievement. She reports this approach is less effective in measuring district efficiency because it is sensitive to district choices and preferences in curriculum and student academic goals (Imazeki, 2008). To offset this problem, the investigator makes use of the Herfindahl Index which assesses district efficiency levels based on the principle of competition between education markets. This method makes the assumption districts are more efficient in their spending of education resources if parents have a choice where they may send their child to school. Hence, the closer schools are in proximity to each other the more likely schools will spend their resources efficiently to attract more students.

The results of the study indicated most of the independent variables were shown to be statistically significant in their influence over total costs. It was revealed that education costs rise for districts who have higher student populations coming from impoverished families. This was also

found to be true for students who require special education services. Teacher salary indexes by region also supported higher yields in education resources. This was also the case for non-English speaking students. However, this result was not found to be statistically significant. Imazeki also reported larger districts require more resources than smaller districts because they were found to be less efficient in how they utilize their resources. Finally, based on the Herfindahl index further supporting evidence was made indicating schools spend their resources more efficiently in areas where parents have more choice in where to send their child to school as compared to districts located in less competitive education markets. Total per pupil cost estimates were made by Imazeki based on students meeting the performance target of 800 on the state's assessment. These estimates revealed a wide range in per pupil expenditures between districts in the state. This range fell between $5,832 to over $23,800 per student. Despite this range, approximately ninety percent of the 937 districts in the State of California fell between $6,678 and $11,011 per student. Based on this model, legislators would need to allocate over $45 billion for all districts to potentially bring students to the achievement level that has been identified by the researcher. The researcher also devised pupil weights to determine the additional costs needed to educate students coming from poor families as well as those needing special education services and support learning how to read and speak English. Imazeki identified impoverished student weights at 1.3, meaning the cost to educate these students would require 30% more resources than a regular student to educate to have the opportunity to meet the 800 proficiency target. Additionally, non-English speaking students would require between 1.08 and 1.24 additional resources depending on the degree of services required to assist them. Much larger student weights were allocated to students with severe learning disabilities, ranging between 1.13 and 6.68.

Positive and negative aspects of the Statistical Modeling method:

The benefit of this approach is that it directly attempts to quantify the relationship between costs and outcomes by considering a variety of influencing variables as well as current education expenditure levels (Hanushek, 2007a; Imazeki, 2008; Odden, 2003). This can be very helpful for policymakers and researchers interested in establishing a rational basis for estimating K-12 education budgets. Additionally, this cost analysis method also excels at identifying the differences in funding needed by districts' based on student characteristics (Imazeki & Reschovsky, 2004; Odden, 2003). However, unlike the Evidence-Based and Professional Judgment methods, it does not provide any insight or recommendations on how best to utilize these resources to service students (Imazeki, 2008). Another potential problem with this model is it assumes that future spending, student and district characteristics as well as academic outcomes will remain constant over time (Imazeki, 2008). This issue of consistency makes the long term viability of this type of analysis less promising. In order to circumvent this problem, new investigations would need to be conducted annually to determine costs. This method is also susceptible to the same pitfalls of any other research design in that it is highly sensitive to the reliability and quality of data available to the researcher. Hence, the more reliable and consistent the data, the less bias and potential for calculation errors will occur (Imazeki, 2008). Another issue that has been a consistent problem for researchers utilizing the Statistical Modeling approach involves the concept of efficiency in how a district makes use of its available resources. This research design inherently makes the presumption that inefficiency is a random occurrence across districts (Addonizio, 2003b; Duncombe & Yinger, 2011). A further drawback to this approach is its complexity in design and its inability to accurately ascertain which variables or combinations of variables produce a given outcome (Addonizio, 2003b; Imazeki & Reschovsky, 2005; Ochalek, 2008; Odden, 2003; Rebell, 2006). Plaintiffs, legislators

and school policymakers have been reluctant to utilize this approach in determining an adequate level of funding (Costrell, Hanushek, & Loeb, 2008). However, the Empirical Observation or Successful School District method has shown some promise when looking for a more practical analysis.

Successful Schools or Empirical Observation Method

Similar to the statistical modeling or cost function approach, this approach is designed to analyze the relationship between student academic achievement and the actual spending of school districts (Addonizio, 2003b; Daniel, 2010; Odden, 2003; Rebell, 2006). This is accomplished by identifying school districts within a particular state who are currently meeting or exceeding state academic performance standards (Addonizio, 2003b, 2004; Hanushek, 2007a; Lefkowits, 2004; Ochalek, 2008; Odden, 2003; Rebell, 2006). Once a pool of districts has been identified, spending on remedial categorical programs are removed from their total expenditures to help establish a base cost of educating the average child (Daniel, 2010; Hanushek, 2007a; Odden, 2003). When doing so, researchers typically exclude extremely high and low spending districts from the selection process (Daniel, 2010; Hanushek, 2007a; Odden, 2003). This helps to eliminate their potential to influence the results of an analysis. An average cost is then calculated from this pool of identified successful schools which is believed to be an adequate level of funding for other schools to produce similar academic achievement levels with their student populations (Hanushek, 2007a). Other costs associated with educating higher need students are estimated and added to the base cost to provide the necessary additional services and programs to accommodate these children (Addonizio, 2003b, 2004; Hanushek, 2007a; Ochalek, 2008; Odden, 2003).

The premise of this approach is that any efficient school district should be able to produce similar student performance outcomes to successful districts if equivalent levels of funding are provided (Addonizio, 2003b, 2004; Rebell, 2006). However, in order to accomplish this, an operational definition of satisfactory student performance must be established by the researcher (Addonizio, 2003b, 2004). Additional criteria are also taken into consideration as the researcher attempts to identify successful schools such as: pupil/teacher ratios, teacher experience, teacher salary, average school population, district size, etc. (J. Augenblick & Myers, 2001; Rebell, 2006).

The following sections describe two independently directed research analyses employing the Successful Schools method. The first explores the resources needed by urban schools in Michigan to provide an adequate education. The second explores the resources needed to provide all students in the state with an adequate education utilizing the results from the Michigan Merit High School Exam which is given to eleventh grade students annually as a requirement for graduation.

Successful Schools Example: *Michigan Urban Schools*

An investigation of the cost of providing an adequate education using the Successful Schools method was conducted by Addonizio (2003b). He applied this model to Michigan's schools by analyzing 30 of the state's neediest metropolitan districts. Districts targeted for the analysis had greater than 50% of their student populations qualifying for free and reduced meal benefits. They also accounted for approximately 30% of the state's total K-12 student enrollment (Addonizio, 2003b). The purpose of the analysis was to identify a cost that would support specific academic achievement standards (Addonizio, 2003b). These achievement levels were established based on the selection of an exemplary district. An exemplary district was selected based on comparisons made

from three criteria: district student achievement on the 1998-1999 MEAP, base district per pupil amounts, and percentage of at risk students.

Two districts were identified by the researcher to serve as exemplary districts which would be used to determine a base cost to provide an adequate education. The two districts selected were Kalamazoo and Ypsilanti public schools. They were selected because of their better than predicted performance on the MEAP in comparison to their high levels of disadvantaged students. Additionally, their levels of resources utilized to accomplish this task were moderately lower than many of the other districts. This observation characterized both of them to be efficiently using their resources. Kalamazoo was the more efficient district in terms of dollars spent to produce their students' academic outcomes by utilizing $7,948 per pupil. Ypsilanti was higher spending $8,822 per student. Recognizing the need to provide more funds to schools who have higher at-risk populations, Addonizio also developed a formula to raise all districts to the achievement levels of the selected exemplary districts. These added funds would be provided to schools above and beyond their base per pupil amount. The final estimate produced from the analysis revealed roughly $414,294,646 of additional revenue would need to be earmarked by the state to raise student achievement levels to those attained by students attending Kalamazoo Public Schools. This amount was nearly three times higher if Ypsilanti were selected as the baseline exemplary district, requiring the state to allocate $1,273, 879, 983 more revenue to produce similar results. Kalamazoo proved to be the more efficient of the two identified exemplary districts, spending less resources to achieve their student outcomes.

Addonizio demonstrated that the selection of a benchmark district is crucial in estimating adequate funding levels. That is, the more efficient the exemplary district, the lower the level of

funding the state must allocate for K-12 public education in order to provide an adequate education to its students (Addonizio, 2003a; Daniel, 2010; Ochalek, 2008).

<u>Successful Schools Example</u>: *Michigan High Schools*

Ochalek (2008) makes use of the Successful Schools research method to estimate the cost to adequately fund education for all students attending Michigan's public schools. Her study compared results of 515 K-12 districts in the State excluding public school academies, non K-12 districts and districts with less than 100 students. The researcher made use of a number of variables to assist in identifying potential exemplary schools. The dependent variable for her study was 11th grade MEAP English and Math results. The independent variables utilized by the investigator were: district operating expenditures per pupil, district size, district geographic location, class size, highly qualified teachers, economically disadvantaged student population, special education student population, English language learner population, percentage of white students in district, percentage of African-American students in district, and percentage of Hispanic students in district. Ochalek made use of the successful/exemplary schools definition developed by Augenblick as well as Addonizio's previous research to assist in identifying potential exemplary districts who would serve as a baseline for funding in Michigan (Addonizio, 2003b; Augenblick & Myers, 1997). This definition takes into consideration a district's relative academic performance while also considering the above stated dependent variables along with the efficiency of how they utilize their financial resources to produce their academic results. In addition to selecting an exemplary district, the researcher made use Addonizio's adequacy grant formula which takes into account the cost of educating students with higher academic needs (Addonizio, 2003b). These additional funds were

provided to districts if they provide services to a higher ratio of disadvantaged children than the selected exemplary district.

Ochalek's findings revealed that ten of the selected independent variables were found to be significant in helping to identify an exemplary district. These included: percent of students who are economically disadvantaged, special education students in district, percentage of African-American students in district, class size, highly qualified teachers, district operating expenditures per pupil, and district geographic location. The largest contributing dependent variable was economically disadvantaged. A negative relationship was identified, meaning achievement decreased as each variable increased, with the following independent variables: percent of students who are economically disadvantaged, percentage of African-American students in district, special education students in district and class size. In contrast, a positive relationship was identified between achievement and the following independent variables: current operating expenditures per student, number of highly qualified teachers. Geographic location of a district also had a positive relationship with test scores. Specifically the further away a district was from large cities, the higher was student performance.

Ochalek found that the range in estimated costs to provide an adequate education in Michigan was very broad depending on the exemplary district selected. She identified 9 potential exemplary districts which brought the range in additional revenue from as little as $25.7 million dollars to in excess of $8 billion. This wide range is not surprising because it is highly dependent upon the selection of the exemplary which is determined based on the criteria established by the researcher. Hence, if a researcher selects a district with higher per pupil expenditures for a given level of student achievement than another identified exemplary district (i.e., a relatively inefficient district), the higher the estimated costs will be for the state. Efficiency generally is defined as

finding the least expensive way to achieve a desired outcome (Hanushek, 2007a). This is primarily why the researcher must be sensitive to the level of efficiency with which an exemplary district utilizes their resources.

<u>Positive and negative aspects of Successful Schools Method:</u>

The strength of the Successful School district approach is its ability to validate a quantifiable base cost to produce desired student outcomes based on past student performance (Rebell, 2006). Additionally, the results and findings of these studies are also appealing to policymakers and the public because expenses and student performance are directly linked (Rebell, 2006). This research method also focuses its attention on the characteristics of districts that have proven to successfully educate their students to meet set state performance expectations (J. Augenblick et al., 2007). It also provides a measurable connection between education costs and academic outcomes (Rebell, 2006). However, the drawback of this model is its failure to control for variation in student characteristics and backgrounds resulting in studies that are prone to skewed results (Addonizio, 2003a, 2003b; J. Augenblick & Myers, 2001; Odden, 2003). Similar to Statistical Modeling, results of this method are also highly dependent upon the quality of data available to the researcher (Rebell, 2006). This method is also highly sensitive to the way in which the researcher defines student and district success (Hanushek, 2005; Odden, 2003). Case in point, some schools that perform comparatively well utilizing fewer resources to educate their children can be overlooked by the investigator. Finally, there is no substantiated evidence indicating schools receiving resources in line with the identified successful schools would be able to produce similar student performance levels (Hanushek, 2005).

Another issue that has been seen as problematic with this research method is the sensitivity involved in the selection of a model or exemplary district to establish a base cost (Addonizio, 2003b, 2004; Hanushek, 2007a; Ochalek, 2008; Odden, 2003). This is the case because the selection of a model district invariably impacts the total level of expenditures needed by a state to subsidize their K-12 public education system (Addonizio, 2003b, 2004; Ochalek, 2008; Odden, 2003). Hence, if a less efficient district is selected (one who utilizes more resources to obtain their results) the costs will be much higher to a state as compared to a district who obtains their results utilizing fewer funds. Another potential drawback with this research method is districts would receive the same base per pupil level of funding under this model as the identified exemplary benchmark district. The problem with this funding approach is those districts currently receiving higher per pupil expenditures could be reduced to that of the selected exemplary district (Addonizio, 2003a).

The Successful Schools method has also been criticized for not effectively delineating the added costs needed to educate both ELL students as well as those with special needs (Addonizio, 2003a, 2003b; Hanushek, 2005, 2007a; "N.J. Const.," 1947). It fails to meet this objective largely because schools that have been identified as successful at educating their students to prescribed achievement standards are typically wealthy and have very low at risk student populations (Rebell, 2006). To address this problem, researchers utilizing this method often omit the costs associated with educating these high need students from their analysis to help establish a base cost. Once this is established, the researcher later formulates an added cost or weight to address the additional resources needed to educate these types of students (Rebell, 2006). Finally, this research design implicitly tries to forecast future student achievement levels from what is known about the present (Hanushek, 2007a). As a result, this method has difficulty predicting the potential for students to achieve at higher academic standards (Hanushek, 2007a). Hence, there is little evidence

demonstrating how their costs will rise in order to improve student academic achievement levels. Rather, districts can only attempt to replicate the achievement levels of the selected exemplary or benchmark district.

Literature Review Summary:

There has been a great deal of contention and debate over the level of resources needed to provide children in the United States with an education. This responsibility has primarily been the states' to address. However, because of social and political pressure surrounding the inequalities that schools with large populations of minorities were operating under, the federal government has increased its role to help address these differences. Their intervention began as a result of the decision rendered in the 1954 landmark Federal court case *Brown v. Board of Education Topeka.* This case helped to begin the long process of seeking methods to ensure equal educational opportunity. It also inspired future litigation seeking to equalize funding disparities between wealthy and poor schools. Furthermore, it prompted the United States government to increase its role in providing additional resources to schools. One of the first initiatives implemented by the federal government to accomplish this task was the passage of the Elementary and Secondary Education Act of 1965. This legislation helped to provide additional funds to schools for students who come from low income families as well as those who have disabilities. It also marked the beginning of holding schools accountable for the additional resources they have been provided by requiring them to disclose how they have been utilized.

Another outcome that occurred as a result of the *Brown* decision was an increased interest in understanding the reasons why differences in educational opportunity exist. One of the most influential of these research investigations was the 1966 Coleman Report. One of the many findings

of this report revealed that the level of resources utilized in providing an education for a child has much less influence over their academic achievement than does their socioeconomic status. This conclusion became one of the central arguments employed by researchers suggesting that money did not matter in education. Despite this declaration, equity in funding became a central issue for litigation which would help prove otherwise.

Early court cases involving concerns over the distribution of educational resources during the 1960's and 1970's were brought to trial in both federal and state courts. The arguments presented in these cases cited inequities in student educational opportunities because of the way states funded their schools. During this period the vast majority of resources raised for public education were obtained from local property taxes. This type of funding system became increasingly unpopular as schools located in property poor areas had fewer resources available to provide educational services and programs as compared to more affluent neighborhoods. This inequity prompted plaintiffs living in property poor areas to bring their arguments to court. However, the vast majority of these cases were unsuccessful in proving their state's funding systems to be unconstitutional ("Burruss v. Wilkerson ", 1969; "McInnis v. Shapiro," 1968). This was largely because there was no standard by which the courts could measure a state's ability in meeting the academic needs of students based on the funds used to provide them. Despite these setbacks, other strategies were being devised by litigants during this period seeking to address inequity in school funding. However, these strategies would not be tested again under federal law because of the decision handed down in 1973 by the United States Supreme Court in *Rodriguez v. San Antonio Independent School District*. This majority decision proclaimed education was not a fundamental right protected under the United States Constitution. This abruptly ended the federal courts' role in future school finance litigation.

However, new strategies were employed by plaintiffs seeking to equalize funding disparities between poor and wealthy districts were brought to trial in state courts.

The landmark State of California school finance court case *Serrano v. Priest* was the first to successfully argue their position in state court. Unlike previous cases, the legal team representing the plaintiffs in *Serrano* avoided focusing their arguments on linking educational resources to student need. Rather they attempted to confirm that education was a fundamental right protected under the state's constitution. They accomplished this by providing the court with a manageable standard it could use to measure equity in funding between districts. The premise behind this standard, which became known as the "fiscal neutrality principal", maintained the quality of a child's education should not be based on where they live and go to school, but rather on the wealth of the state as a whole (Addonizio, 2003b; Coons et al., 1970; Minorini & Sugarman, 1999b). The California Supreme Court rendered its verdict on behalf of the plaintiffs in *Serrano* citing education was a fundamental right based on the equal protection language found under its constitution. The success of this case led to a litany of other state school finance litigation seeking to equalize the distribution of educational resources between poor and wealthy districts. Many of these cases occurring between 1973-1983 were successful in utilizing the wealth discrimination strategies established by the Coons team in *Serrano* (Minorini & Sugarman, 1999a). However, court proceedings involving equity in funding began to slow down as no significant litigation took place until 1989. By this time new strategies were being employed by legal teams interested in shifting emphasis from issues of equity to issues surrounding the concept of educational adequacy. The verdict handed down in Kentucky's *Rose v. Council for Better Education*, which resulted in the complete overhaul of the State of Kentucky's public education system, marked the starting point in what many to believe to be the "adequacy movement" (Minorini & Sugarman, 1999a, p. 175).

The legal arguments presented in the *Rose* case and those that followed during the third wave of school finance litigation (1989-present) centered their arguments on issues of adequacy. In particular, they attempted to get states to provide children with a high minimum quality education (Minorini & Sugarman, 1999a). However, in order to provide this, it would be necessary for funding systems to consider educational differences in students and their costs (Minorini & Sugarman, 1999a). This emphasis is a recognizable change from theories surrounding previous equity cases which were primarily interested in equalizing educational resources (Minorini & Sugarman, 1999a). Additionally, adequacy cases focused much of their attention on the outcomes that are a result of a child's educational experiences as well as the costs necessary in providing them (Minorini & Sugarman, 1999a).

During the post *Rose* era, litigation involving claims of educational inadequacy spread rapidly and occurred in 45 of 50 states (Hanushek, 2009; Minorini & Sugarman, 1999a). Of these cases, plaintiffs triumphed in two-thirds of them (Hanushek, 2009). The success of plaintiffs coincided with the standards-based education reform movement emphasizing student academic outcomes, a movement that immediately followed the 1989 National Education Summit and states' adoption of education achievement goals (Rebell, 2008).

In recent years, additional government policies aimed at improving student achievement have been initiated. One of the most far reaching of these to have a dramatic impact on public education is the Federal No Child Left Behind Act of 2001. This act, whose purpose is to hold schools accountable for student performance, tied Federal Title I monies, funds used to provide additional support for at risk learners, to academic achievement. The provisions of this act require states to test all third through eighth grade students in both math and reading annually as well as ninth through eleventh graders once. Additionally, it requires schools work toward reaching 100%

proficiency in both the aforementioned curricular areas by the year 2014. It is primarily because of these federal mandates that it is imperative to identify an adequate level of funding necessary to accomplish this goal. Although there has been some effort by legislators to close the funding equity gap in recent years, the difference in available resources between wealthy and poor districts remains substantial. To address this issue, methods have been devised by researchers to estimate the costs of providing an adequate education. These methods include: Professional Judgment, Evidence-Based, Statistical Modeling or Cost Function, and Empirical Observation or Successful Schools Methods. Each of these methods has their own unique way of calculating the costs of providing an adequate education to meet or address specified academic outcomes.

The challenge today for state and federal legislators is to develop fiscally adequate education funding systems which reinforce student achievement expectations. Strong arguments have been made in both support and opposition to the methods employed by investigators to calculate adequate education costs. Those in support agree that more refinement of these research techniques must be made in order to improve their accuracy and validity in the estimates they provide. However, despite the shortfalls of these studies, they do provide a rational basis for the costs they report which are both practical and transparent. This is in sharp contrast to the opaque political process that has been utilized by both federal and state legislators. Additionally, as methods are refined and improved, they will provide more accurate data for policymakers to assist them in making better and more informed decisions. This process can only help lead policymakers to build a more modern education funding system which supports expected student achievement levels.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter outlines the methodology that will be employed for this study including the research design, sample, data collection procedures and data analysis techniques.

The Successful Schools method will be utilized in this study to estimate the cost of an adequate education for students attending Michigan's public schools and public school academies. This non-experimental research design will be employed because it provides impartiality in how findings are obtained since variables cannot be influenced to skew results. Another reason why this methodology will be employed is because it has been utilized in numerous other costing out studies which have provided plausible evidence to state policymakers of the costs needed to provide adequate public education services and programs (J. Augenblick et al., 2007; Ochalek, 2008). Although this research design has been criticized for its limitation on predicting the costs of future student achievement, it is still the most promising and practical of the four methods developed by researchers seeking to meet desired levels of student proficiency. It accomplishes this by analyzing current levels of student performance based on the resources used to obtain them. This data will help serve to provide valuable insight into the level of funding needed by schools to achieve at expected student performance standards.

This production function research design will look at various relationships from the composite score of two outcome variables, percentage of district students scoring proficient on the State of Michigan Fifth Grade Math and Reading portions of the MEAP, and a set of selected independent variables which include: district per pupil foundation allowance, total district operating expenditures, total district student enrollment, district geographic location, district average class size, district

average teacher years of service, student socioeconomic status, student ethnicity, student population qualifying for special education services and English as a secondary language learners. The unit of measurement for both the dependent and independent variables will be the district level. Multivariate regression analysis will be used to estimate the relationships between the dependent and independent variables to answer the research questions of this study. This research method is used by investigators seeking clarification and answers to complex problems involving a variety of independent variables which potentially have an influence on an given outcome (Hair, Black, Babin, & Anderson, 2009). It is understood there are a large number of additional variables which have an impact on student academic performance. Because of the vastness of these independent variables, those selected for this study will be incorporated based on those selected by researchers who have conducted similar production function studies in the past (Addonizio, 2003b; J. Augenblick et al., 2007; Greenwald et al., 1996b; Imazeki, 2008; Ochalek, 2008; Wise, 1968). Additionally, it is the intention of the researcher to utilize the above mentioned independent variables because their values are known and can be quantified unlike other unobserved variables such as curriculum, scheduling, teacher professional development and training, selected teaching strategies and classroom management techniques which are more difficult to calculate, measure and assign a value to (Hair et al., 2009). The estimated regression equation will be used to identify potential model districts that will serve as a baseline for establishing cost estimation for this analysis. This method is outlined in more detail later in this chapter

It is understood the level of reliability of the results obtained in any research design is highly dependent upon the reliability of the data sources used to produce them. The data sources incorporated in this study will be obtained from those collected and archived by the State of Michigan.

Finally, because it has been well documented that additional funds are essential to provide supplemental services and programs to assist students having special learning problems, language barriers and socioeconomic limitations, adequacy grants will be calculated to meet the additional financial resource needs of these students (Ochalek, 2008; Addonizio, 2003(Coleman & et al., 1966; Coons et al., 1970; Wise, 1968; Wise & Gendler, 1989).. Adequacy grants will be calculated for all public schools and public school academies included in this study. This process and the formula used to calculate these grant amounts are presented in more detail later in this chapter.

Sample

In order to calculate the cost of an adequate education in Michigan, districts proven successful in educating their students will need to be identified in order to determine an adequate funding level for the State. For the purposes of this study, all districts and public school academies will be included in this analysis. Because this research design is focused on obtaining more insight on the costs needed to provide an adequate education for Michigan's public schools and public school academies, information involving both parochial and private education systems will be excluded from consideration.

There are approximately 1.6 million students attending over 867 public school districts and academies in the State of Michigan (Michigan School Data, 2012). Of these public school districts and academies, approximately 400 receive the minimum state per pupil foundation allowance of $6,966, with the remaining receiving higher levels of revenue (Wicksall & Wolf, 2012). Furthermore, 72% of the state's total student population attend schools who receive the foundation minimum (Wicksall & Wolf, 2012). The list of public school districts and public school academies included in this study will be obtained from the Michigan Department of Education.

Methodology

An academic standard will need to be identified in order to delineate the costs required to provide an adequate education. This process is a critical aspect of this analysis as it will dramatically affect the final recommendation of expenditures needed to meet the adequacy goal (Rebell, 2006). Additionally, this will also provide a working definition of what is considered an adequate education because it provides a standard to work towards. Districts identified as being exemplary, those efficiently educating their students to exceed predicted student performance levels, will be selected based on the percentage of students who have attained proficiency on the 5th Grade Math and Reading portions of the MEAP. The criteria used to measure this standard will be based on 2012 State of Michigan MEAP proficiency cut scores which are established by the by State Board of Education.

School districts considered exemplary for this analysis will be determined based on the regression model's residual results controlling for independent variables noted in equation 3.1 below. Public school districts and academies showing positive residuals of two or more standard deviations above their predicted levels of student achievement on the fifth grade math and reading sections of the MEAP will be considered exemplary.

The following regression equation will be utilized to predict district student achievement levels:

(3.1)

$$Y = a + b_1 COE + b_2 DSIZE + b_3 GEOLOC + b_4 CLSZ + b_5 HIQUAL + b_6 ECDIS + b_7 ELL +$$

$$b_8 SPED + b_9 WHITE + b_{10} AFRAM + b_{11} HISP + b_{12} TDOE + E$$

Where:

a = Constant

E = Error Term

Y = District Achievement: Total percentage of district students scoring proficient on State of

Michigan Fifth Grade Math and Reading MEAP test.

COE = Current district operating expenditures per pupil: This measure will exclude capital

expenditures.

DSIZE = District Size: This variable will include the average full time equivalent, FTE, students

attending a given public school district or academy.

GEOLOC = Geographic Location: Because it is necessary to assign a value to all independent

variables in a regression equation, a set of dummy variables will be used to designate the

geographic location of each district included in this study. The researcher will divide the

state into 5 areas to delineate where districts will reside in proximity to one another for

comparison. The omitted variable will be Southeast Lower Peninsula. The following

numerical assignments will be given: 0 = Southeast Lower Peninsula, 1 = Southwest Lower

Peninsula, 2 = Northeast Lower Peninsula, 3 = Northwest Lower Peninsula, and 4 = Upper

Peninsula.

CLSZ = Class Size: This variable will be determined based on the total number of classroom teachers employed by a district divided by a districts' or academies' FTE student enrollment.

$$\text{Class Size} = \frac{\text{Total Enrollment (FTE)}}{\text{Total number of classroom teachers}}$$

HIQUAL = Highly Qualified Teachers. This variable will include the total percentage of teachers who are categorized as highly qualified by the state of Michigan based on requirements under the No Child Left Behind Act of 2001 (i.e. teacher certification and bachelor's degree).

ECDIS = Economically Disadvantaged. This variable represents students coming from low socioeconomic backgrounds which is a proven predictor of student success in school. It will be calculated based on the percent of a district's students who qualify for the Federal free and reduced meal benefits. This variable will serve as a measure for students who are academically at risk to fail due to low socioeconomic status (SES).

SPED = Special Education: This variable includes the percentage of district students who receive educational support services and programs through Federal Title 1 Categorical Grant funding.

ELL = English Language Learners: This variable will include the percentage of students who are not proficient in English based on State of Michigan criteria.

WHITE = Percentage of Caucasian students within a district or academy.

AFRAM = Percentage of African-American students within a district or academy.

HISP = Percentage of Hispanic students within a district or academy.

TDOE =Total district operating expenditures. This variable will include all operating resources available to districts coming from all sources of revenue.

The regression model will be estimated by the method of weighted least squares, with each case (district) weighted by the square root of its total enrollment. This statistical technique is an appropriate step to take when making estimation if one suspects the variance of the error term will not be the same for every observation (heteroskedasticity). The most common illustration of heteroskedasticity is when pooled data is used, such as district level statistics. Because this analysis employs this type of data, where the dependent variable is a mean value for the subjects in the observational unit, observations made from larger units (e.g., districts) will presumably be more accurate. Hence, the observations made from larger units or districts should theoretically be more accurate than data drawn from smaller districts. This will invariably lead to different error term values for each observation. For further discussion of heteroskedasticity see Eric Hanushek and John Jackson, Statistical Methods for Social Scientists, (San Diego, CA: Academic Press, 1977), 142-153.

Once the regression model has been estimated, two districts will be selected as model exemplary districts. These districts will serve as a baseline for the costs needed to fund Michigan's schools adequately resulting in each district receiving the same per pupil funding as the selected model exemplary districts. This will provide a feasible base cost needed by the State to plan and budget for K-12 public education. However, it will be necessary to also calculate the additional costs needed to provide supplemental educational support for students coming from challenging socioeconomic circumstances, which has been shown to be strongly associated with poor academic success. The intent behind this process is to provide districts with the resources necessary to enable their student populations to achieve at similar standards to those identified model exemplary districts (Addonizio, 2003b). This will be accomplished through the use of an adequacy grant formula which has been developed and utilized in previous research (Addonizio, 2003b; Ochalek, 2008).

For the purposes of this analysis, each school district will have their own proposed adequacy grant applied to them. This will be multiplied by the ratio of the district's proportion of economically disadvantaged children to the ratio of the selected exemplary district and the district's cost index. The difference between the adjusted revenue and total revenue of a non-exemplary district will be the maximum number of adequacy grant dollars a district could receive. Districts with a positive dollar grant would receive per pupil revenue equal to that of the exemplary district. They will also receive additional funds based on the districts adjusted ratio of economically disadvantaged students and the cost of local educational resources (Addonizio, 2003b; Ochalek, 2008). Districts that are reported as having a negative dollar grant total will be awarded a grant of zero.

Below is the formula that will be utilized in calculating each district's adequacy grant:

$$G_{ij} = \text{Max} \ [(AR_{ij} - TR_i, \text{Ø}]$$

Where:

G_{ij} = per pupil grant to district $_i$ based on exemplary district j

AR_{ij} = estimated target, or adjusted revenue per pupil in district i based on exemplary

district j = $TR_j * (\underline{F}_i/F_j) * (C_i)$

TR_i = total revenue per pupil in district $_i$

TR_j = total revenue per pupil in district $_j$

F_i = percent of students in district $_i$ eligible for free/reduced lunch

F_j = percent of students in exemplary district $_j$ eligible for free/ reduced lunch

C_i = cost index for district $_i$

Because it is recognized there are differences in educational costs across the state, a cost index for each school district (C_i) will be determined based on inter-district salary differences between teachers with similar credentials and qualities following the method utilized in Addonizio's urban schools adequacy research (Addonizio, 2003b). A regression formula will be used to estimate these differences between actual and predicted teacher compensation. The following formula will be used in calculating the average predicted instructional salaries of each district.

$$AVESAL = b_0 + b_1 AVEEXP + b_2 AVE EXP^2$$

Where:

AVESAL = Average instructional salary in a district.

AVEEXP = Average years of teacher experience

C_i = $\dfrac{\text{Actual average salary district}_i}{\text{Predicted average salary of district}_i}$

Data Collection Procedures

All school district data will come from administrative data files which are readily available online from the Michigan Department of Education and from the Center for Educational Performance and Information (CEPI). The data sets created by the Michigan Department of Education and CEPI are available to the public. They represent the most current public school data that is available regarding Michigan's public schools and their academic levels of achievement. All the information collected for this study will be entered manually into a data file for further analysis and testing using SPSS for Windows v. 11.5. The dependent variables for this study will be district Fifth Grade Math and Reading MEAP scores. Furthermore, the independent variables used for this study will include: district per pupil foundation allowance, total district per pupil operating

expenditures, total district student enrollment, district geographic location (set of dummy variables), district average class size, district average teacher years of service, student socioeconomic status (percentage of students who qualify for free and reduced meal benefits), student ethnicity, percentage of student population qualifying for special education services, and percentage of English as a secondary language learners. All statistically significant findings will be based on an alpha level of .05 which reveals a 95 percent chance of certainty that a given result is not due to chance.

STATISTICAL MATRIX

Research Question(s)	Variables	Data Collection Instrument	Data Analysis Technique
1. What variables (geographic location, student characteristics, and district characteristics) best predict district academic proficiency on the MEAP?	**Dependent Variable**: Fall 2013 MEAP (5th Grade Math & Reading Composite Score) **Independent Variables:** district per pupil foundation allowance, total district per pupil operating expenditures, total district student enrollment, district geographic location (set of dummy variables), district average class size, district average teacher years of service, student socioeconomic status (percentage of students who qualify for free and reduced meal benefits), student ethnicity, percentage of student population qualifying for special education services, and percentage of English as a secondary language learners	Figures utilized for this question will be obtained from pre-existing data sets available from the Michigan Department of Education.	A Multivariate Regression Analysis will be used to determine which independent variables best predict district academic proficiency on the 5th Grade MEAP (Math & Reading). Dummy coding will be applied to selected independent variables, as noted above.
2. Who are Michigan's		The data collection instrument used for	Analysis of residuals from the

exemplary districts?		this question will be the same instrument used to answer question 1.	Multivariate Regression model described above will be used to report findings relating to this question.
3. What are "adequate" per pupil funding levels for school districts, conditional on educational costs and needs?		The data collection instrument used for this question will be the same instrument used to answer question 1	A sensitivity analysis will be done to determine how the State's costs will vary based on student academic needs.

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APPENDECIES

Table I. *Inflation Effects on State of Michigan's Minimum Per Pupil Foundation Allowance*

Fiscal Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Minimum PPFA	6626	6626	6700	6875	7108	7204	7316	7162	7146	6846
Difference from previous year	-	-	(+74)	(+175)	(+233)	(+96)	(+112)	(-154)	(-16)	(-300)
U.S. Average Annual Rate of Inflation	2.3	2.7	3.4	3.2	2.8	3.8	-0.4	1.6	3.43	2.7 Jan.-Apr.
Minimum PPFA adjusted for inflation	6474	6491	6472	6655	6909	6930	7609	7047	6900	6661
Adjusted Minimum PPFA Difference accounting for Inflation	(152)	(179)	(228)	(220)	(199)	(274)	+293	(115)	(246)	(185)
Total Net Loss or Gain in annual revenue per pupil	(152)	(179)	(153)	(45)	34	(178)	405	(269)	(262)	(485)

*Michigan minimum Per Pupil Foundation Allowance (PPFA) information obtained from Michigan Senate Fiscal Agency website: accessed 5-23-12, http://www.senate.michigan.gov/sfa/Departments/DataCharts/DCk12_BasicFoundationHistory.pdf

Table II. *Michigan Annual Fall Pupil Count*

Academic Year	Per Pupil Headcount
1990-1991	1,651,502
1991-1992	1,673,020
1992-1993	1,675,465
1993-1994	1,667,041
1994-1995	1,653,949
1995-1996	1,673,879
1996-1997	1,680,693
1997-1998	1,694,320
1998-1999	1,710,365
1999-2000	1,714,815
2000-2001	1,720,335
2001-2002	1,731,151
2002-2003	1,750,631
2003-2004	1,734,019
2004-2005	1,723,087
2005-2006	1,712,133
2006-2007	1,693,436
2007-2008	1,661,414
2008-2009	1,631,200
2009-2010	1,605,971
2010-2011	1,577,606
2011-2012	1,550,550

*Pupil counts were obtained from Bulletin 1011 published annually by the MDE, accessed 5/23/12 at: http://www.michigan.gov/mde/0,4615,7-140-6530_6605-21539--,00.html

Table III. *Michigan Funding Equity Gap*

Fiscal Year	Minimum	Maximum [1]	Equity Gap
1993-94	$2,762	$10,294	$7,532
1994-95 [2]	4,200	10,454	6,254
1995-96	4,506	10,607	6,101
1996-97	4,816	10,762	5,946
1997-98	5,124	10,916	5,792
1998-99	5,170	10,916	5,746
1999-2000	5,700	11,154	5,454
2000-01	6,000	11,454	5,454
2001-02	6,300	11,754	5,254
2002-03 [3]	6,700	11,954	5,254
2003-04 [3]	6,700	11,954	5,254
2004-05	6,700	11,954	5,254
2005-06	6,875	12,129	5,254
2006-07	7,085	12,339	5,231
2007-08	7,204	12,387	5,183
2008-09	7,316	12,443	5,127
2009-10	7,162	12,170	5,008
2010-11	7,146	12,154	5,008
2011-12	6,846	11,854	5,008

1) This maximum per pupil foundation allowance is for Bloomfield Hills which has a comparatively similar population to traditional public schools and public school academies. There are 2 other districts in the state which have fewer than 10 pupils.
2) New funding system, Proposal A, was initiated
3) For FY 2003-04 and FY 2004-05, proration occurred; this did not statutorily reduce the foundation allowance, but reduced per-pupil funding by approximately $74 each year.

*Source: Information obtained for this table was acquired from actual minimum and maximum per pupil foundation amounts which can be found at: http://www.senate.michigan.gov/sfa/Departments/DataCharts/DCk12_BasicFoundationHistory.pdf