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## A Correlational Study Examining the Relationship Between State Fiscal Effort and High School Graduation Rates

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**A CORRELATIONAL STUDY EXAMINING THE RELATIONSHIP BETWEEN STATE  
FISCAL EFFORT AND HIGH SCHOOL GRADUATION RATES**

by

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A dissertation Submitted to the Faculty of  
Old Dominion University in Partial Fulfillment of the  
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## **ABSTRACT**

One way of analyzing United States investment in human capital is through examination of the nation's high school graduation rates. High school graduation has an impact on society's growth and prosperity. This study examined states fiscal effort toward education and its impact on state high school graduation rate. Utilizing a qualitative design state fiscal effort and state high school graduation rate were examined over a 25 year period from 1986-2010. Multiple regression analysis and repeated measures ANOVA was used to determine if sustained fiscal effort had an interaction with state high school graduation rate over time. This study revealed that state fiscal effort by itself did not have an effect on state high school graduation rate. The data revealed that time and higher levels of fiscal effort supported higher graduation rates. Furthermore, the study found that the cumulating effect of increasing fiscal effort over time had a statistically significant impact on increasing high school graduation rate over time.

I would like to dedicate this work to my son to show him that with passion, commitment, perseverance, and resilience that he can make a difference in this world.

## ACKNOWLEDGEMENTS

I would like to recognize and thank my family for all of the support they have given me during this rigorous and life-changing process. Without my husband's kindness, love, and support, I would not have had the countless hours needed to complete this process. Your understanding and gentle pushes kept me making steady progress. I would like to thank my parents because they truly made it their role in life to be my first teachers and role models. You have lived your life with strength and courage and ensured I knew the true heart of a family. Without that instilled in me, I would not have had the grit to make it through this part of my professional life.

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## TABLE OF CONTENTS

	<b>Page</b>
ACKNOWLEDGEMENTS .....	iii
TABLE OF CONTENTS .....	iv
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
CHAPTER 1 .....	1
INTRODUCTION.....	1
Revenue Framework of Education Finance .....	4
Federal Revenue .....	4
State Revenue .....	8
Local Revenue .....	9
Factors that Increased Spending.....	9
Policy, Litigation, and Legislation .....	12
Graduation Rates and Investment in Human Capital .....	13
The Significance of the Study .....	15
Research Problem and Questions .....	16
Overview of the Methodology .....	17
Delimitations .....	19
Overview of the Study.....	20
Key Terms .....	21
CHAPTER 2 .....	24
Chapter Overview .....	24

Introduction .....	24
Literature Review .....	28
History of Education Finance in the United States .....	31
Early History Through Ratification of the Bill of Rights .....	31
Education Finance 1780 to the Civil War .....	33
Education Finance During Reconstruction Through World War I .....	34
Education Finance Sputnik Through 1982 .....	36
A Nation at Risk Through the Present.....	37
The Legal Framework of Education Finance .....	39
Education Finance Litigation .....	39
Equity Issues.....	41
Adequacy Issues .....	42
Research in Education Finance and Student Achievement .....	43
Education Funding and Social Outcomes Research.....	46
Class Size Reduction .....	46
Teacher Quality .....	48
Use of Fiscal Resources.....	49
State High School Graduation.....	51
Graduation Rates and Human Capital .....	51
Graduation Rate as a National Focus .....	53
Graduation Rate as the Outcome Variable .....	54
Capacity and Effort.....	55
Limitations in Current Educational Research Regarding Spending.....	57

Research Questions .....	59
CHAPTER 3 .....	62
Introduction .....	62
Sample .....	62
Variables.....	63
Predictor Variables: Fiscal Effort and Time.....	63
State High School Graduation Rate.....	64
Study Design .....	65
Data Collection.....	66
Data Analysis .....	66
Strengths.....	68
CHAPTER 4 .....	70
RESULTS.....	70
Chapter Overview .....	70
Descriptive Analysis of Variables .....	70
Fiscal Effort for the United States Over Time .....	72
High School Graduation Rates for the United States Over Time .....	73
State Fiscal Effort and State High School Graduation Rate Slopes .....	74
Patterns in the Fiscal Effort Slope and State High School Graduation Rate.....	75
Multiple Regression Analysis .....	79
Repeated Measures ANOVA .....	81
Summary .....	82
CHAPTER 5 .....	84

DISCUSSION .....	84
Chapter Overview .....	84
Overall Discussion.....	84
Discussion of Results .....	87
Fiscal Effort Over Time.....	89
State High School Graduation Rate Over Time .....	92
State Analysis Over Time.....	94
Limitations .....	97
Implications for Future Research .....	98
References.....	101
Appendix A: State Fiscal Effort and State High School Graduation Slopes .....	113



## LIST OF TABLES

	<b>Page</b>
Table 1. <i>Descriptive Statistics</i> .....	71
Table 2. <i>State Graduation Rates According to State Fiscal Effort</i> .....	77
Table 3. <i>Crosstabulation of Fiscal Effort Category and Fiscal Effort Slope</i> .....	78
Table 4. <i>Mean State Graduate Rate by State Fiscal Effort</i> .....	79
Table 5. <i>Multiple Regression Analysis Results</i> .....	80
Table 6. <i>Relationship Between Independent Variables and Dependent Variable</i> .....	81

## LIST OF FIGURES

	<b>Page</b>
<i>Figure 1.</i> U.S. public high school averaged freshman graduation rate (AFGR) by year and state or jurisdiction: School years 2002-2003 through 2009-2010 (NCES, 2010). .....	2
<i>Figure 2.</i> Percentage of revenues for elementary and secondary education by source of funds: 1970-1971 through 2008-2009. ....	6
<i>Figure 3.</i> Percentage distribution of revenue for public elementary and secondary education in the United States by source: Fiscal years 2008, 2009, 2010, and 2011. ...	7
<i>Figure 4.</i> Current expenditure per pupil in fall enrollment in public elementary and secondary schools: 1970-71 through 2007-08. ....	10
<i>Figure 5.</i> Scatterplot and fit line for the trend in state fiscal effort over a 25-year period. ....	73
<i>Figure 6.</i> Scatterplot and fit line for the trend in state high school graduation rate over a 25-year period. ....	74
<i>Figure 7.</i> Trend lines in fiscal effort for low effort fiscal states and high effort fiscal states. ....	82

## CHAPTER 1

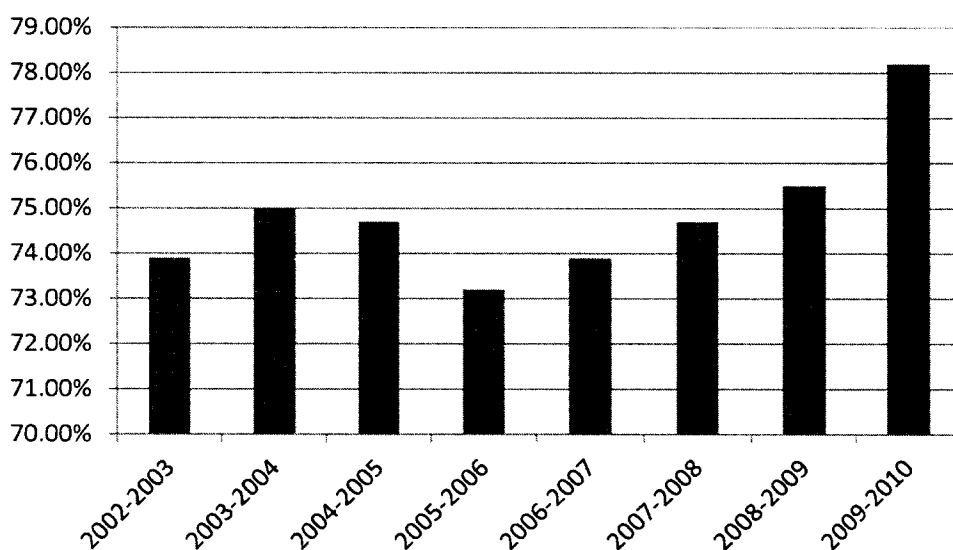
### INTRODUCTION

Of all the civil rights for which the world has struggled and fought for 5000 years, the right to learn is undoubtedly the most fundamental.... The freedom to learn...has been bought by bitter sacrifice. And whatever we may think of the curtailment of other civil rights, we should fight to the last ditch to keep open the right to learn. We must insist upon this to give our children the fairness of a start which will equip them with such an array of facts and such an attitude toward truth that they can have real chance to judge what the world is and what greater minds have thought it might be. (W.E.B. Du Bois, 1949, p. 230)

To secure individual and societal success the United States needs to invest in human capital through its public education system. One way of analyzing United States investment in human capital is through examination of the nation's high school graduation rates. High school graduation has an impact on society's growth and prosperity. Three quarters of the fastest growing occupations in the United States require higher education (Darling-Hammond, 2011). According to Darling-Hammond (2011), the U.S. on-time graduation rate has been holding at approximately 70%. That statistic means that 30% of high school-aged students are not prepared to enter the fastest growing occupations in the labor market. This phenomenon will impact the growth of the United States economy.

Figure 1 depicts the U.S. high school average freshman graduation rates between years 2002 and 2010 from the National Center for Education Statistics (NCES). High school graduation for the early part of the 21<sup>st</sup> century hovered around 70%. In 2009-2010 the federal government refocused effort on graduation rates. The graduation rate reached 78% in 2010 (Snyder & Dillow, 2010). This increase still has not improved the graduation rate ranking of the United States in comparison with other industrialized countries. Other industrialized nations' graduation rates are increasing at a much faster

rate than that of the United States (Darling-Hammond, 2011). Furthermore, although the United States graduation rate hovered around 70% for the first part of the 21<sup>st</sup> century, other industrialized nations reflected increases every year (Darling-Hammond, 2012). Over the most recent decades, according to reports published by the Organization for Economic Co-operation and Development (OECD), the United States graduation ranking has dropped from 2<sup>nd</sup> to 21<sup>st</sup> out of 28 countries (OECD, 2011).



*Figure 1.* U.S. public high school averaged freshman graduation rate (AFGR) by year and state or jurisdiction: School years 2002-2003 through 2009-2010 (NCES, 2010).

[http://nces.ed.gov/pubs2013/2013309/tables/table\\_03.asp](http://nces.ed.gov/pubs2013/2013309/tables/table_03.asp)

The high school graduation rate has a tremendous impact on society.

Nongraduates can cause a drain on society because of reduced employment and increased need for social services (Darling-Hammond, 2006; Owings & Kaplan, 2013). According to Bridgeland, DiIulio, and Morison (2006), those who do not graduate from high school are more likely to be unemployed, use social services, and cause higher criminal justice

costs. Therefore, it is vital for educators to determine the most effective ways to utilize funding allocated to education. Policymakers, legislatures, and educational leaders need to understand the impact of K-12 education funding on the state's economy and recognize education's return on investment to the state (Owings & Kaplan, 2013). Delving into research that examines funding and its use promises to contribute to the enhancement of efficiency, equity, and adequacy of school funding, which is a major policy, litigation, and legislative issue (Levin, 2005).

Currently, there is a vital gap in research concerning education fiscal policy and its impact on student achievement (Owings & Kaplan, 2013). Education finance is a national policy focus because of its effect on the economy. Funding is also a focal point because of the controversial nature of some research findings, such as the Coleman Report (1966), and Hanushek's (1986) conclusion that spending and student achievement are not related. Since the Coleman Report, research has examined different educational spending practices and their effects on student achievement, such as class size, teacher quality, and professional development, using production function research. Research has shown that certain factors related to spending, such as teacher quality, make a difference in student achievement (Owings & Kaplan, 2013). Nevertheless, education fiscal policy is a topic that is still debated because of the lack of research to end the controversy.

Equality, equity, and adequacy have been defined over time in education finance research. Many people confuse equality and equity; they are very different terms. Equality is treating everyone the same. Equity is ensuring that everyone gets what they need. There are two types of equity: horizontal and vertical. Horizontal equity has been defined simply as meaning that students equally positioned in socioeconomic status and

academic need should be treated equally with regard to funding. For example, students in the same district with the same needs should receive the same funding, curriculum, and instructional materials. Vertical equity refers to the notion that everyone is not equal and therefore should not be treated equally (Owings & Kaplan, 2013). For example, students with disabilities should be treated differently from regular needs students because they have different learning needs. Adequacy has been defined as the level of educational resources needed to provide all students with what they need to succeed (Rebell, 2009). Adequacy involves sufficient funding for educational programs and requires some subjectivity. Inequities and inadequacy of funding lead to lack of necessary resources for students to be successful in school. These inequities and lack of adequacy are reflected in the quality of teachers (Darling-Hammond, 2011). Teacher quality is a school variable that has a positive influence on student achievement, and if the lack of equitable or adequate funding causes this to decline, it affects students' ability to succeed in school (Hattie, 2009; Owings & Kaplan, 2013). Expanding the current knowledge base about school funding practice and its impact on student achievement will support effective decision making with regard to state education expenditures. Therefore, it is necessary to examine the relationship between state funding and student outcome variables.

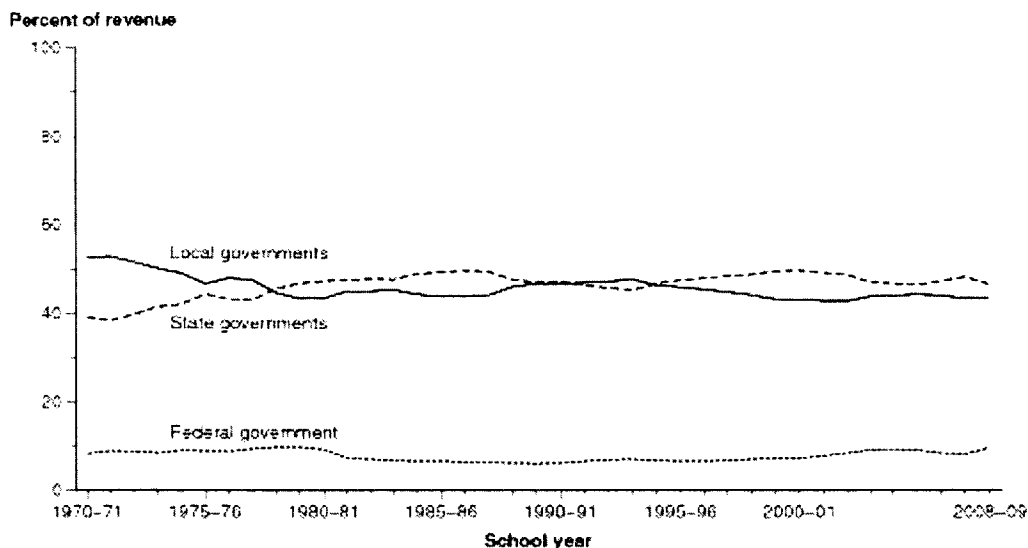
### **Revenue Framework of Education Finance**

#### **Federal Revenue**

Education is not mentioned in the first 10 Amendments of the Constitution, also known as the Bill of Rights. Therefore, education became a state responsibility. The fathers of the country had a strong belief that education was important and that it was the way to keep a democratic society effectively running (Kelly, 2012). Even though the

nation's early presidents and legislatures believed education was in the best interest of the country, they put public education and its financing under the control of state and local government (Alexander & Alexander, 2009).

Funding public education is primarily a state responsibility; however, public education is funded through a combination of federal, state, and local budgets. Figure 2 displays elementary and secondary revenue over a 39-year period. Federal revenue has been consistent at 8% to 10% over the 39 years, with a slight increase to 12% over the most recent 2 years shown in Figure 2. There is not as much consistency regarding state and local revenue over time. At certain points in time the state provided a higher percentage of the revenue and at others points in time the local budget supported a higher percentage of revenue. In the most recent year depicted, however, the trend was toward higher levels of federal revenues.



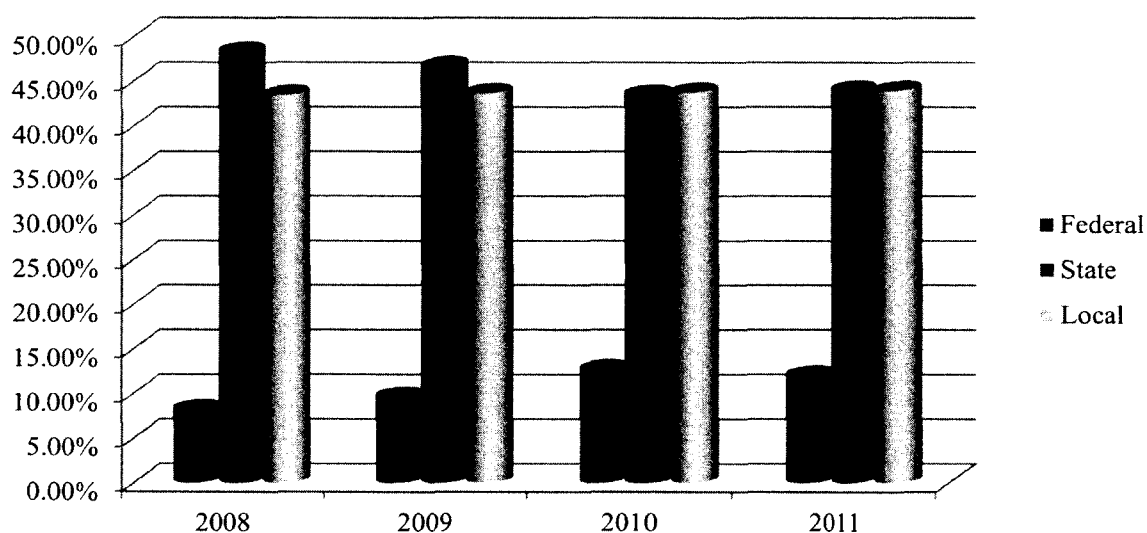
*Figure 2. Percentage of revenues for elementary and secondary education by source of funds: 1970-1971 through 2008-2009.*

Source: U.S. Department of Education, National Center for Education Statistics, *Revenues and Expenditures for Public Elementary and Secondary Education, 1970-71 through 1986-87*; and Common Core of Data (CCD), *National Public Education Financial Survey, 1987-88 through 2008-09*.

Figure 3 depicts the percentage of distribution of federal, state, and local funding for public education in Fiscal Years 2008-2011. In 2008, 8.2% of public education funding was from the federal government, 48.3% was funded from the state government, and 43.5% was funded by the local government. In 2009, there was an increase in federal funding, from 8.2% to 9.6% due to the American Recovery and Reinvestment Act (ARRA). The state's contribution decreased slightly, from 48.3% to 46.7% because states were in a financial shortfall. The local portion of funding increased minimally, from 43.5% to 43.7% because of the state decrease. There was approximately a 3% increase in federal funding in 2010 that continued into fiscal year 2011; this increase was due to the American Recovery and Reinvestment Act (ARRA). Congress enacted



ARRA funding because of the financial impact of the recession on education funding. In 2008, the United States experienced a stark economic decline. The aftermath of this decline was seen in 2010 when all but two states faced budget shortfalls in the billions (Owings & Kaplan, 2013). This decline impacted education funding, causing school districts to cut their budgets. Therefore, the Congress gave public education \$100 billion in funding to lessen the huge cuts that were going to befall education (Cavanaugh, 2011). This money created or saved 420,000 jobs in education (Cavanaugh, 2011). Furthermore, expenditures for instruction from ARRA amounted to \$19.5 billion or 6.1% of total current expenditures for instruction (Snyder & Dillow, 2012), thereby accounting for the 3% increase in federal funding for education.



*Figure 3.* Percentage distribution of revenue for public elementary and secondary education in the United States by source: Fiscal years 2008, 2009, 2010, and 2011.

Source of revenues and type of expenditures for public elementary and secondary education, by state or jurisdiction: Fiscal year 2008, 2009, 2010, and 2011 (NCES, not in ref 2013). <http://nces.ed.gov/pubs2013/expenditures/tables.asp>

## **State Revenue**

As previously noted, public education is a state responsibility. As such, each state constitution controls how education is organized and administered. Because no two states' constitutions are identical, there is a lack of consistency in the states' systems of education. Each state is required to have an educational system and to pass laws deemed necessary for students but not in conflict with the Constitution (Owings & Kaplan, 2013). Furthermore, each state has an organizational structure that delegates most of the responsibilities to the localities. The state constitution is organized so that the state controls the parameters for policies and regulations. The localities then follow the directives from the state education agency.

The state can tax citizens to support education, and the state controls whether or not the localities can levy tax to support education. A legal precedent has been established in state constitutional language regarding the state's allowing districts taxing authority (Owings & Kaplan, 2013).

All states calculate per-pupil expenditure to support funding public education. Per-pupil expenditure is the amount spent for a specific time period divided by a unit of measure, such as average daily attendance or fall enrollment (Snyder & Dillow, 2012). Even though this is a good measure of how states fund education it does not show the entire picture because it does not take into account the state's capacity to fund programs (Kelly, 2012). Fiscal effort represents a ratio of total per-pupil expenditure and a measure of state wealth comprising the Gross Domestic Product (GDP) at the federal level or the Gross State Product (GSP) at the local level. It is usually calculated on a per-capita basis (Owings & Kaplan, 2013). The state's wealth and ability are taken into

account with regard to fiscal effort in identifying the state's disposition toward supporting education.

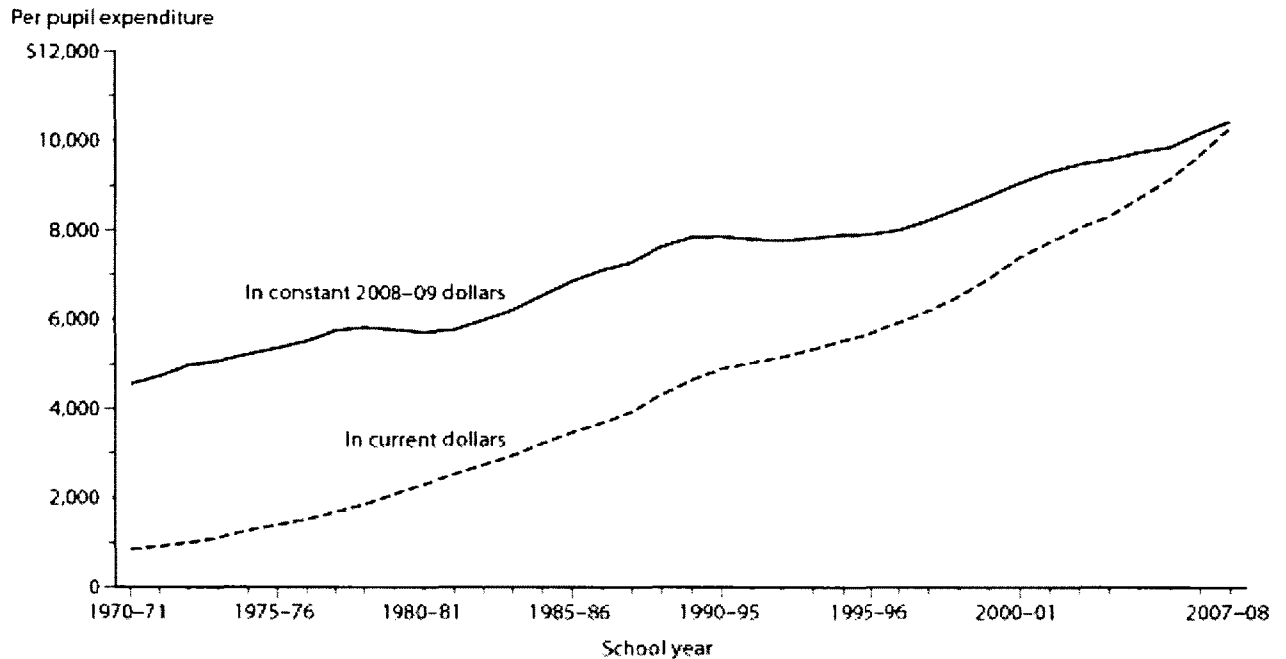
### **Local Revenue**

Federal, state, and local taxes support education funding as noted earlier. Each state department develops education policies and regulations that regulate how districts function in that state. This type of regulation includes taxing citizens to support education. Some states have enacted legislation giving school districts the ability to tax for school needs (Owings & Kaplan, 2013). These districts are fiscally independent because each district can tax its citizens. Other districts are fiscally dependent because they do not have the authority to tax for school needs. Fiscally dependent districts must wait for the school budget to be approved by the county or city. The governing body sets the tax rate and the portion of funding the school district receives for the school year (Owings & Kaplan, 2013). Furthermore, over time there has been a shift in the source of education funding from the localities to the state. This shift creates an issue with the consistency of funding because property taxes are more stable than sales and income taxes. Therefore, districts are dealing with fluctuations in funding because of tax base instability. Every year local revenues for education are affected by the policy set forth by the state department with regard to regulation for taxation.

### **Factors that Increased Spending**

Federal, state, and local revenues have been tracked over the past 5 decades. Figure 4 represents the 2008-2009 total yearly per-pupil expenditure and per-pupil expenditures from 1970 to 2008 in both constant and current dollars. Spending for public

education has increased by 250% to 300% over the past 50 years (Snyder & Dillow, 2011).



*Figure 4.* Current expenditure per pupil in fall enrollment in public elementary and secondary schools: 1970-71 through 2007-08.

From U.S. Department of Education, National Center for Education Statistics, *Revenues and Expenditures for Public Elementary and Secondary Education, 1970-71 through 1986-87*; and Common Core of Data (CCD), *National Public Education Financial Survey, 1987-88 through 2007-08*.

There are several factors that contribute to increased spending, including the Elementary and Secondary Act (ESEA), the Education for All Handicapped Children Act, and enrollment increases and the subsequent need for additional staffing. The ESEA, enacted by President Johnson's administration based on the president's war on poverty in the mid-1960s, provided an increase in educational funding. In 1975, Congress enacted the Education for All Handicapped Children Act (Public Law 94-142). This law supports all students' rights to have free and appropriate public education.

There has been a significant increase in the number of children deemed as having special needs. The percentage of students labeled as disabled has increased from 8.3% in 1976-77 to 13.2% in 2006-07 (Snyder & Dillow, 2011). This growth in the special education population and the specific needs of such students has caused an increase in federal, state, and local funding for education. The federal goal was to fund 40% of the cost of educating special education students; the percentage has never reached even half of that amount. Therefore, states and localities also have had to increase spending for students with disabilities (Owings & Kaplan, 2013).

Another cause of increased federal government educational spending was the need to fund the Elementary and Secondary Education Act (ESEA, 1965) under Title I (Public Law 89-10). In 2002, ESEA legislation was reauthorized as the No Child Left Behind Act (NCLB). Congress set guidelines for No Child Left Behind. Due to the accountability placed on the states, NCLB needed to be funded. Therefore, the updates made to ESEA increased federal spending on public education.

Growth in education spending also involves the number of students' being educated in public schools. Enrollment in the public education system has increased over the past 30 years. Elementary through high school enrollment increased from 36.1 million in 1960 to 49.3 million students in 2011 (Snyder & Dillow, 2012). This enrollment growth caused an increase in capital outlay for such things as school buildings and land. The growth also increased the need for other instructional materials such as books, paper, and ink. Therefore, with increased enrollment there are increased costs, which in turn, increase the need for education funding.

Although growing enrollment is one reason for the increase in revenue, staffing is one of the largest reasons for the revenue increase over the past 30 years. ESEA and the Education for All Handicapped Children Act both required more staffing to meet the needs of law. To mitigate poverty, one structure in ESEA was to offer interventions for students by highly qualified staff. Special education generally calls for smaller class sizes to meet the needs of special needs children. Finally, the overall enrollment increase from 36.1 million to 49.3 million has required additional instructional staffing. There has been a significant increase in instructional staff since 1969. The National Center for Education Statistics reported an increase in instructional staff from 3,361,000 in 1969 to 6,355,000 in 2009 (Snyder & Dillow, 2011).

### **Policy, Litigation, and Legislation**

Education finance policy, litigation, and legislation have created the system the United States operates today. Two major areas of focus for finance policy are equity and adequacy. Both areas have been addressed in litigation and legislation in 45 states (National Access Network, 2011). Finance policy litigation in court mandates has dominated education finance policy over the 3 most recent decades (Springer, Liu, & Guthrie, 2009). States have faced and continue to face court mandates due to allegations that resources being provided to some students are not equitable or adequate (Archibald, 2006). There are two types of school finance equity: horizontal and vertical. Horizontal equity is defined as the notion that equally situated children should be treated equally (Springer et al., 2009). The term *equally* is defined as meaning that students with similar socioeconomic backgrounds and academic needs receive equivalent funding toward meeting educational requirements. Vertical equity is defined as the notion that unequally

situated children receive unequal shares of resources (Owings & Kaplan, 2013).

Adequacy, on the other hand, is defined as the level of available resources' being sufficient to provide all students opportunity to reach proficiency (Springer et al., 2009).

Both horizontal and vertical equity have evolved from litigation over time.

Adequacy addresses how much funding is needed for all students to achieve a given level of proficiency (Picus & Odden, 2011). Adequacy is value driven and is defined in terms of the priorities of those in decision-making power (Owings & Kaplan, 2013). Due to this subjectivity, determining how much funding a school district or school needs continues to be researched through four methods. The four research methods that have been used by fiscal adequacy experts are economic cost function, successful school district, professional consensus, and state of the art. Litigation since 1989 has focused on funding adequacies and ruled on the constitutionality of state finance systems (Rebell, 2009). Adequacy has been the research focus for 20 years and probably will continue to be the focus because the amount of funding needed by a district or school for students to be successful is still ambiguous (Owings & Kaplan, 2013).

### **Graduation Rates and Investment in Human Capital**

Funding education to increase graduation rates so that all students are career and college ready is an investment in human capital. For the economy to sustain growth today, the workforce must be literate and capable, possessing sophisticated mathematical and technological skills and knowledge (Fowler, 2013). Therefore, it is vital for the country's public schools to produce an educated workforce. Currently, more than a quarter of children per graduating class, approximately 1 million students, fail to graduate from high school in the United States (Balfanz & Legters, 2004; Balfanz, 2009). This

phenomenon is devastating to the United States economy and quality of living.

Richmond (2009) estimated that the dropouts of the class of 2008 would cost the U.S. Treasury more than \$319 billion in lost or reduced wages the students could have earned had they completed high school. Furthermore, the Center for Labor Market Studies at Northeastern University estimated that nongraduates will cost taxpayers \$292 thousand in lower tax revenues, social services costs, and incarceration (2009). Today, high school nongraduates have trouble finding jobs, and the jobs they do find pay less than a living wage (Balfanz, 2009). This situation leads to high unemployment, poverty, health risks, incarceration, and the use of social services (Owings & Kaplan, 2013). If this trend continues over a decade there will be more than 12 million nongraduates, ultimately resulting in lower tax revenues and requiring increased expenditures for social services (Balfanz, 2009).

In addition to economic benefits, converting nongraduates to graduates affects the safety, health, and quality of life in the United States. Those who graduate from high school are more likely to be employed, assume civic responsibilities, have access to health insurance and subsequently have lower health risks, and positively impact their community (Owings & Kaplan, 2013). The results of one study indicated that if Vermont were to provide an education system that allowed each student to graduate from high school career and college ready, the economic impact would be approximately \$100 million per graduating class over their lifetimes (Balfanz, 2009).

Another huge benefit of higher graduation rates would be the decreased cost for incarceration. In recent years the nation has been spending more money for incarceration than education (Darling-Hammond, 2006). Federal and state expenditures for



incarceration have grown by 900% since the 1980s whereas national student per-pupil expenditures have grown only 26% over the same time period (Darling-Hammond, 2006). Half of the prison population have below average literacy skills and, therefore, are incapable of being successful in today's workforce (Lochner & Moretti, 2004).

### **The Significance of the Study**

The purpose of this study is to examine the relationship between state fiscal effort and high school graduation rates. Finance decisions must be made regarding the factors that have the most economic benefit for the United States. Therefore, it is vital that state fiscal effort be analyzed closely as it relates to educational outcomes. Hedges, Laine, and Greenwald (1994) stated, "Given limited state budgets and questions about efficacy of public schools, evidence that school expenditures are unrelated to student performance has deflected attention from the question of revenue sufficiency in discussion about how to improve education" (p. 5). Currently, most educational funding has been examined through the lens of student per-pupil expenditure. Even though that type of study is a good start it does not provide the full picture regarding states' ability to support public education (Kelly, 2012).

Furthermore, most studies have researched public education funding in limited ways, including one state or division, and over short periods of time. These studies have not examined educational funding over a span of time to facilitate true generalization (Kelly, 2012). Therefore, this study will focus on fiscal effort over a 25-year period and will include all 50 states and the District of Columbia. The fiscal effort for each state will be investigated in relation to state high school graduation rate over the 25-year period of time. Furthermore, over the past few years, research has been conducted focusing on

state fiscal effort and student academic outcome variables (Goodale, 2009; Pirim, 2011; Kelly, 2012; Morris, 2012). This study will add to the current literature.

### **Research Problem and Questions**

This study will examine the association between state fiscal effort and state high school graduation rates. Abundant research has been conducted regarding educational expenditures and the related impact on education; however, these studies have many limitations. First, they have focused on one school division or a single state's practices, thereby limiting the research because divisions and states are vastly different in terms of wealth capacity (Owings & Kaplan, 2013). Second, each of the studies has covered only a short period of time. Therefore, the studies have had poor predictability value and failed to show the impact of spending over a period of time. This study will focus on state fiscal effort and state high school graduation rate, which is an outcome common among all states. The study will investigate data over a 25-year period. The research questions included the following:

1. What are the trends in state fiscal effort in the United States over 25 years, 1986-2010?
2. What are the trends in high school graduation rate in the United States over 25 years, 1986-2010?
3. What is the relationship between increasing state fiscal effort on state graduation rates in the United States over 25 years, 1986-2010?
4. What is the relationship between decreasing state fiscal effort on state graduation rates in the United States over 25 years, 1986-2010?

### Overview of the Methodology

This study used a nonexperimental, ex post facto design to address the research questions. The data utilized required this type of design as it would be unethical to withhold state funding from random states. Therefore, the study relied on existing data.

Variables of study were state fiscal effort, time, and state high school graduation rate. State fiscal effort and time were the predictor variables and state high school graduation rate was the criterion variable. The predictor and criterion variables were examined through data points over time. The variable of state high school graduation rate was selected because it is a figure that all states calculate and report for No Child Left Behind.

This study's population encompassed all 50 states and the District of Columbia, with regard to their fiscal efforts and high school graduation rates over a 25-year period. Owings and Kaplan's (2013) definition of fiscal effort was used, employing a formula where  $E$  is fiscal effort,  $R$  is the revenue allocated for education measured as the state's per-pupil expenditure for K-12 education, and  $TB$  is a measure of wealth, the Gross State Product (GSP) on a per-capita basis. The equation for effort takes the following form:  $E = R/TB$ .

Effort then is a ratio of the total state per-pupil spending divided by the GSP per capita. The use of a ratio was needed because without comparison of the state education revenue against the tax base, only revenue would be considered. In that case, a wealthy district, simply by spending slightly more money would appear to be expending more because of the larger budget (Owings & Kaplan, 2013). Using the effort formula shows how much of a state's wealth was earmarked for education. Furthermore, by using GSP

the researcher controls for upturns and downturns in the economy. The economic variances were accounted for in the GSP figures. Fiscal effort controls for both wealth and size of the state.

Because of the complexity of educational funding, the study employed multiple regression analysis and repeated measures analysis of variance (ANOVA), using SPSS statistical software. The model was used with all 50 states and the District of Columbia. Multiple regression models allowed for the researcher to develop an understanding of which predictor variable were related to the criterion variable. Specifically, regression analysis helped identify how the value of the criterion variable changes when any one of the predictor variables was varied. Most commonly, regression analysis estimates the conditional expectation of the dependent variable given the independent variables (Aiken & Stephen, 1991). Furthermore, repeated measures ANOVA estimated the difference between various data to test the changes in the means overtime (Trochim, 2001). Therefore, the researcher was able to determine the relationship between the outcome variable, high school graduation, and time and state fiscal effort together.

The study involved long-term trend analysis utilizing data over a 25-year period. Long-term trend analysis assessed more accurately the impact of state fiscal effort on high school graduation rate. Longitudinal studies show normal growth and trends. The researcher assessed relationship of growth and trends by examining the slope as related to regression. This study included the use of a common indicator among states and encompassed a multiyear scope. Fiscal effort and high school graduation rate data were collected for all 50 states and the District of Columbia.

Data for the study was derived from the following sources: (a) state economic budget data measuring fiscal effort, (b) state effort tables provided by William Owings, (c) the Digest of Education Statistics, (d) the Education Finance Statistics Center (EDFIN) longitudinal data for fiscal years 1986-2010, and (e) the National Center for Education Statistics.

### **Delimitations**

The purpose of this study was to determine the relationship between state fiscal effort and state high school graduation rates. Correlational studies provide pertinent and legitimate information; however, it is important to note that they do not determine causation. This study included data from all 50 states and the District of Columbia regarding fiscal effort and high school graduation rates. The study was nonexperimental, using historical and current data supplied by the Education Finance Statistics Center and the Digest of Education Statistics. Over the period of years to be studied, the definition for high school graduation has changed; further, the ways in which certain states calculate graduation rate are different. Another limitation was that each state may aggregate the data and may include differing terms for graduation rate due to the emphasis on college and career readiness resulting from new legislation. These limitations were addressed by using the NCES calculation method known as the average freshman graduation rate (AFGR), which endeavors to standardize data across states. In 2008, as an adjustment to NCLB, the USDOE established a requirement that all states move to a 4-year, on-time graduation rate calculation (Chapman, Laird, & KewalRamani, 2010). The estimate for AFGR is the percentage of high school students who graduate 4 years after entering 9<sup>th</sup> grade. The calculation for the estimation involves adding the 3-year current enrollment

(8<sup>th</sup>, 9<sup>th</sup>, and 10<sup>th</sup> grade) (Chapman, Laird, & KewalRamani, 2010). Therefore, each state was assessed separately to determine if there is a relationship on high school graduation rate based upon the state's fiscal effort and time. Furthermore, in general, states' investments in education controlled for inflation have not increase substantially over the past 25 years. Murray et al. (2007) reported that states' investments in education have remained at 22% of the overall budget. Data that have been averaged by the nation or region are skewed (Kelly, 2012). Verstegen (1994) found that variations among states ranged from losses of 6% to gains of 90% when looking at states individually. Verstegen also reported a connection between states' capacity and effort in relation to quality of education. This is a limitation because average of averages tends to distort the mean.

### **Overview of the Study**

This study included examination of state fiscal effort and state high school graduation rates overtime. Examining the amount of state fiscal effort through the lens of state high school graduation will help to identify practices and policies associated with academic achievement. The hypothesis was that increased state fiscal effort over a period of time will increase states' graduation rates.

This document was organized into three chapters. The first chapter includes description of the funding for public education, information about the educational history and significance of the study, the research questions, description of the methodology, and the delimitations. The second chapter presents a comprehensive review of literature related to education finance and high school graduation rate. The third chapter explains in detail the methodology used in the study. In chapter 4 the results from the analysis are

described. Chapter 5 details the results from the analysis and possibilities for further studies.

### **Key Terms**

**Average Freshman Graduation Rates (AFGR):** A graduation rate statistic reported by the National Center for Educational Statistics (NCES) which attempts to standardized the calculation method between states. The AFGR is an estimate of the percentage of high school students graduating four years after entering 9<sup>th</sup> grade. The 9<sup>th</sup> grade class is estimated by adding the total student enrollment for three consecutive years which are 8<sup>th</sup>, 9<sup>th</sup>, and 10<sup>th</sup> grade and then dividing by three.

**Fiscal Capacity:** The funding resources available to support services.

**Fiscal Effort:** The ratio of total per pupil expenditures (PPE) to state wealth measured by Gross State Product (GSP) per capita.

**Gross State Product:** A measurement of economic output of a state.

**Horizontal Equity:** People of similar characteristics should receive equal funding shares.

**Intercept:** The Y value for the line defined by linear regression.

**No Child Left Behind (NCLB):** Public Law 107-110 was passed on January 8, 2002. A reauthorization of the Elementary and Secondary Education Act requiring states to meet Annual Yearly Progress (AYP) objectives on five different indicators. Graduation rates are included for high school.

**School Finance Adequacy:** The level of educational resources available to provide all students what they need to succeed.

**School Finance Equity:** Stipulates that equally positioned children should be treated equally and unequally positioned students should be treated appropriately unequally.

**Slope:** The change in Y for each unit change in X

**Vertical Equity:** Those of differing characteristics could require different treatment to be treated appropriately with funding shares.





## **CHAPTER 2**

### **REVIEW OF RELATED LITERATURE**

#### **Chapter Overview**

This chapter provides a review of education finance literature. It presents a review of the history of American education finance. The chapter also describes the legal framework for education finance because policy, litigation, and legislation have greatly impacted educational funding. Then details regarding education finance are explored through its impact on student achievement. Fiscal capacity and fiscal effort are defined. Graduation rate is reviewed in three ways. First, graduation rate is emphasized in relation to human capital. Second, it is examined through federal legislation. Finally, it is analyzed through the lens of state graduation rate calculation. Research questions and definitions conclude the chapter.

#### **Introduction**

This section provides an overview of the literature review. Education finance equity and adequacy are defined, and a review of the litigation that has occurred and continues to occur with regard to creation of these definitions and funding policies is presented. It is vital for educators to determine the most effective ways to utilize funding allocated to education, especially in the current economic climate. Having a strong understanding of education finance involves knowing the impact of K-12 education funding on the state's economy and recognizing education's return on investment to the state (Owings & Kaplan, 2013). Researchers, such as Opkala (2002), have demonstrated the importance of not only examining expenditures but also analyzing the impact of the expenditures on student achievement. The emphasis is on the relationship between funding and student achievement (Kelly, 2012). In this study, state high school

graduation rate is the measure to be examined. Over the years, many studies have been conducted examining the relationship between funding and diverse student achievement factors (Hill, 2008). The evidence from these finance studies has not been conclusive (Hill, 2008). Due to the current economic situation, it is imperative for educational leaders to show the significance of the relationship between funding and student achievement. Several factors have brought this to the forefront due to changes in finance policy, litigation pertaining to equity and adequacy of education, and relevant legislation.

Education finance policy has been an important aspect of educational research, litigation, and legislation over many decades. One of the most influential studies conducted in education finance policy was the Equality of Educational Opportunity study, commonly referred to as the Coleman Report. This report focused on equality in America's public schools (Coleman, 1966). The Coleman Report found that school funding inputs had no significant relationship to student achievement and that socioeconomic status and family background were the most significant predictors of a child's success. These results led many to believe that money was not the answer to student achievement issues. Ongoing arguments over education finance and its importance to educational policy continue today and use information from the Coleman Report to support the opinions. Many research studies have been conducted regarding school finance and student achievement due to the influence of this seminal research. The impact of this report is still apparent today.

Considerable research has been conducted in the area of education finance and its relation to student achievement (Hill, 2008; Kelly, 2012; Morris, 2012). The question of what makes students achieve is still being debated and is creating a considerable amount

of contention among stakeholders (Lips, Watkins, & Fleming, 2008). Research is still being conducted to provide conclusions regarding which variables influence student achievement, for example, teacher capacity, school leadership, curriculum, and instructional materials. Educational funding is very complex because there are so many variables at the school level that need to be considered (Hill, 2008). There is a multitude of school resources and each can be related to student achievement.

Currently, there is controversy about spending and student achievement. Nevertheless, researchers have agreed that funding must be provided in areas that reflect a positive relationship to student achievement (Lips et al., 2008). In 2006, Owings and Kaplan reviewed all finance and achievement studies and did a factor analysis to see which funding areas reflected a positive relationship to student achievement. Owings and Kaplan's review found it is best to use education funding retaining high quality teachers, providing purposeful professional development, and maintaining school facilities (2006). Expanding current knowledge about school funding practices and their impact on student achievement will provide support for policymakers in making effective decisions regarding state expenditures. To examine the relationship between funding and student outcomes, it is necessary to understand educational litigation and legislation.

Finance equity and adequacy are two areas of educational spending addressed in the literature. There are two types of equity: horizontal and vertical. Horizontal equity has been defined simply as meaning that students equally positioned in socioeconomic status and academic need should be treated equally with regard to funding. For example, students in the same district with the same needs should receive the same funding, curriculum, and instructional materials. Vertical equity refers to the notion that everyone

is not equal and therefore should not be treated equally (Owings & Kaplan, 2013). For example, students with disabilities should be treated differently from regular needs students because they have different learning needs. Adequacy has been defined as the level of educational resources needed to provide all students with what they need to succeed. Adequacy involves sufficient funding for educational programs and requires some subjectivity. Inequity and inadequacy of funding lead to lack of the resources necessary for students to be successful in school.

Both equity and adequacy continue to be discussed as finance policy objectives. The goal is that such policies will assist in identifying and defining sufficient funding for all students to succeed. Equity is the area that prevailed first in the courts because it seemed as though the American public school system was the most unequal in the world in terms of spending (Darling-Hammond, 2006). Review of recent data in school equity cases has found that in the areas of qualified teachers, class sizes, adequate resources, and adequate facilities, curriculum-poor districts serving more students of color have fewer resources than affluent, White districts (Darling-Hammond, 2006). Therefore, state courts are ruling on constitutionality of states' funding systems that facilitate access to highly qualified teachers, reasonable class sizes, adequate resources and facilities, and a rigorous and effective curriculum. Springer, Liu, and Guthrie's (2009) research found that states with school funding mechanisms declared unconstitutional by state courts had more equitable resource distribution practices than did states that had not had their school funding systems ruled unconstitutional. Both the litigation and the research then turned to equity and adequacy. Currently, most education finance litigation focuses on adequacy of funding rather than equity.

In addition to litigation, federal legislation has affected educational funding policy and practice. The No Child Left Behind Act of 2001 (NCLB), the most recent reauthorization of the Elementary and Secondary Education Act (ESEA) is presiding over education policy today (Spellings, 2005). NCLB stipulates guidelines that states must follow to receive federal funding. These guidelines include the requirement that all students must make yearly progress as demonstrated on annual assessments. High school graduation is included as an indicator for high schools to demonstrate continued growth or academic proficiency (National High School Center, 2011). The NCLB legislation has tied student outcomes, such as graduation rates, to federal funding.

### **Literature Review**

To properly frame this study, education finance literature since the 1920s was reviewed. The study's literature review spans a period from the 1920s to today. Historical and current research, litigation, and legislation that impacted and led to current public school funding policy were reviewed. Finance research, litigation, and legislation have shaped current education policy today.

There are many different issues and varying positions with regard to the importance of public school funding. Expanding the current knowledge base about school funding practices and their impact on student achievement will provide support for policymakers in making effective decisions regarding state expenditures. It is important that funds be spent on items that correlate to positive student outcomes. There is a vital gap in research concerning education fiscal policy and its impact on student achievement (Owings & Kaplan, 2013). Education finance studies have taken place over decades but have become more prevalent since the Coleman Report in the 1960s. Researchers are

still attempting to determine which educational factors, such as teacher quality, class size, school leadership, and curriculum, have the most positive effect on student achievement. Hedges et al. (1994) were able to support various factors, such as teacher quality, and to refute some of Coleman's work in their study. In attempts to further the research, studies examining equity and adequacy of educational funding have been and are still being conducted. This further research also has been inconclusive; therefore, researchers are still trying to determine the fiscal effort necessary to educate all students so that they can be productive members of society (Hill, 2008). Researchers have agreed, however, that funding must be provided in areas that show a positive relationship to student achievement because of the beneficial effects on society as a whole (Lips et al., 2008; Owings & Kaplan, 2013).

The impact on society of students' graduating from high school is tremendous. Student graduation affects unemployment, annual income, and tax contributions. Education is an investment in human capital (Owings & Kaplan, 2013); therefore, the high school graduation rate has been a focus on multiple levels—federal, state, and local—for the past decade (Morris, 2012). The graduation rate became even more of a focal point with the most recent reauthorization of ESEA; it still is a focal point for the current political administration. Studies examining the components needed for a student to graduate from high school have found that many factors influence graduation. Furthermore, the follow-up report to *A Nation at Risk*, that is, *A Nation Accountable: Twenty-five Years after a Nation at Risk* (2008), noted that individuals are trying to predict the specific skills and competencies that students will need to be productive citizens. This prediction is important because it relates directly to states' attempts to

make fiscal decisions for education. Therefore, a long-term analysis of state education spending and determination of how increased or decreased spending patterns impact high school graduation rates will expand the current research.

The production function method has been used to study education finance. The Coleman Report of 1966 is a good example of a production function statistical tool being utilized (Hedges et al., 1994). Hedges et al. in their 1994 study noted that the dominant paradigm used in analyzing the effect of educational resources on student outcomes over the last few decades has been production function. The production function method involves attempts to correlate certain inputs to outcomes; for example, asking questions such as how much will achievement on a test shift if student expenditures are increased by, say, \$200 (Hedge et al., 1994). Such studies are nonexperimental because historical data are analyzed. Almost all economic theories have stemmed from production function methods (Hedges et al., 1994). Furthermore, a production function can be defined as the specification of the minimum input requirements needed to produce designated quantities of output (Hedges et al., 1994). There are some issues in linking this function to educational research because of the complexity of school-based factors (Hanushek, 1986). For example, modifications are made to accommodate for policy issues and measurement variables (Hanushek, 1986).

This study used multiple regression analysis and repeated measures ANOVA to examine state fiscal effort, time and high school graduation rate. This longitudinal study determined if the trend of increased fiscal effort correlates to increased graduation rate for all 50 states and the District of Columbia. Research has shown that it takes at least 5 to 7 years for data to show correlation (Berman & McLaughlin, 1978; Fullan, 2000).



Fiscal effort represents a state's contribution to education in relation to the state's wealth; examination of fiscal effort will provide a perspective different from the analysis of student per-pupil expenditures as has been the case in many other studies (Owings & Kaplan, 2013). State fiscal effort was appraised for all 50 states and the District of Columbia over a 25-year period. For this study, state fiscal effort and time represented the input and high school graduation rate represented the output. All states calculate high school graduation rate; therefore, it is a common output.

This correlational study involved use of multiple regression analysis, an advanced statistical methodology that provides a model for examining the relationship between variables (Aiken & West, 1991). As previously noted, education finance research is complex due to the nature and number of defining aspects of the organization. This process allowed the researcher to control for multiple variables while focusing on the primary variable being analyzed. Furthermore, repeated measures ANOVA was utilized to examine questions 3 and 4 to determine if there is a relationship between sustained increasing or decreasing state fiscal effort and increasing and decreasing state high school graduation rate. Repeated measures ANOVA determines whether there has been change over time in the means of the variables in the study.

## **History of Education Finance in the United States**

### **Early History Through Ratification of the Bill of Rights**

From the beginning of this country's history education was seen as the means to life, liberty, and the pursuit of happiness. The first education finance law (the Massachusetts Act of 1642) required parents to be sure that sons and servants were educated (Shoup & Studer, 2010). When this law failed, another law, called the Ye Olde

Deluder Satan Law, was enacted in 1647. Motivated by religion, the Ye Olde Deluder Satan Law encouraged reading instruction because the creators believed those who could read the Bible would be less likely to be seduced by Satan (Cubberley, 2004). This law, which included a financial penalty for towns that did not comply, was the first to require an organized system for educating citizens as well as funding to pay for it (Owings & Kaplan, 2013). If a town had at least 50 families, the town was required to hire a school master to teach reading and writing (Shoup & Studer, 2010). This system expanded quickly to other colonies. For example, Connecticut enacted laws similar to but stronger than those in Massachusetts, requiring, for example, the removal of children and servants from families that did not comply with the laws. These laws were the first legislative actions to establish the use of a property tax to support education and, therefore, were the first steps toward education finance policy.

A century later, in 1758, major education finance decisions were made by the American government. During this time debate about whether the federal government or the state government should have power over education took place. The debate was intense because education was viewed as having an important impact on the success of the nation.

The U.S. Constitution framers debated areas of government control, including education, during its creation. Throughout the process, the individuals who were involved in writing the Constitution discussed the importance of education to the country's future. All of the writers believed that education was of vital importance to the pursuit of life, liberty, and happiness. In *The Wealth of Nations*, Smith (1776) stated that education should be a joint effort between the individual and the government. Smith's

writing described excellence and liberty as being possible only through the provision of a quality education for the citizenry. His major point was that America needed to invest in human capital.

The debate continued after the Declaration of Independence was written (Cubberley, 2004). The nation's leaders were deciding whether control should be at the national or state level. As a compromise, some of the control was delegated to the federal government and other powers to the state. The representatives were trying to appease both federal advocates and state advocates (Owings & Kaplan, 2013). Education was directly addressed in neither the Constitution nor the Bill of Rights. Anything not articulated in the Constitution or Bill of Rights became a state function; therefore, education became a state function.

### **Education Finance 1780 to the Civil War**

The promotion of education as the means for reaching excellence and liberty continued. It was common in the early years of education finance that states used state funding to help towns pay for schools. For example, in 1795, New York's legislature appropriated \$50,000 annually for 5 years to help towns establish schools (Shoup & Studer, 2010). Furthermore, the federal government passed two land ordinance acts in 1785 and 1787, continuing the federal support of education. The first land ordinance secured funding for education because the Congress enacted legislation that required new states to use sale proceeds from certain lots of land for education (Tansill, 2008). Congress took this requirement a step further in the second of the two acts called the Northwest Ordinance of 1787; new states were required to create and maintain basic laws that included education (Shoup & Studer, 2010). In the same year, a third ordinance was

passed, and 5 million acres of land were conveyed to speculators. In 1802, in its fourth article, the ordinance focused on the importance of education through the lens of religion, morality, and knowledge as necessary for good government and happiness (Cubberley, 2004; Tansill 2008). Furthermore, this ordinance required that money from a certain portion of the land sales be spent on education (Cubberley, 2004). Therefore, both government and private schools were promoted and funded early as a way to build the United States.

The federal government continued to show its support of education in the 1800s. In 1836, under Andrew Jackson's presidency, Congress had a surplus of funding and began to decentralize control of education. The federal government returned \$28 million of federal revenue surplus to the states, and much of this funding was spent on schools (Owings & Kaplan, 2013). From 1861 through 1865 the government was focused on the Civil War, but still managed to pass acts in support of growing education (Cubberley, 2004). For example, in 1862, Congress established the Morrill Act, which provided each congressional delegation acres of federal land to be sold to fund public colleges (Cross, 1999).

### **Education Finance During Reconstruction Through World War I**

In the years following the Civil War, Congress enacted legislation to support the continued growth of education (Cubberley, 2004). In 1867, education was advanced to the policy level by Congress's enacting legislation to establish the U.S Department of Education (Owings & Kaplan, 2013). The second Morrill Act, enacted in 1890, allowed states to use public land grants to create and sustain agricultural and mechanical colleges and appropriated funds to support teaching and equipment in the colleges.

During the early 1900s the United States dealt with wars and the Great Depression, both of which had effects on education finance. World War I brought the need for rapid improvement in education, especially for the returning soldiers who needed to learn skills to work. Therefore, Congress passed laws to support the needed improvement to facilitate the education of returning soldiers. Congress issued grants to support vocational education and workplace training. For example, Congress sold surplus machine tools to schools for 15% of the original price so that schools could have real-life equipment (Owings & Kaplan, 2013).

At the height of the Great Depression in 1932 the government was dealing with millions of families' not having food and masses of students' dropping out of school to help support their families. Therefore, the Congress needed to step in with funding; they enacted the Agricultural Adjustment Act (Snyder & Dillow, 2012); this act provided food to schools. World War II brought the need for more technological advances and the need to support disabled veterans returning home from war. Therefore, public schools once again came to the forefront (Goldin, 2001). The Lanham Act of 1940 allowed the federal government to take over the maintenance and operation of schools in military and war-impacted areas (Snyder & Dillow, 2012). Furthermore, another vocational rehabilitation act (Public Law 78-16) was enacted to support returning disabled war veterans.

After World War II the United States citizenry perceived themselves as educated and superior to citizens of other nations. The United States was leading the world in military and economic power.

## **Education Finance Sputnik Through 1982**

With the launching of Sputnik in 1957 the nation as a whole experienced an overwhelming realization: Russia had sent an artificial Earth satellite into outer space before the United States. This event caused many to begin to question the quality of the U.S. educational system. In response to what was viewed as a crisis, the federal government enacted the National Defense Act (NDEA) (Public Law 85-864) in 1958. This law elevated science and mathematics to the top of the essential areas to be taught to students. Although math and science were the focal point for this law, it also supported technology, foreign language, testing, and other advances in education such as vocational and technical programs to support America's defense. Federal financial assistance was provided to states to assist in carrying out the new legislation under NDEA (Shoup & Studer, 2010).

In the 1960s and 1970s, the federal government enacted many laws in support of education including the aforementioned statutes. In 1965, President Lyndon Johnson worked with Congress to pass the Elementary and Secondary Education Act (ESEA) (Public Law 89-10), which represented an effort to fund certain educational needs that were identified in the nation at that time. Five aid programs were developed to finance education under ESEA. For example, part of ESEA stipulated funding to support the education of students in poverty; this grant is known as Title I. The actions of the Congress to support ESEA were deemed the most important efforts to fund education.

Special education support grew from the initial statute called the Education of Mentally Retarded Children Act (Public Law 85-926) during the 1970s. Congress passed the 1975 Education for All Handicapped Children Act (EAHCA) to be sure that federal

funds were used to support adequate education for students with disabilities. Prior to that time families of children with disabilities were required to fund their children's education and support (Yell, 2005). Today, the federal government funds 17% of the costs to support special education in the United States (Owings & Kaplan, 2013).

### **A Nation at Risk Through the Present**

The Elementary and Secondary Act enabled many of the legislative decisions occurring from 1983 through today. In the early 1980s schools were being seen as institutions to support all things and all persons (Shoup & Studer, 2010). This view led to one of the most comprehensive yet controversial reports addressing education in the United States: *A Nation at Risk: The Imperative for Educational Reform*. This report ushered in the notion of the state government's assuming a more deliberate role in the quality and adequacy of education. It shifted the focus from equity to adequacy and accountability (Shoup & Studer, 2010). *A Nation at Risk* (1983) called for increased rigor, more accountability, and the enactment of additional laws by the federal and state government (Owings & Kaplan, 2013). Many of the actions were offshoots from earlier litigation related to the 1986 Handicapped Children's Protection Act (Public Law 99-372), which allowed parents of students with disabilities who brought court cases to receive money to pay for attorney fees. This statute was adjusted in 1997 and renamed the Individuals with Disabilities Act (IDEA) (Public Law 105-17). The law provided further protection to special needs children and gave parents additional rights. In 1988 additional amendments provided further support for Title I, math and science education, impact aid, and other factors. The improvement of secondary education was continued in 1990 with Congress's enactment of the School Dropout Prevention and Basic skills

Improvement Act. In 1994, through the Goals 2000: Educate America Act (Public Law 103-33), the federal government created a partnership with states and localities by providing funding grants to support educational reform efforts. All of these reforms were designed to support increased accountability for all students to achieve in rigorous ways, and they impacted funding at both the federal and state levels.

In 2001, ESEA was reauthorized and renamed the No Child Left Behind Act, and funding was redistributed to support its accountability provisions. NCLB was signed into law in 2002 and has had the most impact on education since President Johnson's attempt at supporting education in the 1960s. With NCLB came increased educational accountability of states and localities. This accountability involved ensuring that all subgroups achieved in reading and mathematics. States were required to develop a system for ensuring that all students made progress; the act also detailed the subgroups to be measured. Each state was required to set up a system to facilitate students' making progress each year so that by 2013-2014 100% of students would be proficient in reading and mathematics as indicated by a state measure.

This requirement led to creation of the most recent federal government initiative: Race to the Top grants. This grant program allocated \$4 billion in funding to states to support valid assessment systems that inform instruction, provide accurate information about student performance, and ensure that all students will be career or college ready when they leave high school (McGuinn, 2012). With the items enacted by Congress, the federal government currently provides approximately \$50 billion for education (Owings & Kaplan, 2013). Since the nation's early history, political leaders have deemed



education funding to be essential to the excellence and liberty necessary for the nation to be prosperous.

## **The Legal Framework of Education Finance**

### **Education Finance Litigation**

Litigation related to school finance has been occurring for more than a century. During the 1860s, the Supreme Court defined equal protection in the 14<sup>th</sup> Amendment (Owings & Kaplan, 2013). The ruling and definition focused on each state's being required to explain how taxes were distributed and how taxes were being used for different sections of the state's population (Owings & Kaplan, 2013). The court ruled that no state could deny any person the rights of the law. This ruling led to many cases including *Brown v. Board of Education* (1954). *Brown v. Board of Education* (1954) was important because it helped dismantle segregation. The case had an impact on school finance for decades to follow because states were required to desegregate schools by 1970. Furthermore, in the 1960s, almost 100 years after passage of the 14<sup>th</sup> Amendment, the equal protection clause was revisited in two court cases. *McInnis v. Shapiro* (1968) challenged the ways states were dispersing funds to localities.<sup>1</sup> The gist of this case was that states should play a larger role in ensuring that students have educational opportunities no matter the wealth of their locality, thereby allowing the focus to be on student educational need rather than locality wealth (Owings & Kaplan, 2013). The *Burruss v. Wilkerson* (1969) court case also argued the need for the state to take more ownership in education.<sup>2</sup> This case also focused on disparities among localities. The courts ruled that the 14<sup>th</sup> Amendment did not require states to provide equal funding to

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<sup>1</sup> *McInnis v. Shapiro*, 310 F. Supp. 572 (W.D.Va. 1969), affirmed, 397 U.S. 44, 90 S. Ct. 812 (1970)

<sup>2</sup> *Burruss v. Wilkerson*, 310 F. Supp. 572 (W.D.Va 1069), affirmed, 397 U.S. 44, 90 S. Ct. 812 (1970)

localities. The Supreme Court agreed with the district courts without explanation. Lack of explanation led to additional litigation in other states.

Another landmark case regarding funding in education is *Serrano v. Priest* (1976).<sup>3</sup> This state case focused on the education funding formula in California (Owings & Kaplan, 2013). Several finance factors emerged from this court case. The California Supreme Court ruled (a) that education was vital to the success of the state, (b) that the basic aid funding model in California did not equalize funding, and (c) that the disparities in schools were due to varying property wealth of the localities (Owings & Kaplan, 2013). The California Supreme Court found that the state's funding system violated the 14<sup>th</sup> Amendment and California's Constitution; the court mandated increased funding for poorer school districts in California (Alexander & Alexander, 2009).

Using the logic from *Serrano v. Priest*, a federal district court in Texas ruled that the state funding model made education quality a function of the local property tax base and that state funding was not sufficient to remediate the problem. On appeal, the U.S. Supreme Court ruled in *San Antonio Independent School District v. Rodriguez* (1973) that education was not a fundamental right guaranteed in the federal constitution.<sup>4</sup> This ruling affected school finance reform because it solidified the requirement that all funding litigation concerning equity would be handled by state courts (Owings & Kaplan, 2013).

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<sup>3</sup> *Serrano v. Priest*, 5 Cal. Rptr. 345, 601, 487 P.2d 1241 (1971), appeal after remand, 18 Cal. 3d 728, 135 Cal. Rptr. 345, 557 P.2d 929 (1976), cert. denied, 432 U.S. 907, 97 S. Ct. 2951 (1977).

<sup>4</sup> *San Antonio v. Rodriguez*, 411 U.S. 1, 93 S.Ct. 1278, rehearing denied, 411 U.S. 959, 93 S.Ct. 1919 (1973).

Education finance litigation then focused on state equity and adequacy in funding. In the *Abbott v. Burke* (1985) case, litigation took place over 3 decades.<sup>5</sup> This case was deemed to be one of the most significant cases of equity and adequacy of finance, ruling for the impoverished Abbott school district in New Jersey. The 20 court decisions finally led to the decision that the State of New Jersey had to increase the state's aid to low-income districts so that funding was equitable and adequate for all students in the state. To facilitate this requirement the court ruled that the state had to ensure that the per-pupil ratio was equitable and adequate in low socioeconomic districts in comparison to the wealthier districts in the state.

The Kentucky Supreme Court, in the case of *Rose v. Council for Better Education* (1989), focused on equity of the state's constitutional language and its educational system.<sup>6</sup> The court found that the way the system was operated did not match the state constitution's language. Furthermore, the Commonwealth of Kentucky school system was in violation of the state's constitution because of differences in monetary distribution among school districts (Alexander & Alexander, 2009). This court case also marked the first case that used the words "adequate school funding."

### **Equity Issues**

For more than 3 decades finance policy has focused on equity of funding (Springer et al., 2009). A number of states have faced and continue to face court mandates due to allegations that resources being provided to some students are not equitable or adequate (Archibald, 2006). School finance equity is defined as equal treatment of students of similar background in terms of wealth and academic needs

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<sup>5</sup> *Abbott v. Burke*, 100 N.J. 269, 495 A. 2d 376 (1985).

<sup>6</sup> *Rose v. Council for Better Education, Inc.*, 790 S.W.2d. 186 (1989).

(Springer et al., 2009). School finance adequacy is defined as sufficient resources being made available to provide all students opportunity to reach proficiency (Springer et al., 2009). Both issues have evolved from litigation over time.

Finance equity has two fundamental components: horizontal and vertical equity. Horizontal equity refers to students' receiving equal shares of funding (Owings & Kaplan, 2013). For example, students should have similar supports, such as textbooks, teacher-to-student ratio, and access to high quality curriculum, regardless of the school they attend.

The second component of equity is vertical equity. Vertical equity takes into account the differences among students. Students with different backgrounds and needs may need dissimilar funding. Consequently, what is good for one student may not be good enough for another student (Owings & Kaplan, 2013). Vertical equity allows students and schools to be funded differently, but appropriately. This process is somewhat more cumbersome because legitimate factors need to be considered in allocating resources differently based on the student population. Furthermore, to make the ultimate funding decisions educators must agree that the factors are legitimate.

Equity litigation has shifted educational funding; however, even with progress in this regard policymakers have realized more work needs to be completed (Picus & Odden, 2011). Therefore, the focus has shifted to include adequacy in education finance.

### **Adequacy Issues**

Adequacy addresses the amount of funding needed for all students to achieve (Picus & Odden, 2011). Adequacy is value driven and is defined by priorities of those in decision-making power (Owing & Kaplan, 2013). Due to this subjectivity, the amount a

school district or school needs tends to be unclear. Furthermore, there is a constant shift in the source of education funding between local and state funding as noted in Chapter 1. When localities experience fluctuations in both funding sources, instability results. Consequently, a school with adequate funding one year may experience insufficiency the next year due to fluctuations in funding. Litigation since 1989 has focused on funding adequacies and setting the rules on the constitutionality of state finance systems (Verstegen, 2002). Adequacy has been the focus for 20 years and will probably continue to be the focus because the amount of funding a district or school needs for students to be successful remains ambiguous (Owings & Kaplan, 2013).

Both equity and adequacy are finance policy targets; such policies will assist in identifying the sufficient funding needed for all students to succeed. Currently, states' education finance systems are similar to the finance systems of the 1930s industrial age. The global economy and information age call for a new finance system that anchors the cost of education in high state standards, instruction, and assessment for all students (Verstegen, 2002). This situation has resulted in many states' having their funding mechanisms challenged regarding both equity and adequacy (Springer et al., 2009).

### **Research in Education Finance and Student Achievement**

Research regarding educational funding is expansive. Education finance research has involved several models such as per-pupil expenditure to test outcomes or examination of spending practices over many decades. Some individuals oppose demands for increased educational funding based upon research indicating that increased expenditures make little difference in achievement (Hanushek, 1986). Others, however, have found that increased funding for certain school resources is related to student

achievement (Hedges et al., 1994). Many finance studies have focused on expenditures related to class size reduction, increased teacher salaries, and teacher quality. Several researchers also have focused on professional development, leadership, and instructional materials (Darling-Hammond, 2000; Phillips, 2010). The researchers were trying to ascertain whether or not these expenditures had an impact on student achievement.

The Coleman Report, also known as the Equality of Education Opportunity, was a critical study in the area of school finance. This study was funded in the 1960s by the federal government as support for the Civil Rights Act of 1964 (Owings & Kaplan, 2013). The focus of the study was equality in the educational system with regard to facilities, teacher quality, socioeconomic status, curriculum, and student achievement (Owings & Kaplan, 2013). Results indicated that schools had little effect on student performance; however, this finding was not the only reason this study is so important. It is also important because of the methodology used by Coleman; Coleman used a production function theory. Production function studies attempt to derive a relationship between inputs and outputs (Hedges et al., 1994). The desired outcome of these types of studies is the development of models that allow for prediction of the effects of a certain input on a certain output. The Coleman Report led to many additional studies in education finance and the use of the production function model (Hedges et al., 1994).

Another landmark researcher in the area of school finance and production function studies is Eric Hanushek. During the 1980s and 1990s, Hanushek published several articles that continued to support the findings from the Coleman Report. In his series of articles spanning a few decades, Hanushek used data from 38 different articles and books to focus on inputs and their effect on outcomes. He focused on inputs such as

teacher-pupil ratio, teacher experience, teacher education, administrative inputs, and facilities. In his articles Hanushek argued that there is no relationship between school funding and student achievement; however, he noted that education research is complex due to the number of research variables and the difficulty in deriving outcomes (Hanushek, 1986). Furthermore, Hanushek asserted that money is not the answer to improving student outcomes (Hanushek, 1986). As Hanushek has continued his studies, he has stated more recently that improving student outcomes depends on where the money is spent.

During these same years other researchers were completing studies that found a correlation between increased educational funding and student achievement (Hedges et al., 1994). The research focused on educational funding and labor force (Owings & Kaplan, 2013). A small group of economists conducted research projects that linked school spending and adult successes in the form of increased earnings. These links have been shown to be strong and persistent over time (Verstegen & King, 1998). Card and Krueger (1992) used earnings rather than test scores as the outcome measure and found significant relationships between spending on education and labor market outcomes.

There has been a growing body of research indicating that increased finance has an impact on improving student achievement. Hedges et al. (1994) reanalyzed Hanushek's data and found evidence to support the correlation between funding and student achievement. The study by Hedges et al., which has been described as the most exhaustive synthesis of education production functions to date, showed that money does matter. Studies have continued to have conflicting results; therefore, the debate continues.

### **Education Funding and Social Outcomes Research**

As education continues to grow more and more complex, understanding how to effectively use funding is vital. One segment of the research has indicated that funding does make a difference in certain outcomes, and other research has demonstrated that funding does not make a difference. Two aforementioned major studies, by Coleman (1966) and Hanushek (1986; 1996), found no significant effect on student achievement for expenditures. Another study, by Hedges et al. (1994), found significant effects on student achievement related to finance. The debate continued even after these studies.

#### **Class Size Reduction**

Finn and Achilles's (1990) research, which focused on class size reduction, found a significant relationship between funding and student outcomes. Finn and Achilles reported an experiment on class size in Tennessee in which students were randomly assigned to large or small classes. Their research found that lower pupil-teacher ratios related positively to student outcomes. In 2003 the American Educational Research Association furthered the study on class size by examining for consecutive years the effects of small classes on long-term achievement. The study found that minority and urban students maintained achievement even when class size increased after having consecutive years in small classes (AERA, 2003).

The research of Nyhan and Alkadry (1999) focused on class size and lower pupil-teacher ratios. Nyhan and Alkadry studied class size and socioeconomic factors and found a relationship between socioeconomic factors, not class size, and academic performance. They examined 531 schools in southern Florida and used the state achievement test data to measure the impact of class size on increasing student



achievement. Nyhan and Alkadry found that smaller class size had little to no impact on increasing student achievement.

Ilon and Normore (2006) studied class size reduction in relation to funding. They examined the relationship between lower class size and increased achievement. In addition, they wanted to determine whether or not lowering class size was cost efficient. Ilon and Normore studied Florida's statewide initiative to reduce class sizes to determine if this input was more cost effective than other inputs for education in the State of Florida. Ilon and Normore noted a limitation in past studies in that the researchers used a linear model. Use of a linear model is considered a limitation because education data are nested; therefore, a multilevel model has more reliability and validity (Osborne, 2008). Furthermore, the researchers found that experimental design models had not worked in the past. Therefore, they employed a nonexperimental design using raw data from Florida schools, including budget information. Ilon and Normore found that class size reduction in these Florida schools was the least cost effective means of raising test scores. The researchers confirmed that class size reduction was not more cost efficient than hiring teachers with higher qualification, such as master's degrees.

Hattie's 2009 meta-analysis included the variable of class size. His study concluded that the relationship between class size and student achievement is slight. One reason for this small effect related to teachers' not adopting new methods for teaching. The teachers were still using large-group strategies and therefore not optimizing the small-class opportunities such as more individualized instruction (Finn, 2002).

It seems that class size has positive effects in certain circumstance, such as being connected to improving teacher quality. Nevertheless, without both in play the billions of dollars being spent to reduce class size need to be reconsidered (Hattie, 2009)

### **Teacher Quality**

Staff qualifications and instructional quality are two areas that have been studied for decades to determine if they are related to student achievement. Bidwell and Kasarda (1975) and Phillips (2010) found that hiring highly qualified teachers resulted in a positive effect on mathematics and reading academic achievement. Bidwell and Kasarda found that high funding as well as staffing qualifications had a positive effect on academic achievement. Staffing qualification was defined in terms of college completion; funding was defined in terms of the amount a district was willing to pay teachers with high educational qualifications (Bidwell & Kasarda, 1975). Phillips indicated that smaller investments in other educational strategies, such as instructional quality, may yield achievement gains. Hedges et al. (1994) found in their research statistically reliable evidence of relationships between staff qualifications and instructional quality and increased student achievement. Darling-Hammond (2006) found that factors related to teacher quality, such as content knowledge, skillful teaching, ongoing professional development, and verbal ability, are important to student outcomes. These teacher qualities can help students overcome demographic deficits such as poverty.

Hattie's (2009) meta-analysis found that what teachers do matters for student success. In his research he examined teacher quality in terms of teacher effects, teacher influences, teacher questioning, and teaching and learning strategies. He clarified teacher effects by articulating that teachers who teach in a deliberate and visible manner make a

difference. He defined deliberate and visible teacher qualities in terms of teachers' making adjustments when learning is or is not occurring in the classroom, their setting challenging goals, and their giving students multiple opportunities to acquire and apply knowledge to meet goals. According to the findings of the research, a teacher's ability to provide appropriate questioning and teaching strategies makes a difference in student achievement. Hattie cited research from Ben-Ari and Eliassy (2003) to support the benefits of direct instruction and the research of Wiggins and McTighe (2005) to support the need for active teaching that engages students in active thinking.

Educational research consistently confirms that the quality of the classroom teacher makes an impact on student achievement.

### **Use of Fiscal Resources**

Another model that has been used to study educational spending is based on how resources are used. Research has shown that it is not the amount of money but what the funds are being used for that is important. O'Connell-Smith (2004) stated, "Schools should be held accountable for how they spend funds for student achievement" (p. 299). O'Connell-Smith studied the relationship between Minnesota student achievement scores from the Grade 8 Basic Skills Test and district spending to determine variables associated with higher levels of student academic achievement. The researcher found that increased teachers' salaries correlated to improved reading achievement scores on the Minnesota state test for eighth graders. O'Connell-Smith used Minnesota students' Basic Skills Test in mathematics and reading as a measure of achievement and district budgets as the measure of financial support. The Basic Skills Test was administered to determine student competency in mathematics and reading. O'Connell-Smith used a

two-level hierarchical model to analyze the data. This two-level process allowed the researcher to test how the district-level variable (budget) and student background affected the other variable, student achievement scores.

Biniaminov and Glasman (1983) found that school principals and site-based decision making with regard to funding had an impact on student achievement. They interviewed 20 school principals to determine where they were spending their funding. Several principals reported spending a large amount of their funding on expanding their school's educational services to have a positive impact on student achievement. Using funding to improve teacher quality and retention had positive effects for students with low-socioeconomic backgrounds; however, the researchers found that little money was spent on these areas. Biniaminov and Glasman's study found that money spent on disadvantaged students had real, positive effects on achievement in all content areas. Furthermore, retaining teachers and improving their instructional quality had a positive effect on student achievement.

Grubb (2006) examined the relationship between increased resource allocation for enriched curriculum, remedial education, and staff development and student achievement. Grubb replaced the simple one-equation, input-output model. He expanded the research to include a wider variety of resources dealing with instructional quality, such as the effectiveness of teachers, leadership, and district support in relation to the provision of the appropriate resources (Grubb, 2006). Teacher understanding of instruction and control over innovation enhanced student outcomes in math and science. Furthermore, Grubb found that teacher collaboration enhanced student outcomes.

Archibald (2006) focused on school finance adequacy in her research study. Archibald not only examined the correlation of funding and student achievement, but she also focused on four categories: instruction, instructional support, leadership, and operations and maintenance. Archibald used a program called InSite to study Washoe County School District in Reno, Nevada. She employed a three-level hierarchical linear model to analyze student data. Archibald's results indicated that instruction and instructional support were positively related to student achievement in reading.

The indecision remaining after decades of study regarding education finance and its impact clearly shows the need for another way of analyzing school spending. If funding for education continues to be researched in the same manner as in the past, findings regarding the relationship between funding and student outcomes will never be cohesive and will continue to deflect attention from the question of revenue sufficiency.

### **State High School Graduation**

#### **Graduation Rates and Human Capital**

This study will utilize state high school graduation rate as the indicator of student achievement because it is a common indicator among states. The impact of student high school graduation on society is tremendous. Student graduation affects unemployment, annual income, and tax contributions. Education is an investment in human capital (Owings & Kaplan, 2013). It is estimated that each nongraduate costs the federal government \$800,000 over the course of the person's lifetime because of unemployment, public assistance, and criminal justice (Smink & Heilbrunn, 2005). Pirim (2011) found that high school graduation is a factor that reduces unemployment. The U.S economy has become more knowledge intensive and this has increased the need for increasing high

school graduates (Pirim, 2011). This confirms the significance of investing in human capital. Lochner and Moretti (2004) estimated that increasing high school graduation by 1% would save \$2 billion by reducing costs associated with crime. Furthermore, education is a social investment that raises the standard of living by increasing spendable income (Owings & Kaplan, 2013). It has been estimated that the federal government would receive \$45 billion in extra tax revenue in 2007 if the number of high school nongraduates were cut in half (Levin, Belfield, Muenning, & Rouse, 2006).

Lochner and Moretti (2004) studied the impact of high school graduation on incarceration. The study found that the completion of 12<sup>th</sup> grade decreased incarceration rates by .76 percentage points for Whites and 3.4 percentage points for Blacks. The researchers specifically found that a 1-year increase in average education level reduced the state-level arrests by 11%. Other studies, such as the research of Lochner (2007), also focused on the reasons that education reduces crime or incarceration (Darling-Hammond, 2006; Levin et al., 2006).

Lochner found that education might affect crime in three ways. First, education raises wage rates, thereby deterring the need for committing a crime. Crime increases as unemployment rates increase, thereby increasing the cost related to crime and decreasing the revenue going into taxes for government responsibilities (Owings & Kaplan, 2013). Second, schooling can shift a person's mindset for risk taking or patience. This shift is important because students are helped in school to understand that it is important to look toward future opportunities and to recognize there is a successful path ahead if they get an education. Understanding that education can be lucrative will help the student be patient and recognize that risks associated with crime can remove their opportunities for

success in the future (Lochner, 2007). Finally, being a part of the school environment may affect a student's social networks, and research has found peers to be the most influential factor for high school students in making decisions (Lloyd, 2008). Students who join gangs are more likely to be encouraged to drop out of school and partake in criminal activities (Lochner, 2007); gang members do not consider education a way of being successful in the future. The gang lifestyle most likely will result in incarceration, thereby reducing potential benefits from education and making it more difficult for students to return to school because of the stigma associated with incarceration (Lochner, 2007). Two thirds of all incarcerated men in 1993 had not graduated from high school; this trend still stands (Lochner, 2004). Therefore, the individuals with whom high school-aged students associate play a role in whether or not the students graduate from high school or partake in criminal activity.

### **Graduation Rate as a National Focus**

Graduation rate has been a long-time focus of education. It became even more of a focal point with the most recent reauthorization of ESEA. No Child Left Behind (NCLB) requires states to use graduation rate as an academic measure for Adequate Yearly Progress (National High School Center, 2011). The federal government defined graduation rate for states as the number of students who graduate on time within a 4-year period, not including General Education Diplomas (GED) or other alternative diplomas (National High School Center, 2011). Graduation rate still is a focal point for the current political administration. States have ongoing committees to define work readiness and the graduation requirements necessary to be career or college ready (Lloyd, 2008). All 50 governors in 2005 developed and signed the National Governors Association (NGA)

Compact Rate exhibiting the hope to have a common statistical approach for reporting graduation rate (NGA, 2006). In the ever changing world, however, this effort is ongoing because states are continuing to find needs with regard to graduation rate calculation (NGA, 2006). The committees are finding that students must have certain skills to be ready for the 21<sup>st</sup> century. The follow-up report to *A Nation at Risk*, that is, *A Nation Accountable: Twenty-five Years after a Nation at Risk* (2008), noted that individuals are trying to predict what skills and competencies students will need to be productive citizens. All of these predictors relate to decisions states are making regarding the knowledge and skills students must have to graduate from high school. Also, in 2008 additional regulations and guidelines for high school graduation rates were established by the U.S Department of Education; the revised rate was called the 4-year adjusted cohort rate (Morris, 2012). The hope was that this new definition would bring more uniformity to the states' calculation of graduation rates (Morris, 2012). The federal government has supported the use of the 4-year adjusted cohort rate for federal accountability. The rate was directly related to adequate yearly progress for the 2011-2012 school year (Richmond, 2009).

### **Graduation Rate as the Outcome Variable**

High school graduation rate data have been collected over a long period of time and can support a longitudinal study. A major limitation in the overall study of educational outcomes has been collecting data necessary to examine change over time across states (Swanson & Stevenson, 2002). Utilizing state high school graduation rates will minimize the limitation of collecting data over a long period of time across all states.



Past studies were not specific or precise in that they used the national average for high school graduation rate. This study will focus on each state's fiscal effort and high school graduation rate. Each level of funding will be computed individually, thereby contributing to more specificity and validity (Owings & Kaplan, 2013). This study will use the NCES calculation method known as the average freshman graduation rate (AFGR), which endeavors to standardize data across states. The estimate for AFGR is the percentage of high school students who graduate 4 years after entering 9<sup>th</sup> grade. The calculation for the estimation involves adding the current enrollments for 8<sup>th</sup>, 9<sup>th</sup>, and 10<sup>th</sup> grades (Chapman et al., 2010). Therefore, each state will be assessed separately to determine if there is an effect on high school graduation rate based upon the state's fiscal effort. State high school graduation rate has been used in studies to demonstrate validity (Morris, 2012). In this study, using longitudinal state high school graduation rate data and state fiscal effort data will show the impact of state funding on student achievement.

### **Capacity and Effort**

Fiscal capacity is the state's ability to pay for or the funding available to support different services (Owings & Kaplan, 2013). Chervin (2007) noted that capacity is computed as a state's wealth present in Gross State Product or other measures in the existing tax base. Fiscal capacity of a state does not necessarily tell the whole story with regard to funding; fiscal effort also must be defined. Fiscal effort measures the state's ability to pay in relation to how much the state spends on different resources (Owings & Kaplan, 2013). Fiscal effort is also known as tax effort (Goodale, 2009). At the state level, using tax effort to adjust for wealth is relevant in comparing investment in human capital between states (Alexander, 2001). Therefore, fiscal capacity and fiscal effort

must be examined together to determine the areas viewed by states as fundamentally important. Fiscal effort can be used as an indicator of how much each particular state invests in education (Goldschmidt & Eyermann, 1999; Owings & Kaplan, 2013). A state's potential taxing power and its year-end budget position are two other factors that can be included in this measure of fiscal capacity (Adams, 1983). It is politically tempting to assert that states with higher capacity will maintain and increase funding for education; however, this is not always the case (Adams, 1983).

State fiscal effort as a ratio of Gross Domestic Product is an aggregate measure of a system of fiscal support in education research (Goldschmidt & Eyermann, 1999). Aggregation can capture underlying differences in a system (Goodale, 2009); therefore, measurement error is reduced. This process is useful in comparing data from multiple sources over a long period of time. This study compared 50 states in terms of state fiscal effort and student achievement outcome graduation rates. Therefore, fiscal effort, a common funding variable, allowed for a comparison among all 50 states.

Fiscal effort as a funding variable was first studied by Goldschmidt and Eyermann in 1999. Owings, however, initiated a longitudinal study of state fiscal effort in relation to student achievement outcomes, and several studies, including work by Goodale (2009), Kelly (2012), and Morris (2012), employed the same type of analysis using the fiscal effort ratio where  $E$  is fiscal effort,  $R$  is the revenue allocated for education measured as the state's per-pupil expenditure for K-12 education, and  $TB$  is a measure of wealth, the Gross State Product (GSP) on a per capita basis. The equation for effort takes the following form:  $E = R/TB$ .

It is important in finance research to use states' fiscal effort and capacity to study the effects on student outcomes over time. In general, states' educational investments controlled for inflation have remained relatively the same over the past 25 years. Murray, Rueben, and Rosenberg (2007) reported that states' investments in education have remained at 22% of the overall budget. Furthermore, it appears that data that have been averaged by the nation or the region are skewed. Variations among states range from losses of 6% to gains of 90% (Verstegen, 1994). There is a connection between states' capacity and effort in relation to quality of education (Verstegen, 1994).

### **Limitations in Current Educational Research Regarding Spending**

Studies in education finance have been inconclusive and conflicting over time. Today, however, there is consensus that the impact of funding depends on where it is spent. Some studies showed there was a correlation and others did not depending on the focus of the funding (Hill, 2008; Verstegen, 2002). There is still a need to determine how much funding is needed and where it should be focused to make a difference in student academic success (Grubb, 2006). Furthermore, previous studies tried to generalize beyond the research's scope. Although Archibald (2006) made conclusions in her research, she omitted considerations such as spending factors and multiple assessments. Smith (2004) focused on only one division, which was limiting. Archibald's limitations included focusing on only one state. The studies did not have the scope necessary to make the generalizations that were stated in the research. Card and Payne (2002) used microsamples of SAT scores from the same period to determine whether higher versus lower spending made a difference. Once again the researchers studied one variable.

Another limitation was that the studies were isolated to a few schools or a few divisions. Ilon and Normore's (2006) research involved one state and could not clearly separate the class size initiative in the state from teacher qualifications and pay. O'Connell-Smith's (2004) research involved a few divisions in Minnesota. Biniaminov and Glasman (1983) collected data from a national sample of 32 secondary schools from a total of 572; therefore, they sampled only 5.6% of the population.

Education finance research has improved over time. Studies have used more common variables. Grubb (2006) studied multiple variables and considered a wider variety of resources. Grubb used the National Educational Longitudinal Survey of the Class of 1988 to estimate some of the intermediate equations in a more elaborate system of equations, specifically those describing the effects of funding patterns on the school resources that are known to be effective. Grubb used effective strategies in the sense that they enhanced various educational outcomes including outcomes that were created in the classroom and went beyond test scores.

Recent studies were building upon each other while trying to show linkages. O'Connell-Smith (2004) cited existing research to define factors as being associated with increased student achievement, such as smaller class size, higher teacher salaries, and teachers with more experience. Further, in her study she included teacher quality because that was seen as a major variable in the 1994 study by Hedges et al. O'Connell-Smith and Card and Payne (2002) used Hanushek's (1986; 1996) research to build upon and show linkages to their studies.

There has been some success in isolating variables related to student outcomes in research. Verstegen and King's (1998) research found that former research rested on

assumptions that the production process could be modeled and that estimates could be made regarding the contributions of individual inputs to specific and measurable outcomes of schooling. Reliance on these assumptions caused a limitation because the studies made use of standardized achievement test scores and family inputs in ways that ignored variables that might have been more related to the teaching and learning process.

In conclusion, previous research studies regarding educational spending exhibited faults and limitations. These faults and limitations decreased the usefulness of the results at the system level. The research did not present a holistic picture of educational funding and its impact on student achievement. This study expanded education finance research through a longitudinal study over 25 years. This study is unique because it analyzed all 50 states and the District of Columbia over a 25-year period using a consistent indicator of graduation rate. Berman and McLaughlin (1978) noted that data must be examined over time. Examining the impact of funding, measured as effort, on graduation rates over time helped to fill the gaps in the current literature.

### **Research Questions**

As a measure of educational spending, this study examined fiscal effort instead of per-pupil expenditure, which has been used by most education finance studies. A state's fiscal capacity and effort exerted for education are factors that can be ascertained through data available for all states and the District of Columbia. Abundant research has been conducted regarding educational expenditures and the impact on student outcomes; however, the findings are becoming more conclusive that not only is funding needed but also important are the areas in which the money is spent.

The purpose of this research was to identify how fiscal effort relates to state high school graduation rates over time. This study examined state fiscal effort and improved student outcomes through state high school graduation rates, which represent a consistent measure over time. Examining the level of state fiscal effort through the lens of state high school graduation rates over time supported the identification of practices and policies associated with academic achievement.

As noted previously, this study examined fiscal effort instead of per-pupil expenditure. Fiscal effort is the ratio of a state's per-pupil expenditure to the state's Gross State Product (GSP) (Owings & Kaplan, 2013). The use of fiscal effort as a measure of educational spending added to the current research regarding education finance. Abundant research has been conducted regarding educational expenditures and the impact on education; however, these studies have many limitations. First, the studies have focused on only one school division or a single state's practices. This focus limits the research because divisions and states are vastly different in terms of wealth capacity (Owings & Kaplan, 2013). Second, the studies have covered only a short period of time; therefore, they have poor predictability and fail to show the impact of spending over time. In this study, the research focused on state fiscal effort and state high school graduation rate. The study examined data over a 25-year period. The following research questions guided the study:

1. What were the trends in state fiscal effort in the United States over 25 years, 1986-2010?
2. What were the trends in state high school graduation rate in the United States over 25, 1986-2010?

3. What is the relationship between increasing state fiscal effort and state graduation rates in the United States over 25 years, 1986-2010?
4. What is the relationship between decreasing state fiscal effort on state graduation rates in the United States over 25 years, 1986-2010?

## **CHAPTER 3**

### **METHODOLOGY**

#### **Introduction**

Chapter 3 presents the methodology for this study, including an overview of the study's purpose and research questions as well as information about the sample and variables. The chapter includes description of the study design and data collection process. Data analysis and strengths and limitations are explained in this chapter. The chapter concludes with a detailed rationale and summary of the study.

This longitudinal study identified how state fiscal effort relates to academic achievement and improved student outcomes over a 25-year period. Analysis of state fiscal effort and its correlation to state high school graduation rate, which was the student outcome variable, was the focus of the study. Examining state high school graduation rate through the lens of state fiscal effort and time supported identification of funding practices and policies associated with academic achievement. Fiscal effort was calculated for all states; high school graduation rate is an indicator that all states report. This longitudinal correlational study used preexisting data and is therefore nonexperimental in design. When there are potential issues regarding ethics or morals, using preexisting variables is appropriate (Lord, 1973). Both variables, independent and dependent, are preexisting.

#### **Sample**

This study focused on the fiscal efforts and high school graduation rates of all 50 states and the District of Columbia. Graduation rate served as the criterion variable of the study. The participants included students that graduated between 1986 and 2010. The federal government requires that all states to be accountable for the percentage of



students graduating from high school (NCLB, 2002). Graduation rate reports included aggregate data for a large number of students, not individual students.

### **Variables**

The hypothesis was that increased fiscal effort over a period of time will be associated with increased states' high school graduation rates and decreased fiscal effort over time will be associated with decreased states' high school graduation rates. Therefore, the research questions focused on the relationship between increasing or decreasing state fiscal effort on state graduation rates in the United States over 25 years, from 1986 to 2010. The predictor variables in this study were state fiscal effort and time; the criterion variable was high school graduation rate.

#### **Predictor Variables: Fiscal Effort and Time**

Fiscal effort, which was one of the predictor variables in this study, refers to the states' funding effort toward education and other areas. A state's capacity and the percent that is allocated to education demonstrate the state's effort toward education (Owings & Kaplan, 2013). Each state determines how much of its money will be invested in education, in other words, how much the state values education (Kelly, 2012). State fiscal effort as a ratio of Gross Domestic Product is an aggregate measure of a system of fiscal support in education research (Goldschmidt & Eyermann, 1999). Aggregation can capture underlying differences in a system (Goodale, 2009); therefore, measurement error is reduced. This process was useful in comparing data from multiple sources over a long period of time. Fiscal effort, a common funding variable, allowed for a comparison among all 50 states and the District of Columbia.

Owings and Kaplan's (2013) definition of fiscal effort was used; in the formula,  $E$  is fiscal effort,  $R$  is the revenue allocated for education measured as the state's per-pupil expenditure for K-12 education, and  $TB$  is a measure of wealth, the Gross State Product (GSP) on a per-capita basis. The equation for effort takes the following form:

$$E = R/TB.$$

Effort then was represented by the total state spending per pupil divided by the GSP per capita (Owings & Kaplan, 2013). By using GSP the researcher controlled for variances in the economy (Owings & Kaplan, 2013). The variances were included in the Gross State Product figures. Owings and Kaplan's fiscal effort controlled for both wealth and size of the state.

It is important in finance research to use states' fiscal effort and capacity to study the relationship with student outcomes over time. In general, states' investments in education controlled for inflation have not increase substantially over the past 25 years. Murray et al. (2007) reported that states' investments in education have remained at 22% of the overall budget. Furthermore, according to Kelly (2012), data that have been averaged by the nation or the region are skewed. Verstegen (1994) found that variations among states ranged from losses of 6% to gains of 90% when looking at states individually. Verstegen also reported a connection between states' capacity and effort in relation to quality of education.

### **State High School Graduation Rate**

High school graduation rate was a common variable among all states and served as the criterion variable in this study.

This study utilized the NCES calculation method known as the average freshman graduation rate (AFGR), which endeavors to standardize data across states. The estimate for AFGR is the percentage of high school students who graduate 4 years after entering 9<sup>th</sup> grade. The AFGR is calculated by adding the 3 years of enrollment in the 8<sup>th</sup>, 9<sup>th</sup>, and 10<sup>th</sup> grades (Chapman et al., 2010). Therefore, each state was assessed separately to determine if the state's fiscal effort has an effect on high school graduation rate.

### **Study Design**

Repeated measures analysis was conducted using SPSS to assist in answering Questions 1 and 2 to identify the trend in state fiscal effort and state high school graduation rate over time.

Additionally, multiple regression analysis was used to identify the overall fit of the model in contribution to the relative value of the predictors in total variance. This type of regression model is used frequently for education data sets (Elmore & Woehlke, 1996); it is an extension of simple linear regression. This analysis allowed the researcher to predict the value of a variable in relation to another variable. Specifically, regression analysis helped to identify how the value of the criterion variable changed when any one of the predictor variables was varied (Aiken & Stephen, 1991). Therefore, the researcher was able to determine the relationship between the best fit line and the slopes and intercepts for the variables over time.

Furthermore, repeated measures ANOVA was utilized to examine Questions 3 and 4 to determine if there is a relationship between sustained increasing or decreasing state fiscal effort and increasing and decreasing state high school graduation rate.

Repeated measures ANOVA determines whether there has been change over time in the

means of the variables in the study. The criterion variable was continuous and the predictor variables were categorical. Therefore, it was appropriate to use repeated measures ANOVA to explore Questions 3 and 4 of this study.

### **Data Collection**

Data for this study have already been created and are available to the public. State high school graduation rate data were drawn from the Digest of Education Statistics through the website [http://nces.ed.gov/programs/digest/d10/tables/dt10\\_111.asp](http://nces.ed.gov/programs/digest/d10/tables/dt10_111.asp). This website was used to collect the data that were analyzed through multiple regression analysis for all 50 states and the District of Columbia by year, beginning with 1986 and ending with 2010.

Fiscal effort data were collected for all 50 states and the District of Columbia using the following equation:  $E = R/TB$ , in which  $E$  is fiscal effort,  $R$  is the amount of money spent for elementary and secondary education per pupil for the state, and  $TB$  is the measure of wealth determined by the Gross State Product (GSP) on a per capita basis (Owings & Kaplan, 2013). The per-pupil expenditure data were found on the Education Finance Statistics Center's website: <http://nces.ed.gov/edfin/>. The GSP is available from the United States Bureau of Economic Analysis website: <http://www.bea.gov/>. Owings and Kaplan's publicly available data base, which was used in this study, included fiscal effort data collected over a 25-year period.

### **Data Analysis**

The data were analyzed using two methods: multiple regression analysis and repeated measures ANOVA. SPSS statistical software was utilized. The first level of analysis conducted was to verify that the data set met the eight assumptions required for

multiple regression analysis to produce valid and reliable results. The second level of analysis involved the use of repeated measures to identify the intercepts and slopes in terms of whether state fiscal effort and high school graduation rate were increasing or decreasing over the 25-year period for all 50 states and the District of Columbia. This analysis answered Questions 1 and 2 of this study. The repeated measures cubic equation used to answer Question 1—to determine whether fiscal effort was increasing or decreasing over the 25-year period for the United States was:

$$FE = I + t + t^2 + t^3 + e$$

FE signified the fiscal effort in this study which was a predictor variable. *I* represented the intercept and *t* represented time the other predictor variable in the study. Finally, the error term “*e*” was the expressive error in predicting the value of fiscal effort.

The repeated measures quadratic equation used to answer Question 2—to determine whether state high school graduation rate was increasing or decreasing over the 25-year period for the United States was:

$$GR = I + t + t^2 + e$$

GR represented graduation rate in this study which was the criterion variable. *I* represented the intercept and *t* signified time a predictor variable in the study. Finally the error term “*e*” was the expressive error in predicting the value of graduation rate.

In the second analysis, *Y* represented the criterion variable, high school graduation rate; *X* the predictor variable, time; and *m* the slope. This analysis was used to answer the third and fourth research questions. The analysis provided the average state fiscal effort and average state high school graduation rate for the United States. Subsequently, multiple regression analysis was conducted and examined for each state, to determine

whether state fiscal effort and time in relation to state high school graduation rates were increasing or declining. The state's intercept and slope were used to determine the increase or decline of each variable over time.

Additionally, the assumptions related to repeated measures ANOVA were met. First, sphericity, also known as homogeneity of covariance, was tested to determine if the levels of variance between each set of different scores of the repeated measures were comparable (Girden, 1992). The Mauchly's Test was implemented to determine if sphericity had been violated (Kinnear & Gray, 2011). The box test was conducted to determine if the different categories had all been sampled from the same population (Kinnear & Gray, 2011).

Repeated measures ANOVA was used to examine change in the data over time to determine if there was an association between state fiscal effort and state high school graduation rate. Furthermore, this design examined the interaction effect between the variables fiscal effort and time combined and state high school graduation rates (Morris, 2012).

### **Strengths**

Longitudinal studies have advantages over cross-sectional data because differences between subjects and within subjects can occur (Osborne, 2008). Furthermore, several researchers have suggested that longitudinal data can be investigated first by analyzing patterns of change within units over time and then relating these patterns between variables (Hofmann, Griffin, & Gavin, 2000). Data were examined over 25 years in this study; therefore, patterns were analyzed. Another strength of this study was the use of national data that was common among all states. Data

collected from this study added to the current literature because of the longitudinal nature of the study and the ability to generalize the analysis.

## **CHAPTER 4**

### **RESULTS**

The purpose of this study was to examine the relationship between state fiscal effort and state high school graduation rate over a 25-year period. To increase the generalizability of the study all 50 states and the District of Columbia were examined. Data were collected and analyzed for a 25-year period from 1986-2010.

#### **Chapter Overview**

This chapter presents the findings of this longitudinal study. The researcher conducted a descriptive analysis of the data and examined the data set to ensure that assumptions were met for both multiple regression analysis and repeated measures ANOVA. Average state fiscal effort and average state high school graduation rates were identified for both the United States as a whole and for each state individually. Additionally, the data were analyzed to identify sustained positive or negative slopes for both variables over time using multiple regression analysis. Finally, repeated measures ANOVA was conducted and analyzed to determine if there was an association between state fiscal effort and state high school graduation rate over the 25 years of data.

#### **Descriptive Analysis of Variables**

Descriptive analysis was conducted for all 50 states and the District of Columbia using SPSS software. For each state the maximum, minimum, and mean were calculated for each variable. Furthermore, standard deviation from the mean was calculated to identify how much variation from the average existed. The data showed low standard deviation overall for fiscal effort, indicating that data points tended to be very close to the expected value. Standard deviation for graduation rate was higher, which indicated that



the data points were spread over a larger range of values. Table 1 presents the summary data in the form of maximum, minimum, and standard deviation.

Table 1. *Descriptive Statistics*

	<i>N</i>	Minimum	Maximum	Mean	Standard deviation
Fiscal effort	1275	.1512	.4048	.233442	.0438484
Graduation rate	1275	49.7	91.4	75.324	7.7349
Valid <i>N</i> (listwise)	1275				

SPSS software was used to test for six of the eight assumptions for multiple regression analysis. The other two assumptions were verified previously because those assumptions dealt directly with the data set. First, the data set was reviewed to ensure the data were measured on a continuous scale. Second, the data set included two or more independent variables. SPSS software was used to conduct the Durbin-Watson statistic along with tests for homoscedasticity and multicollinearity. Furthermore, SPSS scatterplots were used to determine the existence of a linear relationship, and the residuals for the data set were examined to ensure there were no significant outliers. Additionally, the residuals were reviewed for normal distribution. The data set met all of the assumptions; therefore, multiple regression analysis was appropriate for this study.

The assumptions related to repeated measures ANOVA were also reviewed in examining the data set. The Mauchly's test of sphericity was conducted and resulted in approximate  $X^2(299) = 1585, p < .05$ . Because the  $p$  value for the Mauchly's test is less

than .05, the Greenhouse-Geisser corrected degrees of freedom were used to test for statistical significance.

### **Fiscal Effort for the United States Over Time**

One of the goals in this study was to determine the trend in state fiscal effort over a 25-year period. A repeated measures analysis was conducted using SPSS software. A preliminary analysis was conducted to test the assumptions related to repeated measures. Furthermore, diagnostics were conducted to determine if the data fit the model of regression. First, a block entry was conducted to examine the slope of fiscal effort over the 25-year period. When state fiscal effort was observed using the linear model the slope for the time observed was less than one. Therefore, the increases and decreases in fiscal effort over the 25-year period were slight.

A quadratic model and a cubic model were used to examine the data further. Additionally, an *R* squared change test was conducted. The *R* squared test revealed that the cubic model best fit the examination of state fiscal effort data over the 25-year period. Conducting this analysis revealed that between 1986 and 1991 there was a slight increase in state fiscal effort, occurring at a slow rate. From 1991 to 2001, the graph showed almost a straight line, thereby indicating no increase or decrease in state fiscal effort. The last 10 years of data, from 2001 to 2010, revealed an accelerated increase in state fiscal effort. Figure 5 depicts the scatterplot and fit line for the trend in state fiscal effort over a 25-year period. Each variable also was input individually to determine if the variable created any change to the fit line. Inputting the variables individually did not have an effect on the fit line and results of the data analysis.

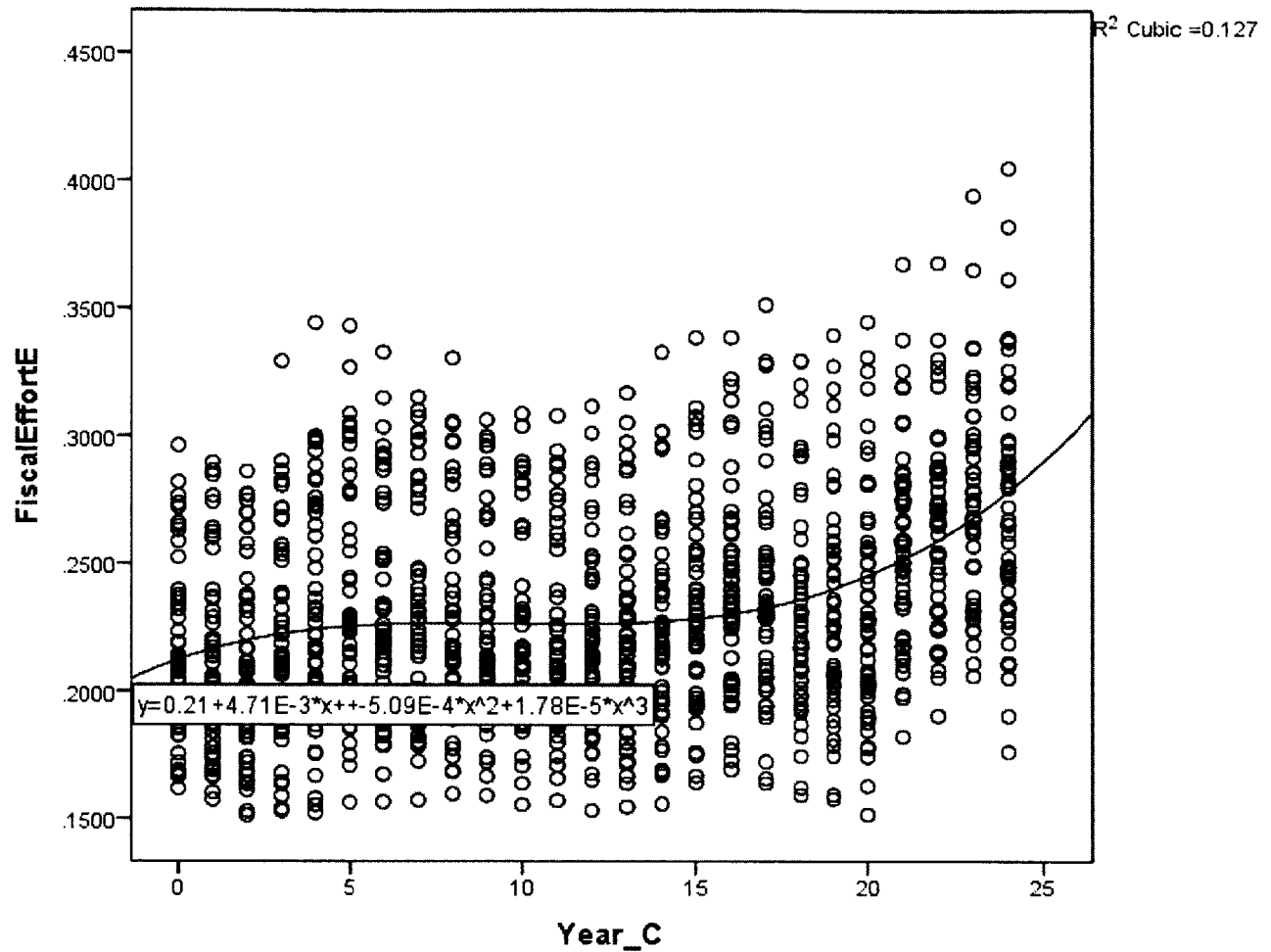
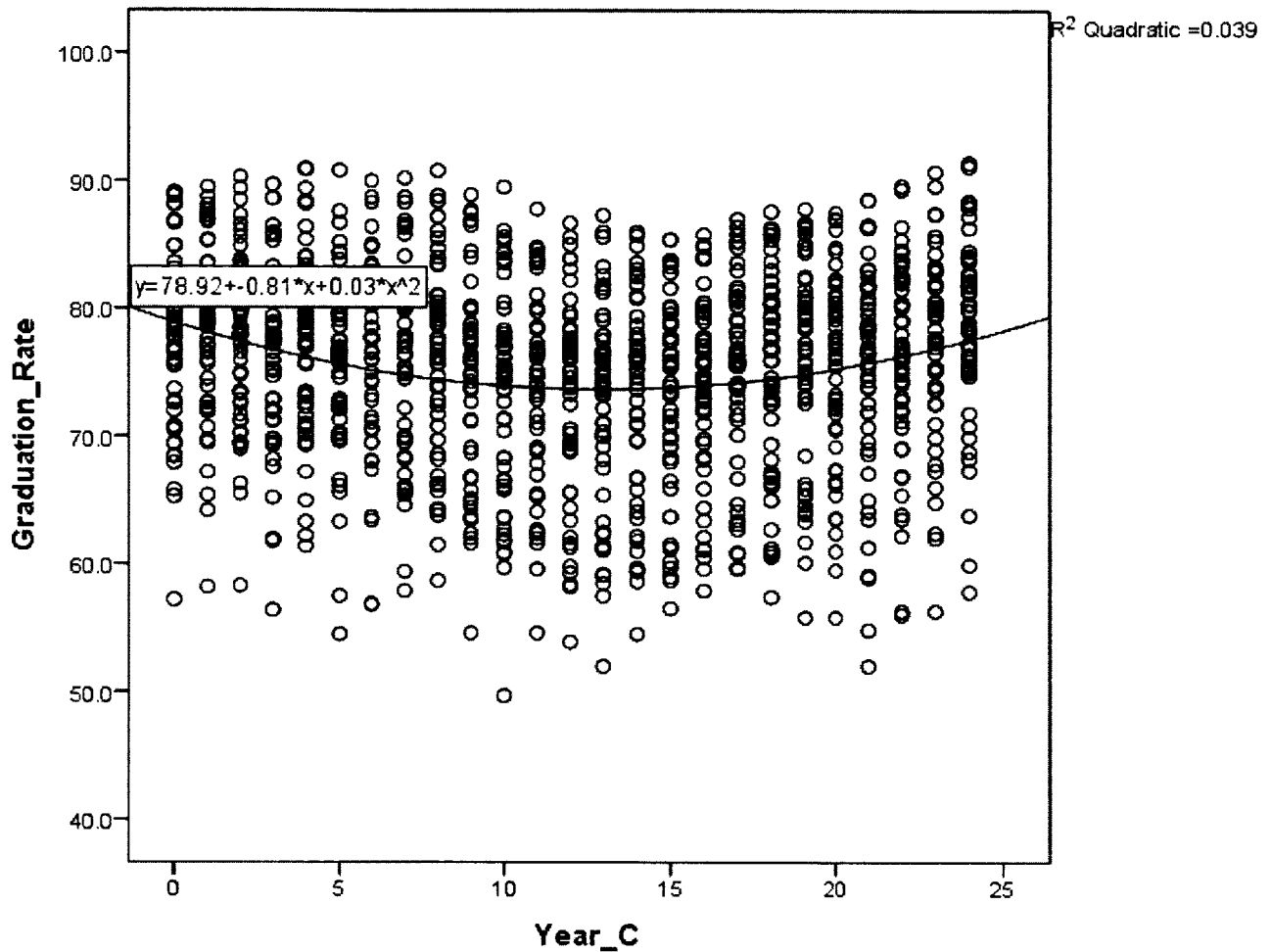


Figure 5. Scatterplot and fit line for the trend in state fiscal effort over a 25-year period.

### High School Graduation Rates for the United States Over Time

To determine the trend in high school graduation rates from 1986-2010 a repeated measures analysis was conducted using SPSS software. Block entry of the data was completed; then each variable was inputted individually to see if any change to the  $R$  squared occurred. The quadratic model was the best fit for this data set. The data revealed a slight decrease in graduation rates from 1986 through 2001. In 2001, state high school graduation rates began to increase at a very slow rate, continuing through

2010. Figure 6 depicts the scatterplot and fit line for the trend in state high school graduation rate over the 25-year period examined.



*Figure 6.* Scatterplot and fit line for the trend in state high school graduation rate over a 25-year period.

### State Fiscal Effort and State High School Graduation Rate Slopes

An analysis was conducted for all 50 states and the District of Columbia to determine which states had a sustaining positive slope or negative slope for state fiscal effort. This status was determined by the slope of the best fit line over the entire data set

from 1986-2010. Of the 50 states, 46 had a sustained a positive slope over the 25-year period. The District of Columbia had a sustained negative slope over the 25-year period.

The researcher conducted an analysis for all 50 states and the District of Columbia to determine which states had a sustaining positive or negative slope for overall high school graduation rate. This statistic was determined by the slope of the best fit line over the entire data set from 1986-2010. Of the 50 states, 31 had a sustained negative slope over the 25-year period. The District of Columbia had a sustained positive slope over the 25-year period. (See Appendix A.)

Further analysis of the data revealed that 18 states each reflected an increasing state fiscal effort slope and an increasing state high school graduation rate slope. Montana and Colorado each showed a decreasing state fiscal effort slope as well as a decreasing state high school graduation rate slope. Arizona, Florida, and the District Columbia reflected opposite trends. Each of these states showed the fiscal effort slope decreasing while the state high school graduation rate slope was increasing. Finally, the data analysis revealed that 28 states showed an increasing state fiscal effort slope and a decreasing high school graduation rate.

### **Patterns in the Fiscal Effort Slope and State High School Graduation Rate**

To address the second and third research questions, average fiscal effort, slope for fiscal effort over time, and average state high school graduation rates were examined further through the use of SPSS. With SPSS a median split was used to categorize each state as a high or low fiscal effort state and to categorize the states based on their fiscal effort over time (i.e., slope). Each state was classified as having a high positive or a low positive or negative slope based on the pattern of its fiscal effort over 25 years. High and

low fiscal effort states were defined according to the average fiscal effort of the state. There were 26 states with high fiscal effort slopes ( $n = 26$ ) and 20 states with low fiscal effort slopes ( $n = 20$ ). Because there were only 5 states with negative slopes, these states were combined with the low positive states.

After the states were categorized as having a high positive or a low positive or negative fiscal effort slope, a  $t$ -test was run to compare the average graduation rate between the two groups to determine if there was a relationship between the pattern of fiscal effort over 25 years and graduation rate. The average graduation rate for states that had a high positive slope (i.e., a trend of increasing fiscal effort over 25 years) was 75%. The average graduation rate for states that had a low positive slope or a negative slope (i.e., a trend of small increases or decreases in fiscal effort over 25 years) had an average graduation rate of 76%. Results indicated no significant difference between the states in average graduation rate,  $t(49) = -.30, p = .77$ .

To take this a step further, the average graduation rate was analyzed based upon the actual slope pattern rather than the median split. The slope patterns were defined with the following parameters: high slope, 4.00 or above; medium slope, 2.00-3.99; low slope, up to 1.99; negative, any negative slope.

Table 2 depicts graduation data for the states according to fiscal effort. High fiscal effort was defined as a sustained increasing slope over the 25-year period; high fiscal effort states generated the highest high school graduation rates over the 25-year period ( $M = 79\%$ ). Negative fiscal effort was defined as a sustained decreasing slope over the 25-year period; states with negative fiscal effort generated the lowest state high school graduation rates over the 25-year period ( $M = 71\%$ ).

Table 2. *State Graduation Rates According to State Fiscal Effort*

Slope group	Graduate rate average				
	Mean	N	Standard deviation	Minimum	Maximum
High	78.5766	13	7.21082	64.64	87.01
Low	77.4988	10	6.81053	67.63	86.90
Moderate	73.5254	23	5.84299	62.89	80.25
Negative	70.7984	5	9.61049	58.43	83.14
Total	75.3247	51	7.10434	58.43	87.01

To investigate further, the researcher conducted a crosstabulation in SPSS using fiscal effort slope and level of fiscal effort (high effort or low effort) based upon the average. This process categorized each state as high or low fiscal effort and high or low or negative slope. Table 3 depicts the crosstab results. A chi square analysis was run to determine whether there was a significant association between fiscal effort and the fiscal effort slope. Results showed that the association between variables was not significant,  $\chi^2 = .96$ ,  $p = .33$ . Therefore, there is no significant difference between the expected and observed result.

Table 3. *Crosstabulation of Fiscal Effort Category and Fiscal Effort Slope*

		25-year average fiscal effort category		
		Low effort	High effort	Total
Slope group	High	11	15	26
	Low or negative	14	11	25
Total		25	26	51

Frequencies were calculated to identify each state as high fiscal effort slope and high fiscal effort, high fiscal effort slope but low fiscal effort, low fiscal effort slope and low fiscal effort, or low fiscal effort slope but high fiscal effort. The data revealed that the states with low fiscal effort but increasing slopes had the lowest average graduation rates. Furthermore, states with high fiscal effort and increasing slopes had the highest graduation rates. States in each group are identified in Appendix A.

Table 4 depicts mean state graduation rates according to fiscal effort. The data revealed that states with high average effort and increasing slopes generated the highest average state graduation rate over the 25-year period examined ( $M = 76.8\%$ ). States with high fiscal effort but decreasing slopes generated a similar but slightly lower average state high school graduation rate ( $M = 76.3\%$ ). States with low fiscal effort but increasing slopes over the 25 years had the lowest average state high school graduation rate ( $M = 72.6\%$ ); those with low fiscal effort and decreasing slopes showed an average state graduation rate of 75.1%. Statistical significance tests were not conducted due to the small numbers of states in each group, but the pattern may warrant further research



and may highlight the importance of both the trend in fiscal effort over time as well as the actual level of fiscal effort.

Table 4. *Mean State Graduate Rate by State Fiscal Effort*

Fiscal effort category for states with increasing effort slopes	Graduate rate				
	Mean	<i>N</i>	Standard deviation	Minimum	Maximum
Low effort	72.6051	11	8.32537	62.89	87.01
High effort	76.8072	15	6.67666	62.96	86.05
Total	75.0294	26	7.56113	62.89	87.01
Fiscal effort category for states with decreasing effort slopes					
Low effort	75.0866	14	5.54735	67.63	86.90
High effort	76.3258	11	8.24729	58.43	86.12
Total	75.6318	25	6.73822	58.43	86.90

### Multiple Regression Analysis

Multiple regression analysis was conducted to help answer the following question: Do sustained increases or decreases in state fiscal effort have a relationship with increasing or decreasing state high school graduation rate? Using SPSS software, multiple regression analysis was conducted with time and fiscal effort serving as the predictor variables and state high school graduation rate as the criterion variable. As noted previously, the data were analyzed to ensure the data set met the necessary assumptions. Examination of the data presented in Table 5 shows that the probability of

the  $F$  statistic (23.163) for the overall regression relationship was  $< 0.001$  or equal to a level of significance of 0.05. Therefore, the null hypothesis of no relationship between the set of predictor variables and the criterion variable was rejected. There was a statistically significant relationship between the set of predictor variables and the criterion variable; however, it was a weak predictor as shown by the high number for the residual. Therefore, much of the variance in graduation rate data cannot be explained by time and fiscal effort. Moreover, Table 5 shows that the multiple  $R$  for the relationship between the variables is .188, thereby indicating a weak correlation.

Table 5. *Multiple Regression Analysis Results*

Model	Sum of squares	$Df$	Mean square	ANOVA <sup>a</sup>					
				$F$	Sig.	$R$	$R$ square	Adjusted $R$ square	Standard error of measurement
Regression	2684.331	2	1342.166	23.163	.000 <sup>b</sup>	.188 <sup>a</sup>	.035	.034	7.6121
Residual	73472.881	1268	57.944						
Total	76187.212	1270							

a. Dependent variable: Graduation rate

b. Predictors: (Constant), Year, Fiscal effort

Table 6 shows the relationship of the individual predictor variables to the criterion variable. The  $b$  coefficients associated with the strength of fiscal effort and time showed that fiscal effort and time both had a statically significant relationship with state high school graduation rate because the  $b$  coefficient was less than or equal to the level of significance of 0.05. Furthermore, time had a negative association (-.120), thereby indicating an inverse relationship with state high school graduation rate. The numeric

value was considered low; therefore, the strength was stronger. The opposite was shown for state fiscal effort, however: State fiscal effort had a higher numeric value (33.6); therefore, the strength was weaker.

Table 6. *Relationship Between Independent Variables and Dependent Variable*

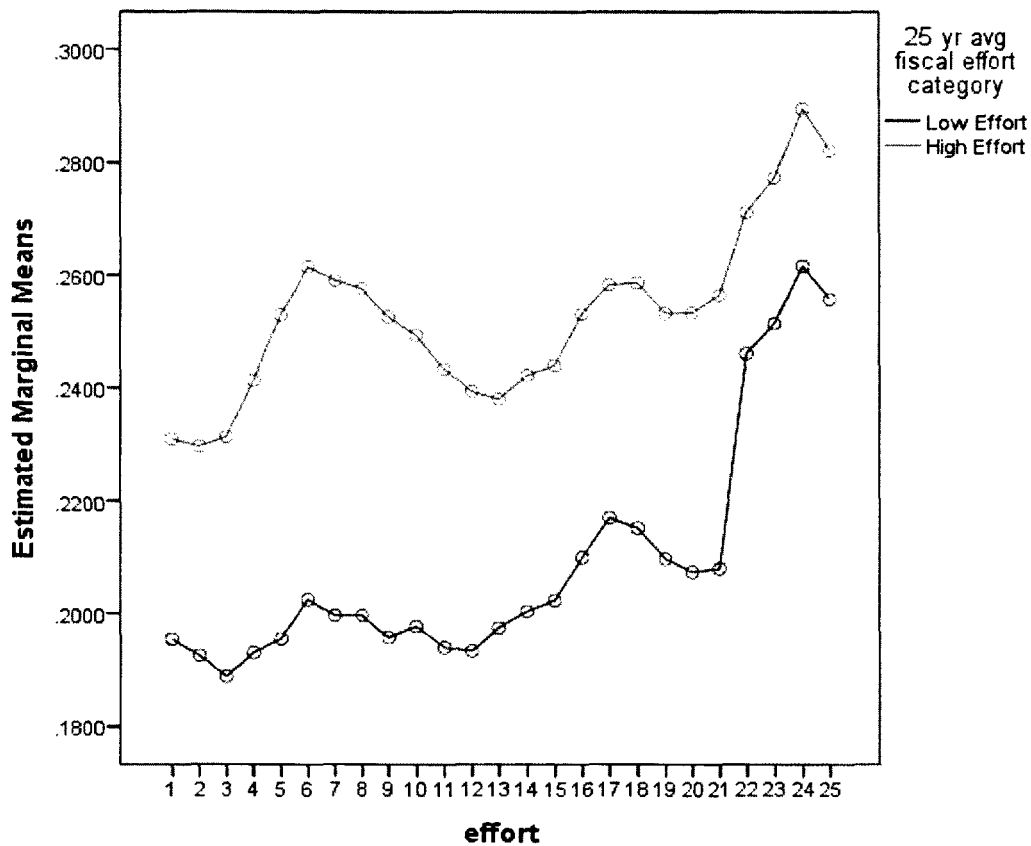
	<i>B</i>	Standard error	Beta	<i>T</i>	Sig.	Tolerance	<i>B</i>
(Constant)	68.923	1.168		59.014	.000		
Fiscal effort	33.694	5.173	.189	6.513	.000	.907	1.103
Time	-.120	.031	-.112	-3.869	.000	.907	1.103

Dependent variable: Graduation rate

### Repeated Measures ANOVA

Based upon the results from the multiple regression analysis, the data were examined to determine if the interactive effect of state fiscal effort and time combined had an association with state high school graduation rate over time. A repeated measures ANOVA was conducted; examination of the main effects showed statistically significant results ( $p = .001$ ), including a statistically significant effect for time with regard to both variables ( $p < .05$ ). Both high fiscal effort states and low fiscal effort states reflected increased graduation rates across the 25 years studied. Further, both the high fiscal effort states and the low fiscal effort states showed a trend of increasing fiscal effort. Main effect results showed a statistically significant effect ( $p = .001$ ) with increasing high school graduation rate. In 2010, there was a decrease in fiscal effort for both high fiscal effort states and low fiscal effort states as depicted in Figure 7. The data in Figure 7

indicate that, over time, when fiscal effort reflected sustained increases, the gap in high school graduation rates between low fiscal effort states and high fiscal effort states was narrowed.



*Figure 7.* Trend lines in fiscal effort for low effort fiscal states and high effort fiscal states.

### Summary

The hypothesis that sustained increases or decreases in state fiscal effort would have an impact on increases and decreases in state high school graduation rate was supported in the results presented in this chapter. Initially, when one year at a time was

examined for increasing or decreasing slope, the analysis showed that states with increasing fiscal effort had decreasing graduation rates; states with decreasing fiscal effort had increasing high school graduation rates. Fiscal effort and graduation rates increased and decreased comparably for some states; therefore, fiscal efforts for one year alone varied in results by state. Nevertheless, the results did reveal that a certain threshold of fiscal effort and increasing fiscal effort slope over the 25-year period did result in a higher average high school graduation rate. Furthermore, the data revealed that the lowest fiscal effort states, even with sustained increasing slopes, generated lower average high school graduation rates. The sustained increase may be due to the low-graduation states' trying to put funding toward education to increase graduation rates but not meeting the necessary fiscal effort threshold for their students. Moreover sustainment of increasing fiscal effort over time resulted in both high fiscal effort and low fiscal effort states' improving their high school graduation rates. At one point, between 2005 and 2009, low fiscal effort states' sustainment of increased funding narrowed the high school graduation gap between those states and high fiscal effort states.

## **CHAPTER 5**

### **DISCUSSION**

#### **Chapter Overview**

The purpose of this study was to examine state fiscal effort and state high school graduation rates over a 25-year period in an effort to determine the relationship between the two variables. The first chapter included a description of the funding for public education, information about the educational history and significance of the study, the research questions, a description of the methodology, and the delimitations. The second chapter presented a comprehensive review of literature related to education finance and high school graduation rate. The third chapter explained in detail the methodology used in the study. Chapter 4 included an analysis of the data set over a 25-year period for all 50 states and the District of Columbia. Finally, in Chapter 5 the results of the study and its impact on education are discussed. Chapter 5 also includes delimitations of the study and possibilities for future research.

#### **Overall Discussion**

Currently, there is a vital gap in research concerning education fiscal policy and its impact on student achievement (Owings & Kaplan, 2013). Education finance is a national policy focus because of its effect on the economy. Funding is also a focal point because of the controversial nature of some research findings, such as the Coleman Report (1966) and Hanushek's (1986) conclusion that spending and student achievement are not related. Since the Coleman Report, research has examined various educational spending practices and their effects on factors related to student achievement, such as class size, teacher quality, and professional development, using production function

research. Research has shown that certain factors related to spending, such as teacher quality, make a difference in student achievement (Owings & Kaplan, 2013).

Nevertheless, education fiscal policy is a topic that is still debated because of the lack of research to end the controversy.

Equality, equity, and adequacy have been defined over time in education finance research. Many people confuse equality and equity; they are very different terms. Equality involves treating everyone the same. Equity involves ensuring that everyone gets the treatment they need. There are two types of equity: horizontal and vertical. Horizontal equity has been defined simply as meaning that students equally positioned in socioeconomic status and academic need should be treated equally with regard to funding. For example, students in the same district with the same needs should receive the same funding, curriculum, and instructional materials. Vertical equity refers to the notion that everyone is not equal and therefore should not be treated equally (Owings & Kaplan, 2013). For example, students with disabilities should be treated differently from regular needs students because they have different learning needs. Adequacy has been defined as the level of educational resources needed to provide all students with what they need to succeed (Rebell, 2009). Adequacy involves sufficient funding for educational programs and requires some subjectivity. Inequities and inadequacy of funding lead to lack of necessary resources for students to be successful in school. These inequities and lack of adequacy are reflected in the quality of teachers (Darling-Hammond, 2011). Teacher quality is a school variable that has a positive influence on student achievement, and if the lack of equitable or adequate funding causes this to decline, it affects students' ability to succeed in school (Hattie, 2009; Owings & Kaplan,

2013). Expanding the current knowledge base about school funding practice and its impact on student achievement can support effective decision making with regard to state education expenditures. Therefore, it was necessary to examine the relationship between state funding and student outcome variables.

To enhance the existing literature, this study examined the relationship between state fiscal effort and high school graduation rate over a 25-year period. Examining the amount of state fiscal effort through the lens of state high school graduation helped to identify practices and policies associated with academic achievement. The use of the state fiscal effort ratio was needed because without comparison of the state education revenue against the tax base, only revenue would be considered. In that case, a wealthy district, simply by spending slightly more money would appear to be expending more because of the larger budget (Owings & Kaplan, 2013). Using the effort formula showed how much of a state's wealth was earmarked for education. Furthermore, by using GSP the researcher controlled for upturns and downturns in the economy. The economic variances were accounted for in the GSP figures. Fiscal effort controlled for both wealth and size of the state.

The research questions included the following:

1. What are the trends in state fiscal effort in the United States over 25 years, 1986-2010?
2. What are the trends in high school graduation rate in the United States over 25 years, 1986-2010
3. What is the relationship between increasing state fiscal effort on state graduation rates in the United States over 25 years, 1986-2010?



4. What is the relationship between decreasing state fiscal effort on state graduation rates in the United States over 25 years, 1986-2010?

The statistical procedures selected for this study were multiple regression analysis and repeated measures ANOVA, using SPSS statistical software. Multiple regression analysis allowed for determination of the predictor variables that were related to the criterion variable. Specifically, regression analysis helped identify how the value of the criterion variable changed when any one of the predictor variables was varied. Regression analysis estimated the conditional expectation of the criterion variable given the predictor variables (Aiken & Stephen, 1991). Repeated Measures ANOVA allowed for analysis of changes in the means over time.

The study utilized long-term trend analysis to examine data over a 25-year period. Long-term trend analysis allowed for more accurate examination of the impact of state fiscal effort on high school graduation rate. Longitudinal studies show normal growth and trends. The effects of growth and trends were assessed by examining the slope as related to regression.

### **Discussion of Results**

The overall findings did support a relationship between state fiscal effort and state high school graduation rate over the 25 years included in the data set. The multiple regression analysis showed a weak but statistically significant relationship between the variables. The *b* coefficient associated with the strength of fiscal effort and time showed that fiscal effort and time both had a statistically significant relationship with state high school graduation rate because the *b* coefficient was less than or equal to the level of significance of 0.05. Furthermore, time had a negative association (-.120), thereby

indicating an inverse relationship with state high school graduation rates. Therefore, a positive change in one unit of X (time) was a slight negative change in one unit of Y (graduation rates). Because the numeric value was lower, the strength was stronger. An opposite finding was shown for fiscal effort. As fiscal effort increased over the 25-year period so did high school graduation rates. Fiscal effort had a higher numeric value (33.6); therefore, the strength was weaker. These results should impact education finance policy because they show that sustained fiscal effort over time matters. These results are notable because it shows that time and fiscal effort have a relationship with high school graduation rates. Policy makers and educators need to know these results to influence the political context and ensure that fiscal effort is sustained as a part of state policy. As legislators, policy makers, and educators advocate towards sustained fiscal effort and as graduation rates increase personal income and tax revenue will increase while social service costs will decrease. This will help ensure the prosperity of the United States of America.

The probability of the *F* statistic (23.163) for the overall regression relationship was  $< 0.001$  which met the level for significance. Therefore, the null hypothesis stating that there was no relationship between the set of predictor variables and the criterion variable was rejected. There was a significant relationship between the set of predictor variables and the criterion variable; however, it was a weak predictor as shown by the high number for the residual (57.94). As such, much of the variance in high school graduation rates cannot be explained by time and fiscal effort alone.

By examining fiscal effort the researcher examined the overall funding toward education. However, this study's examination did not examine the various budget

categories to which the funds was allocated and spent. This was important to recognize because past research has shown that where the money is spent has important implications for student achievement. For example, researchers agree that spending money to improve teacher quality has a positive impact on student achievement (Hattie, 2009). However, there is still controversy over whether or not class size reduction has a positive impact (Hattie, 2009; Ilon & Normore, 2006; Nyhan & Alkadry, 1999). While Table 5, presented in Chapter 4, showed that the multiple  $R$  was .188 for the relationship between the variables, by examining just the fiscal effort exerted for instruction may increase the association.

### **Fiscal Effort Over Time**

As noted in Chapter 4, state fiscal effort over the 25-year period showed variance across the years examined. Between 1986 and 1991 there was a slight increase in state fiscal effort. This phenomenon could be contributed to the legislation and reports being explored and cited in the early 1980s (Shoup & Studer, 2010). One of the most comprehensive yet controversial reports addressing education in the United States, *A Nation at Risk: The Imperative for Educational Reform* (1983) had a major influence on the period between 1986-1991. This report ushered in the notion of the state government's assuming a more deliberate role in the quality and adequacy of education. It shifted the focus from equity to adequacy and accountability (Shoup & Studer, 2010). *A Nation at Risk* called for increased rigor, more accountability, and the enactment of additional federal and state accountability laws. This shift in focus could be one of the reasons for the slight increase in state fiscal effort.

From 1991-2000 state fiscal effort remained relatively level. During this time, federal funding had a slight increase and states used this funding to supplant education funding to support increased accountability (Owings and Kaplan, 2013). Many of the legislative actions were focused on improving ESEA. Other actions were offshoots from earlier litigation related to the 1986 Handicapped Children's Protection Act (Public Law 99-372), which allowed parents of students with disabilities who brought court cases to receive money to pay for attorney fees. This statute was adjusted in 1997 and renamed the Individuals with Disabilities Act (IDEA) (Public Law 105-17). The law provided further protection to special needs children and gave parents additional rights. The improvement of secondary education was continued in 1990 with Congress's enactment of the School Dropout Prevention and Basic skills Improvement Act. In 1994, through the *Goals 2000: Educate America Act* (Public Law 103-33), the federal government created a partnership with states and localities by providing funding grants to support educational reform efforts. All of these reforms were designed to support increased accountability for all students to achieve in rigorous ways. As states used the slight increase in federal funding to supplant their own funding, state funding remained relatively level during this period.

In 2001 state fiscal effort reflected a sustained and accelerated increase. This was a reaction to meet the federal requirements for state testing standards as required by No Child Left Behind. During this time, ESEA was reauthorized and renamed the No Child Left Behind Act. With NCLB came increased educational accountability of states and localities. This accountability involved ensuring that all subgroups achieved in reading and mathematics. States were required to develop a system for ensuring that all students

made progress; the act also detailed the subgroups to be measured. Each state was required to set up a system to facilitate students' making progress each year so that 100% of students would be proficient in reading and mathematics by 2013-2014, as indicated by a state measure. Therefore, funding was impacted at the federal, state, and local levels.

As shared previously, federal, state, and local funding from 1986-2010 has been mostly consistent at the federal level and fluctuating at state and local levels. Federal funding remained consistent over the 25 years studied; except for in 2009 there was steep increase in funding from 8.2% to 9.6%. The American Recovery and Reinvestment Act (ARRA) contributed significantly to this increase. The state's contribution decreased slightly, from 48.3% to 46.7% because states were in a financial shortfall from 2008-2009. The local portion of funding increased minimally, from 43.5% to 43.7% because of the state decrease. In 2008, the United States experienced a stark economic decline. The aftermath of this decline was seen in 2010 when all but two states faced budget shortfalls in the billions (Owings & Kaplan, 2013). This decline impacted education funding, causing school districts to cut their budgets. Therefore, Congress appropriated public education \$100 billion to lessen the huge state and local cuts that were going to befall education (Cavanaugh, 2011). This money created or saved 420,000 jobs in education (Cavanaugh, 2011). Furthermore, expenditures for instruction from ARRA amounted to \$19.5 billion or 6.1% of total current expenditures for instruction (Snyder & Dillow, 2012), thereby accounting for the 3% increase in federal funding for education. Overall funding for education had an impact on the increase in high school graduation rates from 2001-2010 that was found in this study.

### **State High School Graduation Rates Over Time**

To determine whether state high school graduation rates were increasing or decreasing from 1986 through 2010, a repeated measures analysis was conducted. In this examination, time was the predictor variable and high school graduation rate was the criterion variable. The analysis revealed a slight decrease in graduation rates between 1986 and 2000. As shared earlier, fiscal effort from 1986-1991 had a slight increase and from 1991-2000 remained level. Therefore, states were not exerting increased fiscal effort toward education. During the 1990's government agencies and non-governmental organizations worked collaboratively to help implement reform focused on academic standards and assessment systems. Most states had content standards, performance standards, and assessments in place by the end of the 1990's. Much of the work in the 1990's laid the foundation for the increases in graduation after 2001. For example, The Goals 2000: Educate America Act, that became law in 1994 and was amended in 1996, supported the creation of comprehensive reform in education including No Child Left Behind Act of 2001. In 2000, the governors from all 50 states came together to discuss the needed next steps to ensure all students graduate from high school to continue the concerted effort for all students to reach academic proficiency. Research has shown that it takes at least 5 to 7 years for data to show correlation (Berman & McLaughlin, 1978; Fullan, 2000).

Furthermore, the sustained increase in state high school graduation rates between 2001- 2010 may be a response to the reauthorization of ESEA in 2001 and sustained increased fiscal effort toward education. During this time period high-stakes testing became a requirement for state accountability. Testing was required for students to

graduate from high school and all students were required to pass rigorous state tests by the end of the 2013-2014 school year. This included special education, ESL, free/reduced lunch, and minority students being categorized by subgroup to ensure all students were meeting the standards set forth by NCLB. The sustained high school graduation rate increase from 2001-2010 is significant in the study because it refutes research indicating that high-stakes testing is detrimental to schools' meeting the needs of all students and to students' graduating from high school (Morris, 2012). Marchant and Paulson (2005) claimed that high-stakes testing enacted because of NCLB was counterproductive to all students' learning and meeting high standards. Based upon this analysis which supports Morris's 2012 finding, it appears that NCLB had a positive effect on increasing the high school graduation rate. Therefore, further research is warranted in this area.

Also, the data revealed from 2001 there was an accelerated increase in state fiscal effort toward education. This correlated with the sustained increase in high school graduation rates from 2001 with the most substantial increases taking place after 2008. Fiscal effort, as researched in this study, is the overall funding a state puts toward education controlled for its wealth. By definition overall effort did not examine the categories to which the funding was allocated. Research has been conclusive regarding certain categories education funding should be spent (Owings & Kaplan, 2006, 2013; Hattie, 2009). As shared previously, further review of where the funding is spent must occur. This study determined that sustained fiscal effort increases high school graduation rates. It does not examine the various budget categories where funding is allocated. In 1975, Bidwell and Kasarda found that high funding as well as staffing qualifications had

a positive effect on academic achievement. Staffing qualification was defined in terms of college completion; funding was defined in terms of the amount a district was willing to pay teachers with high educational qualifications (Bidwell & Kasarda, 1975). Darling-Hammond (2006) found that factors related to teacher quality, such as content knowledge, skillful teaching, ongoing professional development, and verbal ability, are important to student outcomes. These teacher qualities can help students overcome demographic deficits such as poverty. Hattie's (2009) meta-analysis found that what teachers do matters for student success. In his research he examined teacher quality in terms of teacher effects, teacher influences, teacher questioning, and teaching and learning strategies and found that these factors have a moderate effect size on student achievement. It costs more money to train teachers to ensure these effective practices take place. Therefore, it is vital for our nation's legislators, policy makers, and educators to examine the fiscal effort put toward education and the categories in which the funding is being spent. Increased funding on teacher quality will have more of an impact on student academic success than spending money to put Rolls Royce engines in school buses. Where money is spent matters. Thus, examining fiscal effort by category may be warranted.

### **State Analysis Over Time**

The patterns revealed during this part of the analysis were noteworthy and supportive of further research pertaining to fiscal effort and student achievement. This part of the study examined average fiscal effort, slope for fiscal effort over time, and average state high school graduation rates. Each state was categorized as a high or low fiscal effort state and categorized based on their fiscal effort over time (i.e., slope). Each



state was classified as having a high positive or a low positive or negative slope based on the pattern of its fiscal effort over 25 years. The analysis was conducted by identifying the y-intercept and slope. Additionally, the average state high school graduation rate was calculated for each state.

Examination of the data revealed state fiscal effort had an impact on high school graduation rate when correlated with time. When fiscal effort was examined over time it had an impact on high school graduation rates. Furthermore, when state fiscal effort was examined as an average over time the data revealed that higher levels of fiscal effort supported higher graduation rate averages. For example, states with high fiscal effort that increased over time had the highest high school graduation rate average. States with low but increasing fiscal effort were shown to have the lowest high school graduation rate average. This finding may highlight the importance of not only the trend in fiscal effort over time but also the actual level of fiscal effort – approaching a level of determining funding adequacy.

Adequacy addresses the level of funding needed for all students to achieve (Picus & Odden, 2011). Adequacy is value driven and is defined by priorities of those in decision-making power (Owings & Kaplan, 2013); it has been defined as the level of available resources being sufficient to provide all students opportunity to reach proficiency (Springer et al., 2009). Further research along the lines of this study may help determine an actual level of adequate funding to increase graduation rates.

The repeated measures ANOVA revealed that a cumulative effect of increasing fiscal effort over time had a statistically significant impact on increasing high school graduation rate over time. Therefore, this showed that increased funding cannot occur

sporadically or only once to have a significant impact on increasing high school graduation rate. Research supports that it takes at least 5 to 7 years of sustained effort for data to show correlation (Berman & McLaughlin, 1978; Fullan, 2000). In other words, the federal, state, and local government cannot expect to put a one-time round of funding in school systems and expect significant outcomes for students. All governmental agencies must sustain the fiscal effort put toward education for the funding to have a positive impact on student achievement.

As previously noted, increasing the nation's graduation rate has a significant impact on our nation's economy by decreasing crime costs, increasing tax revenue, and decreasing social service costs. Increasing the graduation rate by 1% would save \$2 billion annually by reducing costs associated with crime (Lochner & Moretti, 2004). Furthermore, it was estimated that the federal government would have received \$45 billion in extra tax revenue in 2007 alone if the number of high school nongraduates were cut in half (Levin et al., 2006). Additionally, it has been estimated that each nongraduate costs the federal government \$800,000 over a person's lifetime due to unemployment, public assistance, and criminal justice costs (Smink & Heilbrunn, 2005). Pirim (2011) found that high school graduation is a significant factor in reducing unemployment. The U.S economy has become more knowledge intensive and this has increased the need for increasing high school graduates (Pirim, 2011). Approximately 30% of students are not graduating from high school ready for the fast growing occupations such as STEM (Darling-Hammond, 2011). Today, high school nongraduates have trouble finding jobs, and the jobs they do find pay less than a living wage (Balfanz, 2009). For the economy to sustain growth today, the workforce must be literate and capable, possessing

sophisticated mathematical and technological skills and knowledge (Fowler, 2013). This confirms the significance of investing in human capital.

Therefore, the United States must invest in its human capital and continue the focus on increasing high school graduation rates and fiscal effort exerted toward education. This study found a certain threshold of fiscal effort plus sustainment of this effort had the highest impact on high school graduation rates. Therefore, legislators, policy makers, and educators need to know the relationship between fiscal effort and high school graduation rates has a direct and significant relationship to increasing tax revenues and decreasing social safety net costs and crime costs. States and localities should continue to define work readiness and the graduation requirements necessary for students to be career or college ready. Fiscal effort needs to be reviewed and adjusted at the federal, state, and local level to ensure the funding is reaching the level and sustainment of fiscal effort so all students will be academically successful and graduate from high school on time. High school graduation has a tremendous impact on our economy and our society as a whole.

### **Limitations**

This study has limitations that must be described before the results can be evaluated. One limitation was that the data are not random. Therefore, due to the nature of the study, the research was nonexperimental. When there are potential issues regarding ethics or morals, using preexisting variables is appropriate (Lord, 1973). It would be unethical to withhold funding from some students and increase funding to others. Furthermore, both variables, predictor and criterion, are preexisting.

Another limitation was reflected in changes in the description of graduation rate. Over the period studied the definition for graduation changed; how each state calculated graduation rate was not consistent. Nevertheless, this study used the NCES calculation method, known as the average freshman graduation rate (AFGR). This calculation method standardizes data across states by using consistent definition of terms.

Another limitation is that fiscal effort was calculated using the states' overall spending toward education. It does not disaggregate where the categorical funds were spent. Therefore, this study did not examine what categorical funds were spent that related to increased graduation rates. Examining effort and categories would increase the study's power and reduce error.

The researcher used multiple regression analysis and repeated measures ANOVA, which could represent a limitation if the data set did not meet the assumptions related to each statistical model to ensure valid results from the test conducted. This study met the assumptions for both statistical models and, therefore, yielded accurate results from multiple regression analysis and repeated measures ANOVA.

### **Implications for Future Research**

There are several implications for future research based upon the findings of the current study. First, the longitudinal data could be reviewed in chunks of time over the entire 25-year span to review the lag effect. Second, the study could be replicated but improved by examining the percentage of children in poverty in the state over the 25 years. Third, funding categories could be examined because where the money is spent has an impact on student achievement and high school graduation. Finally, research related to fiscal effort and adequacy in funding for education could be investigated.

First, the 25-year data set could be examined in chunks of time. For example, Morris (2012) used ANOVA to examine state fiscal effort and high school graduation rate from 2002-2009. In the research Morris calculated slope from 1996-2009. This allowed for the effects of the increases or decreases in funding to be shown in the 2002-2009 analysis of graduation rate. Fullan (2000) asserted that it takes 5 to 7 years to see impacts of systemic change. Furthermore, the data revealed that the culminating effect of increased effort over time had an impact on increasing high school graduation rates. Therefore, future research could analyze relevant data for the entire 25-year span.

Second, this study could be replicated but improved by reporting the effects of socioeconomic status over the 25-year period. Kelly's 2012 study revealed a significant impact of socioeconomic status with regard to fiscal effort and NAEP math scores. It would be thought-provoking to determine to what degree, over time, fiscal effort and free or reduced-price lunch rates have any causative impact on state high school graduation rates.

Third, it is vital for educators to determine the most effective ways to utilize funding allocated to education, especially in the current economic climate. Therefore, it is recommended that this study be replicated and include examining the fiscal effort levels in regard to funding categories and graduation rates. Such a national study would be the first of its kind examining state categorical effort levels and a student outcome measure. As shared earlier, where the money is spent has an impact on whether or not the additional funding positively impacts high school graduation rates.

Finally, based upon the interesting pattern found in this study, it is recommended that further research be conducted regarding fiscal effort and adequacy of funding for

education. Litigation has been focused on this topic for at least the past 20 years, and the evidence is still inconclusive. The pattern in this study revealed that states at a certain threshold of effort reflected a higher average state high school graduation rate. The study also revealed that states with sustained increasing slopes generated a slightly higher average high school graduation rate. When these two factors combined were taken into account, once again the data revealed that states with higher fiscal effort and sustained increasing slopes reflected the highest average state high school graduation rate. This finding supports further research regarding a concrete level in terms of adequacy of funding.

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# APPENDIX A: STATE FISCAL EFFORT AND STATE HIGH SCHOOL

## GRADUATION SLOPES

Overall State Fiscal Effort and State High School Graduation  
Slope

State	Fiscal Effort Slope	Grad Rate Slope
Alabama	3.71	-0.16
Alaska	3.47	-0.27
Arizona	-9.07	0.03
Arkansas	3.85	-0.12
California	2.02	0.18
Colorado	-5.35	-0.03
Connecticut	3.39	-0.13
Delaware	3.33	-0.04
District of Columbia	-3.2	0.22
Florida	-9.47	0.02
Georgia	4.35	-0.26
Hawaii	5.1	-0.51
Idaho	2.38	0.08
Illinois	2.04	-3.32
Indiana	2.37	-0.22
Iowa	4.78	-0.09
Kansas	1.15	-0.19
Kentucky	3.92	0.14
Louisiana	3.96	0.14
Maine	4.4	-0.01
Maryland	5.43	0.06
Massachusetts	2.05	0.06
Michigan	1.91	-0.02
Minnesota	9.97	-0.2
Mississippi	3.68	-0.14
Missouri	2.09	0.22
Montana	-1.87	-0.24
Nebraska	1.5	-0.12
Nevada	1.41	-0.95
New Hampshire	2.36	0.18
New Jersey	1.56	0.13
New Mexico	3.34	-0.43
New York	5.64	-0.49
North Carolina	1.69	0.03
North Dakota	1.9	-0.18
Ohio	2.69	-0.01

Oklahoma	7.1	2.31
Oregon	6.07	0.1
Pennsylvania	6.57	-0.01
Rhode Island	2.39	0.09
South Carolina	3.4	-0.31
South Dakota	8.41	-0.23
Tennessee	2.23	0.11
Texas	1.31	0.3
Utah	1.44	-0.07
Vermont	4.77	0.26
Virginia	2.08	0.02
Washington	1.88	-0.25
West Virginia	2.65	-0.05
Wisconsin	7.71	0.09
Wyoming	3.49	-0.21

**State Fiscal Effort Slope Tables**

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**States with High Fiscal Effort and Increasing Fiscal Effort Slope**

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Alaska  
Arkansas  
Connecticut  
Iowa  
Kentucky  
Maine  
Maryland  
New York  
Ohio  
Oregon  
Pennsylvania  
South Carolina  
Vermont  
West Virginia  
Wisconsin

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**States with Low Fiscal Effort and Increasing Fiscal Slope**

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Alabama  
Delaware  
Georgia  
Hawaii  
Louisiana  
Minnesota  
Mississippi  
New Mexico  
Oklahoma  
South Dakota  
Wyoming