Spring 2014

Relationship Between Virginia's Fiscal Effort and Public School Graduation Rates

Bryce Ryan Johnson
Old Dominion University

RELATIONSHIP BETWEEN VIRGINIA'S FISCAL EFFORT AND PUBLIC SCHOOL GRADUATION RATES

by

Bryce Ryan Johnson

Bachelor of Science in Biology and Secondary Education, May 1999, Asbury College
Masters of Arts in Educational Leadership, May 2003, Old Dominion University

A Dissertation Submitted to the Faculty of Old Dominion University in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

EDUCATIONAL LEADERSHIP

OLD DOMINION UNIVERSITY
MAY 2014

Approved by:

Dr. William Owings (Chair)

Dr. Linda Shiffletfe (Member)

Dr. Steve Myran (Member)

Dr. John Ritz (Member)

ABSTRACT

RELATIONSHIP BETWEEN VIRGINIA'S FISCAL EFFORT AND PUBLIC SCHOOL GRADUATION RATES

Bryce R. Johnson
Old Dominion University, 2014
Chair: Dr. William Owings

Prior education finance studies have measured the effect of funding on various student achievement variables. These studies demonstrate the need for resources in education, but this need requires further exploration. Previous literature shows several limitations regarding study length, scope and fiscal resources analyzed. This study further investigates school funding by analyzing the relationship between school funding and high school graduation rates over a nine-year time frame.

This research examines what role Virginia's school districts' division fiscal effort (the proportion of its wealth invested in K-12 public education) plays in determining several identified measurable student outcomes from 2003 to 2012. The methodology used within the study includes linear regression, bivariate correlation, time-lagged correlation and a fixed effects least square dummy variable model. Results demonstrate that division fiscal effort and high school graduation rates are not significantly correlated. The results indicate that division fiscal effort alone was not the only predictor of academic success and that other variables like poverty status and minority classification have a greater impact on graduation rate than division fiscal effort.

ACKNOWLEDGEMENTS

I dedicate this dissertation to my amazing family and friends. I am grateful for my awesome wife, Brooke, who constantly encouraged and challenged me to keep going. You were always there to help and love in any way. You deserve a large part of this degree! I am thankful for my parents, Bill and Frances Johnson, who constantly gave support. You both checked on my progress and cheered me all the way. A big shout out goes to my favorite brother, Chad Johnson. You have been a great encouragement. Tyler Bragg, you are a true friend who appreciates the journey. I'm thankful for all your constructive comments and the "checking up" moments. Finally, I dedicate this work to my Lord and Savior Jesus. He gave me the desire and brain to get this done.

I want to thank Dr. William A. Owings for all his guidance and support. You constantly gave of your time and energy to make sure I finished this journey. I have never had a more compassionate and knowledgeable teacher. You have given me many opportunities to succeed and for that I am thankful.

TABLE OF CONTENTS

Page

Page

Page

LIST OF TABLES

Page

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

Introduction to the Study

This dissertation explores the relationship between Virginia's local education funding as measured by fiscal effort and its public schools' high school graduation rates. The study aims to further prior research by examining Virginia's educational funding practice using a formula termed fiscal effort. To strengthen reliability, the study explores data from a nine-year time span (2003 – 2012). Chapter 1 details the background and rationale for the study, states the research question, and explains the significance and overview of the methodology. The chapter concludes with delimitations and term definitions. Chapter 2 reviews the history of education finance, discusses the legal framework for education finance, details court cases relevant to education finance litigation, defines capacity and effort, reviews prior studies relevant to educational finance, and details the conceptual framework. Chapter 3 encompasses the methodology and details the range, variables, data source, and analysis. Chapter 4 details the results for each statistical test and Chapter 5 reviews the findings with analysis and implications.

Currently the nation's economy and states' fiscal resources are under considerable stress at a time when our U.S. workforce is in need of increasingly educated workers. This fiscal stress makes it crucial to identify how to most effectively maximize minimal state and local financial resources in a manner that legislators, policy makers, and educators alike comprehend and support. This

understanding requires knowing the impact of K-12 education funding on the state's economy and education's return on investment to the state.

Background and Rationale

Due to an increasingly competitive global and knowledge-based economy, the results of dropping out of high school are severe to students, communities, and our nation. Minimally, each adult needs a high school diploma to earn a livable wage (Hamm, 2004). Businesses require employees with the knowledge and technical skills that minimally require a high school diploma. Student dropouts who become parents create communities which are more likely to have unstable families, bringing adverse factors to family health, future employment, and children's education (Greene & Winters, 2006; Losen, 2006). The competitive global market and student dropout concern sparked an era of U.S. public school accountability.

U.S. public school fiscal accountability became a national focal point in the mid-1990s as researchers began to question the value of increased education dollars on student achievement. In one study, "Moving Beyond Spending Fetishes," Hanushek (1995) found that the prior 25 years (1965-1990) of gains in U.S. public school funding did not increase student achievement on standardized tests. He claimed that those funding increases produced smaller classes (low pupil-teacher ratios) and teachers with higher degrees, warranting higher salaries. Furthermore, he wrote that there was no strong or systematic relationship between school expenditures and student performance. Hanushek continued to raise opposition to increased education funding, stating that public schools were not using their resources effectively and responsibly.

Greenwald, Hedges, and Laine (1996) disagreed with Hanushek; they determined that per-pupil spending and student achievement were correlated. They argued that Hanushek's research design, taking a vote count of 187 equations, was limited in depth and thus inconclusive. Greenwald et al. concluded that resources do affect student achievement – especially per-pupil expenditures, teacher experience, teacher salary, administrative inputs, and facilities.

Currently, educational finance studies have reviewed various models that attempt to predict the impact of local and state spending on student achievement (Archibald, 2006; Grub, 2006; Kelly, 2012; Morris, 2012; O'Connell-Smith, 2004; Pirim, 2011). Studies analyze additional school funding with the goal to reduce class size or raise teacher salary and the effect on student achievement (Grub, 2006; O'Connell-Smith, 2004;). Researchers have also compared student socio-economic status and its impact on student achievement (Grubb, 2006).

Archibald (2006) reviewed school funding for instruction, operations, leadership, and support services. He studied the effect of these variables on student achievement. The study analyzed one school district and its student success on a reading and math state level assessments and concluded that funding for instruction and support were positively related and significant for reading achievement in four of the grade levels studied during one school year.

Another study by O'Connell-Smith (2004) compared eighth grade state reading and math scores for one academic year in Minnesota's public schools. Variables compared included student/teacher ratio, teacher wages, and per-pupil spending. The study found that math and reading results were positively influenced

by the variables of per-pupil spending and teacher wages when compared to instructional support services. Instructional support services are expenditures for activities designed to assist teachers provide instruction. This category includes funding for assistant principals, curriculum development, and computer-assisted instruction. A likely answer for the negative association between math and reading results and instructional support services may be that assistant principals are the disciplinarians of the schools and work mainly with at risk students.

Grissmer and Flanagan (1998) examined rising math scores on the National Assessment of Educational Progress (NAEP) assessment in Texas and North Carolina from 1990 to 1997. The study examined the education reforms in each state with a goal of isolating the improvements that were significant to the NAEP score gains. The study found three reasons for each state's NAEP success: 1) Leadership from the business community, 2) Political leadership, and 3) Continuity and stability of reform policies over time. The key reform policies detailed were:

> 1) State-wide academic standards by grade for clear teaching objectives, 2) Holding all students to the same standards, 3) State-wide assessments closely linked to academic standards, 4) Accountability systems with consequences for results, 5) Increasing local flexibility for administrators and teachers, 6) Computerized feedback systems, 7) Shifting resources to schools with more disadvantaged students, and 8) Infrastructure to sustain reform. (Grissmer & Flanagan, 1998, p. 19)

Another study by Grissmer et al. (2000) compared several states 4th grade math scores on the NAEP assessment from 1990 to 1996. Variables studied included

per-pupil spending and family socio-economic status (SES). The study found that students from lower SES homes scored lower on the 4th grade math NAEP test. The study suggested that gains in achievement for lower SES students could be achieved through a modest increase in resources, if given to specific programs such as higher per-pupil expenditures and reducing pupil to teacher ratios. A conservative estimate displayed gains of 12 to 15 percentage points in test scores with additional targeted expenditures of fewer than $1,000 dollars per pupil in the states with the lowest SES (Grissmer et al., 2000).

Grubb (2006) analyzed the impact of funding on building operations and reviewed differences in funding plans and student academic improvement. The National Educational Longitudinal Survey of the Class of 1988 (NELS88) was the primary information source for this study. NELS88 gathered data from each academic core subject (language, math, science, social studies) with relation to certain academic variables such as post secondary enrollment (college attendance) and graduation rates (Grubb, 2006). Results showed that allocating resources to reduce class size and raise teacher salary produced the most significant impact (Grubb, 2006). Additional results displayed that allocating resources to curriculum revision, staff development or student remediation had little influence on achievement.

Several recent fiscal effort studies (Kelly, 2012; Morris, 2012; Pirim, 2011) completed at Old Dominion University should be noted. Kelly's 2012 study compared 4th and 8th grade math NAEP scores and fiscal effort for all 50 states and the District of Columbia from 1992 – 2009. She concluded that fiscal effort alone was not a predictor of student achievement. Results demonstrated that increased

fiscal effort in low poverty states did result in increased student achievement over time. However, the opposite results were observed in high poverty states.

Morris's 2012 study examined the relationship between state fiscal effort and graduation rates over time (2002 – 2009). The twenty states analyzed were selected based on their sustained increasing or decreasing fiscal effort. The results showed no significant interaction effect between the fiscal effort categories and time on graduation rates. The results did show a significant relationship between time and graduation rates for both increasing and decreasing fiscal effort categories. The study refuted prior research which found high-stakes testing had a negative impact on graduation rates (Morris, 2012).

Pirim (2011) examined the association of increased fiscal effort for education and the long-term (25 year) impact on unemployment trends. The study concluded that fiscal effort and health spending were the only variables with an impact on employment. The findings assert that the only way to effectively reduce unemployment is investment in improving the quality of human capital through better education and health services.

Lastly, several empirical studies have contended that more funding is not necessary to increase student test scores (Miles & Darling-Hammond, 1998; NCREL, 2000; Odden & Archibald, 2000). One study of five elementary schools from 1995 to 1998 observed a change in funding allocations towards academic initiatives and its result on student achievement (Odden & Archibald, 2000). Three schools decided to increase funding for remediation programs and to provide additional staff professional development activities, while two schools adjusted funding to provide

additional staff to reduce the student to teacher ratio. The findings demonstrated that each school could provide the new educational strategies with minimal gains in funding (Odden & Archibald, 2000). The results indicate that increased educational funding may not be the solution to raising student achievement, but better organization of current funds may reach desired results.

The noted studies demonstrate the need for resources in education but this issue requires further exploration. The research reviewed displays several limitations regarding the study length, scope and fiscal resources analyzed. This study further investigates school funding by analyzing the correlation between school funding and high school graduation rates over a 9-year time frame.

Owings and Kaplan (2013) define *fiscal effort* in the following formula, where *E* is fiscal effort, *R* is the revenue allocated or current expenditures for education measured as the per pupil expenditure for K-12 education, and *TB* is a measure of wealth. The equation for fiscal effort can be viewed as: $E = R/TB$. This research will examine what role Virginia's school districts' division fiscal effort (the proportion of its wealth invested in K-12 public education) plays in determining several identified measurable student outcomes (detailed in this narrative) from 2003 to 2012.

Effort, then, is a ratio of the total local current expenditure per pupil (R) in the numerator divided by the GSP (gross state product) per capita, one measure of wealth, in one calculation and divided by SPCI (state per capita income) in the other. Both measures of wealth are used in separate calculations.

Proposed Research Questions/Hypothesis

This analysis of division fiscal effort combined with local graduation rates

raises several questions. What are the long-term moderating effects of increased division fiscal effort for education and student outcomes such as high school graduation rates? Currently, no literature has fully explored this question. In light of the nine years of data on division fiscal effort, it is possible to determine if effort slopes are decreasing, flat, or increasing. The timespan of nine years was selected due to the availability of consistent student graduation data with Virginia's Graduation and Completion Index (GCI). The GCI is calculated based on cohorts of students who begin ninth grade in the same year and progress through high school. The GCI data were available for each school division in Virginia beginning with 2003 (VDOE, 2011a). In addition, the relationship between effort and certain student outcome measures can be explored.

Hierarchy of Objectives/Goals

The main objective for this study will be to examine the relationship between division fiscal effort and high school graduation rates. The goal of the study is to provide additional data beyond the current empirical research on the relationship between school funding and high school graduation rates. Due to this goal the study will attempt to answer the following research questions.

1. Are Virginia's school division's fiscal effort (FE) indices and high school graduation rates correlated?
    - In light of the nine years of data (2003 – 2012) on effort, it will be possible to determine if effort slopes are decreasing,

flat, or increasing. The relationship between effort and certain student outcome measures can be explored.

2. After controlling for socio-economic status (SES), how much will division fiscal effort affect the annual rate of change in Virginia's high school graduation rates from 2003 – 2012?
3. What trends are apparent in relation to Virginia's fiscal effort with high school graduation rates?

Purpose and Significance

This study will use a non-experimental ex post facto analysis, which nullifies the need for a hypothesis to be tested. Regardless, due to the material covered in

the literature review, the following items are presumed:

1. Fiscal effort and graduation rates will be positively correlated.
2. Division fiscal effort will demonstrate no significant amount of variance regarding graduation rates.

Based on the review of the literature, local-level high school graduation rates and division fiscal effort could be positively linked. Though generalizations are difficult to validate in any field, the large sample size and data range may allow some valid generalizations about the relationship between fiscal effort and high school graduation rates. Although no single assessment can determine the effectiveness of education, assessments can be evaluated to provide insight and decide how to improve a student's academic success.

Proposed Research Design and Methodology

The methodology explores the study's research questions and details the impact of Virginia's school division's fiscal effort on high school graduation rates. The design of the study seeks to uncover significant relationships, review predictive trends, and validate connections among the variables of funding and achievement as measured by division fiscal effort and high school graduation rates.

The first research question "Are Virginia's fiscal effort (FE) indices and high school graduation rates correlated?" will be studied using bivariate correlation. A correlation analysis among the variables of division fiscal effort and high school graduation rates will be computed. A bivariate correlation will be chosen to measure the strength of the relationship between fiscal effort and high school graduation rates.

The second research question, "After controlling for socio-economic status (SES), how much will division fiscal effort affect the annual rate of change in Virginia's high school graduation rates from 2003 – 2012?" will be studied via a linear regression analysis. This statistical test would assign a value to each school division individually with comparison to fiscal effort and high school graduation rates for each year.

The third research question, "What past trends are apparent in relation to Virginia's division fiscal effort and high school graduation rates?" will be studied with a time-lagged correlation and a fixed effects least squares dummy variable model. The time-lagged correlation analysis would allow the researcher to study potential relationships among variables that involve some delay. Unfortunately, in the field of education, fiscal inputs and student achievement outputs do not happen at concurring measurable time points. Generally, funds are allocated from the state level

before any student achievement is measured for a given year. This would lead to some delay when analyzing the impact of fiscal inputs on student achievement.

Finally, a fixed effects least squares dummy variable model would be used to expand upon and account for variance that may affect the results from the time-lagged analysis. Results from this study will give time effect statistics on effort and high school graduation rates while considering the covariance associated with race, gender and socio-economic status.

Delimitations

Due to the ex post facto design of this research, random sampling can not be incorporated. It should be noted that observing relationships may be better analyzed through examining naturally occurring groups as opposed to controlled random samples. This study, which will observe the impact of educational funding, would prove more effective by comparing groups which were previously different and review the reasons for these differences. This design differs from traditionally sampling groups that are equal and providing them with various treatments. The decision to not include possible covariance may allow biased correlation estimates in the distributed lag analysis. Due to a fixed effects model (least squares dummy variable model) being used, variables may display multicollinearity, which increases standard errors and limits calculations regarding individual predictors. Multicollinearity does not minimize the predictive power or reliability of the model as a whole. Regardless of these limitations, the power of this study will stem from comparing local differences in funding and detailing the impact of funding on student

achievement. Finally, with fiscal effort data being observed at the local level only, the generalizability of this study is limited to the local level with localities not considered.

Definitions

1. Fiscal Effort – a formula that compares a localities's measure of wealth, in this case either Gross State Product (GSP) or State Per Capita Income (SPCI) to its contribution of funds towards K-12 education. The formula is express as FE = R/TB, where R is expressed as revenue and TB is expressed as the measure of wealth.
2. Fiscal Capacity – the ability of a government to raise own-source revenue. Standardized fiscal capacity among school divisions is determined by dividing the measure of capacity by a unit (e.g., population or pupils). Virginia adopted a finance formula during the 1974-76 Biennium titled the Local Composite Index (LCI) that is currently used to measure the fiscal capacity of each school division. The formula uses per-capita property value weighted at .5, per-capita income weighted at .4, and per-capita revenue from sales tax at .1.
3. GSP – Gross State Product is a measurement of state economic output that includes the sum of all value added by industries within a state.
4. SPCI – State Per Capita Income is the mean income within an economic aggregate, such as a country or city. It is calculated by taking a measure of all sources of income in the aggregated (e.g., GDP, Gross National Income) and

dividing it by the total population. One short fall is that it does not attempt to reflect the distribution of income or wealth.

5. Property Tax – An ad valorem tax levy on the value of property that the owner is mandated to pay to the government. The tax amount is based on assessed property values and local tax rates.
6. Per Capita Tax – a flat rate tax levied upon each individual, eighteen years or age or older, living in the taxing district. The tax has no connection with employment or income.
7. NCEE – National Commission on Excellence in Education is a group commissioned by President Ronald Reagan to observe the state of U.S. education in 1983. It created the report A Nation at Risk: The Imperative for Educational Reform.
8. ESEA – Elementary and Secondary Education Act. It is legislation that provides financial aid to schools educating low income students.
9. ARRA – American Recovery and Reinvestment Act of 2009, a federal economic stimulus program created by the 111th United States Congress and signed into law by President Barack Obama on February 17, 2009.
10. NCLB – No Child Left Behind Act of 2001, a law that mandated each child be tested yearly to demonstrate adequately yearly progress in math and reading
11. Equity – distribution of the materials needed for each individual to learn and reach their educational potential.

12. NAEP – National Assessment of Educational Progress, the largest nationally representative and continuing assessment of what America's students know and can do in various subject areas.
13. Graduation Rate – A formula that counts the total number of students graduating divided by the total number of graduates and dropouts multiplied by 100. Students who transferred into a district are included in this calculation.
14. Graduation Completion Index - In Virginia, graduation rates are calculated via the Graduation and Completion Index (GCI). The GCI is calculated based on cohorts of students who begin ninth grade in the same year and progress through high school.
15. Federal Graduation Indicator - The federal graduation indicator (FGI) is a graduation rate indicator used by the federal government. This indicator is one of 29 indicators that schools with a graduating class must meet to make adequate yearly progress (AYP). The FGI differs from the GCI in the following ways: 1) The federal indicator does not permit any students to have their cohort adjusted, regardless of language or disability status and 2) The federal indicator only includes Virginia's standard and advanced studies diplomas.
16. Per Capita – A measure that denotes the mean amount of an item per individual.

17. Ex post facto - A study which explores potential cause-and-effect relationships by observing an existing condition or state of affairs and looking back in time for valid causal factors.
18. LCI – Local Composite Index, a formula used by Virginia to compute a value for each school division biennially. The LCI is composed of 50 percent true value of real property, 40 percent of adjusted gross income and 10 percent of taxable retail sales.
19. Required minimum local expenditure – The required dollar amount a school division must pay to meet the mandated Virginia Standards of Quality (SOQ) requirements. Calculated by multiplying the adjusted average daily membership by the school division's individualized per pupil basic aid amount to equal the total cost of the program. Once calculated, sales tax is subtracted from the total cost of the program and the result is multiplied by the Local Composite Index value. The locality funds the resultant amount, also known as required local effort, and the state pays the remaining SOQ amount.
20. Required minimum local expenditure data – The dollar amount a school division pays above the required minimum local expenditure.
21. State Basic Aid – Grants that are allocated from the state to local school divisions without specified expenditure restrictions for the operation of public schools. State basic aid is given based on a school division's ability to provide a minimal educational program.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Introduction

Although many studies over the past nine years have analyzed spending on education and its impact on educational outcomes, many share several weaknesses (Archibald, 2006; Grub, 2006; O'Connell-Smith, 2004;). They commonly analyzed insufficient spans of funding and educational data (often only a year's worth) and assessed its fiscal impacts of a state through per-pupil spending without accounting for a locality's wealth (fiscal effort). In reassessing these nine years of data to determine the impact of division fiscal effort on a quantifiable variable (high school graduation rates), this present study uses a formula that factors in a locality's wealth. This study also identifies essential educational and economic factors related to the impact of fiscal effort that states should consider when funding public schools and seeking a return on their investment.

The U.S. educational system is under constant pressure to remain nationally and internationally competitive. The multiple stressors targeting national and state fiscal resources, combined with the global marketplace's need for increasingly well-educated knowledge workers, requires that legislators, policy makers, and educators alike understand and creatively invest limited resources. Educators must keep these stakeholders cognizant of the impact that adequately funding K-12 education is having on the state's economy, including its return on investment.

History of Education Finance in the United States

Early history through 1776

Within 40 years of the first Puritans' arrival in Massachusetts, the Bay Colony's lawmakers passed "The Old Deluder Satan" Act of 1647, the first step taken on U.S. soil toward the public funding of education (Cubberley, 1920). This act mandated that each town of at least 50 families to appoint a reading and writing teacher and pay him what compensation the citizens thought appropriate to educate its children. Taxing property wealth to finance public schools had begun.

Likewise, during colonial times, communities of 100 families or more could be considered urban areas. The Old Deluder Satan Act required that these more densely populated communities maintain a grammar school for their students that prepared them for eventual university attendance. Since the urban communities pulled money for education from larger fiscal resources, urban areas were more advanced with regard to education than the rural areas (Butler, 2006).

The Old Deluder Satan Act of 1647 was implemented inconsistently, however. By the end of the 1650s, only eight of the 100-family towns and 1/3 of the 50-family towns met the Act's mandates for grammar schools and staffing. The remaining towns ignored the requirements and opted to pay a fine (Altenbaugh, 1999).

Education Finance and the New Nation

By the end of the 1700's, Americans still viewed education as a relatively minor need except for the wealthy. There were several reasons for this general lack of interest: 1) the widespread, labor-intensive agricultural life of the time, 2) the homogeneity of the people, 3) the absence of cities, 4) the isolation and independence

of the villages, 5) the lack of full voting rights for men in a number of the states, 6) the lack of any economic demand for a formal education, and 7) the absence of important political questions requiring resolution at the polls that would require the citizenry to be able to read. Additionally, the country was still relatively poor, with the financial debt from the Revolutionary War. Money was needed for labor and all types of internal improvements. America had few industries and its foreign trade was severely hindered by European nations (Cubberley, 1920).

Education Finance and the Industrial Revolution

After the colonies became an independent nation, the initial U.S. federal guidelines for education were stated in the Northwest Ordinance of 1785. The ordinance sectioned the Northwest Territory into towns of 36 square miles, subdivided into 36, 640-acre sections. The 16th section of each Congressional township would support education – by locating a public school there or by selling the land to raise funds to maintain public schools.

Unlike other nations, the U.S. Constitution, ratified in 1789, did not directly detail responsibility for education. The Tenth Amendment's "reserved powers" section (all powers not specifically delegated to the federal government or prohibited to the states by the Constitution were reserved for the states) gave each state the responsibility for educating its inhabitants (Carstensen, 1988).

At the turn of the 19th century, parents were required to pay public school fees according to what they could afford. This funding system reinforced an elitist society because the wealthier families, having resources to pay more, were entitled to have their students attend school more hours per day and complete more grades. Children

whose parents needed them to work to help support the family might only receive a few years (if any) of primary public schooling, while children with wealthier parents could use their personal resources to fund their continuing education through public grammar school, a private academy, and possibly into university or could receive a totally private education with tutors or in a tuition-based private school (Kaplan & Owings, 2010).

The 1800s brought considerable variance of opinion regarding the role of public education across the United States. Historian Elwood Cubberley (1920) described this period as education's first awakening and recognized two parts to the American education problem at that time: 1) Americans need to exhibit a consciousness of the necessity for general education, and 2) Americans need to develop a willingness to pay for it.

After 1825, with the full extension of voting rights (white men), America's desire for a national education system grew. This expansion to all classes of people, poor as well as wealthy, worker as well as boss, generated the realization that education was a fundamental necessity for each state that would provide economic, social, and civic opportunities for every child. This new logic was discussed in the 1825 preamble to the first school law enacted in Illinois which states:

> To enjoy our rights and liberties, we must understand them; their security and protection ought to be the first object of a free people; and it is a well-established fact that no nation has ever continued long in the enjoyment of civil and political freedom, which was not both virtuous and enlightened; and believing that the advancement of literature always has been, and ever will be

> the means of developing more fully the rights of man, that the mind of every citizen in a republic is the common property of society, and constitutes the basis of its strength and happiness; it is therefore considered the peculiar duty of a free government, like ours, to encourage and extend the improvement and cultivation of the intellectual energies of the whole. (Cubberley, 1920, p. 671)

In 1837, Massachusetts created the first State Board of Education headed by an appointed secretary. Horace Mann, the Massachusetts State Senate President, accepted that position. As an education reformer, Mann wanted to broaden educational opportunities for all students and to educate public opinion to support schools' value to the community. He proposed to change school operations with six principles: 1) the public should no longer remain ignorant; 2) the public should pay for such education; 3) schools should welcome and educate children from all backgrounds; 4) this education must be non-sectarian; 5) this education be taught by the spirit, methods, and discipline of a free society; and 6) education be taught by highly-trained, professional teachers (Mann, 1844). To these ends, Mann founded the "common school" to gather together children, regardless of social class, for a common learning experience. This environment encouraged discipline for all students, created opportunities for poorer students to climb the social ladder, and aimed to give every student, wealthy or poor, an opportunity for a productive future (Foner, 2006).

According to Mann, if public schools were to be equitable, tax dollars must support them. Conflict arose over this funding idea, and Mann had many opponents to his public school support philosophy. Nonetheless, his ideas for public schools

eventually gained widespread acceptance. As education grew in importance, state governments began to incorporate school funding requirements into their constitutions (Odden & Picus, 2004).

During this time period, American voters sought change regarding public schools' financing. Legislatures passed laws permitting or requiring local property taxation, restricting public funds to government schools, and limiting private funds to public primary schools (Stoddard, 2009). Given their early support of town schools, New England states tended to have high levels of public subsidies for primary schools. Meanwhile, newly populated states in the West were transitioning to a public school system. In the South, states supported schools with private funds before and after the Civil War.

Education Finance Post-Industrial Revolution through 1967

The 19th century's second and third quarters saw the rise of local school districts. By 1840 their organizational and practical weaknesses became clear. State control of school systems would be needed to ensure a higher quality and more equitable education for all children.

From the earliest colonial days to the late 19th century, the American public school "system" and its funding continued to evolve. Prior to the public school model, in the U.S. as a whole, a private school system prevailed in urban areas. Here parents who wanted and could afford to formally educate their children contributed funding to their student's school – usually a private grammar school for younger students and an academy or proprietary school for older students. As "higher education" became more essential in the late 19th century, the public high school

became the main provider of "secondary education." Eventually academies were either converted into high schools, became "prep" schools, or closed their doors (Kaplan & Owings, 2010). By the late 1800s, when voters decided to have public schools free of parental contributions by mandating funding via taxation, this system had changed (Acemoglu & Jorn-Steffen, 2001).

The federal government's role in education expanded rapidly in the 20th century. The Smith-Hughes Act of 1917 created vocational programs in high schools, and the Government Issued (GI) Bill of 1944 gave financial aid to military veterans to attend college. The states also began to consolidate small school districts into larger districts with common procedures (Butts, 1978).

In 1940, the U.S. had more than 117,000 school districts. As the number of school districts grew, educational leaders realized that smaller, inefficient school districts needed to be consolidated with other districts to achieve an economy of scale. By 2008, the total number of school districts had decreased to 13,809 (Dillow & Snyder, 2012). Figure 1 illustrates the decline of U.S. public school districts.

Education Finance – Sputnik to 1980

In 1958, following the Cold War and the Soviet launch of Sputnik, Congress passed the National Defense Education Act (NDEA). NDEA's goal was to meet the needs of an elevated national security and provide highly trained individuals to help America compete with the Soviet Union in scientific and technical fields. NDEA provided support for loans to college students, improvements in math, science and foreign language instruction at the elementary and secondary level and vocational-technical training (Jordan, 1982).

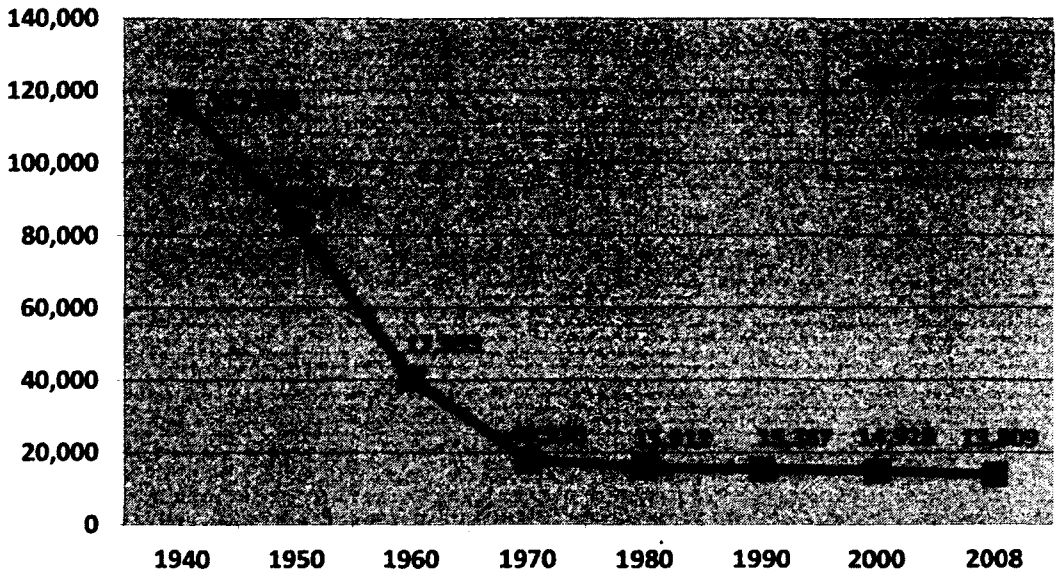

Figure 1. Number of U.S. public school districts 1940-2008. Source: Snyder and Dillow (2012). Figure produced by author.

During the 1960s, this shift in power from the parents to the state altered the relationship among the students and state; the state received more power and resources to create an improved public school climate and higher student outcomes. Students gained additional rights to obtain an adequate education that adequately prepared them for the requirements of the workplace (Augenblick & Myers, 1997; Carnoy, 1983; Wise, 1983). Some argued that this change also moved the responsibility for the student's academic success away from the parent and student (Carnoy, 1983; Franciosi, 2004).

In 1966, a production-function study titled "Equality of Educational Opportunity" – commonly known as the Coleman Report, was conducted to see if the Civil Rights Act of 1964 had improved learning opportunities for all American students. After examining racial segregation, the issues of equal funding in U.S. public schools, and the standards of low-income, high-minority schools as compared

to more affluent, white schools, the study's researchers – led by Johns Hopkins sociology professor James Coleman – found no significant relationship between school expenditures, the quality of education, and student achievement (Coleman, Campbell, Hobson, McPartland, Mood, Weinfeld, & York, 1966). School funding and its correlation to student achievement has since been highly debated.

A Nation at Risk through the Present

In 1981, Terrel H. Bell, the U.S. Secretary of Education under President Ronald Reagan, created The National Commission on Excellence in Education to combat the idea that public schools were ineffective. The commission's goals were to: 1) analyze the quality of teaching at all educational levels (elementary through college), 2) compare the educational systems of other developed countries with that of the U.S., 3) predict the chances of a high school senior being accepted into a university, 4) learn which (K through 12) educational programs forecast a student's success in college, and 5) highlight educational issues that need to be addressed for an effective educational system to exist.

The Commission's results, published in 1983 as *A Nation at Risk: The Imperative for Educational Reform*, detailed how U.S. students were academically falling behind their international peers. Illiteracy rates for U.S. students were up (ranging from 13% to 40%), while SAT scores for high school students were down (since a high point in 1963). Remedial instruction for science, reading, and math were highlighted by the military and businesses as subjects requiring additional review for new college graduates. The Commission summarized, "The average graduate of our schools and colleges today is not as well-educated as the average

graduate of 25 or 35 years ago, when a much smaller portion of our population completed high school and college" (*A Nation at Risk*, 1983, p. 25). The commission further commented, "The negative impact of this fact cannot be overstated. If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might have well viewed it as an act of war. As it stands, we have allowed this to happen to ourselves" (*A Nation at Risk*, 1983, p. 21).

A Nation at Risk placed America's public education system under a microscope and pushed for national accountability. The report focused on local and state educational agencies' role in raising academic standards via improved educational quality and higher student achievement. The report did not place additional demands on the federal government (Cross, 2004; McDonnell, 2005). Instead, the commission focused on five key components: content, educational expectations, time spent on schooling, teaching and leadership and fiscal support (National Commission on Excellence in Education, 1983). Meeting expectations for education reform would create the need for additional school funding.

To increase academic standards for high school graduation, state educational departments were required to add "five new basics" to their schools' curriculum models: 1) in high school, four years of English, three years of math, three years of science, three years of social studies, and half a year of computer science, 2) adopt more rigorous and measurable standards, 3) extend the school year, 4) improve teaching with enhanced preparation and professionalization, and 5) add accountability to education (National Commission on Excellence in Education, 1983).

Educational communities responded instantly to this new mandate. Forty-five states began evaluating and altering their educational processes to raise classroom rigor and boost student learning (Jennings, 1995). Additional local and state money was given to schools for instructional and building purposes. In 1983, $118.4 billion was spent on public education (Dillow, Snyder, & Hoffman, 2012). If educational spending had increased with the rate of inflation, we would have spent 246 billion dollars in 2005. Rather, in 2005, 499 billion dollars was spent on public education or about twice the amount spent in 1983 (Dillow, Snyder, & Hoffman, 2012). State educational departments created curriculum models to ensure all schools were consistently teaching appropriate material to a high academic standard. These models focused on seven changes: 1) expanded use of core curriculum, 2) increase in the interdisciplinary nature of content, 3) emphasis on depth of coverage, 4) use of more original source materials, 5) enhanced focus on higher order thinking skills, 6) expanded methods of student assessment, and 7) additional teacher choice (Murphy, 1991). Each state's department of education adjusted licensure requirements (additional courses required prior to receiving a teaching license and license renewal) for teachers as well as for their supervision (informal/formal observations) from their building administration. States also implemented standardized tests to assess student comprehension (Ravitch & Finn, 1988). Although intentions were good, this new "business model" did not raise students' achievement test scores (Finn, 1991; Hallinger, 1992).

Goals 2000: Educate America Act

In response to *A Nation at Risk* (1983), President George H. W. Bush proclaimed that the U.S. needed to develop national educational objectives. To this end, Congress legislated the Goals 2000: Educate America Act (Hanushek & Raymond, 2001). Under this Act, the government would increase federal funding to any states that developed new curriculum models to raise student achievement. In response to Goals 2000, states created policies and procedures to increase students' achievement test scores, create more professional development opportunities for teachers, and provide pre-service teacher training. These improvement plans were required prior to any state receiving federal funding for education.

Goals 2000 had the following objectives:

- Increase high school graduation rates
- Increase subject assessment scores in certain benchmark years (4^{th}, 8^{th}, and 12^{th} grades)
- Provide quality teacher preparatory programs
- Provide quality professional development experiences for current staff
- Raise U.S. math and science test scores to first place worldwide
- Continue to create and maintain safe schools
- Increase parental support
- Increase adult literacy (Goals 2000: Educate America Act, 1993).

Goals 2000 established a federal partnership through a system of grants to states and localities to reform education systems. Title III, a core component of Goals 2000, provided states funding to adjust their systems to achieve national goals. Title

III, when compared to prior federal formula-grant programs, provided an innovative approach for federal funding to be provided for each state. Initially, multilevel planning grants were made to both states and their local districts, and they were established to promote top-down and bottom-up planning. During the first grant year, states could spend up to 40 percent of funds to support state-level system building activities, with 90 percent of funds in subsequent years given to support competitive grants to local districts and schools to implement state standards. The federal funds were additionally used by states as "block grants." The law allotted federal funding to be broadly used for coordinated improvement activities. This term described the flexibility states had to develop their own criteria for awarding subgrants (Schwartz & Robinson, 2000).

Since 1994, states have gained more than $2 billion from formula-based Goals 2000 grants. One study that detailed state usage of these funds was completed by the General Accounting Office (GAO), Goals 2000: Flexible Funding Supports State and Local Education Reform (1998). This study detailed that, from 1994 – 1997, states used roughly $109 million for state-level reform activities to help construct key components of a new standards-based system. Forty-four percent of the state-level funds supported personnel to manage the states' subgrant programs and other state-sponsored education reform activities. Twenty-eight percent of these funds were used by the states to contract with state and national experts to help create new standards and assessments, to form new curricula, and conduct research projects. Nine percent of funds were allocated for staff training and professional development costs (General Accounting Office, 1998).

The majority of Goals 2000 funds assisted reform at the district and school level. These funds were allocated based on three categories: local school improvement, preservice teacher education reform, and professional development (Schwartz & Robinson, 2000). From 1994 to 1997, more than a third of the 14,367 school districts in the United States received a Goals 2000 subgrant. Due to the discretion states had in deciding the amount of district grants, the average size of awards ranged from $10,000 to over $200,000 (General Accounting Office, 1998).

Later in the 20th century, educational researchers, policy makers, and the general public became concerned that what was considered to be adequate funding did not translate into reduced student failure rates or improved academic outcomes (Hanushek, 1998; Ladd, 1996; Wise, 1983). In response, school districts with low student achievement claimed that they needed additional funding to raise student achievement. Districts saw these additional revenues required as "compensatory funds" needed to balance disadvantages their students had regarding their academic success (Alexander, 2004; Tyack, 1974; West & Peterson, 2007; Wise, 1983).

The Legal Framework for Education Finance

History of U.S. Educational Funding

The Tenth Amendment states, "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people" (U.S. Const., amend. X). This amendment has limited the federal government's financing of public schools, placing the greater responsibility for public school funding on local and state governments (Education

Commission of the States, 2006). Historically, the federal government finances less than 10% of funds required by public schools (Liu, 2006). Thus the majority of educational spending is the responsibility of the state and local government.

States have the constitutional power to decide the amount allocated for educational funding. Each state allocates money for education generated from two sources: local property taxes and the state's funding contribution based on a percentage of state revenues (Coons, Clune, & Sugarman 1969). This flexibility gives each local and state government a variety of programs to use in formulating the level of a school district's funding.

While the state has the responsibility for funding education, the proportion of funds coming from the state, locality, and federal government varies by state. Figure 2 compares the proportion of education funding coming from each government branch in 1929 and 2010. The reduction in local funds and increase in state funds from 1929 to 2010 supporting education is evident, as is the relative unchanged proportion of federal dollars to public education over these years.

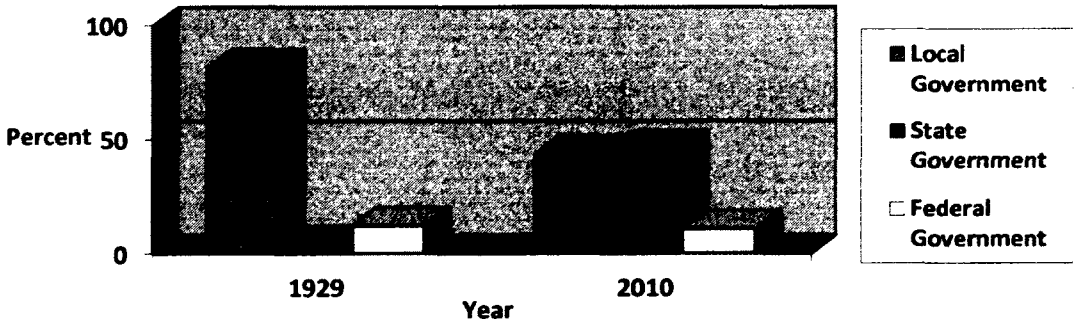

Figure 2. Comparison of Branch Spending on Education – 1929 vs 2010. Source: NEA (2011).

From 1929-30, nearly 26 million students resided in approximately 120,000 public school districts. Local governments contributed 82.7% of the funding for public schools, while the state governments and the federal government aided with 4.9% and 12% respectively (NCES, 2012). Even though the legal authority for operating U.S. public schools has resided with each of the 50 state governments, in the 1970s, local government in most states began to take over the responsibility for schools' fiscal management. Eventually, state governments took larger fiscal roles in funding public schools. As a result, by 2010-2011, roughly 49 million students were enrolled in approximately 15,344 school districts. The NEA (National Education Association) estimated that in 2010-2011, state governments contributed 45.8% of the revenue for public elementary and secondary schools, while local governments and the federal government paid 43.7% and 10.5%, respectively (NEA, 2011).

The funding proportions from each government branch vary by state. For example, in 2009-2010, Kansas public schools received 52.7% of its resources from the state, 35.7% from local sources, and the remaining 11.6% from the federal government. In contrast, public schools in Illinois that year received 18% from the state sources, 69.1% from local sources, and the remaining 12.9% from the federal government (NEA, 2011).

When a state chooses to rely heavily on local resources to support its public schools, however, an inequitable funding system results. This disparate funding has allowed public schools serving affluent students to have attractive and healthy facilities and to be well-stocked with experienced educators, technology, and other learning resources, while public schools serving low-income students tend to have

old, decaying buildings, worn desks, larger groups of students per teacher, outdated textbooks, and increasing drop-out rates (NEA, 2005).

The difference between each state's funding level and the funding allocated by the federal government causes variation in the total fiscal output towards education. Table 1 below shows the variation among states in detail for fiscal year 2011.

Table 1

Revenue distribution public elementary and secondary education: Fiscal year 2011 Revenues [in thousands of dollars]

	Total	Local[1]	State	Federal
United States	**$604,293,209**	**$261,965,331**	**$266,786,402**	**$75,541,475**
Alabama	7,386,471	2,307,983	3,827,907	1,250,581
Alaska	2,470,274	521,768	1,524,083	424,422
Arizona	9,764,472	4,200,211	3,924,369	1,639,892
Arkansas	5,273,728	1,711,386	2,703,033	859,309
California	67,864,062	20,203,927	38,411,425	9,248,710
Colorado	8,820,783	4,288,294	3,540,865	991,623
Connecticut	9,989,986	5,739,726	3,422,642	827,618
Delaware	1,748,658	516,279	1,024,557	207,823
District of Columbia[4]	1,925,824	1,698,626	0	227,198
Florida	26,358,355	12,492,913	9,069,113	4,796,329
Georgia	18,047,879	8,208,751	7,526,257	2,312,872
Hawaii[4]	2,470,432	63,280	2,059,791	347,361
Idaho	2,183,491	495,614	1,382,052	305,826
Illinois	28,895,633	16,691,051	9,304,471	2,900,110
Indiana	11,761,793	4,181,108	6,534,419	1,046,267
Iowa	5,906,171	2,742,097	2,550,546	613,528
Kansas	5,670,547	2,028,345	2,979,230	662,971
Kentucky	6,993,349	2,221,230	3,622,461	1,149,658
Louisiana	8,246,484	3,233,813	3,479,231	1,533,440
Maine	2,597,927	1,256,620	1,052,058	289,249
Maryland	13,437,322	6,672,768	5,508,344	1,256,210
Massachusetts	15,357,042	8,287,173	5,797,874	1,271,995
Michigan	19,466,487	6,042,795	10,717,834	2,705,858
Minnesota	10,938,581	3,635,648	6,397,541	905,392
Mississippi	4,483,191	1,405,267	2,071,471	1,006,453
Missouri	10,169,473	5,779,196	3,008,369	1,381,908
Montana	1,654,729	632,641	723,125	298,964
Nebraska	3,911,430	2,090,741	1,186,279	634,411
Nevada	4,212,793	2,360,780	1,388,359	463,653
New Hampshire	2,844,769	1,597,636	1,041,561	205,572

Table 1 Continued

New Jersey	25,217,564	14,477,191	9,403,391	1,336,982
New Mexico	3,744,076	598,541	2,423,599	721,936
New York	57,538,128	29,072,179	23,097,859	5,368,090
North Carolina	13,228,999	3,401,425	7,688,360	2,139,214
North Dakota	1,258,921	442,351	629,843	186,727
Ohio	22,973,368	10,348,507	9,921,997	2,702,863
Oklahoma	5,874,001	2,125,560	2,754,252	994,189
Oregon	6,120,056	2,463,231	2,792,707	864,118
Pennsylvania	27,174,139	14,476,964	9,378,294	3,318,881
Rhode Island	2,278,564	1,198,154	830,217	250,194
South Carolina	7,873,340	3,373,102	3,414,705	1,085,533
South Dakota	1,307,520	661,188	380,410	265,922
Tennessee	8,915,680	3,608,119	3,995,291	1,312,271
Texas	50,874,695	22,476,413	20,430,187	7,968,095
Utah	4,597,983	1,679,229	2,340,850	577,903
Virginia	14,527,472	7,678,728	5,951,317	897,427
Washington	11,107,344	3,270,611	6,941,092	895,641
West Virginia	3,166,494	947,243	1,872,918	346,332
Wisconsin	10,485,161	4,570,797	5,244,730	669,635
Wyoming	1,601,628	653,305	846,053	102,270

— Not available.
† Not applicable.
# Rounds to zero.
[1]Local revenues include intermediate revenues.
[2]U.S. totals include the 50 states and the District of Columbia.
[3]Value affected by redistribution of reported values to correct for missing data items.
[4]Both the District of Columbia and Hawaii have only one school district each; therefore, neither is comparable to other states. Local revenues in Hawaii consist almost entirely of student fees and charges for services, such as food services, summer school, and student activities.
NOTE: Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "National Public Education Financial Survey (NPEFS)," fiscal year 2011, Version 1a.

Elementary and secondary education receive federal, state, and local funding – which the *Digest of Education Statistics 2010* describes as the following (Dillow, Snyder and Hoffman, 2012) in Table 2.

That the annual expenditures for elementary and secondary education exceed $500 billion is almost unfathomable. Not surprisingly, educational stakeholders (legislators, educators, and policy makers) expect quantifiable educational returns; but all financial investments take time to mature as do investments in human capital

through education. It would be unreasonable for investors to expect a specific educational result, such as a one-point increase in achievement test scores for every additional dollar spent per student.

Researching a return on investment in education is more complex. Analysis should reveal any relationships between specific funding and student outcomes. This requires placing K-12 public education funding in an historical framework and studying the relationships among the variables of spending and various student outcome measures.

Table 2

Elementary and secondary education funding at the federal, state and local level: Fiscal year 2010

Elementary and Secondary Level	Amount	Percentage
Federal	$47,707,000,000	8%
State	$282,663,076,000	48%
Local	$254,359,051,000	44%
Total	$584,729,127,000	100%

Source: Dillow & Hoffman (2011). Note: Percentage calculated by author.

Between 1970 and 2006, the percentages of total elementary and secondary school funding allocated by federal, state, and local sources remained relatively stable (Snyder, Dillow, & Hoffman, 2012). As illustrated in Figure 3, federal allocations fluctuated between 8% and 10% of public school funding, while local and state funding percentages traded places three times.

In the early to mid-1970s, local governments funded approximately 52% of the public school budgets, while the state provided approximately 39% and the federal government 9%. State funding began to outpace local funding in the late

1970s, retaining the lead until about 1989, when state and local funding were equal. In 1994, state revenues took over, outpacing local funding until approximately 2003. State and local revenues account for nearly equal percentages, 42% to 43% for 2005-2006.

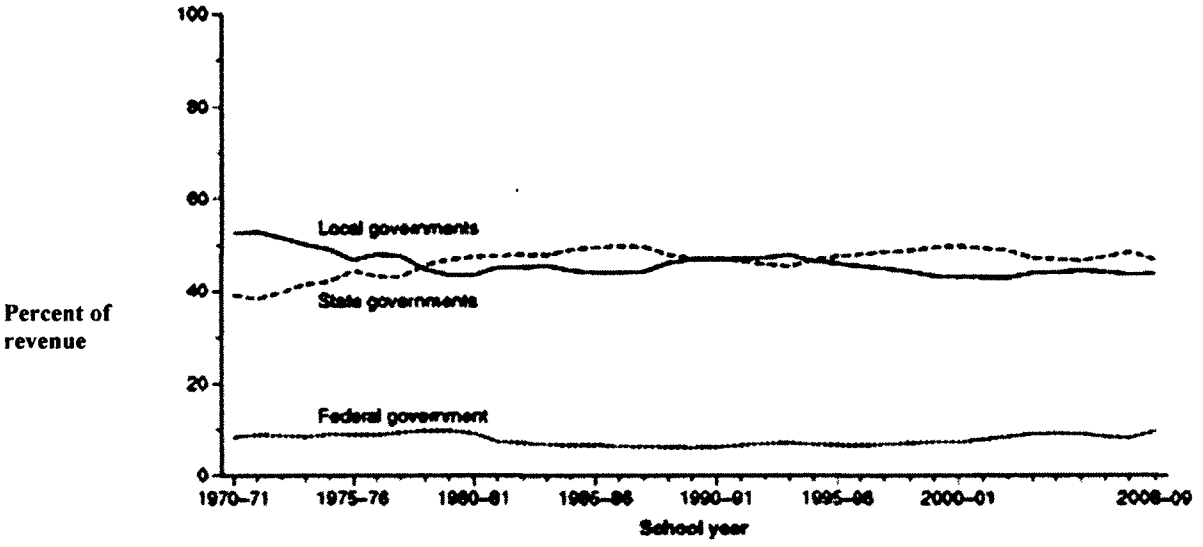

Figure 3. Percentage of revenue for public elementary and secondary schools, by source of funds: 1970-71 through 2008-09. Source: U. S. Department of Education, National Center for Education Statistics, *Revenues and Expenditures for Public Elementary and Secondary Education*, 1970 – 71 through 1980 – 87; and Common Core of Data (CCD), National Public Education Financial Survey, 19878-88 through 2008-09

Currently, after adjusting for inflation, our nation's spending per pupil has almost tripled over the past four decades (National Center for Education Statistics, 2012). This increase in spending is a result of increased state accountability and a larger student population. Certain states have allocated their funding wisely and demonstrated significant increases in student outcomes, while other states have not which resulted in minimal student achievement gains (Rampey, Dion, & Donahue, 2009).

Dipping revenues have pushed more than 30 states to reduce education spending since the current recession began in 2008 (Johnson, Oliff, & Williams, 2010). Our national economy is likely to get worse before it improves with the full impact of the housing market collapse not yet affecting many state and local budgets (Hess & Downs, 2010). Currently, states are foreseeing over $100 billion in budget shortfalls. This scenario demonstrates the need for educators to make a case that spending correctly on education produces positive results by increasing our nation's human capital or taxpayers may view schools as a poor investment (McNichol, Oliff, & Johnson, 2010).

From 1960 to 2000, spending on elementary and secondary public education increased from 250 %to 300% (Dillow, Snyder, & Hoffman, 2012). Figure 4 illustrates this increase. This degree of fluctuation in spending may seem large, but understanding why this increase occurred is as important as understanding how the funds were targeted.

Systemic changes and population expansions prompted these spending increases. First, in 1975, Congress enacted Public Law 94-142, the Education for All Handicapped Children Act, which stated that every child with a disability had the right to a "free appropriate public education" (p. 775). As a result, the number of students identified as being eligible for special education services rose from 8.3% in 1976-77 to 13.2% in 2008-09 (Dillow, Snyder, & Hoffman, 2012). Second, during the 1970s, these special education services mandated that more teachers be hired to meet the increasingly diverse student needs and, consequently, teacher-to-pupil ratios decreased. Third, public school enrollments have increased over the past decades. As

of 2009, there were 51.6 million K-12 public school students compared to 36.1 million in 1960. Public school enrollment is higher than at any prior time. Increased enrollment means additional costs for the construction of new classrooms, reducing class sizes and supplying current technology. These three major changes accounted for some of the growth in public school spending.

Education costs have increased overall, but not necessarily in relation to a state's wealth. Some of this variance in spending is due to the state's or locality's ability to pay for education. Certain states are wealthier than others, and some regions within states are wealthier then others. Virginia's Washington, D.C. suburbs

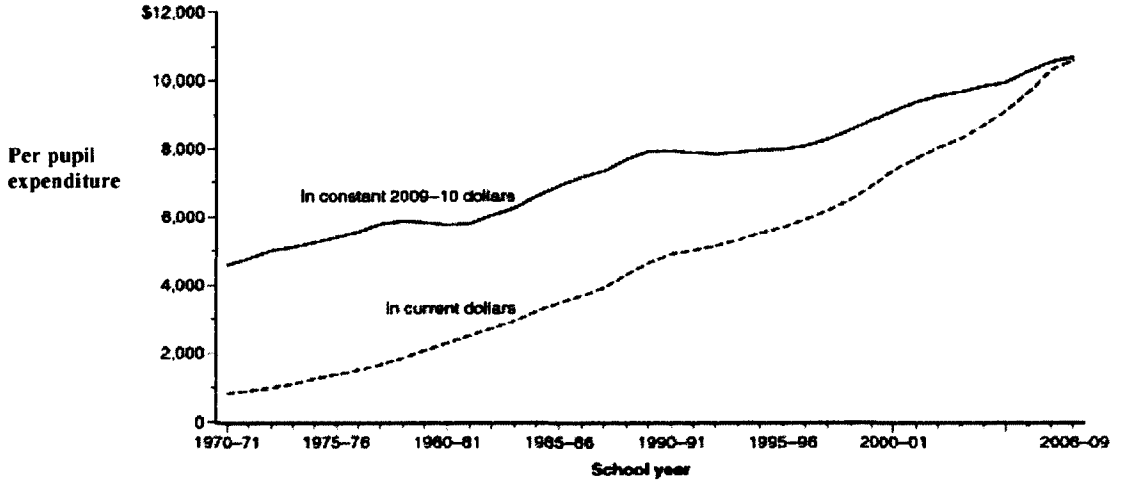

Figure 4. Current expenditure per pupil in fall enrollment in public elementary and secondary schools: 1970-71 through 2008-09.

Source: U. S. Department of Education, National Center for Education Statistics, *Revenues and Expenditures for Public Elementary and Secondary Education*, 1970 – 71 through 1980 – 87; and Common Core of Data (CCD), National Public Education Financial Survey, 19878-88 through 2008-09

have greater fiscal capacity to fund education than does southwestern Virginia's rural population. From a policy and practice perspective, examining the effort a state or

locality exerts to fund education will help identify practices and policies linked with improved student capacity.

Deciding Funding Levels for Schools

States have different ways of deciding funding levels for schools. States most frequently use a basic level – or foundation program – for funding school districts. This program requires that a state establish a minimum local tax rate and a minimum education spending for school districts in the state to fund a floor level of education services. The minimum spending level is viewed as the foundation amount (Owings & Kaplan, 2013). The Foundation formula gives equal base-funding for every locality that is multiplied by a weight for each student. The weight factor changes due to the level of the student educational needs (Griffith, 2005). This funding formula affords more funding to localities with a greater population of special needs students. Most educators would deem the foundation amount insufficient to meet every student's needs. The foundation program does not consider the school district's fiscal ability to finance education and gives a starting point for localities to begin their contribution. Not every state has a student-weighting factor. For example, Virginia gets a set amount under Title VIb and distributes those funds on a per capita basis of identified students.

Modified foundation programs attempt to level funding for school districts across states by adhering to funding formulas. Funding formulas alter the amount required by each state for education by analyzing the localities' ability to pay for education through taxation. According to these formulas, localities demonstrating greater wealth will receive fewer state-generated funds; less wealthy localities will

receive more state-generated funds. The state makes up for any shortfall between the tax yield and the spending level (foundation amount). Generally, states that use this formula require funding for special needs students to come from the local government.

Another foundation program, district power equalization, uses an inverse ratio formula. Here, the state decides the funding required to appropriately educate a student and gives funding in an inverse proportion to the district's ability to pay. Every state uses a different formula. A majority of states, 80%, adhere to foundation programs, 14% apply a modified formula program, and 6% follow a power equalization formula (Verstegen & Jordan, 2009). Table 3 details the programs each state uses to finance its public schools.

Table 3

Fifty State Finance Formulae, 2007

State	Flat Grant	Foundation	DPE	Full Funding	Combination/Tiered
Alabama		X			
Alaska		X			
Arizona		X			
Arkansas		X			
California		X			
Colorado		X			
Connecticut		X			
Delaware		X			
Florida		X			
Georgia					X
Hawaii				X	
Idaho		X			
Illinois					
				X	

Table 3 Continued

Indiana		X			
Iowa		X			
Kansas		X			
Kentucky					X
Louisiana		X			
Maine		X			
Maryland		X			
Massachusetts		X			
Michigan		X			
Minnesota		X			
Mississippi		X			
Missouri		X			
Montana					X
Nebraska		X			
Nevada		X			
New Hampshire		X			
New Jersey		X			
New Mexico		X			
New York		X			
North Carolina	X				
North Dakota		X			
Ohio		X			
Oklahoma		X			
Oregon		X			
Pennsylvania		X			
Rhode Island			X		
South Carolina		X			
South Dakota		X			
Tennessee		X			
Texas					X
Utah		X			
Vermont			X		
Virginia		X			
Washington		X			
West Virginia		X			
Wisconsin			X		
Wyoming		X			
Total	**1**	**40**	**3**	**1**	**5**

Source: Verstegen and Jordan (2009, p. 226)

Two concerns are viewed when examining the funding formulas of public schools. One problem, intrastate funding, is the concern of this study. The other problem is interstate funding. Interstate funding details funding discrepancies for

education from state to state. This discrepancy is due to two conditions: state capacity - how wealthy a state is due to its economy and resources and state effort - how willing a state is to supply educational funding (Augenblick, Meyers, & Anderson, 1997).

Intrastate disparity results due to variation in revenue generation between a state's school districts (Augenblick, Meyers, & Anderson, 1997). This study will analyze intrastate disparities, with the intent to discover if interstate disparities allow for variation regarding high school graduation rates. If this proves not true, then additional research could analyze the impact of intrastate disparities on high school graduation rates.

Education Finance Litigation

The states' and communities' push for increases in student achievement and graduation rates and the schools' requests for additional funding to handle academically disadvantaged student populations eventually led to legal battles. Early during the 1970s, state supreme courts *Horton v. Meskill* (1977), *Northshore School District v. Kinnear* (1974), *Pauley v. Kelly* (1979) started to realize the inadequacy of many state school funding systems and concluded that the current funding systems violated the state's constitutions (Augenblick et al., 1997; Belfield & Levin, 2007; Fischel, 1989). Over the next 30 years, 39 states were accused of failing to fund their public schools at sufficient levels (West & Peterson, 2007), in violation of constitutional law. In *Robinson v. Cahill* (1973), the New Jersey State Supreme Court described public school *adequacy* as a "thorough and efficient education sufficient to

prepare a child to take his place in the world as a citizen and a worker" (Wise, 1983, p. 301).

Another landmark New Jersey Supreme Court case, *Abbott v. Burke* (1970) found that the education of students in low-income and minority communities was underfunded and unconstitutional. Higher-wealth districts in New Jersey had been receiving more funding per pupil than poorer districts. The ruling required the Abbott districts to be funded at the level of the highest funded districts in New Jersey and mandated the implementation of a comprehensive set of remedial measures, including high quality education, supplemental programs and reforms, and school facilities improvements, to ensure an adequate and equal education for low-income students.

McInnis v. Shapiro

The debate regarding adequate and appropriate funding did not originate with *Rodriguez*. Five years prior, the courts analyzed a fiscal equity litigation concerning disadvantaged urban students in *McInnis v. Shapiro* (1968). Plaintiffs stated that the state's education finance system, based on a minimum foundation level of $400 per student, was inadequate to meet their educational needs. They contended that students held a federal constitutional right to a "financing system which apportions public funds according to the educational needs of students" (*McInnis v. Shapiro,* 1968, p. 293). This claim was dismissed by the lower courts, finding that the controversy was nonjusticiable due to there being "no discoverable and manageable standards by which a court can determine when the Constitution is satisfied and when it is violated" (*McInnis v. Shapiro,* 1968, p. 335).

The *McInnis* plaintiffs could not assist the court out of this dilemma and

provided two alternative solutions: 1) all students should receive the same dollar appropriation or 2) the state should eliminate all variations in local property values while allowing districts to establish their own taxes. The lower and Supreme Court both found that neither of these solutions would answer the plaintiff's argument that education funding should be directly related to student needs.

Burruss v. Wilkerson

Another case similar to *McInnis, Burruss v. Wilkerson* (1970) continued the debate concerning appropriate funding for students in Virginia. The plaintiffs, school-aged children and residents of Bath County, Virginia, argued that the Virginia Basic State School Aid Fund Act, under which state funds are apportioned to local school districts, is unconstitutional under the equal protection clause of the Fourteenth Amendment and Section 129 of the Virginia Constitution. Like *McInnis,* the court ruled in *Burruss* against the plaintiff and ruled that a "need standard is impossible for judicial measurement or implementation due to a lack of manageable standards" (LaMorte, 1996, p. 341).

Serrano v. Priest

Additional cases aimed to answer this issue. Plaintiffs in *Serrano v Priest* (1971) created a "fiscal neutrality" concept. This idea contended that the level of resources accessible to students in each school district should not be a function of wealth, other than the wealth of the state as a whole. This mindset would force a state to equalize the value of taxable wealth in each district and allow equal tax efforts to give equal resources. The California Supreme Court agreed with the plaintiffs and accepted the fiscal neutrality principle, which avoided the "nebulous concept of

educational needs" detailed in *McInnis* (Rebell, 2002, p.1265).

Unfortunately, the vision for equality in education through the fiscal neutrality principle resulted in the unwanted outcome of reduced spending per pupil. This can be observed in a second round of litigation in the *Serrano* case, where the judge found that wealth-related differences between districts should be reduced to "insignificant differences," which he detailed as "amounts considerably less than $100 dollars per pupil" (Rebell, 2002, p. 750). This equalization combined with a ceiling on increases in local proper taxes, known as Proposition 13, allowed California to reduce its educational spending. California fell from a 5th place ranking in per-pupil spending in 1964-1965 to 44th nationally in 2009-2010 (Morgan & Morgan, 2010).

Overall, the search for equality through the fiscal neutrality principle had a strong beginning appeal, but in reality the goal for fiscal equality has proved elusive. Court rulings have narrowed the spending gap between school districts but the main focus raised in *Rodriguez* (1973), finding an adequate level of education and allowing each student a chance to achieve it, were not answered by the fiscal equality mindset. Enrich (1995) summarized this point by stating: "Equalizing tax capacity does not by itself equalize education. The educationally relevant disparities not only reflect the tax base inequalities, but local political and administrative choices as well, not to mention the impact of preexisting differences in the students and their milieus" (p. 101). A localities attempt to equalize these preexisting differences and tax base inequalities is termed effort.

San Antonio Independent School District v. Rodriguez

In another case, *San Antonio v. Rodriguez* (1973), several Mexican-American

parents complained that their children were attending inferior schools that were not providing the type of education that future workers would need and sued regarding the Texas education funding system. The plaintiffs argued that the Texas education funding model made educational quality a function of the local property tax base, and the state funding was insufficient to correct the inherent inequalities. In *Rodriguez*, the U.S. Supreme Court backed away from considering education as a fundamental right.

More than 40 years after *Brown v. Board of Education* (1954), growing numbers of students lacked an adequate education and the understanding of the growing income gaps amongst the haves and have-nots inspired plaintiff attorneys to create new education theories for the courts to consider. Due to the standards based movement of the 1980's, educational adequacy concerns raised in *Rodriguez* (1973) were no longer a vague notion and viewed irrelevant to a state's educational system (McUsic, 1999).

A new definition of adequacy resulted: "Adequacy is the provision that minimum educational opportunity is necessary to (minimally) prepare students for adult roles" (Wise, 1983, p. 309). This led to funding adequacy being formed from the value given to a student's academic ability from being educated by the school (Alexander, 2004; Carnoy, 1983; Odden, 2000). Generally, the courts sided with the plaintiff school districts, requiring that additional funding be provided by their state (West & Peterson, 2007).

Even if educational stakeholders assert that all students should receive a quality education and our judicial system agrees that schools have a right to adequate

funding from their state, not all parties agree on what is an "appropriate" education. Today, minimal agreement exists concerning the funding required, or even the formula necessary, to decide what can be considered to be an appropriate education (Augenblick et al., 1997; West & Peterson, 2007).

Educational Legislation

Elementary and Secondary Education Act

In 1965, President Lyndon Johnson's Elementary and Secondary Education Act (ESEA) increased public schools' importance and accountability, sending more money to public schools and signaling the federal government's interest in improving public education for all U.S. students (Carnoy, 1983). This act triggered a debate about educational quality among educational stakeholders and led to the Coleman report that argued that school funding has little effect on student achievement. Parents, educators, and state governments discussed concerns over curriculum and time spent in school. Ultimately a shift occurred, giving authority to the state concerning the amount of time a student spends in school and what curriculum is taught (Carnoy, 1983).

No Child Left Behind Act of 2001

Today's public schools function in an era of accountability. The No Child Left Behind (NCLB) Act of 2001 required schools to demonstrate that each of its students' subgroups – minority students, low-income students, students with disabilities, and English Language Learners – meet adequate yearly progress (AYP) objectives. Many schools had to refine instructional practices in order to reach AYP

status. Consequences to schools for failing to meet AYP status were both public and punitive (NCLB, 2002).

Race to the Top and Other Obama Administration Educational Funding

President Barack Obama enacted the American Recovery and Reinvestment Act of 2009 (AARA) to stimulate the U.S. economy for the short-term and invest in education. AARA allotted $98.2 billion for education, giving an opportunity to save hundreds of thousands of jobs, aid states and school districts, and promote reforms and general school improvements. The temporary funding provided was to be encumbered in a two to three year time span and not to result in unsustainable requirements after the funding expires. Four principles were to be used in AARA funding distribution: 1) spend funds quickly to save and create jobs, 2) improve student achievement through school improvement and reform, 3) ensure transparency, reporting, accountability, and 4) invest one-time ARRA funds thoughtfully to minimize the "funding cliff."

One component of the ARRA program is the State Fiscal Stabilization Fund (SFSF). This program allots governors approximately $48.6 billion to advance essential education reforms. Governors must produce three items to receive SFSF funds: 1) assurance they are advancing the four reforms described in the statute and complying with maintenance of effort requirements; 2) baseline data on their current status in each of these three areas, and 3) basic information on how the funds will be used (U.S. Department of Education, 2009).

As of March, 2010, the U.S. Department of Education (DOE) had obligated roughly 73 percent of the $98.2 billion from ARRA funding. From that obligated

amount, the U.S. DOE had disbursed 50.8 percent, or $36.8 billion, to states. This shows that roughly 40 percent of total allocated education ARRA funds have been distributed (Cohen, 2010). Table 4 details the AARA funds allocated, obligated and disbursed as of March 5, 2010.

Table 4

Education ARRA Funds Allocated, Obligated and Disbursed as of March 5, 2010 (in millions)

Program	Total Allocated	Obligated		Disbursed	
	$	$	%	$	%
State Fiscal Stabilization Fund	48,600	38,605	79%	22,017	57%
Pell Grants	17,114	8,740	51%	8,658	99%
Special Education	12,200	12,200	100%	2,779	22%
Title I Education for the Disadvantaged	10,000	9,974	99%	2,392	24%
Race to the Top and Investing in Innovation	5,000	1	0%	0	17%
School Improvement Grants	3,000	149	5%	0	0.2%
Rehabilitative Services and Disability Research	680	631	92%	96	15.2%
Educational Technology Grants	650	646	99%	59	9.2%
State Longitudinal Data Systems Grants	250	0	0%	0	0.00%
Work Study	200	200	100%	192	95%
Teacher Incentive Fund	200	54	26%	7	12%
Impact Aid	100	40	39%	40	99%
Teacher Quality Enhancement	100	0	0%	0	0%
McKinney Vento Homeless Education Grants	70	70	99%	15	21%
Student Aid Administration	60	44	73%	19	42%
TOTAL	98,224	71,352	72%	36,274	50%

Source: Cohen, 2010.

Assessing the Impact of Education Dollars on Student Achievement

The multiple stressors targeting national and state fiscal resources, coupled with the global marketplace's demand for increasingly well-educated knowledge workers, requires that legislators, policy makers and educators alike understand and creatively invest limited resources. Educators must keep these stakeholders aware of the impact that adequately funding K-12 education is having on the state's economy, including its return on investment.

In the mid-1990s, researchers began to question the value of increased education dollars on student achievement. In his study, "Moving Beyond Spending Fetishes," Hanushek (1995) claimed that the prior 25 years (1965-1990) of gains in U.S. public school funding did not increase student achievement on standardized tests. He asserted that those funding increases resulted in classes of smaller size (low pupil-teacher ratios) and teachers with higher degrees, warranting higher salaries. Furthermore, he wrote that there was no strong or systematic relationship between school expenditures and student performance. Hanushek stirred up public and policy opposition to increased education funding, arguing that public schools were not using their resources effectively and responsibly.

Greenwald et al. (1996) disagreed with Hanushek; they determined that per-pupil spending and student achievement were correlated. They contended that Hanushek's research design–taking a vote count of 187 equations–was limited in depth, and, therefore, inconclusive. Greenwald et al. concluded that resources do affect student achievement – especially per-pupil expenditures, teacher experience, teacher salary, administrative inputs, and facilities. This lack of consensus among the meta-analyses reflects to some methodological shortcomings in the original studies (Wenglinsky, 1998).

School spending benefits depend on their allocation. The National Center for Education Statistics data, taken at the national level from 1997 to 1998, displayed roughly 60% of district funds were allocated to instruction, 9% to administration, 11% to operations and maintenance, 9% to capital outlay, and 11% to other categories such as instructional staff, student support, student transportation, food services, other

support services and enterprise expenditures (Picus, 2000). In more recent studies, the average percentage of funds allotted for instruction increased. This increase was not evenly distributed among the five major categories of expenditures. These data, for the 2006-2007 school year, were published in *The Condition of Education 2010 in Brief*, sponsored by The National Center for Education. They reported an average of 61% of funds allocated to instruction, 8% to administration, 10% to operations and maintenance, 8% to capital outlay, and 13% to other categories such as instructional staff, student support, student transportation, food services, other support services and enterprise expenditures (Aud & Hannes, 2010). The data are reported in Table 5.

Table 5

Current expenditures per student in fall enrollment in public elementary and secondary schools, percentage distribution of current expenditures, and percent change of current expenditures, by function and object: School years 1989-90 through 2006

	Expenditures (in constant 2008-09 dollars)			Percentage distribution of current expenditures			Percentage change		
	1989-90	1997-98	2006-07	1989-90	1997-98	2006-07	1989-90 to 1997-98	1997-98 to 2006-07	1989-90 to 2006-07
Current expenditures	**$7,849**	**$8,214**	**$10,182**	**100**	**100**	**100**	**5**	**24**	**30**
Instruction	4,735	5,079	6,207	60	62	61	7	22	31
Salaries	3,517	3,692	4,204	45	45	41	5	14	20
Employee benefits	863	939	1,370	11	11	13	3	46	59
Purchased services	107	140	235	1	2	2	31	68	120
Supplies	178	235	285	2	3	3	32	21	60
Tuition and other	69	73	114	1	1	1	5	56	64
Administration	682	634	773	9	8	8	-7	22	13

Table 5 Continued

Salaries	450	433	496	6	5	5	-4	15	10
Employee benefits	119	113	163	2	1	2	-5	45	37
Purchased services	68	61	82	1	1	1	-10	34	21
Supplies	15	14	15	#	#	#	-7	10	2
Tuition and other	29	13	16	#	#	#	-54	22	-44
Student and staff support	878	1,007	1,364	11	12	13	15	35	55
Salaries	573	637	806	7	8	8	11	27	41
Employee benefits	153	166	261	2	2	3	8	58	71
Purchased services	74	118	189	1	1	2	61	60	157
Supplies	51	57	70	1	1	1	11	23	37
Tuition and other	28	30	37	#	#	#	6	23	30
Operational and Maintenance	845	804	1,000	11	10	10	-5	24	18
Transportation	335	330	427	4	4	4	-1	29	27
Food Services	336	337	388	4	4	4	0	15	15
Enterprise operations [2]	36	22	23	#	#	#	-38	4	-36

Rounds to zero.

[1] includes expenditures for student support, other instructional staff, and other support services.

[2] includes expenditures for operations funded by sales of products or services together with amounts for the direct support made available by state education agencies for local school districts.

Note: Detail may not sum to totals because of rounding. Estimates are reviews from previous editions. Expenditures are in constant 2008-09 dollars adjusted using the Consumer Price Index (CPI).

Source: U. S. Department of Education, National Center for Education Statistics; Common Core of Data (CCD); "National Public Education Financial Survey," 1989-90 through 2006-07

School funds also go to school operations and capital improvements - the maintenance, retrofitting, and adding structures to their current campuses. The Bishop decision of the Arizona Supreme Court (*Roosevelt v. Bishop*, 1994) broadened the concept of funding equality to encompass both capital facilities and net current

costs for operations. This prompted states to create funding programs that would aid school districts with their capital projects.

Program initiatives related to school operations and capital improvements might include 1) a per pupil grant to reduce debt service or capital outlay, 2) funds for all or part of the cost of building new or retrofitting old facilities, 3) encumbering some cost of retiring bond indebtedness on a percentage or a fiscally equalized basis, 4) setting up independent commissions that could guide school districts to build facilities that meet state requirements, and 5) improving the bond rating of the school's general obligation-bond issues by pledging the full faith and credit of the state as security of the bonds.

The range for spending on capital outlay and debt service is broad among states. With California spending over $1 billion and South Carolina paying out $10 million for the fiscal year 2006-07, spending on capital outlay and debt service ranges broadly. Allowed uses of funds have ranged from constructing new classrooms to erecting new schools (Salmon, 1988). The number of capital improvement and debt service programs in 2007 with broad coverage has increased, and the number of states with no state program has decreased from 19 to 11. Two studies (Condron & Roscigno, 2003; Roberts, 2011) revealed that increased spending on a school's physical condition and maintenance demonstrated a positive impact on student achievement. Table 6 details the types of funding that states use for capital outlay and debt service.

States have a broad scope of educational spending per pupil. The 2007 index of per-pupil spending, for example, compares the per-pupil financing by each state,

Table 6

State Funding for Capital Outlay and Debt Service Programs, 2007

Item in Funding Formula	2006-07
Grants for Debt Service	11
State Guarantee of District Bonds	2
Equalized Debt Service Grants	5
Loans	6
Approved Project Grants (Capital Outlay)	3
Equalized Project Grants (Capital Outlay)	14
No State Funds	11

Source: Verstegen and Jordan (2009, p. 222)

ranging from New Jersey's $17,620 to Utah's $5,978 (National Center for Educational Statistics, 2008). Liu (2006) analyzed the 2007 school year nationally and discovered that "the ten highest spending states provided an average of more than 50 percent more dollars per pupil than was provided by the lower spending ten states" (p. 2). Spending per pupil directly affects the quality of education each state provides and can increase or decrease student achievement.

Capacity and Effort

Fiscal Capacity Measurement in Virginia: Local Composite Index

The Commonwealth of Virginia adopted a new state Constitution in 1971 that would mandate a certain level of educational quality throughout the state. One

component, Article VIII, claimed the following provisions for educational equality:

> Article VIII, §1: Public schools of high quality are to be maintained. The General Assembly shall provide for a system of free public elementary and secondary schools for all children of school age throughout the Commonwealth, and shall seek to ensure that an educational program of high quality is established and continually maintained.
>
> Article VIII, § 2: Standards of Quality; State and local support of public schools. Standards of quality for the several school divisions shall be determined and prescribed from time to time by the Board of Education, subject only to revision by the General Assembly. The General Assembly shall determine the manner in which funds are to be provided for the cost of maintaining an educational program meeting the prescribed standards of quality, and shall provide for the apportionment of the cost of such program between the Commonwealth and the local units of government comprising such school divisions. Each local unit of local government shall provide its portion of such cost by local taxes or from other available funds. (p. 24)

This mandate created the Standards of Quality (SOQ) in the Virginia State Constitution. The SOQs were funded via a method legislated by the General Assembly. Today this method consists of an equalization formula that uses the Local Composite Index as its measure of public school fiscal capacity (Verstegen & Salmon, 1988).

Funds given to Virginia public school divisions to assist with the SOQ are termed State Basic Aid. State Basic Aid is formulated separately for each public

school division. State Basic Aid funding for school division Y would be given based on the following formula:

State Basic $Aid_Y = (1.0000 - LCI_Y)$ X $(SOQ_Y - 1\%$ Sales $Tax_Y)$.

The following explains this formula:

State Basic Aid_Y: Basic Aid to assist funding the SOQ for school division Y

Local Composite $Index_Y$: Local Composite Index (LCI) for a school division Y

SOQ_Y: Cost of the Standards of Quality for a school division Y

1% Retail Sales and Use Tax Receipts State distribution of the 1% Retail Sales

Tax embarked for K-12 education for a Virginia public school division Y

In Virginia, State Basic Aid encompasses the largest portion of the state budget, accounting for roughly 63 percent of direct aid to local governments. The State Basic Aid formula was created to allow each locality to fund a portion of the Basic Aid costs through local resources based on its local ability to pay (Virginia Department of Education, 2012). The local school division's ability to pay was displayed by the LCI amount. As a result, the State amount of Basic Aid is the difference between 1.0000 and a locality's LCI number. For example, if a school division's LCI value was 0.3584, the state would pay 1.0000 – 0.3584 or 64.16 % (0.6416) times the SOQ minus the 1% sales tax. The LCI is also referred to as the Required Local Effort (RLE), or the minimum amount the locality must pay to fund the SOQs.

Generally, states use an equalization formula that emphasizes property wealth as the basis for a public school division's fiscal capacity. Some states join property wealth and other revenue sources to create indices of fiscal capacity. Regardless of the determination method, the goal of fiscal capacity is to allow the state to disperse funds in an inverse proportion of their school district's capacity to pay. Virginia uses the LCI to determine each public school division's fiscal capacity (Virginia Department of Education, 2012).

Virginia was forced to create a complicated procedure to formulate the fiscal capacities for its school divisions due to the fact these divisions are financially dependent upon funding from their local governing bodies. The local governing bodies have been given a broad amount of local revenue sources, thus making it incorrect to base funding on one measure of fiscal capacity, regardless if the source is income, wealth, or another type of economic indicator. Regardless of the 1% state taxable retail tax, local councils have used, with the blessings of the Virginia Assembly, a variety of user fees and taxes without dedicating any other source toward public education. This decision makes it difficult to isolate how much of the local tax revenue is used to fund Virginia's public schools. Due to the fact that a variety of revenue sources are distributed at the decision of each local governing body, the configuration of the total local tax base is unpredictable and flexible across the localities that operate school divisions. This phenomena has circulated the idea that local tax bases have not been reflective of the funding available to Virginia's school divisions (Verstegen & Salmon, 1988). Figure 5 details the formula used to calculate the Local Composite Index.

Concerns Pertaining to the Local Composite Index

The LCI is a normative measure of local fiscal capacity. A normative measure details every component in a given sample for a specified time as a benchmark for its own comparison. Normative measures give data regarding an individual value in comparison to its peer statistics. In Virginia, each school division's LCI does not directly relate to a constant dollar amount of fiscal capacity per pupil, but it denotes a relative rank among the "normed" LCI values of all school divisions based upon their part of the State Mean.

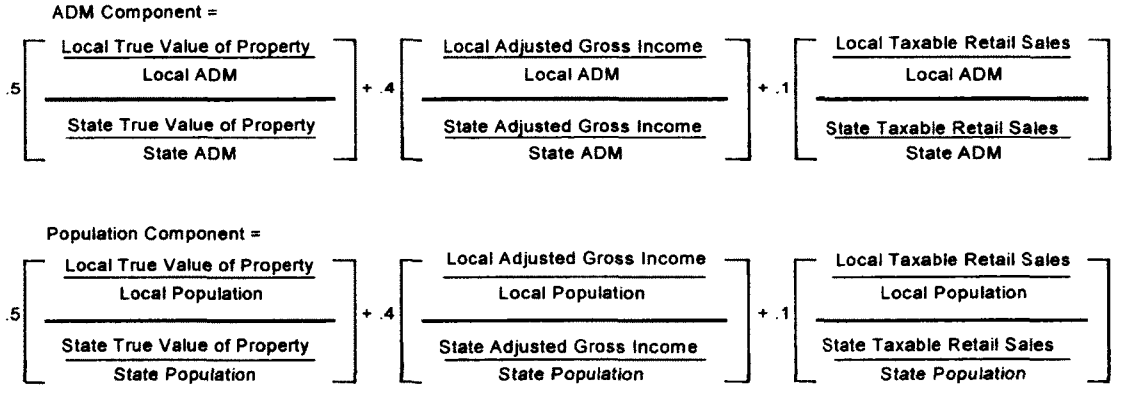

Figure 5. Virginia's Calculation of the Local Composite Index

Source: Virginia Department of Education, 2011a

Virginia's Local Composite Index values display each school division's fiscal capacity among all Virginia public school divisions and are specific to a two year funding range. A school division with a larger LCI amount indicates a greater relative fiscal capacity, whereas lesser LCI amounts display a smaller fiscal capacity to fund education. For the 2010-2012 LCI term, values ranged from .1692 to .8000.

A way to demonstrate how a school division's LCI number would predict its portion of Basic Aid costs is to view the LCI as the local percentage of every dollar selected for education. A school division with an LCI value of 0.2690 would pay approximately 26.90% of the share of its Standards of Quality costs (Virginia Department of Education, 2011a).

The LCI does have limitations as illustrated when attempting to compare its funding amounts across time periods and how it identically handles variations in local change across Virginia. These issues raise concern when considering the validity of the LCI as a predictor of school division fiscal capacity in Virginia.

Normally, indices have values which are related to each other via a standard base (denominator) or value. With Virginia's LCI formula, biennia are not comparable to other biennia. The LCI used for each biennium is formulated independently of previous biennium calculations. For example, the LCI value of .1821 (2010-12) is not directly equivalent to a dollar amount per pupil fiscal capacity. Also, it is not equal to the LCI value of .1821 (2008-10), for the biennium before it. This incomparability occurs due to the recalculation of the State amount (denominator) of the Local to State Ratio bases in a new way with each biennium.

A concern that the LCI incomparability across funding ranges produces is the volatility and lack of stability that complicates the budget process in each school division, due to State Basic Aid being formulated by this measure. Since the most vital component of an effective budget process is a constant funding source, Virginia's LCI system limits the financial stability of its school divisions (Commission on Local Government: Virginia, 1996).

The State amount of the Local to State Ratio is formulated by dividing the collective statewide indicator by its total statewide standardization unit. This formula displays the *mean* value of the State Standardized Indicator. Statistically it is recognized that the mean as a measure of central tendency is swayed significantly by extreme values. Some indicators for certain Virginia school divisions may be viewed as extreme, when analyzed with each other, resulting in a phenomenon where outlying school divisions greatly impact the value of the base (Elias & McDowell, 1992).

Additionally, when viewing LCI over time, variability may not be indicative of local change (growth or decline). Instead, a part of the LCI variation may be a result of the State Standardized Indicator 11 base recalculation, which moves the base to another value. For example, observe the consecutive LCI values of 0.5734, 0.5854, and 0.5882 and their biennial differences of +0.0100 (0.5734 – 0.5854 = +0.0100) and +0.0028 (0.5854 – 0.5882 = 0.0028). The LCI differences display shifts in the state mean (base) and local changes (numerator). The LCI variability displayed may be a result of the LCI's formula.

It would be assumed that the LCI formula could be altered to correct any errors in calculation. Unfortunately, there seems to be no corrections for this variability in the LCI value. Additionally, certain trends in the LCI biennial adjustments among Virginia public school divisions can be explained by observing the volatility that is a result of the changes in state base.

Effort Defined

This research will examine what role Virginia's school districts' division fiscal

effort (the proportion of its wealth invested in K-12 public education) plays in determining several identified measurable student outcomes (detailed in this narrative) from 2003 to 2012.

Owings and Kaplan (2013) define *fiscal effort* in the following formula, where *E* is fiscal effort, *R* is the revenue allocated or current expenditures for education measured as each localities' per pupil expenditure for K-12 education, and *TB* is a measure of wealth. The equation for fiscal effort can be viewed as: $E = R/TB$

Effort, then, is a ratio of the total local current expenditure per pupil (R) in the numerator divided by the GSP per capita in one calculation and divided by SPCI in the other. Both measures of wealth are used in separate calculations. Local current expenditures are used to isolate instructional expenditures, thus avoiding the need to deduct capital outlay and debt service from the figures.

In this study, two measures will evaluate local wealth, the Gross State Product (GSP) on a per-capita basis and State Per Capita Income (SPCI) on a per-capita basis. In using GSP, which already takes into account variances in the economy, these fiscal effort variables are controlled and included in GSP figures. In using SPCI from the *Survey of Current Business*, data traditionally used by the federal government and economists is cited for interstate comparison. Additionally, some contend that SPCI may be a more reliable and valid indicator of fiscal capacity than GSP (Landefeld & Marcuss, 1999, Owings & Kaplan, 2012). As a ratio, this formula controls for the state's wealth and size.

One example of this formula can be found in Table 7. In 2006, Alabama and Vermont had different levels of wealth, or capacity. Alabama had a per capita GSP of

$34,014, while Vermont had a per capita GSP of $38,809. While the $3,895 difference in GSP does not seem significant, capacity examined in relation to spending on education ($13,377 v. $7,980) shows a significant difference, which can be ranked, quantified, and used as an index. In this example, Alabama's effort is .2286, while Vermont's effort is .3447. In ranking the indices nationally, Vermont places first while Alabama ranks 24th. Identical calculations will be performed using SPCI.

Table 7

Effort Data for Alabama and Vermont Using Gross State Product

State	Gross State Product (in millions of $)	Population (in thousands)	Gross State Product Per Capita	Rank Per Capita	Education Spending Per Pupil	Per Pupil Rank	Relative Effort E = R/TB	Effort Rank
Alabama	160,569	4,599	34,914	44	7,980	43	0.2286	24
Vermont	24,213	624	38,809	37	13,377	6	0.3447	1

Source: Owings and Kaplan (2013).

This study uses the total amount of funding per pupil, a variable familiar to educators, as part of its fiscal effort formula rather than as the sole indicator of fiscal effort. This study measures the impact that division fiscal effort has had over a nine year period (2003-2012) on student outcome variables, particularly those measured consistently over time.

This present research focuses on fiscal effort rather than per-pupil expenditures for several reasons. Although ample research has tried to correlate federal, state, and local educational spending practices with student achievement, existing studies suffer from several limitations. Because these previous studies focus

narrowly on specific school districts or single state practices over a short period of time, they have (1) poor generalizability and (2) do not display the impact of spending patterns over time. In contrast, this proposed study extends upon previous research by exploring effort in education funding for each of Virginia's 132 school divisions in conjunction with student outcomes on common and important national indicators. The project's scope encompasses data on these variables over a 9-year period, which should aid with reliability.

Prior Educational Finance Studies on Student Achievement

To date, educational finance studies have examined various models that seek to forecast the impact of local and state spending on student achievement. Studies analyze additional school funding with the goal to reduce class size or raise teacher salary and the effect on student achievement. Studies also compared students' socio-economic status and the impact on student achievement.

Another study by Archibald (2006) analyzed school funding for operations, support, leadership, and instruction. He compared the impact of these variables on student achievement. The study's scope consisted of one school district and its student success on mathematics and reading state level assessments. The study summarized that funding for support and instruction were positively related and significant for reading achievement in four of the grade levels studied during the timeframe of one academic year.

O'Connell-Smith (2004) studied eighth grade state math and reading scores for one academic year in Minnesota's public schools. Variables compared included student/teacher ratio, teacher wages, and spending per pupil. The study concluded

that reading and math results were positively influenced by the variables of teacher wages and spending per pupil when compared to instructional support services.

A study by Grissmer and Flanagan (1998) likewise viewed rising math scores on the NAEP test in North Carolina and Texas from 1990 to 1997. The study examined the education reforms in each state, with a goal of isolating the improvements that were significant to the gain in NAEP scores. The study concluded that each state had implemented a strategic plan, which included:

- establishing clear teaching objectives by grade through state-wide learning standards
- implementing new, state-wide assessments closely linked to the learning standards
- establishing a system of accountability with both sanctions and rewards linked to the assessment results
- establishing a computerized system of feedback on test score performance at the student, classroom, school and district level that can be used for diagnostic purposes
- emphasizing strongly that all students were expected to meet the standards
- deregulating the teaching and school environment and giving teachers and administrators more local and increased flexibility in determining how to meet the standards
- sustaining the system of assessment and accountability without significant changes over several years
- explicit shifting of resources to school with more disadvantaged students.

(Grissmer & Flanagan, 1998, pp. 19-20)

Another study by Grissmer et al. (2000) compared several states 4th grade math scores on the National Assessment of Educational Progress (NAEP) assessment from 1990 to 1996. Variables studied included each families socio-economic status (SES) and spending per pupil. The study found that students from lower SES homes scored lower on the 4th grade math NAEP test. The study suggested that gains in achievement for lower SES students could be achieved through a modest increase in resources, if given to specific programs. A conservative estimate detailed gains of 12 to 15 percentage points in test scores with additional targeted expenditures of fewer than $1,000 dollars per pupil in the states with the lowest SES (Grissmer et al., 2000, p. 101).

Grubb (2006) analyzed the impact of funding on building operations and discovered differences in funding plans and student academic gains. The National Educational Longitudinal Survey of the Class of 1988 (NELS88) was the primary information source for this study. NELS88 gathered data from each academic core (language, math, science, social studies) with relation to certain academic variables such as post-secondary enrollment (college attendance) and graduation rates (Grubb, 2006). Results demonstrated that allocating resources to reduce class size and raise teacher salary produced the most significant impact (Grubb, 2006). Additional results detailed that allocating resources to staff development, curriculum revision, or student remediation had minimal influence on achievement.

A study completed by the Virginia Beach City Public School System (Walden, 2011) analyzed the impact of school funding on regional gain. The study found that

for every one dollar spent and retained in the Virginia Beach region by the Virginia Beach City Public School System, capital budget results in $1.55 of regional spending. The study also found that for every $1 million spent by the Virginia Beach City Public School System, capital budget results in 12.6 regional jobs. Additional results demonstrated that each Virginia Beach City Public School System graduating class generated between $800 million and $900 million in additional lifetime income.

Finally, several empirical studies have argued that additional funding is not required to raise student test scores (Miles & Darling-Hammond, 1998; NCREL, 2000, Odden & Archibald, 2000). Increased funding has been viewed as a negative indicator of success. One study of five elementary schools observed a change in funding allocations towards academic initiatives and its result on student achievement. Three schools chose to raise funding for remediation programs and provide additional staff professional development activities, while two schools adjusted funding to provide additional staff to reduce the student to teacher ratio. The findings demonstrated that each school could provide the new educational strategies with minimal gains in funding (Odden & Archibald, 2000). The results imply that increased educational funding may not be the solution to raising student achievement, but better organization of current funds may reach preferred results.

Hunt (2007), former Governor of North Carolina (1977-1985, 1993-2001), detailed several ideas for the United States to consider when seeking positive change in public education. He explained that citizens should vote for "education candidates" that seek to improve schools and help all students succeed. These political leaders must have a "hands on" approach to education by being connected

with the educational community and staying informed on the progress of state educational goals and policy implementation. Hunt's ideas for building a 21st century U.S. education system call for education to be the focus of any political leader, and that positive educational change (i.e., raising student test scores and graduation rates) can be a reality with educationally focused top down leadership (Hunt, 2007).

The studies analyzed reveal the limited amount of agreement in research regarding educational spending. Findings tend to differ and studies often use a limited amount of data to make a broad generalization. Archibald (2006) and O'Connell-Smith (2004) studied educational funding allocations and tried to decide the best use of money. They found that additional spending in categories of instruction may positively impact student achievement. The range of these studies does not consider increased spending as a variable and student achievement is examined with only one state level test. Also, the studies scope is limited by analyzing a single district or state. Hunt (2007) explains that political leaders should be concerned with education and focus funding to assist raising student achievement.

Grubb's 2006 study considered numerous student achievement variables and the variable of fiscal effort for one school year. Results from educational funding research are difficult to conclude with a limited span of data. Grubb's study did improve on past educational funding research but is hindered by a small range of one year.

Odden and Archibald's (2000) study researched five school's funding projects with the intent to demonstrate that additional funding does not always equate to increasing student achievement. As with Grubb's (2006) study, a small one-year time

span was researched making it difficult to predict trends outside of the five schools studied.

Education and Graduation Rates

History of Research

High school graduation rates and state level standardized tests can be correlated. One study compared research methods for measuring high school graduation rates and found high school completion rates were lowered by a percentage point in states with higher competency exit examinations, while holding all other factors constant. The accountability of testing can impact high school completion (Warren & Manners, 2009).

Due to an increasingly competitive global and knowledge-based economy, the results of dropping out of high school are severe to students, communities, and our nation. Minimally, each adult needs a high school diploma to earn a livable wage. Businesses require employees with the knowledge and technical skills that minimally require a high school diploma. Student dropouts who become parents create communities, which are more likely to have unstable families, bringing adverse factors to family health, future employment, and children's education. Regardless of this need, the United States has large numbers of students not completing high school.

Schools face constant pressure by various stakeholders to improve graduation rates. High school graduation rate is the initial advancement toward a profession for individuals in technologically advanced societies. The high school dropout rate received scrutiny by the federal government passing legislation to reduce the dropout

rate or penalize the schools. The Goals 2000: Educate America Act was signed by President Clinton in 1994, which mandated that 90% of high school students to obtain a high school diploma (Goals 2000, 1, Sec. 102, (1), (A)). In 2008, the National Assessment of Educational Progress (NAEP) found that some schools were still not meeting the target set by Goals 2000 with 8% of students still dropping out of school annually. Figure 6 shows that the percentage of students graduating high school has slightly increased from 1972 to 2008.

Because the national graduation rate is an average, many U.S. high schools fall below it. One 2007 study found some schools with a graduation percentage below 60% were labeled "drop out factories" (Balfanz & Legters, 2004). Balfanz, Bridgeland, Fox and Moore (2010) analyzed dropout factory trends in a 2011 study titled, "Building a Grad Nation." They found at the micro level, "there are currently 1,634 schools in the country in which graduating is at best a 50/50 proposition" (p.1).

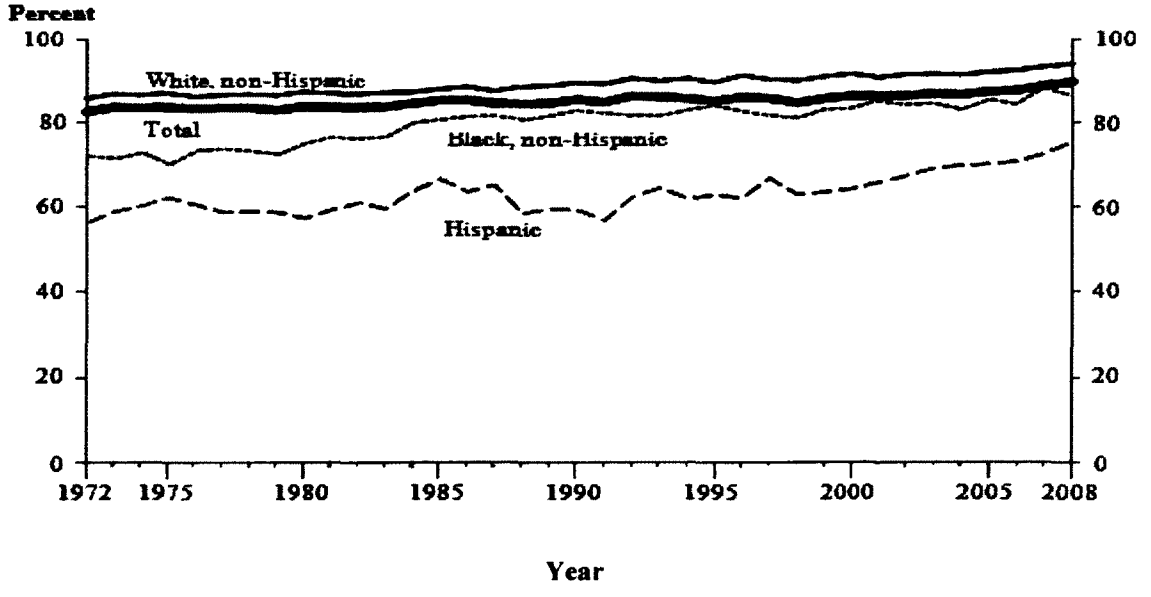

Figure 6. Status completion rates of 18 – through 24 – year-olds not currently enrolled in high school or below by race/ethnicity: October 1927 through October 2008

NOTE: Status completion rates measure the percentage of 18- through 24-year-olds who are not enrolled in high school and who also hold a high school diploma or equivalent credential, such as a General Educational Development (GED) certificate. Those still enrolled in high school are excluded from the analysis. Beginning in 2003, respondents were able to identify themselves as being two or more races. The 2003 through 2008 categories for White (non-Hispanic) and Black (non-Hispanic) contain only respondents who indicated just one race. The Hispanic category includes Hispanics of all races and racial combinations. Due to small sample sizes for some or all of the years shown in the figure, American Indians/Alaska Natives and Asians/Pacific Islanders who are not Hispanic are included in the totals but not shown separately. The Two or more races(non-Hispanic) category is also included in the total in 2003 through 2008 but not shown separately due to small sample sizes. The variability of Hispanic status rates reflects, in part, small sample size of Hispanics in earlier years of the Current Population Survey (CPS). Beginning with 1987, estimates reflect new editing procedures for cases missing school enrollment item data. Estimates beginning with 1992 reflect new wording of the educational attainment item. Estimates beginning with 1994 reflect changes due to newly instituted computer-assisted interviewing. For details about changes in the CPS over time, please see *Kaufman, P., Alt, M.N., and Chapman, C.* (2004). *Dropout Rates in the United States: 2001* (NCES 2005-046). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Source: U.S. Department of Commerce, Census Bureau, Current Population Survey (CPS), October 1972–2008.

Nationally, at the macro level, nearly 30% of all students entering high school in the U.S. never graduate (Greene & Winters, 2006). Figure 7 presents the national dropout rates for 2008 by race and gender. Table 8 details the average freshman graduation rates from 1990 to 2008 for public secondary schools by state.

The economy and job fluctuations present high schools with new hurdles to preparing a work force capable of success in the 21st Century. This instability and change has spurred a series of state and national reports that pursue educational reform initiatives to heighten academic benchmarks and improve the quality of our schools (Balfanz et al., 2010). The concern for educators is, what can be done to reduce the frequency of students dropping out of high school (Bridgeland, Dilulio, & Morrison, 2006)? No easy answers have been found. "Policy makers and educators tend to view the mitigating factors in contradictory ways" (Balfanz et al., 2007, p. 28). Policy makers believe that raising the academic standards will prevent students from dropping out; educators disagree and argue that these policies encourage students to drop out.

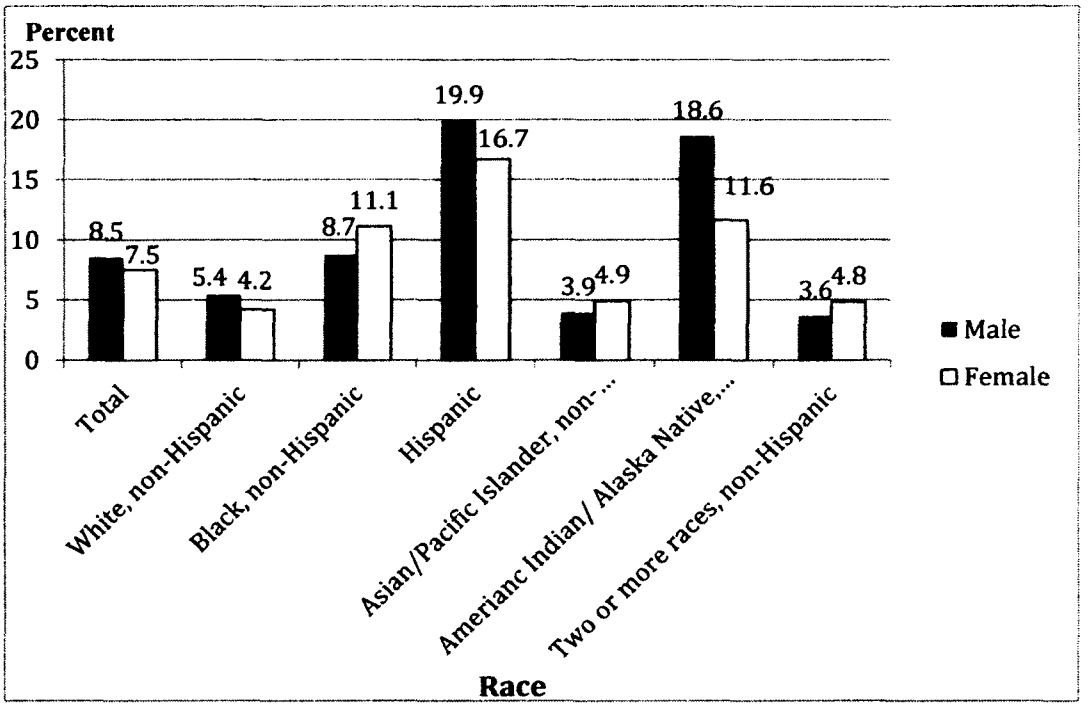

Figure 7. Status dropout rates of 16-through 24-year-olds, by race/ethnicity and sex: October 2008

Note: The status dropout rate indicates the percentage of 16- through 24-year-olds who are not enrolled in high school and who lack a high school credential. High school credentials include high school diplomas and equivalent credentials, such as a General Educational Development (GED) certificate. Respondents were able to identify themselves as being two or more races. The White (non-Hispanic), Black (non-Hispanic), Asian/Pacific Islander (non-Hispanic), and American Indian/Alaska Native (non-Hispanic) categories consist of individuals who considered themselves to be one race and who did not identify as Hispanic. Non-Hispanics who identified themselves as multiracial are included in the Two or more races (non-Hispanic) category. The Hispanic category consists of Hispanics of all races and racial combinations.

Source: U.S. Department of Commerce, Census Bureau, Current Population Survey (CPS), October 2008.

Table 8

Averaged freshman graduation rates for public secondary schools, by state or jurisdiction: Selected years, 1990-91 through 2008-09

State or jurisdiction	1990 -91	1995 -96	1996 -97	1997 -98	1998 -99	1999- 2000	2000 -01	2001 -02	2002 -03	2003- 04	2004 -05

Table 8 Continued

United States	**73.7**	**71.0**	**71.3**	**71.3**	**71.1**	**71.7**	**71.7**	**72.6**	**73.9**	**74.3 \1**	**74.7**
Alabama	69.8	62.7	62.4	64.4	61.3	64.1	63.7	62.1	64.7	65.0	65.9
Alaska	74.6	68.3	67.9	68.9	70.0	66.7	68.0	65.9	68.0	67.2	64.1
Arizona	76.7	60.8	65.3	65.6	62.3	63.6	74.2	74.7	75.9	66.8	84.7
Arkansas	76.6	74.2	70.6	73.9	73.7	74.6	73.9	74.8	76.6	76.8	75.7
California	69.6	67.6	68.8	69.6	71.1	71.7	71.6	72.7	74.1	73.9	74.6
Colorado	76.3	74.8	74.7	73.9	73.4	74.1	73.2	74.7	76.4	78.7	76.7
Connecticut	80.2	76.1	76.7	76.9	76.0	81.9	77.5	79.7	80.9	80.7	80.9
Delaware	72.5	70.4	71.7	74.1	70.4	66.8	71.0	69.5	73.0	72.9	73.0
District of Columbia	54.5	49.7	54.6	53.9	52.0	54.5	60.2	68.4	59.6	68.2	66.3
Florida	65.6	62.3	62.7	62.1	61.4	61.0	61.2	63.4	66.7	66.4	64.6
Georgia	70.3	61.9	62.0	58.2	57.5	59.7	58.7	61.1	60.8	61.2	61.7
Hawaii	75.9	74.5	69.1	68.8	67.5	70.9	68.3	72.1	71.3	72.6	75.1
Idaho	79.6	80.5	80.1	79.7	79.5	79.4	79.6	79.3	81.4	81.5	81.0
Illinois	76.6	75.2	76.1	76.8	76.0	76.3	75.6	77.1	75.9	80.3	79.4
Indiana	76.9	73.6	74.0	73.8	74.3	71.8	72.1	73.1	75.5	73.5	73.2
Iowa	84.4	84.3	84.6	83.9	83.3	83.1	82.8	84.1	85.3	85.8	86.6
Kansas	80.8	77.1	76.9	76.0	76.7	77.1	76.5	77.1	76.9	77.9	79.2
Kentucky	72.9	71.3	71.1	70.2	70.0	69.7	69.8	69.8	71.7	73.0	75.9
Louisiana	57.5	61.7	59.3	61.3	61.1	62.2	63.7	64.4	64.1	69.4	63.9
Maine	80.7	73.7	75.2	78.5	74.7	75.9	76.4	75.6	76.3	77.6	78.6
Maryland	77.5	78.3	76.6	76.2	76.6	77.6	78.7	79.7	79.2	79.5	79.3
Massachusetts	79.1	78.0	78.4	78.3	77.9	78.0	78.9	77.6	75.7	79.3	78.7
Michigan	72.1	71.4	73.5	74.6	73.9	75.3	75.4	72.9	74.0	72.5	73.0
Minnesota	90.8	86.1	78.6	85.0	86.0	84.9	83.6	83.9	84.8	84.7	85.9
Mississippi	63.3	59.7	59.6	59.8	59.2	59.4	59.7	61.2	62.7	62.7	63.3
Missouri	76.0	75.0	74.7	75.2	75.8	76.3	75.5	76.8	78.3	80.4	80.6
Montana	84.4	83.9	83.2	82.2	81.3	80.8	80.0	79.8	81.0	80.4	81.5
Nebraska	86.7	85.6	84.8	85.6	87.3	85.7	83.8	83.9	85.2	87.6	87.8
Nevada	77.0	65.8	73.2	70.6	71.0	69.7	70.0	71.9	72.3	57.4	55.8
New Hampshire	78.6	77.5	77.3	76.7	75.3	76.1	77.8	77.8	78.2	78.7	80.1
New Jersey	81.4	82.8	83.9	76.3	77.5	83.6	85.4	85.8	87.0	86.3	85.1
New Mexico	70.1	63.7	62.5	61.6	63.3	64.7	65.9	67.4	63.1	67.0	65.4
New York	66.1	63.6	65.3	63.4	62.5	61.8	61.5	60.5	60.9	60.9 \6\	65.3
North Carolina	71.3	66.5	65.5	65.6	65.4	65.8	66.5	68.2	70.1	71.4	72.6
North Dakota	87.6	89.5	87.8	86.7	85.6	86.0	85.4	85.0	86.4	86.1	86.3
Ohio	77.5	74.5	76.4	77.0	75.0	75.2	76.5	77.5	79.0	81.3	80.2
Oklahoma	76.5	75.6	74.8	75.1	76.4	75.8	75.8	76.0	76.0	77.0	76.9
Oregon	72.7	68.3	69.1	69.0	68.2	69.6	68.3	71.0	73.7	74.2	74.2
Pennsylvania	79.7	80.0	79.8	79.4	79.1	78.7	79.0	80.2	81.7	82.2	82.5
Rhode Island	75.0	72.7	72.9	72.5	72.2	72.8	73.5	75.7	77.7	75.9	78.4
South Carolina	66.6	60.9	59.6	59.3	59.1	58.6	56.5	57.9	59.7	60.6	60.1
South Dakota	83.8	84.5	84.2	77.7	74.2	77.6	77.4	79.0	83.0	83.7	82.3
Tennessee	69.8	66.6	61.6	58.4	58.5	59.5	59.0	59.6	63.4	66.1	68.5
Texas	72.2	66.1	67.0	69.4	69.2	71.0	70.8	73.5	75.5	76.7	74.0

Table 8 Continued

Utah	77.5	76.9	81.1	80.7	81.6	82.5	81.6	80.5	80.2	83.0	84.4
Vermont	79.5	85.3	83.6	83.9	81.9	81.0	80.2	82.0	83.6	85.4	86.5
Virginia	76.2	76.2	76.6	76.6	76.3	76.9	77.5	76.7	80.6	79.3	79.6
Washington	75.7	75.5	74.0	73.3	73.2	73.7	69.2	72.2	74.2	74.6	75.0
West Virginia	76.6	77.0	76.7	77.4	77.9	76.7	75.9	74.2	75.7	76.9	77.3
Wisconsin	85.2	83.6	83.7	83.1	82.6	82.7	83.3	84.8	85.8	85.8 \6\	86.7
Wyoming	81.1	77.7	78.4	77.1	76.6	76.3	73.4	74.4	73.9	76.0	76.7
Other jurisdictions											
American Samoa	85.3	79.7	79.7	76.6	80.4	71.9	77.0	82.9	81.0	80.2	81.1
Guam	48.2	44.6	45.4	39.5	54.7	52.9	51.7	---	56.3	48.4	---
Northern Marianas	---	63.3	68.9	63.4	63.5	61.1	62.7	65.2	65.2	75.3	75.4
Puerto Rico	60.9	60.8	61.5	61.9	63.6	64.7	65.7	66.2	67.8	64.8	61.7
U.S. Virgin Islands	53.2	54.2	62.0	58.6	58.6	53.8	57.3	48.7	53.5	---	---

Table 8 Continued

State or jurisdiction	2005-06	2006-07	2007-08	2008-09
United States	**73.4 \2**	**73.9**	**74.7**	**75.5 \2**
Alabama	66.2	67.1	69.0	69.9
Alaska	66.5	69.0	69.1	72.6
Arizona	70.5	69.6	70.7	72.5
Arkansas	80.4	74.4	76.4	74.0
California	69.2	70.7	71.2	71.0 \3\
Colorado	75.5	76.6	75.4	77.6
Connecticut	80.9	81.8	82.2	75.4
Delaware	76.3	71.9	72.1	73.7
District of Columbia	65.4 \4\	54.8	56.0	62.4
Florida	63.6	65.0	66.9	68.9
Georgia	62.4	64.1	65.4	67.8
Hawaii	75.5	75.4	76.0	75.3
Idaho	80.5	80.4	80.1	80.6
Illinois	79.7	79.5	80.4	77.7
Indiana	73.3	73.9	74.1	75.2
Iowa	86.9	86.5	86.4	85.7
Kansas	77.5	78.8	79.0	80.2
Kentucky	77.2	76.4	74.4	77.6
Louisiana	59.5	61.3	63.5	67.3
Maine	76.3	78.5	79.1 \5\	79.9 \5\
Maryland	79.9	80.0	80.4	80.1
Massachusetts	79.5	80.8	81.5	83.3
Michigan	72.2	77.0	76.3	75.3
Minnesota	86.2	86.5	86.4	87.4
Mississippi	63.5	63.5	63.9	62.0
Missouri	81.0	81.9	82.4	83.1
Montana	81.9	81.5	82.0	82.0

Table 8 Continued

Nebraska	87.0	86.3	83.8	82.9
Nevada	55.8	54.2	56.3	56.3 \3\
New Hampshire	81.1	81.7	83.3	84.3
New Jersey	84.8	84.4	84.6	85.3
New Mexico	67.3	59.1	66.8	64.8
New York	67.4	68.9	70.9	73.5
North Carolina	71.8	68.6	72.8	75.1
North Dakota	82.2	83.1	83.8	87.4
Ohio	79.2	78.7	79.0	79.6
Oklahoma	77.8	77.8	78.0	77.3
Oregon	73.0	73.8	76.7	76.5
Pennsylvania	83.5 \4\	83.0	82.7	80.5
Rhode Island	77.8	78.4	76.4	75.3
South Carolina	61.0 \4\	58.9	62.2	66.0
South Dakota	84.5	82.5	84.4	81.7
Tennessee	70.7	72.6	74.9	77.4
Texas	72.5	71.9	73.1	75.4
Utah	78.6	76.6	74.3	79.4
Vermont	82.3	88.5	89.3	89.6
Virginia	74.5	75.5	77.0	78.4
Washington	72.9	74.8	71.9	73.7
West Virginia	76.9	78.2	77.3	77.0
Wisconsin	87.5	88.5	89.6	90.7
Wyoming	76.1	75.8	76.0	75.2
Other jurisdictions				
American Samoa	81.0	84.6	---	---
Guam	---	---	---	---
Northern Marianas	80.3	73.6	---	---
Puerto Rico	68.6	66.7	63.1	62.1
U.S. Virgin Islands	---	57.8	57.8	68.1

---Not available.
\1\Includes estimates for New York and Wisconsin. Without estimates for these two states, the averaged freshman graduation rate for the remaining 48 states and the District of Columbia is 75.0 percent.
\2\U.S. total includes estimates for nonreporting states.
\3\Estimated high school graduates from NCES 2011-312, *Public School Graduates and Dropouts from the Common Core of Data: School Year 2008–09.*
\4\Projected high school graduates from NCES 2009-062, *Projections of Education Statistics to 2018.*
\5\Includes 1,161 graduates in 2007-08 and 1,169 graduates in 2008-09 from private high schools that received a majority of their funding from public sources.
\6\Estimated high school graduates from NCES 2006-606rev, *The Averaged Freshman Graduation Rate for Public High Schools From the Common Core of Data: School Years 2002-03 and 2003-04.*

Note: The average freshman graduation rate provides an estimate of the percentage of students who receive a regular diploma within 4 years of entering ninth grade. The rate uses aggregate student enrollment data to estimate the size of an incoming freshman class and aggregate counts of the number of diplomas awarded 4 years later. Averaged freshman graduation rates in this table are based on

reported totals of enrollment by grade and high school graduates, rather than on details reported by race/ethnicity. Some data have been revised from previously published figures.

Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD). "State Nonfiscal Survey of Public Elementary/Secondary Education." 1986-87 through 2009-10; The Averaged Freshman Graduation Rate for Public High Schools From the Common Core of Data. School Years 2002-03 and 2003-04; and Projections of Education Statistics to 2017. This table was prepared August 2011.)

One example of public school funding directly impacting graduation rates can be seen in the school funding inequalities between urban and suburban districts. Suburban districts receive more funding per student than urban school districts do. One study by Education Trust found that in "42 out of 49 states studied—86 percent of school districts with the greatest numbers of poor children have less money to spend per student than districts with the fewest poor children" (Orlofsky, 2001, p.1). For example, in Chicago suburbs there is a huge disparity between the spending on education between the poorest children and the richest children. In one inner city school district, Zion Elementary School District 6, the per student expenditure is $8,675, while in a suburban school district, Rondout School District 72, the per student expenditure reaches close to $22,508 (Rado, 2007). Large fiscal funding disparities also appear between schools within the same urban school district. This disparity appears in the test scores of students in suburban and urban districts.

Nearly 50% of a schools' fiscal support comes from local taxes, with the majority coming via property taxes. This allows the richest districts to spend as much as three times the per-pupil amount of the most economically disadvantaged districts (Condron & Roscigno, 2003). This scenario allows students attending schools in districts with more taxable wealth to have additional funds spent on their education than students attending schools with less taxable wealth (Owings & Kaplan, 2013).

One 2009 report from the Editorial Projects in Education (EPE) Research Center uncovered a $12,307 gap in per-pupil spending among high and low spending school districts in Alaska during the 2005-2006 school year. New Jersey had the next largest spending gap at $10,838, with West Virginia showing the smallest gap of $1,895 (Hightower, 2009). A 2008 study of 10 New York school districts demonstrated funding disparities ranging from $111,750 to $10,330 per pupil – a difference of $101,420 per pupil (Dillow, Snyder, & Hoffman, 2008).

The inequities in urban and suburban funding present a serious concern. Each school should receive an equal share of unrestricted funds in addition to whatever categorical allocations are intended for the special needs of the students it has (such as for special education services or English-language instruction) (Roza, 2006). One problem is that suburban and urban schools in the same district receive the same amount of money for the same categorical program (special education services or English-language instruction) regardless of the number of students that need these services (Roza, 2006). Consequently, low-income and minority students generally located in urban schools are shortchanged.

> For example, a district might allocate $100,000 to each school with English-language learners, even though one school might have 200 students with limited English proficiency and another—often a more affluent school—might have only 20. This results in a per-pupil cost of $500 in the first school and $5,000 in the second. (Roza, 2006, p. 9)

In Virginia, graduation rates are calculated via the Graduation and Completion Index (GCI). The GCI is calculated based on cohorts of students who begin ninth

grade in the same year and progress through high school. The GCI has differential weights based on the outcomes of students who graduate with Board of Education-approved diplomas, earn alternative completion credentials (GED or Certificate of Program Completion) or stay in school beyond their on-time year. Generally, on time graduation is four years. Certain students with disabilities and English language learners are permitted more time to graduate. Figure 8 displays how the GCI is calculated (VDOE, 2011a):

$$\frac{\text{Weighted Values for Cohort \& Carryover Diploma Graduates, GEDs, Still Enrolled Non-Graduates \& Completers in Year X}}{\text{[First-time 9th graders in year x-4) + (Transfers in) – (Transfers out) + (Carryover students)]}}$$

Figure 8. Virginia's Calculation of the Graduation and Completion Index

Source: Virginia Department of Education, 2011a

The federal graduation indicator (FGI) is another graduation rate indicator used by the federal government. This indicator is one of 29 indicators that schools with a graduating class must meet to make adequate yearly progress (AYP). The FGI differs from the GCI in the following ways: 1) The federal indicator does not permit any students to have their cohort adjusted, regardless of language or disability status and 2) The federal indicator only includes Virginia's standard and advanced studies diplomas. Figure 9 displays how the FGI is calculated (VDOE, 2011b):

$$\frac{\text{Standard \& Advanced Diploma Graduates in Year X}}{\text{[(\# of 1st time entering 9th graders in Year X-4) + (Transfers in) – (Transfers our)]}}$$

Figure 9. Calculation of the Federal Graduation Indicator

Source: Virginia Department of Education, 2011b

Due to the FGI limitations on groups included in its graduation percentage (standard and advanced diploma candidates) as well as Virginia's FGI data spanning back to 2008, the FGI will not be included in this study.

Conceptual Framework

This analysis of division fiscal effort combined with graduation rates raises several questions. What are the long-term moderating effects of increased effort for education and long-term student outcomes for which that fiscal effort was intended? Currently, no literature has fully explored this question. In light of the nine years of data points for division fiscal effort, it will be possible to determine if effort slopes are decreasing, flat, or increasing. In addition, the relationship between effort and high school graduation rates can be explored.

The main outcome for this study will be to give information regarding an ex post facto study and the relationship among division fiscal effort and high school graduation rates. A major goal of the study is to provide additional data beyond the current empirical research on the relationship between school funding and high school graduation rates. Due to this goal the study will aim to answer the following research questions.

RQ_1: Are Virginia's local division's fiscal effort (FE) indices and high school graduation rates correlated?

RQ_2: After controlling for socio-economic status (SES), how much will division fiscal effort affect the annual rate of change in Virginia's high school graduation rates from 2003 – 2012?

RQ_3: What past trends are apparent in relation to Virginia's fiscal

effort and high school graduation rates?

These answers will have significant policy and practice implications. Since monetary resources for schools have fluctuated and currently mirror society's economic recession, fiscal resources should be carefully analyzed to ensure funding is properly allocated.

CHAPTER 3

METHODOLOGY

Overview

This study analyzes the relationship between student graduation rates and a locality's fiscal effort index. The research completed followed a quantitative non-experimental ex post facto perspective. The study aimed to discover cause-and-effect relationships by observing an existing condition or state of affairs and reviewing valid causal factors. The study followed a prospective design by finding naturally occurring groups and following them forward. Ex post facto designs uncover if preexisting conditions have caused significant differences in the groups compared (Cohen, Manion, & Morrison, 2007). The study examined the preexisting conditions of division fiscal effort and student achievement to reveal impact over time. When using an ex post facto design, and reviewing causal relationships, some phenomenon are better served by analyzing naturally occurring groups instead of manipulated random samples. Regarding fiscal effort, it would be unethical for the study to knowingly manipulate the funding provided to schools. The study implements a post-test only, non-equivalent group research design. The design was chosen due to the absence of random assignment of the independent variable. Additionally, the school divisions reviewed account for non-equivalent groups that were compared via high school graduation rates.

The ex post facto research design was used to study the data in this investigation. Ex post facto research designs are often considered pseudo-experimental and quantitative in design. According to Kerlinger (1973), ex post facto

research conducts a systematic empirical inquiry in which the researcher does not have direct control of independent variables because their manifestations have already happened or they are, by nature, not manipulable. Ex post facto research design reviews the effect of an event on an outcome with the purpose of establishing a causal link. In this study, the groups (Virginia school divisions) differ in their high school graduation rates and the percent of funding (fiscal effort) given towards public school K-12 education.

The outcome for this study was to uncover if varying levels of fiscal effort were significant in determining Virginia's high school graduation rates. The method used follows a proven research design to analyze experimental components and uncover quantitative outcomes that may be used to rationalize the distribution of future educational funds.

Range

Due to the ex post facto research design, the major parts of this study have occurred. The samples collected represent Virginia's 132 school divisions for each year studied from 2003 – 2012. The geographic range encompassed the entire state of Virginia. The independent variable of division fiscal effort was formulated for the timeframe under investigation (2003-2012) for each school division in Virginia. Each division's ratio of fiscal effort was compared to its high school graduation rate for the time studied (2003-2012).

Variables

One variable, high school graduation rate, consists of every four-year cohort student that received a Virginia high school standard or advanced diploma during the 2003-2012 time frame. Students studied vary in regards to gender, age, race, and socio-economic status.

The other variable, division fiscal effort, consists of Virginia's 132 school divisions for the years studied. Representative data were formulated from division level budget and census data. Required data from the divisions encompass the gross state product, state personal income, and population along with total division level expenditures per pupil above and below the required local effort for the years studied.

Data

Data used in this study are publically available via state and national government statistics. Graduation rate data were used via the Virginia Department of Education online database. The Virginia graduation rate data were recorded from: http://www.doe.virginia.gov/statistics_reports/graduation_completion/hs_grads_completers/archive_data.shtml. The study included Virginia graduation data collected from 2003 to 2012.

The variable of division fiscal effort is formulated as a ratio of utility. Owings and Kaplan (2013) define *fiscal effort* in the following formula, where E is fiscal effort, R is the revenue allocated or current expenditures for education measured as each locality's per pupil expenditure for K-12 education, and TB is a measure of wealth. The equation for fiscal effort can be viewed as: $E = R/TB$.

Effort, then, is a ratio of the total school division current expenditure per pupil (R) in the numerator divided by the Gross State Product (GSP) per capita in one calculation and divided by State Per Capita Income (SPCI) in the other. Both measures of wealth are used in separate calculations. Division current expenditures are used to isolate instructional expenditures, thus avoiding the need to deduct capital outlay and debt service from the figures. Division per-pupil spending is analyzed via two measures. The initial is division level budget expenditures for K-12 education. These data are collected from the Virginia Department of Education for public elementary and secondary education. The division level budget expenditures were recorded from: http://www.doe.virginia.gov/school_finance/budget/calc_tools/index.shtml. The following measure, total student enrollment, is gathered also by the Virginia Department of Education data on student membership for public elementary and secondary education. To calculate the division level per-pupil spending, each division's revenue for education is divided by total student enrollment for each year from 2003-2012. Capacity (GSP) is formulated with two components. Initially, GSP is compiled from the U.S. Department of Commerce's Bureau of Economic Analysis. Once calculated, local level population estimates are gathered from the U.S. Census Bureau. To determine capacity, GSP and SPCI for each Virginia school division are divided by the division's population for each year within the study (2003–2012). Division fiscal effort is determined by dividing local level per-pupil spending by capacity to form the amount of division wealth given to K-12 public education. This amount is determined for each Virginia school division for the time frame 2003–2012.

Data gathered were stored with password protection. Data for Virginia

graduation rates and division fiscal effort were collected into one database. Data collected were studied with the statistical software, Statistical Package for the Social Sciences (SPSS version 20).

Data Analysis

To begin, Virginia division level results were calculated on fiscal effort and percent change for each year studied (2003–2012). Fiscal effort was calculated as a ratio of local level per pupil spending over GSP and SPCI. Average percent change was calculated as the mean of the differences of division fiscal effort from each prior year (2003–2012) from the most current year 2012. Results were analyzed by division ranking and largest margins of change over the years studied.

Following these results, an analysis of the relationship between division fiscal effort and graduation rate was completed. This analysis allowed the means of each variable (fiscal effort and graduation rate) over the time studied (2003–2012) to be ranked and placed within quartiles. Results were analyzed for consistency in ranking and quartiles between variables.

The following research questions will be answered via the data analysis:

RQ_1: Are division fiscal effort (FE) indices and high school graduation rates correlated?

- In light of the nine years of data (2003–2012) points for local effort, it will be possible to determine if effort slopes are decreasing, flat, or increasing. The relationship between

effort and certain student outcome measures can be explored.

RQ_2: After controlling for socio-economic status (SES), how much will division fiscal effort affect the annual rate of change in Virginia's high school graduation rates from 2003–2012? The following null hypotheses can be tested to answer this question:

- H_01^i: There is no statistically significant relationship between a student's high school graduation rate and division fiscal effort (using GSP).
- H_02^i: There is no statistically significant relationship between a student's high school graduation rate and division fiscal effort (using SPCI).

RQ_3: What past trends are apparent in relation to Virginia's fiscal effort and high school graduation rates?

The first research question "Are Virginia's fiscal effort (FE) indices and high school graduation rates correlated?" was studied with a bivariate correlation. A correlation analysis among the variables of division fiscal effort and high school graduation rate was computed. A bivariate correlation was chosen to measure the strength of the relationship between fiscal effort and high school graduation rate.

The next research question "After controlling for socio-economic status (SES), how much will division fiscal effort affect the annual rate of change in Virginia's high school graduation rates from 2003–2012?" was examined via a linear regression analysis. This statistical test assigns a value to each division individually

with comparison to fiscal effort and high school graduation rates for each year. The regression equation is listed as:

$$Y = a + bX + e$$

"Y" is the value of the dependent variable being predicted; in this study it represents Virginia division level high school graduation rates. Alpha (a) is a constant and equals the value of the dependent variable (Y) when the value of X=0. Beta (b) is the coefficient of X and represents the slop of the regression line and the amount change found within the dependent variable of graduation rate for each unit change in the independent variable of fiscal effort. The independent variable is accounted by "X" and is explaining the value or "Y". Finally, the error term "e" is the expressive error in predicting the value of "Y". Results from the regression analysis are given on three statistics of significance. The initial statistic is R^2 which is a measure of association (Seber, 1977); it displays the amount of the variance in the values of Y that can be explained by knowing the amount of "X". The amounts range from 0.0 to 1.0 where a amount closer to 1.0 illustrates a strong association between the variables and explains more of the variance graduation rates (Seber, 1977). Once completed, the standard error of the estimate is detailed (Seber, 1977). The closer the value is to zero demonstrates less error in the prediction of the dependent variable. Finally, the "p" or significance amount is detailed which displays the probability of the regression coefficient in the population is zero (Seber, 1977). In this study, significance is represented by an amount less than .05.

The last research question "What past trends are apparent in relation to Virginia's fiscal effort and high school graduation rates?" were studied with a time-

lagged correlation and a fixed effects least squares dummy variable model. The time-lagged correlation analysis allows the researcher to study potential relationships among variables that involve some delay. This analysis reviews the positive or negative correlation among Virginia high school graduation rates and division fiscal effort. Unfortunately, in the field of education, fiscal inputs and student achievement outputs do not happen at concurring measurable time points. Generally, funds are allocated from the state level before any student achievement is measured for a given year. This would lead to some delay when analyzing the impact of fiscal inputs on student achievement.

For the study, the dependent variable of high school graduation rates "x" and an independent variable of division fiscal effort "z" were measured over time, at varying intervals ranging from 2, 4, 6, and 8 years. The variables are detailed in the following formula:

$$X_T = \Sigma\, {}^{\beta}{}_{1} * Z_{T-1}$$

Regarding this study "x" signifies the dependent variable of Virginia high school graduation rates, "T" signifies the year being studied regarding the graduation rates, "Σ" represents the total of all the computations regarding the dependent variable, "β" represents slope parameters in the linear equation between the independent and dependent variables. "Z_{T-1}" details the value of the independent variable in time increments. The value of "x" at time "T" is represented as a linear function of "z" measured at times T, T-1, T-2, T-3, etc. Due to this equation, the dependent variable is a linear function of "z", and "z" is time-lagged by the time periods (1, 2, 3, etc.). After examination if the values for the time-lagged time

periods are statistically significant, it may be decided that the variance in graduation rate is predicted with the respective lag(s) in funding (Judge, Griffiths, Hill, Luetkepohl, & Lee, 1985).

To analyze the past trends and relationships between the variables of division fiscal effort and graduation rate the time-lagged correlation was calculated at a two, four, six, and eight-year lag (2005, 2007, 2009, 2011). The time lag periods of fiscal effort encompassed the years before graduation data were recorded. Using this study the amount of increase or decrease in graduation rates can be positively or negatively correlated with the increase or decrease in division fiscal effort. Significant lag correlations (positive or negative) clarify shifting trends in achievement due to raised or decreased funding.

Finally, a fixed effects least squares dummy variable model was used to expand upon and account for variance that may affect the results from the distributed lag analysis. Results from this study will give time effect statistics on effort and high school graduation rates while considering the covariance associated with race, gender and socio economic status. Data from this test are detailed for each school division by highlighting significant findings in the lag correlations, significant error estimates and clarification of possible findings from the data based on the research question and the constraints within the statistical amount.

Summary

The methodology provided a detailed process to answer the study's research question and analyze the impact of division fiscal effort on Virginia's high school

graduation rates. The study intended to locate significant relationships, review predictive tendencies, and explore past connections between the variables of educational funding and student achievement as studied via division fiscal effort and Virginia's high school graduation rates. Due to the ex post facto nature of the study, results should not be over generalized outside the range of the study. Additionally, with an ex post facto study it is crucial to account for the possible influences that can affect high school graduation rate. Covariates such as socio-economic status, race, and gender that can impact the independent variable of high school graduation rate must be accounted for via appropriate statistical study.

This study used a non-experimental ex post facto analysis, which nullifies the need for a hypothesis to be tested. Regardless, due to the material covered in the literature review, the following items are presumed:

1. Fiscal effort and graduation rates will be positively correlated.
2. Division fiscal effort will display no significant amount of variance regarding graduation rates.

Based on the review of the literature, high school graduation rates and division fiscal effort could be positively linked. Research conducted over nine years would allow insight into the effect of funding on high school graduation rates. Though generalizations are difficult to validate in any field, the large sample size and data range may allow some valid generalizations about the correlation between fiscal effort and high school graduation rates. Although no single assessment can determine the effectiveness of education, assessments can be evaluated to provide insight and decide how to improve a student's academic success.

CHAPTER 4

RESULTS

Introduction

This study explored relationships among the variables of Virginia high school graduation rates and division fiscal effort. Prior studies have generally analyzed these variables with a limited focus. Generally, student achievement is studied by comparing one subject or grade level without considering the implications of state level policy. This research looked to further previous research by studying achievement (high school graduation rates from 2003-2012) and incorporating the local funding variable termed fiscal effort.

This chapter is structured by reviewing previously discussed research questions. The results will be summarized followed by a discussion of analogous data. Initially, data from the 132 Virginia school divisions regarding fiscal effort are detailed. This information studied is from 2003-2012. To examine these findings further division level means for fiscal effort and high school graduation rates are ranked and configured into quartiles.

The first research question, "Are Virginia's fiscal effort (FE) indices and high school graduation rates correlated?", was answered by a review of each school division's fiscal effort and high school graduation rate in Virginia from 2003 – 2012. A bivariate correlation was completed to analyze the relationship among variables (fiscal effort and high school graduation rate). Due to the data collected, relationships were established by observing if effort slopes are decreasing, flat, or increasing.

The next research question, "After controlling for socio-economic status

(SES), how much will division fiscal effort affect the annual rate of change in Virginia's high school graduation rates from 2003–2012?", was reviewed via a linear regression analysis. The statistical test assigned a value to each division individually with comparison to fiscal effort and high school graduation rates for each year (2003-2012).

The final research question, "What past trends are apparent in relation to Virginia's fiscal effort and high school graduation rates?", was analyzed with a time-lagged correlation, linear regression forecasting and a fixed effects least square dummy variable model. For the study, the dependent variable of high school graduation rates "x" and an independent variable of division fiscal effort "z" were measured over time, at varying occasions. The variables are detailed in the following formula:

$$X_T = \Sigma\, {}^{\beta}{}_{1} * Z_{T-1}$$

To analyze the past trends and relationships between the variables of division fiscal effort and graduation rate the time-lagged correlation was calculated at a two, four, six, and eight-year lag (2005, 2007, 2009, 2011). The time lag periods of fiscal effort encompassed the years before graduation data were recorded. Using this study the amount of increase or decrease in graduation rates can be positively or negatively correlated with the increase or decrease in division fiscal effort.

Finally, a fixed effects least squares dummy variable model was used to expand upon and account for variance that may affect the results from the distributed lag analysis. Results from this study gave time effect statistics on effort and high school graduation rates while considering the covariance associated with race, gender

and socio- economic status.

Fiscal Effort by School Division in Virginia

A school division's fiscal effort (E) is a ratio of per pupil spending (R) over the measure of wealth (TB). The equation for fiscal effort can be viewed as E = R/TB (Owings & Kaplan, 2013). This equation formulates the proportion of each school division's fiscal capacity or effort. Table 9 details the calculation of fiscal effort for each of Virginia's 132 school divisions for the years 2003-2012 using gross state product (GSP). Also, Table 8 demonstrates the yearly average percent change in fiscal effort for each division using gross state product. Table 10 likewise displays the calculation of fiscal effort for each of Virginia's 132 school divisions for the years 2003-2012 using state per capita income (SPCI). Table 10 displays the yearly average percent change in fiscal effort for each division using state per capita income.

The trend from 2003 – 2012 using GSP is that fiscal effort by division has decreased. Of the school divisions studied, 111 have decreased fiscal effort towards education, while 21 have increased fiscal effort. The trend from 2003-2012 using SPCI displayed different results with 35 school divisions showing decreased fiscal effort and 97 school divisions displaying increased fiscal effort. Further analysis into the average percent change using SPCI, Table 10 shows several school divisions that have displayed a large increase in effort: 56% from Appomattox, 38% from Norton, and 32% from Arlington. Table 10 also displays schools divisions with a decreasing fiscal effort: -3% from Floyd, -4% from Craig and -6% from Buena Vista. In reviewing past trends of the relationship between fiscal effort and graduation rates,

the overall upward or downward trend of a school division's fiscal effort is telling of the policy in place regarding educational spending.

Table 9

Division Fiscal Effort using Gross State Product and Average Percent Change in Virginia from 2003 to 2012

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average percent Change
Accomack County	**0.0094**	**0.0095**	**0.0074**	**0.0066**	**0.0070**	**0.0074**	**0.0074**	**0.0074**	**0.0076**	**0.0074**	**-0.0228**
Albemarle County	0.0205	0.0193	0.0198	0.0203	0.0212	0.0212	0.0198	0.0191	0.0184	0.0188	-0.0087
Alleghany County	**0.010583**	**0.0097**	**0.0088**	**0.0094**	**0.0094**	**0.0094**	**0.0082**	**0.007**	**0.0059**	**0.0082**	**-0.0166**
Amelia County	0.0081	0.0060	0.0062	0.0060	0.0064	0.0066	0.0060	0.0059	0.0069	0.0066	-0.0157
Amherst County	**0.0070**	**0.0068**	**0.0065**	**0.0072**	**0.0064**	**0.0063**	**0.0062**	**0.0063**	**0.0046**	**0.0061**	**-0.0040**
Appomattox County	0.0056	0.0052	0.0050	0.0052	0.0052	0.0052	0.0056	0.0049	0.0035	0.0048	0.5853
Arlington County	**0.0397**	**0.0402**	**0.0393**	**0.0403**	**0.0432**	**0.0429**	**0.0406**	**0.0378**	**0.00378**	**0.0354**	**0.3004**
Augusta County	0.0081	0.0079	0.0067	0.0074	0.0078	0.0077	0.0077	0.0075	0.0028	0.0075	0.1464
Bath County	**0.0247**	**0.0256**	**0.0244**	**0.0242**	**0.0242**	**0.0258**	**0.0224**	**0.0214**	**0.0066**	**0.0215**	**0.1596**
Bedford	0.0102	0.0078	0.0071	0.0079	0.0073	0.0077	0.0068	0.0066	0.0061	0.0069	-0.0365
Bedford County	**0.0062**	**0.0059**	**0.0057**	**0.0056**	**0.0059**	**0.0057**	**0.0027**	**0.0054**	**0.0100**	**0.0056**	**0.0896**
Bland County	0.0113	0.0108	0.0101	0.0101	0.0100	0.0102	0.0098	0.0098	0.0061	0.0096	0.0061
Botetourt County	**0.0090**	**0.0103**	**0.0086**	**0.0084**	**0.0064**	**0.0070**	**0.0071**	**0.0075**	**0.0086**	**0.0063**	**-0.0260**
Bristol	0.0056	0.0066	0.0065	0.0066	0.0054	0.0058	0.0062	0.0053	0.0063	0.0069	0.0300
Brunswick County	**0.0064**	**0.0060**	**0.0068**	**0.0070**	**0.0069**	**0.0077**	**0.0067**	**0.0077**	**0.0061**	**0.0076**	**0.0296**
Buchanan County	0.0048	0.0047	0.0062	0.0052	0.0060	0.0073	0.0073	0.0066	0.0063	0.0072	0.0559
Buckingham County	**0.0100**	**0.0086**	**0.0065**	**0.0050**	**0.0046**	**0.0057**	**0.0062**	**0.0050**	**0.0062**	**0.0043**	**-0.0703**
Campbell County	0.0073	0.0072	0.0062	0.0064	0.0053	0.0057	0.0053	0.0056	0.0142	0.0059	0.0804
Caroline County	**0.0076**	**0.0084**	**0.0056**	**0.0063**	**0.0074**	**0.0079**	**0.0076**	**0.0066**	**0.0057**	**0.0061**	**-0.0112**
Carroll County	0.0072	0.0073	0.0060	0.0056	0.0063	0.0066	0.0054	0.0060	0.0085	0.0074	0.0172

Table 9 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average percent Change
Charles City County	**0.0183**	**0.0198**	**0.0185**	**0.0177**	**0.0154**	**0.0148**	**0.0146**	**0.0135**	**0.0129**	**0.0129**	**-0.0366**
Charlotte County	0.0056	0.0047	0.0043	0.0042	0.0044	0.0045	0.0050	0.0054	0.0062	0.0043	-0.0182
Charlottesville	**0.0241**	**0.0233**	**0.0214**	**0.0221**	**0.0234**	**0.0252**	**0.0242**	**0.0252**	**0.0085**	**0.0241**	**0.1366**
Chesapeake	0.0104	0.0099	0.0097	0.0102	0.0121	0.0115	0.0106	0.0103	0.0061	0.0106	0.0380
Chesterfield County	**0.0108**	**0.0101**	**0.0088**	**0.0089**	**0.0092**	**0.0106**	**0.0090**	**0.0085**	**0.0065**	**0.0080**	**-0.0233**
Clarke County	0.0141	0.0147	0.0132	0.0133	0.0124	0.0128	0.0129	0.0123	0.0064	0.0119	0.0286
Colonial Beach	**0.0072**	**0.0061**	**0.0075**	**0.0063**	**0.0065**	**0.0090**	**0.0087**	**0.0078**	**0.0094**	**0.0079**	**0.0266**
Colonial Heights	0.0178	0.0154	0.0147	0.0147	0.0152	0.0162	0.0152	0.0152	0.0219	0.0146	-0.0039
Covington	**0.0152**	**0.0148**	**0.0119**	**0.0161**	**0.0120**	**0.0119**	**0.0114**	**0.0112**	**0.0165**	**0.0122**	**0.0025**
Craig County	0.0102	0.0072	0.0077	0.0058	0.0064	0.0063	0.0067	0.0055	0.0063	0.0056	-0.0515
Culpeper County	**0.0102**	**0.0103**	**0.0090**	**0.0097**	**0.0092**	**0.0102**	**0.0100**	**0.0094**	**0.0091**	**0.0086**	**-0.0169**
Cumberland County	0.0070	0.0062	0.0065	0.0068	0.0060	0.0087	0.0054	0.0071	0.0099	0.0062	0.0292
Danville	**0.0076**	**0.0082**	**0.0064**	**0.0068**	**0.0066**	**0.0074**	**0.0062**	**0.0064**	**0.0109**	**0.0072**	**0.0279**
Dickenson County	0.0080	0.0068	0.0060	0.0067	0.0066	0.0069	0.0055	0.0078	0.0052	0.0083	0.0394
Dinwiddie County	**0.0077**	**0.0073**	**0.0085**	**0.0090**	**0.0063**	**0.0068**	**0.0061**	**0.0051**	**0.0088**	**0.0061**	**0.0112**
Emporia	0.0209	0.019	0.0178	0.0177	0.0181	0.0197	0.0197	0.0183	0.0179	0.016	-0.0274
Essex County	**0.0098**	**0.0094**	**0.0096**	**0.0096**	**0.0084**	**0.0095**	**0.0090**	**0.0090**	**0.0167**	**0.0089**	**0.0361**
Fairfax	0.0173	0.0178	0.0173	0.018	0.0221	0.0216	0.0208	0.0203	0.0062	0.0198	0.1869
Fairfax County	**0.0255**	**0.0252**	**0.0236**	**0.0248**	**0.0250**	**0.0258**	**0.0241**	**0.0222**	**0.0054**	**0.0222**	**0.2471**
Falls Church	0.0361	0.0355	0.0367	0.0389	0.0399	0.0403	0.0378	0.0348	0.0076	0.0310	0.2520
Fauquier County	**0.0176**	**0.0164**	**0.0170**	**0.0164**	**0.0171**	**0.0178**	**0.0179**	**0.0173**	**0.0053**	**0.0161**	**0.1484**
Floyd County	0.0088	0.0077	0.0072	0.0071	0.0063	0.0069	0.0062	0.0057	0.0067	0.0058	-0.0405
Fluvanna County	**0.0100**	**0.0093**	**0.0089**	**0.0085**	**0.0094**	**0.0096**	**0.0102**	**0.0097**	**0.0095**	**0.0090**	**-0.0105**

Table 9 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average percent Change
Franklin	0.0092	0.0086	0.0084	0.0082	0.0084	0.0090	0.0087	0.0084	0.0096	0.0086	-0.0056
Franklin County	**0.0084**	**0.0093**	**0.0084**	**0.0094**	**0.0081**	**0.0099**	**0.0095**	**0.0089**	**0.0039**	**0.0081**	**0.0688**
Frederick County	0.0123	0.0130	0.0114	0.0123	0.0119	0.0122	0.0109	0.0103	0.0186	0.0100	0.0204
Fredericksburg	**0.0199**	**0.0188**	**0.0179**	**0.0182**	**0.0255**	**0.0239**	**0.0224**	**0.0202**	**0.0096**	**0.018**	**0.0490**
Galax	0.0090	0.0075	0.0062	0.006	0.0055	0.0064	0.0056	0.0056	0.0083	0.006	-0.0238
Giles County	**0.0087**	**0.008**	**0.0072**	**0.0063**	**0.0055**	**0.0065**	**0.0051**	**0.0053**	**0.0118**	**0.0052**	**0.0270**
Gloucester County	0.0084	0.0087	0.0089	0.009	0.0097	0.0099	0.0092	0.0081	0.0087	0.0085	0.0029
Grayson County	**0.0079**	**0.0062**	**0.0061**	**0.0045**	**0.0051**	**0.0062**	**0.0063**	**0.0052**	**0.0036**	**0.0054**	**-0.0122**
Greene County	0.0094	0.0091	0.0083	0.0079	0.0082	0.0091	0.0078	0.0072	0.0189	0.0086	0.0935
Greensville County	**0.0063**	**0.0054**	**0.0058**	**0.0055**	**0.0057**	**0.006**	**0.0048**	**0.0046**	**0.013**	**0.0042**	**0.0970**
Halifax County	0.0074	0.0077	0.0071	0.0067	0.0068	0.0069	0.0066	0.0067	0.0048	0.0056	-0.0235
Hampton	**0.0075**	**0.0082**	**0.0072**	**0.0073**	**0.0073**	**0.008**	**0.0075**	**0.0084**	**0.0105**	**0.0078**	**0.0148**
Hanover County	0.0106	0.011	0.0102	0.0104	0.01	0.011	0.0105	0.0098	0.0116	0.0096	-0.0065
Harrisonburg	**0.0167**	**0.0164**	**0.0141**	**0.014**	**0.0133**	**0.0143**	**0.0161**	**0.0134**	**0.0057**	**0.0113**	**0.0254**
Henrico County	0.0129	0.0115	0.0105	0.0103	0.0086	0.0099	0.009	0.0092	0.0137	0.0087	-0.0193
Henry County	**0.0074**	**0.0061**	**0.0051**	**0.0056**	**0.0056**	**0.005**	**0.0045**	**0.005**	**0.0098**	**0.005**	**0.0142**
Highland County	0.0139	0.0133	0.0155	0.0143	0.0149	0.0173	0.0194	0.017	0.0153	0.021	0.0577
Hopewell	**0.0087**	**0.0078**	**0.0073**	**0.0075**	**0.0064**	**0.0071**	**0.0073**	**0.0071**	**0.0088**	**0.0074**	**-0.0112**
Isle of Wight County	0.0096	0.0105	0.0089	0.0096	0.0097	0.0113	0.011	0.0094	0.0103	0.0097	0.0072
James City County	**0.0094**	**0.0128**	**0.0116**	**0.0139**	**0.0084**	**0.0084**	**0.0082**	**0.0083**	**0.0074**	**0.009**	**0.0193**
King George County	0.0129	0.0095	0.0076	0.0071	0.0177	0.0155	0.0122	0.0121	0.0143	0.0118	0.0692
King William County	**0.0098**	**0.0097**	**0.0082**	**0.0092**	**0.0073**	**0.0074**	**0.0074**	**0.0062**	**0.0052**	**0.0068**	**-0.0285**
King and Queen County	0.0094	0.0128	0.0116	0.0139	0.0084	0.0084	0.0082	0.0083	0.0074	0.009	0.1295

Table 9 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average percent Change
Lancaster County	0.0148	0.015	0.0159	0.0167	0.0176	0.0174	0.0173	0.0177	0.007	0.0181	0.0193
Lee County	0.0039	0.0033	0.0038	0.0038	0.0042	0.0067	0.0038	0.0036	0.0049	0.0037	0.0357
Lexington	0.0140	0.0113	0.0112	0.0102	0.0108	0.0107	0.0106	0.0094	0.0132	0.0104	-0.0192
Loudoun County	0.0258	0.0237	0.0243	0.0245	0.0241	0.0252	0.0236	0.022	0.0047	0.0196	0.2483
Louisa County	0.0147	0.0135	0.0127	0.0128	0.0135	0.0132	0.0128	0.0125	0.0108	0.0145	0.0058
Lunenburg County	0.0072	0.0063	0.0062	0.0055	0.0053	0.0051	0.0047	0.0053	0.0071	0.0049	-0.0273
Lynchburg	0.0096	0.0096	0.0091	0.0098	0.0111	0.0107	0.0092	0.0079	0.0053	0.0085	0.0133
Madison County	0.0112	0.0095	0.0097	0.0096	0.0097	0.0104	0.0098	0.0096	0.0107	0.0098	-0.0115
Manassas	0.0155	0.0152	0.0159	0.0167	0.0176	0.0198	0.0167	0.0144	0.0071	0.0133	0.0361
Manassas Park	0.0117	0.0125	0.0133	0.0136	0.0147	0.0145	0.0125	0.0105	0.0198	0.0075	0.0212
Martinsville	0.0095	0.0085	0.005	0.0078	0.0082	0.0073	0.0063	0.0067	0.009	0.0063	-0.0052
Mathews County	0.0096	0.0092	0.0088	0.0094	0.0099	0.011	0.0109	0.011	0.0086	0.012	0.0360
Mecklenburg County	0.0070	0.0069	0.0053	0.0059	0.006	0.0059	0.0052	0.0052	0.0116	0.0053	0.0478
Middlesex County	0.0123	0.0115	0.011	0.0111	0.0123	0.0136	0.0139	0.0134	0.0094	0.0143	0.0363
Montgomery County	0.0111	0.01	0.0096	0.0092	0.0089	0.0095	0.0096	0.0086	0.0042	0.0094	0.0538
Nelson County	0.0161	0.0125	0.0119	0.012	0.0127	0.013	0.0145	0.0146	0.0036	0.0151	0.2647
New Kent County	0.0094	0.0098	0.0094	0.0106	0.0089	0.01	0.0096	0.0077	0.0113	0.0092	0.0156
Newport News	0.0085	0.0075	0.0071	0.008	0.0077	0.0078	0.0077	0.0084	0.0049	0.0083	0.0316
Norfolk	0.0078	0.0081	0.0079	0.0076	0.0069	0.008	0.0074	0.0077	0.0078	0.0076	-0.0008
Northampton County	0.0081	0.0076	0.009	0.013	0.0108	0.0108	0.0125	0.0107	0.0092	0.0092	0.0305
Northumberland County	0.0135	0.0125	0.0133	0.0123	0.0133	0.0142	0.0154	0.0143	0.0099	0.0135	0.0148
Norton	0.0061	0.0072	0.0051	0.0069	0.0052	0.0057	0.0049	0.0053	0.0286	0.0048	0.4004
Nottoway County	0.0054	0.0039	0.0047	0.0056	0.007	0.0054	0.0046	0.0042	0.0166	0.0046	0.2370

Table 9 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average percent Change
Orange County	0.0100	0.0103	0.0084	0.0084	0.0079	0.0089	0.0081	0.0079	0.0048	0.0072	-0.0107
Page County	**0.0058**	**0.0068**	**0.0071**	**0.007**	**0.0067**	**0.0069**	**0.0081**	**0.0085**	**0.0089**	**0.0062**	**0.0163**
Patrick County	0.0065	0.0063	0.0049	0.0066	0.0052	0.0057	0.0052	0.0047	0.0077	0.0046	0.0027
Petersburg	**0.0063**	**0.0059**	**0.0044**	**0.0055**	**0.0048**	**0.005**	**0.0051**	**0.0066**	**0.0103**	**0.0048**	**0.0202**
Pittsylvania County	0.0055	0.005	0.0048	0.0045	0.0049	0.0048	0.0047	0.0048	0.0058	0.0041	-0.0234
Poquoson	**0.0087**	**0.0089**	**0.0077**	**0.0078**	**0.008**	**0.0081**	**0.0081**	**0.0077**	**0.006**	**0.0094**	**0.0267**
Portsmouth	0.0063	0.0056	0.0061	0.007	0.0051	0.0067	0.0057	0.0047	0.0085	0.0086	0.0733
Powhatan County	**0.0124**	**0.0058**	**0.0050**	**0.0056**	**0.0049**	**0.0049**	**0.0052**	**0.0048**	**0.0053**	**0.0050**	**0.1466**
Prince Edward County	0.0068	0.0123	0.0119	0.0118	0.0126	0.0128	0.0116	0.0108	0.0243	0.0108	0.0291
Prince George County	**0.0063**	**0.0072**	**0.0075**	**0.0067**	**0.0061**	**0.0064**	**0.0064**	**0.0064**	**0.0144**	**0.0068**	**-0.0206**
Prince William County	0.0128	0.0090	0.0083	0.0084	0.0080	0.0090	0.0074	0.0075	0.0131	0.0071	0.0597
Pulaski County	**0.0082**	**0.0178**	**0.0173**	**0.0180**	**0.0221**	**0.0216**	**0.0208**	**0.0203**	**0.0062**	**0.0198**	**0.0549**
Radford	0.0103	0.0091	0.0076	0.0081	0.0091	0.0093	0.0086	0.0090	0.0324	0.0093	0.0015
Richmond	**0.0090**	**0.0091**	**0.0076**	**0.0081**	**0.0091**	**0.0093**	**0.0086**	**0.009**	**0.0324**	**0.0093**	**0.2134**
Richmond County	0.0159	0.0168	0.017	0.0158	0.0154	0.0148	0.0137	0.0137	0.0175	0.0137	-0.0089
Roanoke	**0.0127**	**0.0116**	**0.0102**	**0.0097**	**0.0095**	**0.0102**	**0.0090**	**0.0084**	**0.0062**	**0.0096**	**-0.0116**
Roanoke County	0.0109	0.0107	0.0106	0.0101	0.0097	0.0097	0.0107	0.0103	0.0078	0.0091	-0.0143
Rockbridge County	**0.0120**	**0.0118**	**0.0124**	**0.0113**	**0.0106**	**0.0109**	**0.0112**	**0.0117**	**0.0129**	**0.0113**	**-0.0040**
Rockingham County	0.0103	0.0104	0.0098	0.0092	0.009	0.0093	0.0088	0.0084	0.0067	0.0094	0.0002
Russell County	**0.0046**	**0.0042**	**0.0044**	**0.0046**	**0.0041**	**0.0043**	**0.005**	**0.0046**	**0.0097**	**0.0039**	**0.0606**
Salem	0.0134	0.0132	0.0114	0.0119	0.0113	0.0121	0.011	0.0106	0.0062	0.0114	0.0235
Scott County	**0.0046**	**0.0039**	**0.0039**	**0.0042**	**0.0042**	**0.0042**	**0.0041**	**0.0037**	**0.0076**	**0.0032**	**0.0310**
Shenandoah County	0.0095	0.0089	0.0105	0.0104	0.0100	0.0103	0.0106	0.0106	0.0079	0.0123	0.0475

Table 9 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average percent Change
Smyth County	**0.0052**	**0.0046**	**0.0043**	**0.0043**	**0.0044**	**0.0050**	**0.0041**	**0.0038**	**0.0044**	**0.0039**	**-0.0249**
Southampton County	0.0080	0.0081	0.0078	0.0075	0.0079	0.0073	0.0070	0.0063	0.0071	0.0081	0.0046
Spotsylvania County	**0.0105**	**0.0101**	**0.0102**	**0.0099**	**0.0104**	**0.0109**	**0.0096**	**0.009**	**0.0062**	**0.0089**	**-0.0021**
Stafford County	0.0099	0.0089	0.0086	0.0101	0.0095	0.0097	0.0096	0.0109	0.0079	0.0097	0.0085
Suffolk	**0.0077**	**0.007**	**0.0075**	**0.0081**	**0.0075**	**0.0086**	**0.0082**	**0.008**	**0.0098**	**0.0076**	**0.0067**
Surry County	0.0279	0.0279	0.0245	0.0259	0.0263	0.0277	0.0255	0.0264	0.0098	0.0281	0.1333
Sussex County	**0.0170**	**0.0167**	**0.015**	**0.0145**	**0.0145**	**0.0177**	**0.0159**	**0.0148**	**0.0081**	**0.0162**	**0.0493**
Tazewell County	0.0055	0.0047	0.0044	0.0042	0.0047	0.0046	0.0033	0.005	0.0119	0.0043	0.0907
Virginia Beach	**0.0104**	**0.0108**	**0.0102**	**0.0105**	**0.0117**	**0.0122**	**0.0113**	**0.0113**	**0.0088**	**0.0116**	**0.0216**
Warren County	0.0081	0.0086	0.0075	0.0076	0.0074	0.0087	0.0084	0.0081	0.0152	0.0078	0.0456
Washington County	**0.0079**	**0.0073**	**0.0074**	**0.0077**	**0.0067**	**0.0077**	**0.0072**	**0.0077**	**0.0147**	**0.0072**	**0.0445**
Waynesboro	0.0103	0.0104	0.0098	0.0096	0.0085	0.0094	0.0086	0.0093	0.0089	0.0088	-0.0147
West Point	**0.0129**	**0.0124**	**0.0117**	**0.0117**	**0.0125**	**0.0113**	**0.0109**	**0.0109**	**0.0097**	**0.0119**	**-0.0049**
Westmoreland County	0.0073	0.0078	0.0080	0.0073	0.0081	0.0083	0.0101	0.0100	0.0113	0.0103	0.0434
Williamsburg-James City	**0.0195**	**0.0178**	**0.0217**	**0.0191**	**0.0157**	**0.0173**	**0.0158**	**0.0151**	**0.0088**	**0.0155**	**0.0165**
Winchester	0.0184	0.0187	0.0172	0.0167	0.0174	0.0187	0.0170	0.0148	0.0136	0.0140	-0.0277
Wise County	**0.0052**	**0.0054**	**0.0046**	**0.0051**	**0.0050**	**0.0056**	**0.0051**	**0.0047**	**0.0080**	**0.0066**	**0.0500**
Wythe County	0.0073	0.0069	0.0062	0.0065	0.0062	0.0063	0.0056	0.0058	0.0078	0.0067	-0.0016
York County	**0.0084**	**0.0093**	**0.0087**	**0.0087**	**0.0091**	**0.0089**	**0.0086**	**0.0086**	**0.0130**	**0.0090**	**0.0270**

Table 10

Division Fiscal Effort using State Per Capita Income and Average Percent Change in Virginia from 2003 to 2012

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average Percent Change
Accomack County	**0.0809**	**0.0826**	**0.0661**	**0.0589**	**0.0617**	**0.0657**	**0.0707**	**0.0717**	**0.0699**	**0.0684**	**-0.0146**
Albemarle County	0.1752	0.1689	0.1776	0.1806	0.1884	0.1876	0.1896	0.1847	0.1693	0.1729	-0.0007
Alleghany County	**0.2988**	**0.3083**	**0.3187**	**0.3354**	**0.3510**	**0.3353**	**0.3338**	**0.3199**	**0.3735**	**0.3004**	**0.2656**
Amelia County	0.0906	0.0850	0.0787	0.0839	0.0831	0.0833	0.0785	0.0678	0.0542	0.0760	-0.0077
Amherst County	**0.0693**	**0.0520**	**0.0552**	**0.0532**	**0.0566**	**0.0584**	**0.0580**	**0.0574**	**0.0630**	**0.0606**	**-0.0096**
Appomattox County	0.0600	0.0596	0.0586	0.0645	0.0566	0.0557	0.0594	0.0609	0.0425	0.0565	0.0064
Arlington County	**0.0476**	**0.0456**	**0.0447**	**0.0464**	**0.0465**	**0.0460**	**0.0536**	**0.0476**	**0.0464**	**0.0440**	**0.5570**
Augusta County	0.3397	0.3513	0.3512	0.3590	0.3834	0.3797	0.3900	0.3659	0.3714	0.3262	0.3159
Bath County	**0.0690**	**0.0686**	**0.0597**	**0.0661**	**0.0692**	**0.0685**	**0.0743**	**0.0729**	**0.0697**	**0.0693**	**0.1424**
Bedford	0.2116	0.2232	0.2188	0.2152	0.2147	0.2289	0.2149	0.2072	0.2010	0.1982	0.1699
Bedford County	**0.0877**	**0.0683**	**0.0636**	**0.0706**	**0.0650**	**0.0686**	**0.0655**	**0.0638**	**0.0558**	**0.0639**	**-0.0284**
Bland County	0.0530	0.0511	0.0507	0.0496	0.0526	0.0507	0.0259	0.0521	0.0522	0.0520	0.0906
Botetourt County	**0.0970**	**0.0947**	**0.0904**	**0.0900**	**0.0885**	**0.0908**	**0.0937**	**0.0949**	**0.0561**	**0.0886**	**0.0168**
Bristol	0.0767	0.0901	0.0766	0.0750	0.0565	0.0617	0.0679	0.0723	0.0793	0.0580	-0.0175
Brunswick County	**0.0483**	**0.0574**	**0.0580**	**0.0588**	**0.0482**	**0.0514**	**0.0600**	**0.0513**	**0.0579**	**0.0639**	**0.0393**
Buchanan County	0.0544	0.0524	0.0612	0.0626	0.0610	0.0679	0.0640	0.0743	0.0561	0.0701	0.0389
Buckingham County	**0.0413**	**0.0409**	**0.0556**	**0.0459**	**0.0536**	**0.0644**	**0.0704**	**0.0635**	**0.0584**	**0.0659**	**0.0653**
Campbell County	0.0860	0.0754	0.0581	0.0449	0.0411	0.0507	0.0599	0.0482	0.0572	0.0395	-0.0631
Caroline County	**0.0623**	**0.0630**	**0.0554**	**0.0565**	**0.0473**	**0.0504**	**0.0511**	**0.0542**	**0.0507**	**0.0545**	**0.0796**
Carroll County	0.0653	0.0730	0.0501	0.0559	0.0658	0.0701	0.0729	0.0636	0.0522	0.0562	-0.0031

Table 10 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average Percent Change
Charles City County	**0.0618**	**0.0638**	**0.0538**	**0.0500**	**0.0561**	**0.0589**	**0.0514**	**0.0577**	**0.0781**	**0.0686**	**0.0227**
Charlotte County	0.1567	0.1732	0.1655	0.1579	0.1366	0.1311	0.1398	0.1301	0.1183	0.1190	-0.0276
Charlottesville	**0.0478**	**0.0407**	**0.0389**	**0.0377**	**0.0392**	**0.0403**	**0.0480**	**0.0519**	**0.0568**	**0.0401**	**-0.0092**
Chesapeake	0.2059	0.2032	0.1911	0.1964	0.2079	0.2229	0.2322	0.2434	0.2379	0.2221	0.1497
Chesterfield County	**0.0891**	**0.0865**	**0.0870**	**0.0910**	**0.1070**	**0.1018**	**0.1016**	**0.0995**	**0.0564**	**0.0978**	**0.0476**
Clarke County	0.0927	0.0884	0.0785	0.0790	0.0815	0.0935	0.0865	0.0826	0.0596	0.0735	-0.0154
Colonial Beach	**0.1203**	**0.1280**	**0.1180**	**0.1182**	**0.1103**	**0.1132**	**0.1233**	**0.1188**	**0.1185**	**0.1096**	**0.0406**
Colonial Heights	0.0618	0.0529	0.0673	0.0560	0.0579	0.0796	0.0834	0.0758	0.0868	0.0731	0.0348
Covington	**0.1524**	**0.1346**	**0.1319**	**0.1311**	**0.1344**	**0.1438**	**0.1454**	**0.1466**	**0.1419**	**0.1349**	**0.0019**
Craig County	0.1299	0.1293	0.1064	0.1429	0.1061	0.1051	0.1094	0.1082	0.1120	0.1123	0.0075
Culpeper County	**0.0871**	**0.0627**	**0.0685**	**0.0515**	**0.0568**	**0.0557**	**0.0641**	**0.0536**	**0.0576**	**0.0512**	**-0.0446**
Cumberland County	0.0876	0.0903	0.0804	0.0861	0.0813	0.0906	0.0961	0.0904	0.0835	0.0792	-0.0084
Danville	**0.0603**	**0.0545**	**0.0585**	**0.0605**	**0.0534**	**0.0771**	**0.0519**	**0.0685**	**0.0609**	**0.0572**	**0.0319**
Dickenson County	0.0648	0.0720	0.0575	0.0609	0.0582	0.0655	0.0595	0.0620	0.0640	0.0660	0.0304
Dinwiddie County	**0.0687**	**0.0596**	**0.0535**	**0.0599**	**0.0588**	**0.0609**	**0.0527**	**0.0750**	**0.0776**	**0.0763**	**0.0476**
Emporia	0.0660	0.0641	0.0759	0.0804	0.0558	0.0599	0.0583	0.0493	0.0507	0.0565	0.0153
Essex County	**0.0836**	**0.0818**	**0.0862**	**0.0855**	**0.0746**	**0.0843**	**0.0864**	**0.0871**	**0.0834**	**0.0823**	**0.0397**
Fairfax	0.2186	0.2198	0.2113	0.2211	0.2216	0.2288	0.2316	0.2143	0.2497	0.2047	0.2596
Fairfax County	**0.3093**	**0.3100**	**0.3281**	**0.3467**	**0.3543**	**0.3567**	**0.3630**	**0.3367**	**0.3697**	**0.2854**	**0.2659**
Falls Church	0.1503	0.1436	0.1524	0.1463	0.1517	0.1579	0.1719	0.1674	0.1483	0.1480	0.1633
Fauquier County	**0.0755**	**0.0671**	**0.0641**	**0.0631**	**0.0560**	**0.0615**	**0.0593**	**0.0552**	**0.0615**	**0.0531**	**-0.0348**
Floyd County	0.0859	0.0814	0.0794	0.0756	0.0830	0.0853	0.0976	0.0935	0.0874	0.0833	-0.0010
Fluvanna County	**0.0791**	**0.0750**	**0.0747**	**0.0726**	**0.0749**	**0.0799**	**0.0834**	**0.0810**	**0.0879**	**0.0794**	**0.0020**

Table 10 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average Percent Change
Franklin	0.0723	0.0815	0.0754	0.0835	0.0717	0.0874	0.0912	0.0863	0.0756	0.0747	0.0820
Franklin County	**0.1056**	**0.1139**	**0.1016**	**0.1093**	**0.1057**	**0.1081**	**0.1048**	**0.0994**	**0.1016**	**0.0924**	**0.0243**
Frederick County	0.1704	0.1639	0.1599	0.1619	0.2263	0.2114	0.2149	0.1951	0.1883	0.1657	0.0595
Fredericksburg	**0.0772**	**0.0653**	**0.0552**	**0.0534**	**0.0486**	**0.0564**	**0.0534**	**0.0542**	**0.0765**	**0.0555**	**-0.0191**
Galax	0.0743	0.0698	0.0644	0.0559	0.0486	0.0572	0.0488	0.0511	0.0584	0.0476	0.0264
Giles County	**0.0721**	**0.0759**	**0.0799**	**0.0800**	**0.0862**	**0.0876**	**0.0886**	**0.0783**	**0.0802**	**0.0784**	**0.0108**
Gloucester County	0.1787	0.1656	0.1593	0.1576	0.1608	0.1745	0.1894	0.1772	0.1648	0.1472	-0.0191
Grayson County	**0.0676**	**0.0541**	**0.0548**	**0.0399**	**0.0452**	**0.0548**	**0.0605**	**0.0498**	**0.0428**	**0.0502**	**0.0003**
Greene County	0.0804	0.0795	0.0741	0.0706	0.0728	0.0804	0.0752	0.0697	0.0736	0.0789	0.0907
Greensville County	**0.0541**	**0.0469**	**0.0516**	**0.0493**	**0.0509**	**0.0529**	**0.0458**	**0.0441**	**0.0429**	**0.0391**	**0.0964**
Halifax County	0.0635	0.0673	0.0632	0.0593	0.0599	0.0612	0.0632	0.0650	0.0542	0.0518	-0.0131
Hampton	**0.0641**	**0.0712**	**0.0645**	**0.0650**	**0.0648**	**0.0713**	**0.0724**	**0.0814**	**0.0962**	**0.0716**	**0.0208**
Hanover County	0.0911	0.0958	0.0913	0.0924	0.0890	0.0975	0.1008	0.0946	0.1066	0.0889	0.0009
Harrisonburg	**0.1426**	**0.1428**	**0.1260**	**0.1242**	**0.1179**	**0.1268**	**0.1541**	**0.1292**	**0.1527**	**0.1046**	**0.0379**
Henrico County	0.1105	0.1006	0.0940	0.0919	0.0765	0.0880	0.0864	0.0888	0.0864	0.0803	-0.0141
Henry County	**0.0637**	**0.0530**	**0.0456**	**0.0501**	**0.0497**	**0.0444**	**0.0430**	**0.0488**	**0.0402**	**0.0458**	**0.0151**
Highland County	0.1188	0.1158	0.1390	0.1269	0.1321	0.1536	0.1863	0.1640	0.1510	0.1933	0.0684
Hopewell	**0.0749**	**0.0685**	**0.0652**	**0.0670**	**0.0567**	**0.0625**	**0.0702**	**0.0686**	**0.0810**	**0.0679**	**-0.0042**
Isle of Wight County	0.0819	0.0914	0.0796	0.0854	0.0863	0.1003	0.1053	0.0907	0.0951	0.0896	0.0149
James City County	**0.1108**	**0.0829**	**0.0680**	**0.0633**	**0.0767**	**0.1371**	**0.1174**	**0.1165**	**0.1313**	**0.1085**	**0.0291**
King George County	0.0843	0.0846	0.0736	0.0818	0.0646	0.0655	0.0714	0.0603	0.0679	0.0623	0.0724
King William County	**0.0800**	**0.1117**	**0.1034**	**0.1238**	**0.0747**	**0.0747**	**0.0783**	**0.0806**	**0.0680**	**0.0828**	**-0.0202**
King and Queen County	0.1266	0.1310	0.1420	0.1484	0.1562	0.1539	0.1659	0.1713	0.1640	0.1664	0.1429

Table 10 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average Percent Change
Lancaster County	**0.0337**	**0.0286**	**0.0338**	**0.0337**	**0.0369**	**0.0595**	**0.0361**	**0.0348**	**0.0447**	**0.0341**	**0.0392**
Lee County	0.2206	0.2072	0.2176	0.2180	0.2134	0.2231	0.2267	0.2131	0.2030	0.1810	0.2648
Lexington	**0.1259**	**0.1178**	**0.1136**	**0.1138**	**0.1194**	**0.1174**	**0.1228**	**0.1209**	**0.1298**	**0.1339**	**0.0147**
Loudoun County	0.0614	0.0550	0.0558	0.0490	0.0468	0.0454	0.0448	0.0515	0.0652	0.0449	-0.0217
Louisa County	**0.0818**	**0.0839**	**0.0813**	**0.0869**	**0.0988**	**0.0946**	**0.0884**	**0.0760**	**0.0789**	**0.0788**	**0.0230**
Lunenburg County	0.0956	0.0831	0.0867	0.0851	0.0860	0.0924	0.0937	0.0933	0.0981	0.0903	-0.0044
Lynchburg	**0.1330**	**0.1328**	**0.1419**	**0.1489**	**0.1564**	**0.1758**	**0.1607**	**0.1389**	**0.1350**	**0.1227**	**0.0472**
Madison County	0.0999	0.1096	0.1190	0.1210	0.1304	0.1285	0.1200	0.1012	0.1020	0.0695	0.0245
Manassas	**0.0814**	**0.0745**	**0.0451**	**0.0698**	**0.0728**	**0.0649**	**0.0606**	**0.0647**	**0.0832**	**0.0581**	**-0.0013**
Manassas Park	0.0822	0.0804	0.0785	0.0840	0.0881	0.0976	0.1042	0.1067	0.0795	0.1104	0.0452
Martinsville	**0.0603**	**0.0604**	**0.0476**	**0.0526**	**0.0535**	**0.0522**	**0.0495**	**0.0501**	**0.0569**	**0.0486**	**0.0485**
Mathews County	0.1049	0.1003	0.0981	0.0988	0.1090	0.1203	0.1335	0.1291	0.1265	0.1314	0.0460
Mecklenburg County	**0.0953**	**0.0873**	**0.0858**	**0.0818**	**0.0788**	**0.0846**	**0.0917**	**0.0835**	**0.0886**	**0.0866**	**0.0655**
Middlesex County	0.1377	0.1088	0.1066	0.1067	0.1124	0.1149	0.1386	0.1407	0.1334	0.1393	0.2751
Montgomery County	**0.0801**	**0.0853**	**0.0839**	**0.0940**	**0.0794**	**0.0883**	**0.0916**	**0.0744**	**0.1036**	**0.0851**	**0.0210**
Nelson County	0.0729	0.0655	0.0635	0.0709	0.0687	0.0695	0.0736	0.0814	0.0453	0.0760	0.0405
New Kent County	**0.0670**	**0.0712**	**0.0709**	**0.0675**	**0.0614**	**0.0706**	**0.0711**	**0.0747**	**0.0720**	**0.0701**	**0.0072**
Newport News	0.0691	0.0664	0.0803	0.1154	0.0957	0.0959	0.1203	0.1036	0.0846	0.0847	0.0414
Norfolk	**0.1155**	**0.1093**	**0.1191**	**0.1095**	**0.1180**	**0.1260**	**0.1475**	**0.1384**	**0.0909**	**0.1245**	**0.0262**
Northampton County	0.0519	0.0628	0.0459	0.0611	0.0465	0.0504	0.0470	0.0516	0.0528	0.0442	0.3787
Northumberland County	**0.0463**	**0.0342**	**0.0420**	**0.0494**	**0.0618**	**0.0475**	**0.0444**	**0.0404**	**0.0429**	**0.0421**	**0.2297**
Norton	0.0857	0.0898	0.0755	0.0747	0.0701	0.0786	0.0777	0.0762	0.0641	0.0661	-0.0017
Nottoway County	**0.0501**	**0.0592**	**0.0637**	**0.0625**	**0.0597**	**0.0615**	**0.0776**	**0.0818**	**0.0821**	**0.0570**	**0.0264**

Table 10 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average Percent Change
Orange County	0.0560	0.0546	0.0440	0.0584	0.0460	0.0504	0.0499	0.0450	0.0406	0.0425	0.0060
Page County	**0.0542**	**0.0517**	**0.0390**	**0.0491**	**0.0428**	**0.0442**	**0.0492**	**0.0638**	**0.0548**	**0.0440**	**0.0257**
Patrick County	0.0471	0.0438	0.0432	0.0396	0.0434	0.0425	0.0450	0.0464	0.0530	0.0377	-0.0165
Petersburg	**0.0741**	**0.0780**	**0.0690**	**0.0698**	**0.0708**	**0.0716**	**0.0776**	**0.0748**	**0.0751**	**0.0867**	**0.0369**
Pittsylvania County	0.0542	0.0485	0.0542	0.0619	0.0449	0.0595	0.0548	0.0453	0.0784	0.0797	0.0778
Poquoson	**0.1060**	**0.1014**	**0.1012**	**0.0978**	**0.0960**	**0.1026**	**0.1088**	**0.1003**	**0.1041**	**0.0953**	**0.1443**
Portsmouth	0.0580	0.0570	0.0558	0.0603	0.0743	0.0662	0.0671	0.0725	0.0530	0.0720	0.0388
Powhatan County	**0.0536**	**0.0510**	**0.0448**	**0.0499**	**0.0437**	**0.0430**	**0.0502**	**0.0463**	**0.0490**	**0.0461**	**-0.0120**
Prince Edward County	0.1094	0.1075	0.1062	0.1049	0.1113	0.1136	0.1115	0.1047	0.1032	0.0995	0.0598
Prince George County	**0.0702**	**0.0628**	**0.0667**	**0.0600**	**0.0537**	**0.0569**	**0.0610**	**0.0623**	**0.0625**	**0.0628**	**0.0561**
Prince William County	0.0878	0.0788	0.0742	0.0743	0.0708	0.0794	0.0710	0.0728	0.0710	0.0658	0.0045
Pulaski County	**0.1485**	**0.1558**	**0.1546**	**0.1604**	**0.1958**	**0.1918**	**0.1998**	**0.1966**	**0.1968**	**0.1828**	**0.2014**
Radford	0.0767	0.0794	0.0676	0.0723	0.0809	0.0820	0.0827	0.0872	0.0879	0.0862	0.2064
Richmond	**0.1361**	**0.1464**	**0.1518**	**0.1406**	**0.1363**	**0.1315**	**0.1312**	**0.1328**	**0.1310**	**0.1264**	**-0.0022**
Richmond County	0.1091	0.1011	0.0915	0.0868	0.0844	0.0902	0.0862	0.0811	0.0875	0.0887	-0.0034
Roanoke	**0.0937**	**0.0934**	**0.0949**	**0.0895**	**0.0859**	**0.0863**	**0.1025**	**0.0999**	**0.0717**	**0.0840**	**-0.0031**
Roanoke County	0.1025	0.1029	0.1112	0.1010	0.0937	0.0965	0.1076	0.1127	0.1191	0.1042	0.0049
Rockbridge County	**0.0883**	**0.0908**	**0.0873**	**0.0822**	**0.0802**	**0.0821**	**0.0848**	**0.0813**	**0.0814**	**0.0867**	**0.0100**
Rockingham County	0.0391	0.0366	0.0397	0.0409	0.0362	0.0385	0.0476	0.0449	0.0491	0.0358	0.0628
Russell County	**0.1144**	**0.1149**	**0.1023**	**0.1063**	**0.1004**	**0.1070**	**0.1058**	**0.1025**	**0.1067**	**0.1047**	**0.0335**
Salem	0.0393	0.0338	0.0346	0.0375	0.0371	0.0375	0.0391	0.0360	0.0396	0.0297	0.0323
Scott County	**0.0815**	**0.0779**	**0.0937**	**0.0930**	**0.0885**	**0.0910**	**0.1019**	**0.1029**	**0.1049**	**0.1133**	**0.0581**
Shenandoah County	0.0442	0.0399	0.0388	0.0381	0.0388	0.0442	0.0396	0.0369	0.0404	0.0362	-0.0185

Table 10 Continued

Division	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average Percent Change
Smyth County	**0.0685**	**0.0709**	**0.0699**	**0.0668**	**0.0699**	**0.0651**	**0.0673**	**0.0610**	**0.0654**	**0.0750**	**0.0126**
Southampton County	0.0901	0.0878	0.0909	0.0877	0.0923	0.0966	0.0918	0.0865	0.0874	0.0822	0.0069
Spotsylvania County	**0.0850**	**0.0778**	**0.0773**	**0.0903**	**0.0840**	**0.0860**	**0.0919**	**0.1051**	**0.0829**	**0.0895**	**0.0183**
Stafford County	0.1200	0.0983	0.0998	0.0905	0.0954	0.0946	0.1018	0.0909	0.1015	0.0959	-0.0131
Suffolk	**0.0661**	**0.0612**	**0.0674**	**0.0720**	**0.0661**	**0.0759**	**0.0783**	**0.0776**	**0.0703**	**0.0704**	**0.0142**
Surry County	0.2385	0.2433	0.2196	0.2305	0.2334	0.2459	0.2449	0.2551	0.2504	0.2591	0.1441
Sussex County	**0.1456**	**0.1462**	**0.1338**	**0.1293**	**0.1290**	**0.1565**	**0.1528**	**0.1429**	**0.1432**	**0.1493**	**0.0599**
Tazewell County	0.0471	0.0407	0.0392	0.0375	0.0413	0.0410	0.0313	0.0480	0.0496	0.0401	0.0916
Virginia Beach	**0.0889**	**0.0947**	**0.0914**	**0.0931**	**0.1038**	**0.1080**	**0.1087**	**0.1090**	**0.0810**	**0.1069**	**0.0307**
Warren County	0.0697	0.0749	0.0675	0.0678	0.0653	0.0772	0.0809	0.0787	0.0796	0.0721	0.0485
Washington County	**0.0677**	**0.0639**	**0.0664**	**0.0689**	**0.0593**	**0.0686**	**0.0690**	**0.0747**	**0.0750**	**0.0666**	**0.0475**
Waynesboro	0.0879	0.0904	0.0873	0.0851	0.0757	0.0831	0.0822	0.0902	0.0818	0.0814	-0.0061
West Point	**0.1108**	**0.1082**	**0.1050**	**0.1046**	**0.1106**	**0.0998**	**0.1042**	**0.1058**	**0.0990**	**0.1094**	**0.0036**
Westmoreland County	0.0624	0.0680	0.0719	0.0651	0.0719	0.0732	0.0972	0.0962	0.1044	0.0953	0.0545
Williamsburg-James City County	**0.1670**	**0.1553**	**0.1946**	**0.1696**	**0.1389**	**0.1533**	**0.1516**	**0.1463**	**0.1413**	**0.1429**	**0.0272**
Winchester	0.1576	0.1632	0.1535	0.1490	0.1547	0.1656	0.1627	0.1434	0.1249	0.1287	-0.0199
Wise County	**0.0449**	**0.0471**	**0.0410**	**0.0458**	**0.0439**	**0.0497**	**0.0493**	**0.0451**	**0.0540**	**0.0606**	**0.0549**
Wythe County	0.0628	0.0602	0.0551	0.0581	0.0546	0.0555	0.0534	0.0560	0.0720	0.0617	0.0042
York County	**0.0715**	**0.0815**	**0.0779**	**0.0772**	**0.0804**	**0.0786**	**0.0826**	**0.0835**	**0.0898**	**0.0826**	**0.0324**

Table 11 displays division rank and Table 12 displays quartile placement for mean fiscal effort and high school graduation rates for the following categories: all students, economically disadvantaged, black, white, female, and male. Assuming that any type of relationship can be found among division fiscal effort and graduation rates, it would be expected that quartile rank of effort and graduation rates would be similar. Reviewing Table 11, several districts had poor fiscal effort scores (85 or higher) using SPCI but displayed high averages for the six graduation rate categories: Suffolk, Carroll County, Amherst County, Martinsville, Greensville, and Patrick County.

Table 12 includes quartile scores for each school division. Quartiles are a ranked set of data values that divide the data set into four equal groups, each group comprising a quarter of the data. Quartile 1, also the lowest quartile, is the 25th percentile and splits off the lowest 25% of data from the highest 75%. The second quartile, also the median, is the 50th percentile and cuts the data in half. The third quartile, also the upper quartile, is the 75th percentile and splits off the highest 25% of data from the lowest 75% (Hyndman, 1996). Comparing the 132 Virginia school divisions in Table 12 using SPCI, only five school divisions had matching quartile scores for all seven categories: Charlotte County, Colonial Beach, Fairfax, Lexington, and Prince Edward. The following divisions had matching scores of one for each of the seven categories: Charlottesville and Wythe County. No school divisions had matching quartile scores of two or three. Tables 11 and 12 represent an informal review of the relationship between the variables of division fiscal effort and high school graduation rate.

Table 11

Rank of Mean Division Fiscal Effort and Mean High School Graduation Rate (all, economically disadvantaged, black, white, female and male) in Virginia from 2003 to 2012

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Accomack County	**75**	**82**	**80**	**46**	**67**	**83**	**90**	**75**
Albemarle County	9	9	23	58	46	18	26	26
Alleghany County	**3**	**3**	**63**	**45**	**55**	**24**	**65**	**70**
Amelia County	61	72	33	35	60	32	33	38
Amherst County	**99**	**108**	**5**	**2**	**3**	**15**	**8**	**5**
Appomattox County	110	111	108	99	59	109	99	109
Arlington County	**101**	**74**	**73**	**52**	**73**	**71**	**59**	**86**
Augusta County	1	1	11	10	27	3	20	9
Bath County	**71**	**62**	**25**	**32**	**15**	**23**	**25**	**31**
Bedford	7	7	30	73	No Data	37	45	25
Bedford County	**72**	**91**	**52**	**48**	**49**	**50**	**52**	**49**
Bland County	119	119	50	11	No Data	46	79	21
Botetourt County	**44**	**51**	**57**	**109**	**42**	**54**	**57**	**59**
Bristol	77	81	126	111	91	123	128	120

Table 11 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Brunswick County	**120**	**115**	**37**	**31**	**40**	**30**	**36**	**40**
Buchanan County	109	100	58	36	No Data	52	41	71
Buckingham County	**123**	**114**	**88**	**91**	**75**	**86**	**69**	**94**
Campbell County	86	112	89	106	No Data	81	108	74
Caroline County	**102**	**98**	**130**	**107**	**103**	**128**	**129**	**130**
Carroll County	98	99	15	7	4	31	30	10
Charles City County	**106**	**104**	**34**	**37**	**No Data**	**38**	**56**	**27**
Charlotte County	15	18	18	17	22	1	11	20
Charlottesville	**126**	**128**	**121**	**122**	**102**	**119**	**116**	**128**
Chesapeake	8	6	61	69	80	36	68	62
Chesterfield County	**46**	**43**	**48**	**72**	**63**	**42**	**48**	**43**
Clarke County	54	65	21	26	19	20	24	19
Colonial Beach	**28**	**31**	**7**	**18**	**1**	**8**	**7**	**6**
Colonial Heights	94	85	114	87	29	114	82	118
Covington	**16**	**16**	**32**	**62**	**23**	**41**	**40**	**32**
Craig County	24	25	96	89	48	92	63	106
Culpeper County	**80**	**103**	**106**	**67**	**No Data**	**97**	**91**	**110**
Cumberland County	51	55	60	53	68	56	66	55
Danville	**103**	**96**	**124**	**101**	**101**	**121**	**123**	**123**
Dickenson County	95	92	109	64	93	103	114	98
Dinwiddie County	**97**	**102**	**67**	**68**	**No Data**	**64**	**83**	**57**
Emporia	96	94	125	121	97	125	125	121
Essex County	**50**	**48**	**94**	**49**	**52**	**115**	**72**	**97**

Table 11 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Fairfax	5	5	10	13	16	9	10	12
Fairfax County	**2**	**2**	**1**	**127**	**1**	**2**	**3**	**1**
Falls Church	17	17	75	74	56	72	84	73
Fauquier County	**92**	**101**	**53**	**95**	**No Data**	**55**	**50**	**61**
Floyd County	57	59	24	38	11	27	16	35
Fluvanna County	**68**	**71**	**104**	**83**	**81**	**95**	**92**	**105**
Franklin	76	73	107	102	37	113	104	111
Franklin County	**34**	**32**	**118**	**120**	**100**	**111**	**121**	**113**
Frederick County	10	10	42	43	17	48	61	33
Fredericksburg	**93**	**106**	**44**	**57**	**No Data**	**47**	**70**	**22**
Galax	91	97	110	100	No Data	100	93	116
Giles County	**70**	**67**	**111**	**96**	**47**	**106**	**102**	**108**
Gloucester County	11	11	97	117	76	90	71	103
Grayson County	**112**	**122**	**78**	**90**	**1**	**73**	**75**	**81**
Greene County	64	58	65	81	21	70	60	78
Greensville County	**116**	**116**	**2**	**3**	**7**	**1**	**2**	**3**
Halifax County	104	105	113	77	86	110	112	107
Hampton	**88**	**80**	**123**	**98**	**98**	**127**	**119**	**125**
Hanover County	42	41	36	108	43	40	34	41
Harrisonburg	**23**	**23**	**117**	**125**	**107**	**61**	**122**	**101**
Henrico County	39	42	51	59	53	49	51	51
Henry County	**113**	**117**	**102**	**88**	**66**	**108**	**115**	**90**
Highland County	22	15	4	1	No Data	7	1	30

Table 11 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Hopewell	**82**	**88**	**105**	**70**	**77**	**122**	**111**	**102**
Isle of Wight County	55	47	6	6	10	6	5	8
James City County	**60**	**52**	**39**	**16**	**39**	**26**	**21**	**65**
King George County	32	34	12	25	20	16	27	7
King William County	**73**	**84**	**38**	**34**	**32**	**11**	**9**	**76**
King and Queen County	21	19	68	66	61	76	54	82
Lancaster County	**131**	**131**	**49**	**51**	**69**	**44**	**44**	**45**
Lee County	6	8	19	39	24	10	28	15
Lexington	**26**	**28**	**13**	**12**	**14**	**12**	**18**	**13**
Loudoun County	115	120	41	27	26	60	15	72
Louisa County	**65**	**64**	**93**	**79**	**96**	**53**	**87**	**91**
Lunenburg County	43	49	45	105	92	39	38	53
Lynchburg	**20**	**21**	**115**	**131**	**85**	**96**	**109**	**114**
Madison County	31	29	70	41	44	67	94	58
Manassas	**78**	**90**	**46**	**33**	**58**	**45**	**47**	**44**
Manassas Park	52	46	31	54	9	35	49	23
Martinsville	**108**	**109**	**3**	**5**	**28**	**4**	**4**	**4**
Mathews County	35	33	66	9	5	84	88	50
Mecklenburg County	**49**	**66**	**91**	**112**	**70**	**88**	**103**	**79**
Middlesex County	25	30	120	126	95	118	120	124
Montgomery County	**62**	**54**	**55**	**114**	**36**	**57**	**53**	**56**
Nelson County	84	87	87	56	74	91	73	92
New Kent County	**89**	**83**	**95**	**71**	**90**	**89**	**78**	**100**
Newport News	66	45	127	128	108	104	126	127

Table 11 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Norfolk	**27**	**26**	**98**	**60**	**65**	**116**	**77**	**112**
Northampton County	100	79	17	42	No Data	14	46	2
Northumberland County	**121**	**113**	**40**	**28**	**12**	**63**	**31**	**47**
Norton	67	76	76	84	89	59	106	52
Nottoway County	**111**	**93**	**116**	**119**	**No Data**	**102**	**110**	**115**
Orange County	117	121	56	50	6	51	85	37
Page County	**118**	**118**	**79**	**47**	**79**	**1**	**96**	**68**
Patrick County	127	127	9	4	2	22	17	11
Petersburg	**79**	**77**	**43**	**63**	**No Data**	**43**	**42**	**42**
Pittsylvania County	114	110	47	14	33	79	37	54
Poquoson	**30**	**24**	**62**	**86**	**31**	**62**	**35**	**87**
Portsmouth	105	95	77	44	51	99	62	88
Powhatan County	**122**	**124**	**85**	**115**	**62**	**94**	**64**	**93**
Prince Edward County	29	27	16	8	8	21	12	18
Prince George County	**87**	**86**	**103**	**113**	**84**	**98**	**113**	**95**
Prince William County	63	69	69	110	71	69	95	48
Pulaski County	**13**	**12**	**20**	**15**	**No Data**	**17**	**23**	**17**
Radford	47	38	74	21	78	65	98	63
Richmond	**19**	**20**	**100**	**93**	**57**	**105**	**58**	**117**
Richmond County	40	53	131	123	106	129	131	131
Roanoke	**45**	**50**	**28**	**55**	**34**	**34**	**39**	**24**
Roanoke County	38	35	129	130	104	126	130	129
Rockbridge County	**59**	**63**	**29**	**40**	**25**	**33**	**32**	**36**
Rockingham County	128	126	90	94	No Data	82	97	80

Table 11 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Russell County	**37**	**37**	**82**	**97**	**82**	**77**	**80**	**77**
Salem	130	130	71	78	No Data	68	89	67
Scott County	**53**	**44**	**27**	**24**	**1**	**28**	**22**	**34**
Shenandoah County	129	129	101	76	1	93	105	96
Smyth County	**90**	**89**	**35**	**65**	**54**	**25**	**19**	**60**
Southampton County	48	56	84	85	50	87	76	83
Spotsylvania County	**58**	**57**	**26**	**22**	**13**	**29**	**29**	**29**
Stafford County	33	39	83	61	41	85	101	66
Suffolk	**85**	**78**	**8**	**20**	**18**	**5**	**6**	**14**
Surry County	4	4	99	80	83	107	86	104
Sussex County	**18**	**22**	**64**	**19**	**45**	**112**	**43**	**84**
Tazewell County	125	125	128	129	64	124	127	126
Virginia Beach	**41**	**40**	**59**	**30**	**38**	**66**	**55**	**64**
Warren County	74	70	86	92	72	80	100	69
Washington County	**83**	**75**	**112**	**116**	**105**	**101**	**117**	**99**
Waynesboro	56	60	122	124	87	120	124	119
West Point	**36**	**36**	**22**	**75**	**No Data**	**19**	**13**	**28**
Westmoreland County	81	68	54	23	35	74	67	39
Williamsburg-James City County	**12**	**14**	**92**	**104**	**94**	**78**	**81**	**89**
Winchester	14	13	72	103	88	58	107	46
Wise County	**124**	**123**	**81**	**82**	**No Data**	**75**	**74**	**85**
Wythe County	107	107	119	118	99	117	118	122
York County	**69**	**61**	**14**	**29**	**30**	**13**	**14**	**16**

Table 12

Quartile of Mean Division Fiscal Effort and Mean High School Graduation Rate (all, economically disadvantaged, black, white, female and male) in Virginia from 2003 to 2012

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Accomack County	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**2**
Albemarle County	4	4	4	3	3	4	4	4
Alleghany County	**4**	**4**	**3**	**3**	**2**	**4**	**3**	**2**
Amelia County	3	2	3	3	2	3	4	3
Amherst County	**1**	**1**	**4**	**4**	**4**	**4**	**4**	**4**
Appomattox County	1	1	1	1	2	1	2	1
Arlington County	**1**	**2**	**2**	**3**	**2**	**2**	**3**	**2**
Augusta County	4	4	4	4	3	4	4	4
Bath County	**2**	**3**	**4**	**4**	**4**	**4**	**4**	**4**
Bedford	4	4	4	2	No Data	3	3	4
Bedford County	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
Bland County	1	1	3	4	No Data	3	2	4
Botetourt County	**3**	**3**	**3**	**1**	**3**	**3**	**3**	**3**
Bristol	2	2	1	1	1	1	1	1
Brunswick County	**1**	**1**	**3**	**4**	**3**	**3**	**3**	**3**
Buchanan County	1	1	3	3	No Data	3	3	2

Table 12 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Buckingham County	1	1	2	2	2	2	2	2
Campbell County	2	1	2	1	No Data	2	1	2
Caroline County	1	2	1	1	1	1	1	1
Carroll County	2	1	4	4	4	3	4	4
Charles City County	1	1	3	3	No Data	3	3	4
Charlotte County	4	4	4	4	4	4	4	4
Charlottesville	1	1	1	1	1	1	1	1
Chesapeake	4	4	3	2	1	3	2	3
Chesterfield County	3	3	3	2	2	3	3	3
Clarke County	3	3	4	4	4	4	4	4
Colonial Beach	4	4	4	4	4	4	4	4
Colonial Heights	2	2	1	2	3	1	2	1
Covington	4	4	4	3	4	3	3	4
Craig County	4	4	2	2	3	2	3	1
Culpeper County	2	1	1	2	No Data	1	2	1
Cumberland County	3	3	3	3	2	3	3	3
Danville	1	2	1	1	1	1	1	1
Dickenson County	2	2	1	3	1	1	1	2
Dinwiddie County	2	1	2	2	No Data	3	2	3
Emporia	2	2	1	1	1	1	1	1
Essex County	3	3	2	3	3	1	2	2
Fairfax	4	4	4	4	4	4	4	4
Fairfax County	4	4	4	1	4	4	4	4
Falls Church	4	4	2	2	2	2	2	2
Fauquier County	2	1	3	2	No Data	3	3	3

Table 12 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Floyd County	3	3	4	3	4	4	4	3
Fluvanna County	**2**	**2**	**1**	**2**	**1**	**2**	**2**	**1**
Franklin	2	2	1	1	3	1	1	1
Franklin County	**3**	**4**	**1**	**1**	**1**	**1**	**1**	**1**
Frederick County	4	4	3	3	4	3	3	3
Fredericksburg	**2**	**1**	**3**	**3**	**No Data**	**3**	**2**	**4**
Galax	2	2	1	1	No Data	1	2	1
Giles County	**2**	**2**	**1**	**2**	**3**	**1**	**1**	**1**
Gloucester County	4	4	2	1	2	2	2	1
Grayson County	**1**	**1**	**2**	**2**	**4**	**2**	**2**	**2**
Greene County	3	3	3	2	4	2	3	2
Greensville County	**1**	**1**	**4**	**4**	**4**	**4**	**4**	**4**
Halifax County	1	1	1	2	1	1	1	1
Hampton	**2**	**2**	**1**	**2**	**1**	**1**	**1**	**1**
Hanover County	3	3	3	1	3	3	3	3
Harrisonburg	**4**	**4**	**1**	**1**	**1**	**3**	**1**	**1**
Henrico County	3	3	3	3	2	3	3	3
Henry County	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**2**
Highland County	4	4	4	4	No Data	4	4	4
Hopewell	**2**	**2**	**1**	**2**	**2**	**1**	**1**	**1**
Isle of Wight County	3	3	4	4	4	4	4	4
James City County	**3**	**3**	**3**	**4**	**3**	**4**	**4**	**3**
King George County	4	3	4	4	4	4	4	4
King William County	**2**	**2**	**3**	**3**	**3**	**4**	**4**	**2**
King and Queen County	4	4	2	2	2	2	3	2

Table 12 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Lancaster County	1	1	3	3	2	3	3	3
Lee County	4	4	4	3	3	4	4	4
Lexington	4	4	4	4	4	4	4	4
Loudoun County	1	1	3	4	3	3	4	2
Louisa County	3	3	2	2	1	3	2	2
Lunenburg County	3	3	3	1	1	3	3	3
Lynchburg	4	4	1	1	1	2	1	1
Madison County	4	4	2	3	3	2	2	3
Manassas	2	2	3	3	2	3	3	3
Manassas Park	3	3	4	3	4	3	3	4
Martinsville	1	1	4	4	3	4	4	4
Mathews County	3	3	2	4	4	2	2	3
Mecklenburg County	3	2	2	1	2	2	1	2
Middlesex County	4	4	1	1	1	1	1	1
Montgomery County	3	3	3	1	3	3	3	3
Nelson County	2	2	2	3	2	2	2	2
New Kent County	2	2	2	2	1	2	2	1
Newport News	2	3	1	1	1	1	1	1
Norfolk	4	4	2	3	2	1	2	1
Northampton County	1	2	4	3	No Data	4	3	4
Northumberland County	1	1	3	4	4	3	4	3
Norton	2	2	2	2	1	3	1	3
Nottoway County	1	2	1	1	No Data	1	1	1
Orange County	1	1	3	3	4	3	2	3
Page County	1	1	2	3	2	4	2	2

Table 12 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Patrick County	1	1	4	4	4	4	4	4
Petersburg	**2**	**2**	**3**	**3**	**No Data**	**3**	**3**	**3**
Pittsylvania County	1	1	3	4	3	2	3	3
Poquoson	**4**	**4**	**3**	**2**	**3**	**3**	**3**	**2**
Portsmouth	1	2	2	3	3	1	3	2
Powhatan County	**1**	**1**	**2**	**1**	**2**	**2**	**3**	**2**
Prince Edward County	4	4	4	4	4	4	4	4
Prince George County	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**2**
Prince William County	3	2	2	1	2	2	2	3
Pulaski County	**4**	**4**	**4**	**4**	**No Data**	**4**	**4**	**4**
Radford	3	3	2	4	2	2	2	3
Richmond	**4**	**4**	**1**	**2**	**2**	**1**	**3**	**1**
Richmond County	3	3	1	1	1	1	1	1
Roanoke	**3**	**3**	**4**	**3**	**3**	**3**	**3**	**4**
Roanoke County	3	3	1	1	1	1	1	1
Rockbridge County	**3**	**3**	**4**	**3**	**3**	**3**	**4**	**3**
Rockingham County	1	1	2	2	No Data	2	2	2
Russell County	**3**	**3**	**2**	**2**	**1**	**2**	**2**	**2**
Salem	1	1	2	2	No Data	2	2	2
Scott County	**3**	**3**	**4**	**4**	**4**	**4**	**4**	**3**
Shenandoah County	1	1	1	2	4	2	1	2
Smyth County	**2**	**2**	**3**	**3**	**3**	**4**	**4**	**3**
Southampton County	3	3	2	2	3	2	2	2
Spotsylvania County	**3**	**3**	**4**	**4**	**4**	**4**	**4**	**4**
Stafford County	3	3	2	3	3	2	1	2

Table 12 Continued

Division	Fiscal Effort (GSP)	Fiscal Effort (SPCI)	Grad Rate All	Grad Rate ED	Grad Rate Black	Grad Rate White	Grad Rate Female	Grad Rate Male
Suffolk	**2**	**2**	**4**	**4**	**4**	**4**	**4**	**4**
Surry County	4	4	1	2	1	1	2	1
Sussex County	**4**	**4**	**3**	**4**	**3**	**1**	**3**	**2**
Tazewell County	1	1	1	1	2	1	1	1
Virginia Beach	**3**	**3**	**3**	**4**	**3**	**2**	**3**	**3**
Warren County	2	2	2	2	2	2	1	2
Washington County	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**1**
Waynesboro	3	3	1	1	1	1	1	1
West Point	**3**	**3**	**4**	**2**	**No Data**	**4**	**4**	**4**
Westmoreland County	2	2	3	4	3	2	2	3
Williamsburg-James City County	**4**	**4**	**2**	**1**	**1**	**2**	**2**	**2**
Winchester	4	4	2	1	1	3	1	3
Wise County	**1**	**1**	**2**	**2**	**No Data**	**2**	**2**	**2**
Wythe County	1	1	1	1	1	1	1	1
York County	**2**	**3**	**4**	**4**	**3**	**4**	**4**	**4**

Correlation of Virginia's School Divisions Fiscal Effort and Graduation Rates

To answer the question, "Are Virginia's fiscal effort (FE) indices and high school graduation rates correlated?", a bivariate correlation analysis was completed for each school division's graduation rates from 2003 through 2012. The graduation rates (all, economically disadvantaged, black, white, female, and male) were compared with each school division's fiscal effort for these years. In reviewing Table 13, four school divisions, Madison, Falls Church, Buchanan, and Wise displayed statistically significant positive correlations between fiscal effort and overall graduation rate, meaning that as fiscal effort increased, overall graduation rate increased. Three school divisions, Lee, Danville, and Floyd displayed statistically negative correlations between fiscal effort and overall graduation rate, which implied that as fiscal effort increased, overall graduation rate decreased. These results encourage further analysis of the three school divisions that displayed a positive correlation between fiscal effort and overall graduation rate. This additional study could look to isolate strategies these divisions use to increase graduation rate.

Reviewing the graduation rates for economically disadvantaged students, two school divisions, Rappahannock and Page, displayed statistically significant positive correlations between fiscal effort and graduation rate for economically disadvantaged students. Six school divisions, New Kent, Floyd, Lee, Charlotte, Appomattox, and Danville displayed statistically negative correlations between fiscal effort and graduation rate for economically disadvantaged students. Further review of the two schools that displayed a positive correlation between fiscal effort and the graduation rate for

economically disadvantaged students could be completed to explore strategies these divisions use to increase graduation rates.

Comparing the graduation rates for Black students, four school divisions, Clarke, Charlotte, Goochland, and Chesterfield displayed statistically positive correlations between fiscal effort and graduation rate for Black students. Three school divisions, Northumberland, Danville, and Charles City displayed statistically negative correlations between fiscal effort and graduation rate for Black students. Further analysis of the four schools that displayed a positive correlation between fiscal effort and the graduation rate for Black students could be completed to explore strategies these divisions use to increase graduation rates.

Analyzing the graduation rates for White students, eight school divisions, Falls Church, Buchanan, Wise, Martinsville, Pittsylvania, Madison, Buckingham, and Prince William displayed statistically positive correlations between fiscal effort and graduation rate for White students. Four school divisions, Danville, Lee, Floyd, and Powhatan displayed statistically negative correlations between fiscal effort and graduation rate for White students. Further study of the eight schools that displayed a positive correlation between fiscal effort and the graduation rate for White students could be completed to explore strategies these divisions use to increase graduation rates.

Reviewing the graduation rates for female students, four school divisions, Falls Church, Chesterfield, Buckingham, and Buchanan displayed statistically positive correlations between fiscal effort and graduation rate for female students. Five school divisions, Floyd, Lee, Powhatan, Danville, and Salem displayed statistically negative correlations between fiscal effort and graduation rate for female students. Further review

of the four schools that displayed a positive correlation between fiscal effort and the graduation rate for female students could be completed to explore strategies these divisions use to increase graduation rates.

Finally, analyzing the graduation rates for male students, eight school divisions, Fairfax County, Madison, Pulaski, Russell, Buchanan, Pittsylvania, Wise, and Falls Church displayed statistically positive correlations between fiscal effort and graduation rate for male students. Six school divisions, Richmond City, Amelia, Williamsburg, Danville, Lee, and Fauquier displayed statistically negative correlations between fiscal effort and graduation rate for male students. Further analysis of the eight schools that displayed a positive correlation between fiscal effort and the graduation rate for male students could be completed to explore strategies these divisions use to increase graduation rates.

Division Fiscal Effort as a Predictor of Student Achievement

The second research question, "After controlling for socio-economic status (SES), how much will division fiscal effort affect the annual rate of change in Virginia's high school graduation rates from 2003-2012?", was answered via a simple linear regression for high school graduation percentages from 2003-2012. The intent of a simple linear regression model is to explain the relationship between two variables with a straight line. Table 14 displays the results from the simple linear regression model for high school graduation percentages. Outputs include (B) which is the size of the coefficient for the independent variable. Coefficient values show the size of the effect that division fiscal effort is having on graduation rates, and the sign on the coefficient gives the direction of

Table 13

Correlation of Division Fiscal Effort (individual) and High School Graduation Rate (all, economically disadvantaged, black, white, female and male) in Virginia from 2003 to 2012

Division	Graduation Rate	r	P	Division	Graduation Rate	r	P	Division	Graduation Rate	r	P
Accomack	**All**	**-.117**	**.763**	**Amherst**	**All**	**-.256**	**.506**	**Bedford Co**	**All**	**-.609**	**.082**
	ED	**-.235**	**.542**		**ED**	**.103**	**.792**		**ED**	**-.058**	**.881**
	Black	**-.270**	**.483**		**Black**	**-.306**	**.424**		**Black**	**-.613**	**.079**
	White	**-.169**	**.664**		**White**	**-.059**	**.881**		**White**	**-.578**	**.103**
	Female	**-.041**	**.917**		**Female**	**-.229**	**.554**		**Female**	**-.510**	**.103**
	Male	**-.175**	**.652**		**Male**	**-.223**	**.564**		**Male**	**-.394**	**.294**
Albemarle	All	.248	.519	Appomattox	All	-.456	.217	Bland	All	.277	.471
	ED	-.226	.558		ED	-.688*	.040		ED	-.271	.517
	Black	.467	.205		Black	-.500	.170		Black	ND	ND
	White	.222	.566		White	-.429	.249		White	.277	.471
	Female	.212	.584		Female	-.519	.152		Female	.060	.879
	Male	.249	.519		Male	-.404	.281		Male	.253	.511
Alexandria	**All**	**-.434**	**.243**	**Arlington**	**All**	**-.170**	**.661**	**Botetourt**	**All**	**-.415**	**.266**
	ED	**-.529**	**.143**		**ED**	**-.205**	**.595**		**ED**	**-.131**	**.757**
	Black	**-.458**	**.215**		**Black**	**-.166**	**.670**		**Black**	**-.059**	**.925**
	White	**-.237**	**.540**		**White**	**-.179**	**.644**		**White**	**-.461**	**.212**
	Female	**-.411**	**.272**		**Female**	**-.203**	**.601**		**Female**	**-.265**	**.490**
	Male	**-.408**	**.276**		**Male**	**-.133**	**.734**		**Male**	**-.478**	**.193**
Alleghany	All	.379	.314	Augusta	All	-.397	.290	Bristol	All	-.406	.278
	ED	.396	.331		ED	-.363	.337		ED	.363	.337
	Black	.601	.109		Black	.249	.518		Black	.471	.238
	White	.291	.448		White	-.357	.345		White	-.433	.244
	Female	.290	.449		Female	.249	.443		Female	-.632	.068
	Male	.372	.325		Male	-.498	.172		Male	-.055	.889
Amelia	**All**	**-.662**	**.052**	**Bath**	**All**	**.003**	**.993**	**Brunswick**	**All**	**.063**	**.872**
	ED	**-.097**	**.818**		**ED**	**-.225**	**.668**		**ED**	**-.018**	**.964**
	Black	**-.501**	**.169**		**Black**	**ND**	**ND**		**Black**	**.086**	**.825**
	White	**-.579**	**.102**		**White**	**.016**	**.968**		**White**	**-.068**	**.862**
	Female	**-.313**	**.412**		**Female**	**-.198**	**.609**		**Female**	**.384**	**.308**
	Male	**-.765***	**.016**		**Male**	**.312**	**.414**		**Male**	**-.178**	**.647**

Table 13 Continued

Division	Graduation Rate	r	P	Division	Graduation Rate	r	P	Division	Graduation Rate	r	P
Buchanan	**All**	**.863****	**.003**	**Charles City**	**All**	**-.665**	**.051**	**Colonial Heights**	**All**	**-.005**	**.989**
	ED	**.161**	**.679**		**ED**	**.072**	**.865**		**ED**	**.186**	**.724**
	Black	**ND**	**ND**		**Black**	**-.703***	**.035**		**Black**	**.452**	**.702**
	White	**.864****	**.003**		**White**	**ND**	**ND**		**White**	**-.063**	**.873**
	Female	**.708***	**.033**		**Female**	**-.554**	**.122**		**Female**	**-.331**	**.385**
	Male	**.718***	**.029**		**Male**	**-.454**	**.219**		**Male**	**.186**	**.632**
Buckingham	All	.553	.123	Charlotte	All	-.062	.874	Covington	All	-.311	.415
	ED	.434	.243		ED	-.702*	.035		ED	-.073	.891
	Black	.170	.662		Black	.824**	.006		Black	-.111	.776
	White	.686*	.041		White	-.657	.054		White	-.279	.467
	Female	.739*	.023		Female	-.434	.243		Female	-.480	.191
	Male	.150	.701		Male	.402	.284		Male	-.134	.730
Buena Vista	**All**	**.470**	**.202**	**Charlottesville**	**All**	**-.392**	**.296**	**Craig**	**All**	**-.552**	**.124**
	ED	**.524**	**.182**		**ED**	**-.127**	**.744**		**ED**	**.644**	**.167**
	Black	**ND**	**ND**		**Black**	**-.294**	**.442**		**Black**	**ND**	**ND**
	White	**.513**	**.158**		**White**	**-.364**	**.335**		**White**	**-.511**	**.159**
	Female	**.480**	**.191**		**Female**	**-.284**	**.459**		**Female**	**-.384**	**.308**
	Male	**.379**	**.314**		**Male**	**-.379**	**.314**		**Male**	**-.572**	**.107**
Campbell	All	.601	.087	Chesapeake	All	-.400	.287	Culpeper	All	.178	.646
	ED	.100	.798		ED	-.383	.309		ED	.145	.757
	Black	.274	.476		Black	-.489	.182		Black	.188	.628
	White	.642	.063		White	-.246	.523		White	.033	.933
	Female	.500	.171		Female	-.344	.365		Female	.227	.557
	Male	.594	.091		Male	-.418	.263		Male	.077	.845
Caroline	**All**	**-.317**	**.406**	**Chesterfield**	**All**	**.564**	**.113**	**Cumberland**	**All**	**.282**	**.462**
	ED	**-.289**	**.487**		**ED**	**.511**	**.160**		**ED**	**.315**	**.447**
	Black	**-.644**	**.061**		**Black**	**.695***	**.038**		**Black**	**.237**	**.540**
	White	**-.174**	**.655**		**White**	**.492**	**.178**		**White**	**.330**	**.385**
	Female	**-.345**	**.363**		**Female**	**.753***	**.019**		**Female**	**.288**	**.452**
	Male	**-.249**	**.518**		**Male**	**.449**	**.225**		**Male**	**.278**	**.469**
Carroll	All	.398	.289	Clarke	All	-.194	.616	Danville	All	-.850**	.004
	ED	.384	.308		ED	-.204	.661		ED	-.677*	.045
	Black	ND	ND		Black	.973**	.001		Black	-.727*	.027
	White	.187	.630		White	-.183	.638		White	-.917**	.000
	Female	.354	.350		Female	-.261	.497		Female	-.797*	.010
	Male	.073	.851		Male	-.029	.942		Male	-.726*	.027

Table 13 Continued

Division	Graduation Rate	r	P	Division	Graduation Rate	r	P	Division	Graduation Rate	r	P
Dickenson	**All**	**-.015**	**.970**	**Floyd**	**All**	**-.737***	**.024**	**Galax**	**All**	**-.574**	**.106**
	ED	**-.318**	**.405**		**ED**	**-.797***	**.018**		**ED**	**.035**	**.929**
	Black	**ND**	**ND**		**Black**	**ND**	**ND**		**Black**	**ND**	**ND**
	White	**-.021**	**.957**		**White**	**-.749***	**.020**		**White**	**-.425**	**.254**
	Female	**.156**	**.688**		**Female**	**-.910****	**.001**		**Female**	**-.497**	**.174**
	Male	**-.117**	**.764**		**Male**	**-.412**	**.271**		**Male**	**-.312**	**.414**
Dinwiddie	All	-.364	.335	Fluvanna	All	.332	.383	Giles	All	-.183	.638
	ED	-.179	.645		ED	.126	.746		ED	-.274	.475
	Black	-.274	.476		Black	-.523	.149		Black	ND	ND
	White	-.178	.646		White	.498	.172		White	-.120	.759
	Female	-.479	.192		Female	-.012	.975		Female	.003	.994
	Male	-.025	.948		Male	.340	.371		Male	-.121	.756
Essex	**All**	**-.038**	**.924**	**Franklin City**	**All**	**.611**	**.081**	**Gloucester**	**All**	**.350**	**.355**
	ED	**.025**	**.949**		**ED**	**.483**	**.188**		**ED**	**-.364**	**.422**
	Black	**.134**	**.731**		**Black**	**.323**	**.396**		**Black**	**-.122**	**.755**
	White	**-.275**	**.474**		**White**	**-.240**	**.533**		**White**	**.372**	**.325**
	Female	**.104**	**.790**		**Female**	**-.227**	**.557**		**Female**	**.341**	**.370**
	Male	**-.087**	**.824**		**Male**	**.610**	**.081**		**Male**	**.332**	**.383**
Fairfax Co	All	-.395	.292	Franklin Co	All	.329	.387	Goochland	All	.511	.160
	ED	-.128	.743		ED	-.163	.675		ED	.544	.164
	Black	.166	.669		Black	-.370	.328		Black	.725*	.027
	White	-.473	.199		White	-.280	.465		White	.407	.278
	Female	-.297	.438		Female	-.337	.375		Female	.311	.416
	Male	.984**	.000		Male	-.513	.158		Male	.559	.118
Falls Church	**All**	**.869****	**.002**	**Frederick**	**All**	**.470**	**.202**	**Grayson**	**All**	**.191**	**.622**
	ED	**ND**	**ND**		**ED**	**.431**	**.247**		**ED**	**.335**	**.471**
	Black	**ND**	**ND**		**Black**	**.464**	**.208**		**Black**	**ND**	**ND**
	White	**.933****	**.000**		**White**	**.443**	**.232**		**White**	**.179**	**.646**
	Female	**.872****	**.002**		**Female**	**.442**	**.233**		**Female**	**-.167**	**.667**
	Male	**.674***	**.047**		**Male**	**.470**	**.202**		**Male**	**.405**	**.279**
Fauquier	All	-.622	.074	Fredericksburg	All	-.231	.550	Greene	All	.213	.581
	ED	-.509	.161		ED	-.012	.975		ED	.264	.493
	Black	-.454	.220		Black	-.417	.264		Black	.229	.585
	White	-.551	.124		White	-.322	.397		White	.224	.562
	Female	-.352	.353		Female	.223	.565		Female	.354	.350
	Male	-.719*	.029		Male	-.468	.204		Male	.125	.748

Table 13 Continued

Division	Graduation Rate	r	P	Division	Graduation Rate	r	P	Division	Graduation Rate	r	P
Greensville	**All**	**-.148**	**.704**	**Henry**	**All**	**.249**	**.519**	**King William**	**All**	**-.338**	**.374**
	ED	**-.006**	**.988**		**ED**	**.431**	**.246**		**ED**	**-.145**	**.731**
	Black	**-.180**	**.643**		**Black**	**-.174**	**.655**		**Black**	**-.260**	**.499**
	White	**ND**	**ND**		**White**	**.350**	**.355**		**White**	**-.326**	**.431**
	Female	**-.626**	**.071**		**Female**	**.240**	**.533**		**Female**	**-.264**	**.492**
	Male	**.082**	**.834**		**Male**	**.226**	**.560**		**Male**	**-.281**	**.464**
Halifax	All	.371	.325	Highland	All	-.406	.278	Lancaster	All	-.536	.137
	ED	.279	.467		ED	ND	ND		ED	-.314	.411
	Black	.340	.371		Black	ND	ND		Black	-.640	.063
	White	.399	.287		White	-.389	300		White	-.244	.527
	Female	.382	.311		Female	ND	ND		Female	-.565	.113
	Male	.345	.363		Male	-.398	.329		Male	-.105	.788
Hampton	**All**	**.433**	**.244**	**Hopewell**	**All**	**.522**	**.150**	**Lee**	**All**	**-.873****	**.002**
	ED	**.429**	**.250**		**ED**	**.390**	**.299**		**ED**	**-.733***	**.025**
	Black	**.382**	**.310**		**Black**	**.625**	**.027**		**Black**	**ND**	**ND**
	White	**.232**	**.547**		**White**	**.395**	**.293**		**White**	**-.815****	**.007**
	Female	**.402**	**.283**		**Female**	**.599**	**.088**		**Female**	**-.854****	**.003**
	Male	**.413**	**.269**		**Male**	**.363**	**.337**		**Male**	**-.720***	**.029**
Hanover	All	.433	.245	Isle of Wight	All	-.565	.113	Loudoun	All	-.350	.356
	ED	.331	.384		ED	-.504	.167		ED	-.007	.985
	Black	.204	.598		Black	-.217	.576		Black	-.420	.260
	White	.464	.209		White	-.592	.093		White	-.442	.234
	Female	.359	.342		Female	-.625	.072		Female	-.264	.492
	Male	.480	.191		Male	-.387	.304		Male	-.399	.288
Harrisonburg	**All**	**-.455**	**.219**	**King and Queen**	**All**	**.290**	**.449**	**Louisa**	**All**	**-.144**	**.713**
	ED	**-.470**	**.202**		**ED**	**.470**	**.347**		**ED**	**.280**	**.466**
	Black	**-.321**	**.400**		**Black**	**.299**	**.434**		**Black**	**.287**	**.454**
	White	**-.436**	**.241**		**White**	**.415**	**.307**		**White**	**-.167**	**.668**
	Female	**-.583**	**.099**		**Female**	**.455**	**.218**		**Female**	**-.170**	**.661**
	Male	**-.283**	**.460**		**Male**	**.234**	**.544**		**Male**	**-.020**	**.960**
Henrico	All	.486	.185	King George	All	-.191	622	Lunenburg	All	.415	.266
	ED	.126	.748		ED	-.223	.596		ED	.326	.392
	Black	.307	.421		Black	.133	.733		Black	.216	.577
	White	.505	.165		White	-.339	.372		White	.268	.486
	Female	.536	.137		Female	-.291	.448		Female	.428	.251
	Male	.423	.257		Male	-.090	.818		Male	.428	.250

Table 13 Continued

Division	Graduation Rate	r	P	Division	Graduation Rate	r	P	Division	Graduation Rate	r	P
Lynchburg	**All**	**.001**	**.998**	**Mecklenburg**	**All**	**.040**	**.919**	**Norfolk**	**All**	**-.109**	**.780**
	ED	**-.445**	**.230**		**ED**	**.080**	**.838**		**ED**	**.202**	**.603**
	Black	**-.258**	**.502**		**Black**	**.041**	**.917**		**Black**	**-.045**	**.909**
	White	**.239**	**.536**		**White**	**-.050**	**.899**		**White**	**-062**	**.873**
	Female	**.159**	**.683**		**Female**	**.379**	**.314**		**Female**	**-.388**	**.302**
	Male	**-.100**	**.798**		**Male**	**-.256**	**.506**		**Male**	**.132**	**.735**
Madison	All	.937**	.000	Middlesex	All	-.064	.870	Northampton	All	.105	.789
	ED	.529	.177		ED	.072	.854		ED	-.102	.793
	Black	.526	.145		Black	.082	.833		Black	.038	.923
	White	.688*	.040		White	-.161	.679		White	.297	.437
	Female	.495	.176		Female	.143	.713		Female	.141	.717
	Male	.856**	.003		Male	-.245	.525		Male	.037	.924
Manassas	**All**	**-.482**	**.188**	**Montgomery**	**All**	**-.037**	**.925**	**Northumberland**	**All**	**.014**	**.971**
	ED	**-.481**	**.190**		**ED**	**-.458**	**.215**		**ED**	**-.586**	**.097**
	Black	**-.311**	**.415**		**Black**	**.331**	**.384**		**Black**	**-.817***	**.013**
	White	**-.543**	**.131**		**White**	**-.188**	**.629**		**White**	**.247**	**.522**
	Female	**-.559**	**.118**		**Female**	**.363**	**.336**		**Female**	**.006**	**.988**
	Male	**-.391**	**.298**		**Male**	**-.456**	**.218**		**Male**	**-.008**	**.984**
Manassas Park	All	.062	.873	Nelson	All	.096	.805	Norton	All	.152	.697
	ED	-.057	.885		ED	.314	.411		ED	.263	.568
	Black	.410	.273		Black	.109	.780		Black	ND	ND
	White	.042	.914		White	.040	.919		White	.076	.845
	Female	-.065	.868		Female	.054	.890		Female	.140	.719
	Male	.194	.617		Male	.072	.854		Male	.249	.518
Martinsville	**All**	**.599**	**.088**	**New Kent**	**All**	**-.459**	**.214**	**Nottoway**	**All**	**.034**	**.930**
	ED	**.412**	**.270**		**ED**	**-.869****	**.005**		**ED**	**.369**	**.328**
	Black	**.251**	**.515**		**Black**	**-.105**	**.787**		**Black**	**.028**	**.944**
	White	**.749***	**.020**		**White**	**-.429**	**.250**		**White**	**-.157**	**.687**
	Female	**.650**	**.058**		**Female**	**-.533**	**.139**		**Female**	**-.280**	**.465**
	Male	**.546**	**.128**		**Male**	**-.191**	**.623**		**Male**	**.244**	**.526**
Mathews	All	.125	.749	Newport News	All	.055	.888	Orange	All	-.476	.195
	ED	.449	.225		ED	-.277	.471		ED	-.259	.501
	Black	-.209	.653		Black	.167	.668		Black	-.378	.316
	White	-.056	.885		White	.092	.814		White	-.471	.201
	Female	.052	.893		Female	.149	.702		Female	-.369	.328
	Male	-.092	.814		Male	-.027	.944		Male	-.578	.103

Table 13 Continued

Division	Graduation Rate	r	P	Division	Graduation Rate	r	P	Division	Graduation Rate	r	P
Page	**All**	**.600**	**.088**	**Powhatan**	**All**	**-.579**	**.103**	**Rappahannock**	**All**	**.341**	**.369**
	ED	**.699***	**.036**		**ED**	**-.595**	**.120**		**ED**	**.904***	**.013**
	Black	**ND**	**ND**		**Black**	**-.313**	**.412**		**Black**	**ND**	**ND**
	White	**.638**	**.064**		**White**	**-.700***	**.036**		**White**	**.316**	**.408**
	Female	**.472**	**.199**		**Female**	**-.800****	**.010**		**Female**	**-.217**	**.575**
	Male	**.636**	**.066**		**Male**	**-.139**	**.722**		**Male**	**.562**	**.116**
Patrick	All	-.172	.659	Prince Edward	All	.320	.401	Richmond City	All	-.616	.078
	ED	-.272	.479		ED	-.032	.934		ED	-.635	.066
	Black	.524	.286		Black	-.018	.964		Black	-.618	.076
	White	.029	.941		White	.599	.089		White	.074	.850
	Female	-.201	.604		Female	.186	.632		Female	-.417	.264
	Male	-.105	.788		Male	.329	.387		Male	-.820**	.007
Petersburg	**All**	**.312**	**.414**	**Prince George**	**All**	**.221**	**.567**	**Richmond Co**	**All**	**.306**	**.424**
	ED	**.147**	**.705**		**ED**	**.033**	**.933**		**ED**	**.273**	**.477**
	Black	**.394**	**.294**		**Black**	**.042**	**.914**		**Black**	**.359**	**.343**
	White	**ND**	**ND**		**White**	**.446**	**.229**		**White**	**.083**	**.832**
	Female	**.259**	**.500**		**Female**	**-.014**	**.971**		**Female**	**.222**	**.565**
	Male	**.223**	**.565**		**Male**	**.458**	**.215**		**Male**	**.331**	**.384**
Pittsylvania	All	.661	.053	Prince William	All	.424	.255	Roanoke City	All	-.413	.269
	ED	.599	.088		ED	.179	.645		ED	-.594	.092
	Black	-.143	.714		Black	.150	.700		Black	-.230	.551
	White	.702*	.035		White	.676*	.046		White	-.405	.280
	Female	.531	.142		Female	.480	.191		Female	-.470	.202
	Male	.704*	.034		Male	.380	.313		Male	-.331	.385
Poquoson	**All**	**-.168**	**.665**	**Pulaski**	**All**	**.300**	**.433**	**Roanoke Co**	**All**	**-.370**	**.328**
	ED	**-.853**	**.066**		**ED**	**.316**	**.407**		**ED**	**-.171**	**.660**
	Black	**ND**	**ND**		**Black**	**-.071**	**.856**		**Black**	**-.056**	**.886**
	White	**-.130**	**.740**		**White**	**.299**	**.435**		**White**	**-.297**	**.438**
	Female	**-.259**	**.501**		**Female**	**-.098**	**.801**		**Female**	**-.383**	**.308**
	Male	**-.069**	**.861**		**Male**	**.732***	**.025**		**Male**	**-.166**	**.670**
Portsmouth	All	.030	.940	Radford	All	-.169	.664	Rockbridge	All	.312	.414
	ED	-.257	.505		ED	.029	.946		ED	.278	.469
	Black	.006	.988		Black	-.303	.621		Black	.292	.483
	White	-.001	.998		White	-.125	.748		White	.323	.396
	Female	.098	.801		Female	.013	.973		Female	.232	.549
	Male	.014	.972		Male	-.262	.495		Male	.376	.318

Table 13 Continued

Division	Graduation Rate	r	P	Division	Graduation Rate	r	P	Division	Graduation Rate	r	P
Rockingham	**All**	**.075**	**.848**	**Southampton**	**All**	**-.415**	**.267**	**Sussex**	**All**	**-.194**	**.617**
	ED	**.025**	**.949**		**ED**	**-.113**	**.773**		**ED**	**-.439**	**.237**
	Black	**.072**	**.866**		**Black**	**-.448**	**.226**		**Black**	**-.059**	**.880**
	White	**.070**	**.858**		**White**	**-.189**	**.627**		**White**	**-.375**	**.319**
	Female	**-.233**	**.547**		**Female**	**-.315**	**.409**		**Female**	**.163**	**.676**
	Male	**.223**	**.564**		**Male**	**-.454**	**.220**		**Male**	**-.260**	**.499**
Russell	All	.634	.067	Spotsylvania	All	-.253	.512	Tazewell	All	.270	.482
	ED	.600	.087		ED	-.218	.573		ED	.427	.252
	Black	ND	ND		Black	-.401	.285		Black	-.406	.365
	White	.626	.071		White	-.197	.611		White	.322	.398
	Female	.476	.195		Female	-.159	.683		Female	.385	.307
	Male	.724*	.027		Male	-.287	.453		Male	.032	.935
Salem	**All**	**-.409**	**.275**	**Stafford**	**All**	**.253**	**.512**	**Virginia Beach**	**All**	**-.199**	**.608**
	ED	**-.662**	**.052**		**ED**	**-.023**	**.954**		**ED**	**-.342**	**.608**
	Black	**-.489**	**.181**		**Black**	**-.234**	**.545**		**Black**	**-.252**	**.513**
	White	**-.349**	**.357**		**White**	**.367**	**.332**		**White**	**-.213**	**.582**
	Female	**-.797***	**.010**		**Female**	**.258**	**.503**		**Female**	**-.159**	**.683**
	Male	**-.126**	**.747**		**Male**	**.230**	**.552**		**Male**	**-.207**	**.593**
Scott	All	.383	.310	Staunton	All	.311	.415	Warren	All	.495	.175
	ED	.411	.272		ED	.068	.862		ED	.480	.228
	Black	ND	ND		Black	.312	.414		Black	.465	.207
	White	.369	.328		White	.351	.355		White	.477	.194
	Female	.167	.667		Female	.270	.483		Female	.505	.166
	Male	.472	.200		Male	.272	.479		Male	.471	.201
Shenandoah	**All**	**-.599**	**.088**	**Suffolk**	**All**	**-.041**	**.916**	**Washington**	**All**	**.652**	**.057**
	ED	**-.390**	**.299**		**ED**	**.333**	**.382**		**ED**	**.560**	**.117**
	Black	**ND**	**ND**		**Black**	**.184**	**.636**		**Black**	**ND**	**ND**
	White	**-.602**	**.086**		**White**	**-.500**	**.170**		**White**	**.607**	**.083**
	Female	**-.518**	**.153**		**Female**	**-.045**	**.909**		**Female**	**.644**	**.061**
	Male	**-.575**	**.106**		**Male**	**-.051**	**.897**		**Male**	**.415**	**.266**
Smyth	All	-.066	.866	Surry	All	-.256	.506	Waynesboro	All	-.213	.581
	ED	.015	.970		ED	-.283	.461		ED	-.451	.223
	Black	ND	ND		Black	-.162	.677		Black	-.154	.693
	White	-.090	.819		White	-.333	.381		White	.058	.882
	Female	.340	.371		Female	-.303	.428		Female	-.415	.267
	Male	-.320	.401		Male	-.165	.671		Male	.058	.881

Table 13 Continued

Division	Graduation Rate	r	P
Winchester	**All**	**.237**	**.539**
	ED	**ND**	**ND**
	Black	**ND**	**ND**
	White	**.280**	**.466**
	Female	**.181**	**.640**
	Male	**.224**	**.563**
Wise	All	-.035	.929
	ED	-.040	.919
	Black	.046	.906
	White	-.198	.609
	Female	-.091	.816
	Male	.120	.759
Williamsburg	**All**	**-.619**	**.076**
	ED	**-.448**	**.226**
	Black	**-.482**	**.189**
	White	**-.573**	**.107**
	Female	**-.189**	**.627**
	Male	**-.734***	**.024**
Winchester	All	-.386	.305
	ED	-.346	.362
	Black	-.524	.148
	White	-.209	.589
	Female	-.400	.286
	Male	-.253	.511
Wise	**All**	**.796***	**.010**
	ED	**.291**	**.447**
	Black	**ND**	**ND**
	White	**.753***	**.019**
	Female	**.647**	**.059**
	Male	**.679***	**.044**

Table 13 Continued

Division	Graduation Rate	r	P
Wythe	All	.567	.111
	ED	.323	.396
	Black	.471	.345
	White	.560	.117
	Female	.582	.100
	Male	.449	.225
York	**All**	**.506**	**.165**
	ED	**.542**	**.132**
	Black	**.495**	**.176**
	White	**.494**	**.176**
	Female	**.530**	**.142**
	Male	**.451**	**.223**

*denotes correlation is significant at the .05 level

** denotes correlation is significant at the .01 level

ND denotes no data

the effect. For this study the coefficient tells the researcher how much the graduation rate is expected to increase or decrease when that fiscal effort increases by one. Another output, R^2, gives the proportion of the variance of one variable that is predictable from the other variable, SE is the standard error of the estimate which measures the accuracy of predictions and P which indicates the amount of statistical significance of the relationship.

Analyzing the graduation rates there were seven school divisions (Madison, Falls Church, Lee, Buchanan, Danville, Wise, and Floyd) that had significant relationships between fiscal effort and graduation rates. These divisions display that over 90% of the variance in graduation rates is predicted by division fiscal effort. On the other hand, it must be reported that the multiple sources of variance that may explain the difference in graduation rates are not accounted for in the linear regression test. Analyzing the broad range in proportion of the variance (R^2) from .000 to .878 and the minimal amount of significant linear regression relationships it is challenging to conclude that division fiscal effort is a predictor of graduation rates for the state of Virginia as examined in this study.

Standard error values ranged from .013 for Fairfax County to 5.701 for Cumberland. The standard error details the accuracy to anticipate from our prediction. The small numbers in the study and the large standard error of the estimate observed generally implies a broad range among subjective predictions. This result indicates the requirement for large samples and a stronger relationship to allow accurate predicting.

Finally, reviewing the coefficients displayed a broad range from a result of (4.43) for Cumberland to (-3.57) for Floyd. Coefficients were nearly equally split between positive (65) and negative (66). This result showed that in nearly half of the school

divisions when fiscal effort increased graduation rates likewise increased.

Trends between Virginia's Fiscal Effort and High School Graduation Rates

The final research question, "What past trends are apparent in relation to Virginia's fiscal effort and high school graduation rates?", was analyzed with a time-lagged correlation and a fixed effects least square dummy variable model. A time-lagged correlation is used to predict the significance of lag in time of one variable on another variable. For this study, division fiscal effort was time-lagged by two, four, six and eight years to analyze effort's effect on achievement. Graduation rates for the years 2005, 2007, 2009, and 2011 were studied with division fiscal effort for the years 2003, 2005, 2007, and 2009. Results for the time-lagged correlation include Pearson correlation r score that details the strength and direction of the relationship and the p score that displays a statistical significant relationship at the (.05) level.

Table 15 illustrates the time-lagged correlation for graduation rate (all) regarding the years 2005, 2007, 2009, and 2011. Analyzing the results six school divisions, York, Green, Northampton, Charlotte, Northumberland, and Fairfax County displayed statistically significant positive two-year time-lagged correlation. Green and Charlotte displayed a significant negative correlation. Table 16 illustrates results from the four-year lag analysis. Reviewing the results seven school divisions (Amelia, Russell, Henry, Chesterfield, Isle of Wight, Salem, and Rockingham County) displayed statistically significant positive four-year time-lagged correlation. Shenandoah and Powhatan County displayed a significant negative correlation. Table 17 displays data from the six-year lag

Table 14

Linear Regression Division Fiscal Effort (individual) and High School Graduation Rate (all) in Virginia from 2003 to 2012

Division	Graduation Rate	B	R2	SE	P	Division	Graduation Rate	B	R2	SE	P
ACCOMACK	All	-.246	.014	0.787	.763	CLARKE	All	-.100	.038	0.190	.616
ALBEMARLE	**All**	**.308**	**.062**	**0.454**	**.519**	**COLONIAL BEACH**	**All**	**-.023**	**.000**	**1.625**	**.989**
ALEXANDRIA	All	-.173	.188	0.136	.243	COLONIAL HEIGHTS	All	-.409	.097	0.472	.415
ALLEGHANY	**All**	**.704**	**.144**	**0.649**	**.312**	**COVINGTON**	**All**	**1.14**	**.164**	**0.974**	**.279**
AMELIA	All	-2.43	.438	1.040	.052	CRAIG	All	-.244	.304	1.397	.124
AMHERST	**All**	**-.760**	**.066**	**1.084**	**.506**	**CULPEPER**	**All**	**.522**	**.032**	**1.089**	**.646**
APPOMATTOX	All	-.224	.208	0.165	.217	CUMBERLAND	All	4.43	.080	5.701	.462
ARLINGTON	**All**	**-.017**	**.029**	**0.037**	**.661**	**DANVILLE**	**All**	**-1.783**	**.723**	**0.417**	**.004**
AUGUSTA	All	-.063	.158	0.055	.290	DICKENSON	All	-.036	.000	0.943	.970
BATH	**All**	**.002**	**.000**	**0.167**	**.993**	**DINWIDDIE**	**All**	**-.623**	**.133**	**0.602**	**.335**
BEDFORD COUNTY	All	-.607	.371	0.299	.082	ESSEX	All	-.040	.001	0.407	.924
BLAND	**All**	**.279**	**.077**	**0.366**	**.471**	**FAIRFAX COUNTY**	**All**	**-.015**	**.156**	**0.013**	**.292**
BOTETOURT	All	-.639	.172	0.529	.266	FALLS CHURCH	All	.071	.755	0.015	.002
BRISTOL	**All**	**-1.90**	**.165**	**1.615**	**.278**	**FAUQUIER**	**All**	**-.252**	**.386**	**0.120**	**.074**
BRUNSWICK	All	.356	.004	2.131	.872	FLOYD	All	-3.57	.543	1.239	.024
BUCHANAN	**All**	**1.80**	**.746**	**0.398**	**.003**	**FLUVANNA**	**All**	**.543**	**.110**	**0.584**	**.383**
BUCKINGHAM	All	1.75	.306	0.997	.123	FRANKLIN CITY	All	3.27	.373	1.607	.081
BUENA VISTA	**All**	**1.85**	**.221**	**1.316**	**.202**	**FRANKLIN COUNTY**	**All**	**1.10**	**.108**	**1.199**	**.387**
CAMPBELL	All	.968	.362	0.486	.087	FREDERICK	All	.583	.221	0.415	.202
CAROLINE	**All**	**-.645**	**.100**	**0.730**	**.406**	**FREDERICKSBURG**	**All**	**-.088**	**.053**	**0.140**	**.550**
CARROLL	All	.494	.158	0.431	.289	GALAX	All	-.827	.330	0.446	.106
CHARLES CITY	**All**	**-.681**	**.442**	**0.289**	**.051**	**GILES**	**All**	**-.080**	**.033**	**0.163**	**.638**
CHARLOTTE	All	-.177	.004	1.078	.874	GLOUCESTER	All	2.83	.123	2.866	.355
CHARLOTTESVILLE	**All**	**-.168**	**.154**	**0.149**	**.296**	**GOOCHLAND**	**All**	**2.06**	**.261**	**1.317**	**.160**
CHESAPEAKE	All	-.148	.160	0.128	.287	GRAYSON	All	.386	.037	0.749	.622
CHESTERFIELD	**All**	**.446**	**.318**	**.247**	**.113**	**GREENE**	**All**	**.187**	**.046**	**0.324**	**.581**

Table 14 Continued

Division	*Graduation Rate*	*B*	*R2*	*SE*	*P*	*Division*	*Graduation Rate*	*B*	*R2*	*SE*	*P*
GREENSVILLE	All	-.048	.022	0.120	.704	NORTHUMBERLAND	All	.035	.000	0.919	.971
HALIFAX	**All**	**2.41**	**.138**	**2.281**	**.325**	**NORTON**	**All**	**.042**	**.023**	**0.103**	**.697**
HAMPTON	All	.742	.188	0.583	.244	NOTTOWAY	All	.013	.001	0.142	.930
HANOVER	**All**	**.967**	**.187**	**0.761**	**.245**	**ORANGE**	**All**	**-1.00**	**.226**	**0.704**	**.195**
HARRISONBURG	All	-.439	.207	0.325	.219	PAGE	All	2.35	.360	1.187	.088
HENRICO	**All**	**.481**	**.236**	**0.327**	**.185**	**PATRICK**	**All**	**-.387**	**.030**	**0.838**	**.659**
HENRY	All	.332	.062	0.489	.519	PETERSBURG	All	.350	.097	0.403	.414
HIGHLAND	**All**	**-.370**	**.165**	**0.315**	**.278**	**PITTSYLVANIA**	**All**	**1.76**	**.437**	**0.759**	**.053**
HOPEWELL	All	2.88	.272	1.781	.150	POQUOSON	All	-.388	.028	0.859	.665
ISLE OF WIGHT	**All**	**-.685**	**.319**	**0.378**	**.113**	**PORTSMOUTH**	**All**	**.054**	**.001**	**0.687**	**.940**
KING AND QUEEN	All	.797	.084	0.993	.449	POWHATAN	All	-.122	.335	0.065	.103
KING GEORGE	**All**	**-.140**	**.037**	**0.271**	**.622**	**PRINCE EDWARD**	**All**	**.905**	**.102**	**1.013**	**.401**
KING WILLIAM	All	-1.51	.114	1.595	.374	PRINCE GEORGE	All	.635	.049	1.057	.567
LANCASTER	**All**	**-.334**	**.287**	**0.199**	**.137**	**PRINCE WILLIAM**	**All**	**.073**	**.180**	**0.059**	**.255**
LEE	All	-1.48	.763	0.314	.002	PULASKI	All	.273	.090	0.328	.433
LOUDOUN	**All**	**-.044**	**.123**	**0.045**	**.356**	**RADFORD**	**All**	**-.200**	**.028**	**0.441**	**.664**
LOUISA	All	-.135	.021	0.351	.713	RAPPAHANNOCK	All	.142	.116	0.148	.369
LUNENBURG	**All**	**2.27**	**.172**	**1.844**	**.266**	**RICHMOND CITY**	**All**	**-.163**	**.379**	**0.079**	**.078**
LYNCHBURG	All	.001	.000	0.457	.998	RICHMOND COUNTY	All	1.34	.093	1.582	.424
MADISON	**All**	**3.34**	**.878**	**0.471**	**.000**	**ROANOKE CITY**	**All**	**-1.00**	**.171**	**0.835**	**.269**
MANASSAS	All	-.489	.233	0.336	.188	ROANOKE COUNTY	All	-.266	.137	0.253	.328
MANASSAS PARK	**All**	**.096**	**.004**	**0.582**	**.873**	**ROCKBRIDGE**	**All**	**1.67**	**.097**	**1.930**	**.414**
MARTINSVILLE	All	2.37	.359	1.197	.088	ROCKINGHAM	All	.119	.006	0.596	.848
MATHEWS	**All**	**-.022**	**.000**	**0.967**	**.983**	**RUSSELL**	**All**	**.736**	**.402**	**0.339**	**.067**
MECKLENBURG	All	.024	.002	0.227	.919	SALEM	All	-.496	.167	0.418	.275
MIDDLESEX	**All**	**-.127**	**.004**	**0.748**	**.870**	**SCOTT**	**All**	**1.26**	**.146**	**1.156**	**.310**
MONTGOMERY	All	-.016	.001	0.165	.925	SHENANDOAH	All	-.821	.359	0.414	.088
NELSON	**All**	**.143**	**.009**	**0.559**	**.805**	**SMYTH**	**All**	**-.682**	**.004**	**3.897**	**.866**
NEW KENT	All	-1.00	.210	0.738	.214	SOUTHAMPTON	All	-2.413	.172	2.000	.267
NEWPORT NEWS	**All**	**.073**	**.003**	**0.498**	**.888**	**SPOTSYLVANIA**	**All**	**-.425**	**.064**	**0.616**	**.512**
NORFOLK	All	-.888	.012	3.057	.780	STAFFORD	All	.275	.064	0.398	.512
NORTHAMPTON	**All**	**.259**	**.011**	**0.932**	**.789**	**STAUNTON**	**All**	**.677**	**.097**	**0.782**	**.415**

Table 14 Continued

Division	*Graduation Rate*	*B*	*R2*	*SE*	*P*
SUFFOLK	All	-.068	.002	.617	.916
SURRY	**All**	**-.269**	**.066**	**.383**	**.506**
SUSSEX	All	-.240	.038	0.459	.617
TAZEWELL	**All**	**.202**	**.073**	**0.272**	**.482**
VIRGINIA BEACH	All	-.224	.040	0.417	.608
WARREN	**All**	**.878**	**.245**	**0.582**	**.175**
WASHINGTON	All	.436	.425	0.191	.057
WAYNESBORO	**All**	**-1.41**	**.046**	**2.450**	**.581**
WEST POINT	All	.716	.056	1.110	.539
WESTMORELAND	**All**	**-.085**	**.001**	**0.915**	**.929**
WILLIAMSBURG	All	-.243	.383	0.117	.076
WINCHESTER	**All**	**-1.14**	**.149**	**1.032**	**.305**
WISE	All	1.31	.634	0.378	.010
WYTHE	**All**	**3.21**	**.322**	**1.762**	**.111**
YORK	All	.505	.256	0.325	.165

analysis. Analyzing the results five school divisions (Madison, Russell, Buchanan, Rockingham, and Prince Edward County) displayed statistically significant positive six-year time-lagged correlation. Lee, Craig, and Amelia County displayed a significant negative correlation. Table 18 displays data from the eight-year lag analysis. Analyzing the results three school divisions (Madison, Buchanan, and Wise County) displayed statistically significant positive eight-year time-lagged correlation. Floyd, Lee, Falls Church, and Danville displayed a significant negative correlation. Overall, 65 school divisions showed a positive correlation between fiscal effort and graduation rate with 64 school divisions displaying a negative correlation. The results depict that when division fiscal effort was compared with graduation rate at a two-year, four-year, six-year and eight-year lag, roughly half of the school divisions demonstrated a positive correlation while half demonstrated a negative correlation. Due to the limited amount of significant data, the results show no meaningful relationship between division fiscal effort and graduation rate at a two, four, six, or eight-year lag.

The final analysis for the last research question, "What past trends are apparent in relation to Virginia's fiscal effort and high school graduation rates?", is a least squares dummy variable model. Three individual models were implemented. The data studied encompassed multiple years (2005, 2007, 2009, 2011), analyzed high school graduation rate, sources of variance, and fiscal effort impact for each school division in Virginia.

Findings from the least squares dummy variable model are visible in Tables 19 through 22. Table 19 details the three models compared in the least squares dummy variable analysis. Comparing high school graduation rate, Model 1, which studied the effect of socio-economic status, gender, and race on graduation rate determined that 99

Table 15

Two-Year Time Lagged Correlation Data of Division Fiscal Effort and Graduation Rate (2003-2012)

Division	r	P
Accomack County	**.823**	**.177**
Albemarle County	.047	.953
Alexandria	**-.727**	**.273**
Alleghany County	-.006	.994
Amelia County	**.601**	**.399**
Amherst County	.233	.767
Appomattox County	**-.649**	**.351**
Arlington County	.841	.159
Augusta County	**.524**	**.476**
Bath County	-.911	.089
Bedford	**-.758**	**.242**
Bedford County	-.654	.346
Bland County	**.419**	**.581**
Botetourt County	-.752	.248
Bristol	**-.910**	**.090**
Brunswick County	-.065	.935
Buchanan County	**.573**	**.427**
Buckingham County	-.018	.982
Campbell County	**-.641**	**.359**
Caroline County	-.344	.656

Table 15 Continued

Division	r	P
Carroll County	-.385	.615
Charles City County	**-.030**	**.970**
Charlotte County	*-.964	.036
Charlottesville	**.676**	**.324**
Chesapeake	.763	.237
Chesterfield County	**-.398**	**.602**
Clarke County	.537	.463
Colonial Beach	**.685**	**.315**
Colonial Heights	.307	.693
Covington	**.335**	**.665**
Craig County	-.337	.663
Culpeper County	**-.570**	**.430**
Cumberland County	.303	.697
Danville	**.408**	**.592**
Dickenson County	-.077	.923
Dinwiddie County	**-.389**	**.611**
Essex County	-.197	.803
Fairfax County	***.950**	**.050**
Falls Church	-.454	.546
Fauquier County	**.916**	**.084**
Floyd County	-.734	.266
Fluvanna County	**-.786**	**.214**
Franklin	.844	.156
Franklin County	**-.382**	**.618**
Frederick County	.410	.590

Table 15 Continued

Division	r	P
Fredericksburg	**.200**	**.800**
Galax	.891	.109
Giles County	**.894**	**.106**
Gloucester County	.487	.513
Grayson County	**-.785**	**.215**
Greene County	*-.981	.019
Greensville County	**-.206**	**.794**
Halifax County	.430	.570
Hampton	**.777**	**.223**
Hanover County	.835	.165
Harrisonburg	**.529**	**.471**
Henrico County	.117	.883
Henry County	**-.201**	**.799**
Highland County	.271	.729
Hopewell	**-.209**	**.791**
Isle of Wight County	-.253	.747
King George County	**-.720**	**.280**
King William County	-.010	.990
King and Queen County	**.676**	**.324**
Lancaster County	.767	.233
Lee County	**-.329**	**.671**
Loudoun County	.060	.940
Louisa County	**.930**	**.070**
Lunenburg County	.705	.295
Lynchburg	**-.376**	**.624**

Table 15 Continued

Division	r	P
Madison County	.073	.927
Manassas	**.680**	**.320**
Manassas Park	-.146	.855
Martinsville	**-.670**	**.330**
Mathews County	.691	.309
Mecklenburg County	**-.488**	**.512**
Middlesex County	.927	.073
Montgomery County	**-.055**	**.945**
Nelson County	.570	.430
New Kent County	**-.781**	**.219**
Newport News	.355	.645
Norfolk	**-.300**	**.700**
Northampton County	*.980	.020
Northumberland County	***.951**	**.049**
Norton	.744	.256
Nottoway County	**.567**	**.433**
Orange County	-.846	.154
Page County	**.430**	**.570**
Patrick County	-.522	.478
Petersburg	**-.632**	**.368**
Pittsylvania County	-.076	.924
Poquoson	**.784**	**.216**
Portsmouth	-.209	.791
Powhatan County	**-.793**	**.207**
Prince Edward County	.175	.825
Prince George County	**-.669**	**.331**
Prince William County	.368	.632

Table 15 Continued

Division	r	P
Pulaski County	**.384**	**.616**
Radford	-.345	.655
Richmond	**.104**	**.896**
Richmond County	.590	.410
Roanoke	**-.681**	**.319**
Roanoke County	.672	.328
Rockbridge County	**-.166**	**.834**
Rockingham County	-.024	.976
Russell County	**.712**	**.288**
Salem	-.479	.521
Scott County	**-.561**	**.439**
Shenandoah County	.633	.367
Smyth County	**.573**	**.427**
Southampton County	-.112	.888
Spotsylvania County	**.028**	**.972**
Stafford County	.447	.553
Staunton	**-.517**	**.483**
Suffolk	-.897	.103
Surry County	**-.287**	**.713**
Sussex County	-.098	.902
Tazewell County	**-.548**	**.452**
Virginia Beach	-.349	.651
Warren County	**.310**	**.690**
Washington County	.468	.532
Waynesboro	**.209**	**.791**
West Point	-.519	.481
Westmoreland County	**.497**	**.503**

Table 15 Continued

Division	r	P
Williamsburg	**-.201**	**.799**
Winchester	.778	.222
Wise County	**.636**	**.364**
Wythe County	-.170	.830
York County	***.985**	**.015**

*denotes significance at the .05 level

Table 16

Four-Year Time Lagged Correlation Data of Division Fiscal Effort and Graduation Rate (2003-2012)

Division	r	P
Accomack County	**.012**	**.988**
Albemarle County	-.263	.737
Alexandria	**-.702**	**.298**
Alleghany County	.631	.369
Amelia County	***.986**	**.014**
Amherst County	.481	.519
Appomattox County	**-.174**	**.826**
Arlington County	.-.273	.727
Augusta County	**-.315**	**.685**
Bath County	-.922	.078
Bedford	**-.805**	**.195**
Bedford County	-.654	.346
Bland County	**.307**	**.693**
Botetourt County	.260	.740
Bristol	**-.754**	**.246**
Brunswick County	-.097	.903
Buchanan County	**.874**	**.126**
Buckingham County	.125	.875
Campbell County	**-.812**	**.188**
Caroline County	.332	.668

Table 16 Continued

Division	r	P
Carroll County	.874	.126
Charles City County	**.563**	**.437**
Charlotte County	-.068	.932
Charlottesville	**.629**	**.371**
Chesapeake	.615	.385
Chesterfield County	***.967**	**.033**
Clarke County	.123	.877
Colonial Beach	**-.778**	**.222**
Colonial Heights	.425	.575
Covington	**.204**	**.796**
Craig County	-.932	.068
Culpeper County	**.544**	**.456**
Cumberland County	.946	.054
Danville	**-.911**	**.089**
Dickenson County	.249	.751
Dinwiddie County	**-.251**	**.749**
Essex County	-.206	.794
Fairfax County	**.484**	**.516**
Falls Church	-.884	.116
Fauquier County	**-.583**	**.417**
Floyd County	-.345	.655
Fluvanna County	**.332**	**.668**
Franklin	.627	.373
Franklin County	**-.772**	**.228**
Frederick County	.418	.582

Table 16 Continued

Division	r	P
Fredericksburg	**-.356**	**.644**
Galax	-.745	.255
Giles County	**.081**	**.919**
Gloucester County	.911	.089
Grayson County	**.604**	**.396**
Greene County	-.254	.746
Greensville County	**-.565**	**.435**
Halifax County	.863	.137
Hampton	**.047**	**.953**
Hanover County	-.049	.951
Harrisonburg	**.569**	**.431**
Henrico County	-.904	.096
Henry County	***.972**	**.028**
Highland County	.407	.593
Hopewell	**.408**	**.592**
Isle of Wight County	*.962	.038
King George County	**.413**	**.587**
King William County	-.223	.777
King and Queen County	**.857**	**.143**
Lancaster County	-.561	.439
Lee County	**-.252**	**.748**
Loudoun County	-.163	.837
Louisa County	**.293**	**.707**
Lunenburg County	-.801	.199
Lynchburg	**-.536**	**.464**

Table 16 Continued

Division	r	P
Madison County	.937	.063
Manassas	**-.002**	**.998**
Manassas Park	.887	.113
Martinsville	**.839**	**.161**
Mathews County	-.044	.996
Mecklenburg County	**.708**	**.292**
Middlesex County	-.898	.102
Montgomery County	**.628**	**.372**
Nelson County	.572	.428
New Kent County	**-.561**	**.439**
Newport News	-.065	.935
Norfolk	**.340**	**.660**
Northampton County	.025	.975
Northumberland County	**.298**	**.702**
Norton	-.618	.382
Nottoway County	**.318**	**.682**
Orange County	-.374	.626
Page County	**-.624**	**.376**
Patrick County	.039	.961
Petersburg	**.490**	**.510**
Pittsylvania County	.134	.866
Poquoson	**.019**	**.981**
Portsmouth	.510	.490
Powhatan County	***-.964**	**.036**
Prince Edward County	.002	.998
Prince George County	**.504**	**.496**
Prince William County	.886	.114

Table 16 Continued

Division	r	P
Pulaski County	**.078**	**.922**
Radford	.060	.940
Richmond	**.357**	**.643**
Richmond County	.533	.467
Roanoke	**.858**	**.142**
Roanoke County	.529	.471
Rockbridge County	**-.762**	**.238**
Rockingham County	*.956	.044
Russell County	***.977**	**.023**
Salem	*.962	.038
Scott County	**.722**	**.278**
Shenandoah County	*-.974	.026
Smyth County	**-.081**	**.919**
Southampton County	.267	.733
Spotsylvania County	**.518**	**.482**
Stafford County	.310	.690
Staunton	**.461**	**.539**
Suffolk	.054	.946
Surry County	**-.163**	**.837**
Sussex County	.620	.380
Tazewell County	**.829**	**.171**
Virginia Beach	-.435	.565
Warren County	**-.105**	**.895**
Washington County	.378	.622
Waynesboro	**-.097**	**.903**
West Point	.547	.453
Westmoreland County	**-.557**	**.443**

Table 16 Continued

Division	r	P
Williamsburg	**.611**	**.389**
Winchester	-.500	.383
Wise County	**.424**	**.576**
Wythe County	-.199	.801
York County	**.387**	**.613**

*denotes significance at the .05 level

Table 17

Six-Year Time Lagged Correlation Data of Division Fiscal Effort and Graduation Rate (2003-2012)

Division	r	P
Accomack County	**-.180**	**.733**
Albemarle County	-.234	.655
Alexandria	**-.681**	**.137**
Alleghany County	.457	.362
Amelia County	***-.848**	**.033**
Amherst County	.192	.716
Appomattox County	**-.251**	**.632**
Arlington County	.335	.516
Augusta County	**-.383**	**.453**
Bath County	-.218	.678
Bedford	**-.444**	**.378**
Bedford County	-.654	.346
Bland County	**-.233**	**.657**
Botetourt County	.380	.457
Bristol	**-.592**	**.215**
Brunswick County	.014	.980
Buchanan County	***.895**	**.016**
Buckingham County	.215	.683
Campbell County	**-.649**	**.164**
Caroline County	-.374	.465

Table 17 Continued

Division	r	P
Carroll County	.808	.052
Charles City County	**-.597**	**.210**
Charlotte County	-.080	.880
Charlottesville	**-.117**	**.825**
Chesapeake	-.369	.471
Chesterfield County	**.511**	**.300**
Clarke County	.560	.248
Colonial Beach	**-.590**	**.218**
Colonial Heights	.055	.918
Covington	**.391**	**.443**
Craig County	*-.903	.014
Culpeper County	**-.182**	**.730**
Cumberland County	.298	.556
Danville	**-.575**	**.232**
Dickenson County	.242	.644
Dinwiddie County	**-.467**	**.351**
Essex County	.435	.389
Fairfax County	**-.193**	**.714**
Falls Church	-.482	.333
Fauquier County	**-.025**	**.962**
Floyd County	-.729	.100
Fluvanna County	**-.030**	**.956**
Franklin	.407	.423
Franklin County	**.148**	**.779**
Frederick County	.324	.531

Table 17 Continued

Division	r	P
Fredericksburg	**-.007**	**.989**
Galax	-.506	.305
Giles County	**.155**	**.769**
Gloucester County	.638	.172
Grayson County	**.030**	**.955**
Greene County	-.147	.781
Greensville County	**-.528**	**.282**
Halifax County	.795	.059
Hampton	**.140**	**.791**
Hanover County	-.269	.606
Harrisonburg	**.299**	**.565**
Henrico County	.511	.301
Henry County	**.472**	**.344**
Highland County	-.177	.737
Hopewell	**.369**	**.472**
Isle of Wight County	-.190	.719
King George County	**-.055**	**.917**
King William County	-.108	.839
King and Queen County	**.450**	**.371**
Lancaster County	-.494	.320
Lee County	***-.916**	**.014**
Loudoun County	.177	.737
Louisa County	**.187**	**.723**
Lunenburg County	.519	.291
Lynchburg	**-.385**	**.451**

Table 17 Continued

Division	r	P
Madison County	*.910	.015
Manassas	**-.312**	**.547**
Manassas Park	.406	.424
Martinsville	**.696**	**.125**
Mathews County	-.252	.630
Mecklenburg County	**.343**	**.506**
Middlesex County	-.232	.658
Montgomery County	**-.009**	**.987**
Nelson County	.229	.663
New Kent County	**-.027**	**.960**
Newport News	-.097	.855
Norfolk	**.683**	**.134**
Northampton County	.022	.968
Northumberland County	**.532**	**.278**
Norton	-.157	.766
Nottoway County	**-.358**	**.486**
Orange County	-.439	.384
Page County	**-.341**	**.508**
Patrick County	-.027	.959
Petersburg	**.296**	**.569**
Pittsylvania County	.096	.856
Poquoson	**.172**	**.744**
Portsmouth	.142	.789
Powhatan County	**-.583**	**.225**
Prince Edward County	*.820	.046
Prince George County	**.186**	**.725**

Table 17 Continued

Division	*r*	P
Prince William County	-.762	.079
Pulaski County	**-.405**	**.426**
Radford	.488	.326
Richmond	**-.192**	**.716**
Richmond County	.457	.362
Roanoke	**.462**	**.356**
Roanoke County	-.185	.726
Rockbridge County	**-.424**	**.402**
Rockingham County	*.870	.024
Russell County	***.908**	**.012**
Salem	.813	.102
Scott County	**.583**	**.224**
Shenandoah County	-.774	.071
Smyth County	**-.027**	**.960**
Southampton County	-.118	.824
Spotsylvania County	**-.212**	**.686**
Stafford County	.337	.514
Staunton	**.553**	**.255**
Suffolk	.294	.571
Surry County	**.006**	**.991**
Sussex County	.197	.708
Tazewell County	**.382**	**.455**
Virginia Beach	-.655	.158
Warren County	**.277**	**.595**
Washington County	-.289	.579

Table 17 Continued

Division	r	P
Waynesboro	.119	.822
West Point	.755	.083
Westmoreland County	-.548	.260
Williamsburg	**.754**	**.084**
Winchester	-.076	.887
Wise County	**.424**	**.295**
Wythe County	.062	.907
York County	**.424**	**.403**

*denotes significance at the .05 level

Table 18

Eight-Year Time Lagged Correlation Data of Division Fiscal Effort and Graduation Rate (2003-2012)

Division	r	P
Accomack County	**-.117**	**.763**
Albemarle County	.248	.519
Alexandria	**-.727**	**.273**
Alleghany County	.379	.314
Amelia County	**-.662**	**.052**
Amherst County	-.256	.506
Appomattox County	**-.456**	**.217**
Arlington County	.-.170	.661
Augusta County	**-.397**	**.290**
Bath County	.003	.993
Bedford	**-.609**	**.082**
Bedford County	-.805	.195
Bland County	**.277**	**.471**
Botetourt County	-.415	.266
Bristol	**-.406**	**.278**
Brunswick County	.063	.872
Buchanan County	***.863**	**.012**
Buckingham County	.553	.123
Campbell County	**.601**	**.087**
Caroline County	-.317	.406

Table 18 Continued

Division	r	P
Carroll County	.398	.289
Charles City County	**-.665**	**.051**
Charlotte County	-.062	.874
Charlottesville	**-.392**	**.296**
Chesapeake	-.400	.287
Chesterfield County	**.564**	**.113**
Clarke County	-.194	.616
Colonial Beach	**-.005**	**.989**
Colonial Heights	-.311	.415
Covington	**.405**	**.279**
Craig County	-.552	.124
Culpeper County	**.178**	**.646**
Cumberland County	.282	.462
Danville	***-.850**	**.014**
Dickenson County	-.015	.970
Dinwiddie County	**-.364**	**.335**
Essex County	-.038	.924
Fairfax County	**-.395**	**.292**
Falls Church	*-.869	.012
Fauquier County	**-.622**	**.074**
Floyd County	*-737	.024
Fluvanna County	**.332**	**.383**
Franklin	.611	.081
Franklin County	**.329**	**.387**
Frederick County	.470	.202

Table 18 Continued

Division	r	P
Fredericksburg	**-.231**	**.550**
Galax	-.574	.106
Giles County	**-.183**	**.638**
Gloucester County	.350	.355
Grayson County	**.191**	**.622**
Greene County	.213	.581
Greensville County	**-.148**	**.704**
Halifax County	.371	.325
Hampton	**.433**	**.244**
Hanover County	.433	.245
Harrisonburg	**-.455**	**.219**
Henrico County	.486	.185
Henry County	**.249**	**.519**
Highland County	-.406	.278
Hopewell	**.522**	**.150**
Isle of Wight County	-.565	.113
King George County	**-.191**	**.622**
King William County	-.338	.374
King and Queen County	**.290**	**.449**
Lancaster County	-.536	.137
Lee County	***-.873**	**.010**
Loudoun County	-.350	.356
Louisa County	**-.144**	**.713**
Lunenburg County	.415	.266
Lynchburg	**.001**	**.998**

Table 18 Continued

Division	r	P
Madison County	*.937	.011
Manassas	**-.482**	**.188**
Manassas Park	.062	.873
Martinsville	**.599**	**.088**
Mathews County	-.009	.983
Mecklenburg County	**.040**	**.919**
Middlesex County	-.064	.870
Montgomery County	**-.037**	**.925**
Nelson County	.096	.805
New Kent County	**-.459**	**.214**
Newport News	.055	.888
Norfolk	**-.109**	**.780**
Northampton County	.105	.789
Northumberland County	**.014**	**.971**
Norton	.152	.697
Nottoway County	**.034**	**.930**
Orange County	-.476	.195
Page County	**.600**	**.088**
Patrick County	-.172	.659
Petersburg	**.312**	**.414**
Pittsylvania County	.661	.053
Poquoson	**-.168**	**.665**
Portsmouth	.030	.940
Powhatan County	**-.579**	**.103**
Prince Edward County	.320	.401
Prince George County	**.221**	**.567**

Table 18 Continued

Division	r	P
Prince William County	.424	.255
Pulaski County	**.300**	**.433**
Radford	-.169	.664
Richmond	**-.616**	**.078**
Richmond County	.306	.424
Roanoke	**-.413**	**.269**
Roanoke County	-.370	.328
Rockbridge County	**.312**	**.414**
Rockingham County	.075	.848
Russell County	**.634**	**.067**
Salem	-.409	.275
Scott County	**.383**	**.310**
Shenandoah County	-.599	.088
Smyth County	**-.066**	**.866**
Southampton County	-.415	.267
Spotsylvania County	**-.253**	**.512**
Stafford County	.253	.512
Staunton	**.311**	**.415**
Suffolk	-.041	.916
Surry County	**-.256**	**.506**
Sussex County	-.194	.617
Tazewell County	**.270**	**.482**
Virginia Beach	-.199	.608
Warren County	**.495**	**.175**
Washington County	.652	.057

Table 18 Continued

Division	r	P
Waynesboro	-.213	.581
West Point	**.237**	**.539**
Westmoreland County	-.035	.929
Williamsburg	**-.619**	**.076**
Winchester	-.386	.305
Wise County	***.808**	**.013**
Wythe County	.567	.111
York County	**.506**	**.165**

*denotes significance at the .05 level

percent of variance (R^2) in graduation rate is explained within the model. Model 2 incorporated the variable of division fiscal effort and the proportion of the variance decreased to 97 percent. Model 3 analyzed the impact of division fiscal effort by comparing effort scores ranked into tertiles of high, medium, and low. The Model 3 results remained consistent with Model 1 which found that 99 percent of variance in graduation rate is explained within the model and demonstrated that tertile ranking had no significant impact on graduation rate. The variance for models one, two and three were close in range from 97 to 99 percent and illustrate their similar impact on graduation rate.

Table 19

Least Square Dummy Variable Model Summaries for High School Graduation Rate

Model	R^2	SE
1 – Covariance	.991	.0895
2 – Covariance + Fiscal Effort	.972	.1614
3 – Covariance + Effort Tertile	.991	.0896

Table 20 details the least square dummy variable coefficients for Model 1 which studied the impact of socio-economic status, race, and gender on high school graduation rate. Reviewing the effect of socio-economic status discovered that students eligible for free or reduced price lunch had a lower graduation rate than those students that were not eligible. Analyzing race, it was observed that black students had a lower graduation rate than white students. Comparing gender, it was observed that female students had a lower graduation rate than male students. No findings were at the significant level.

Table 20

Least Square Dummy Variable Model Covariance Coefficients and High School Graduation Rate for Model 1

Covariance	B	SE	P
Economically Disadvantaged	**-.565**	**.064**	**.013**
Race Black	-.160	.104	.008
Race White	**-.103**	**.066**	**.260**
Race Male	.092	.023	.060
Race Female	**-.058**	**.031**	**.202**

In reviewing high school graduation rate using Model 2 it was observed that varying amounts of division fiscal effort had a small effect on high school graduation rates. Table 21 displays when fiscal effort increased high school graduation rate increased by .067 compared to examples with lower fiscal effort. Reviewing race and increased fiscal effort, black students displayed a slightly higher graduation rate compared to white students and students who were eligible for free or reduced-price lunch displayed a higher graduation rate compared to those not eligible for free or reduced-price lunch. Finally, females had slightly higher graduation rates compared to males.

Table 21

Least Square Dummy Variable Model Covariance and High School Graduation Rate for Model 2

Variables	B	SE	P
Fiscal Effort	**.067**	**.049**	**.304**
Economically Disadvantaged	.534	.018	.001
Race Black	**.816**	**.005**	**.000**
Race White	.802	.021	.001
Race Male	**.762**	**.021**	**.001**
Race Female	.802	.020	.001

Table 22 depicts the next least square dummy variable model with the variable of division fiscal effort replaced by tertile scores for high school graduation rates. Effort tertile scores were labeled as high, middle, or low with comparison to each other. Although high effort displayed a greater impact on graduation rate compared to middle and low effort, no effort level (high, middle or low) displayed a significant impact on graduation rate. Black students had a slightly higher graduation rate than white students while female students also had a slightly higher graduation rate than male students.

Table 22

Least Square Dummy Variable Model Coefficients Inclusive of Virginia's School Division Fiscal Effort and Covariance for High School Graduation Rate for Model 3

Variables	B	SE	P
High Effort Tertile	**.238**	**.038**	**.025**
Middle Effort Tertile	.064	.007	.013
Low Effort Tertile	**.043**	**.014**	**.093**
Economically Disadvantaged	.569	.036	.004
Race Black	**.827**	**.008**	**.000**
Race White	.812	.011	.000
Race Male	**.775**	**.010**	**.000**
Race Female	.814	.012	.000

The findings displayed in Chapter 4 do not support the hypothesis that Virginia's school division fiscal effort is correlated with high school graduation rate. Also, results did not support the idea that the independent variable of division fiscal effort is a predictor of graduation rate. The data analysis concluded that other variables such as socio-economic status, race, and gender had a greater impact on graduation rates than division fiscal effort. Chapter 5 concludes with a more in-depth discussion of the results.

CHAPTER 5

DISCUSSION

Introduction

The goal of this study was to explore the relationship among Virginia's school division fiscal effort and Virginia's high school graduation rates. The study expanded prior empirical studies on public school funding and academic indicators. The study answered these research questions.

1. Are Virginia's school division's fiscal effort (FE) indices and high school graduation rates correlated?
2. After controlling for socio-economic status (SES), how much will division fiscal effort affect the annual rate of change in Virginia's high school graduation rates from 2003 – 2012?
3. What past trends are apparent in relation to Virginia's fiscal effort with high school graduation rates?

Several statistical tests were used such as a simple linear regression, bivariate correlation, time-lagged correlation, and a least square dummy variable model to answer the research questions. These tests analyzed data on Virginia's division fiscal effort and high school graduation rate from 2003 – 2012 for all of Virginia's 132 school divisions.

Results

Results for the first research question did not affirm the first hypothesis that division fiscal effort and high school graduation rates are correlated. In reviewing graduation rates for all students, four school divisions (3.0%) displayed statistically

significant positive correlations between fiscal effort and overall graduation rate, meaning as fiscal effort increased, overall graduation rate increased. Three school divisions (2.2%) displayed statistically negative correlations between fiscal effort and overall graduation rate, which implied that as fiscal effort increased, overall graduation rate decreased. The remaining divisions showed no significant relationship.

Reviewing the graduation rates for economically disadvantaged students, two school divisions (1.5%) displayed statistically significant positive correlations between fiscal effort and graduation rate for economically disadvantaged students. Six school divisions (4.5%) displayed statistically negative correlations between fiscal effort and graduation rate for economically disadvantaged students. Comparing the graduation rates for Black students, four school divisions (3.0%) displayed statistically positive correlations between fiscal effort and graduation rate for Black students. Three school divisions (2.2%) displayed statistically negative correlations between fiscal effort and graduation rate for Black students. Analyzing the graduation rates for White students, eight school divisions (6.1%) displayed statistically positive correlations between fiscal effort and graduation rate for White students. Four school divisions (3.0%) displayed statistically negative correlations between fiscal effort and graduation rate for White students. Reviewing the graduation rates for female students, four school divisions (3.0%) displayed statistically positive correlations between fiscal effort and graduation rate for female students. Five school divisions (3.8%) displayed statistically negative correlations between fiscal effort and graduation rate for female students. Finally, analyzing the graduation rates for male students, eight school divisions (6.1%) displayed statistically positive correlations between fiscal effort and graduation rate for male

students. Six school divisions (4.5%) displayed statistically negative correlations between fiscal effort and graduation rate for male students. A concern with the analysis is that it does not consider the ANCOVA and results can be incorrectly attributed to the independent variable (fiscal effort). Due to the small amount of statistically significant correlations and concern with other sources of covariance not being reported, it can be assumed that division fiscal effort and high school graduation rate are not significantly correlated. This trend implies that other variables previously discussed, such as a family's socio-economic status and poverty level, have a greater impact on graduation rate than fiscal effort (Grissmer & Flanagan, 1998; Grissmer et al., 2000). Regardless, future study of districts that did display a positive correlation between fiscal effort and graduation rate would be beneficial to identify their use of fiscal effort to increase graduation rate.

The second research question, "After controlling for socio-economic status (SES), how much will division fiscal effort affect the annual rate of change in Virginia's high school graduation rates from 2003–2012?", used a liner regression analysis and found only seven school divisions (5.4%) had significant linear regression relationships between division fiscal effort and high school graduation rates. This small portion displayed evidence that over 90% of the variance in graduation rates is predicted by division fiscal effort. Analyzing the broad range in proportion of the variance (R^2) from .000 to .878 and the minimal amount of significant linear regression relationships it is challenging to conclude that division fiscal effort is a predictor of graduation rates in Virginia school divisions.

The last research question used a time-lagged correlation and fixed effects least square dummy variable model to compare past trends regarding Virginia's fiscal effort and high school graduation rate. These tests were used to study past trends that could not be studied with simple linear regression and non lagged bivariate correlation. For this study, division fiscal effort was time-lagged by two, four, six, and eight years to analyze effort's effect on graduation. Graduation rates for the years 2005, 2007, 2009, and 2011 were studied with division fiscal effort for the years 2003, 2005, 2007, and 2009.

Results from the time-lagged correlation varied regarding significance. The results of the four, six and eight-year lag were consistent with two-year lag results where roughly half of Virginia's school divisions (65 total) showed a positive correlation between fiscal effort and graduation rate. The four, six, and eight-year lag continued the two-year lag trend with higher graduation rates for school divisions that displayed a positive correlation between fiscal effort and graduation rate. The continued increase in graduation rate for the four, six, and eight-year lag was consistent with prior time-lagged research where fiscal inputs and student achievement outputs do not occur with a one unit to one year relationship. Generally, funds are allocated from the state level before any student achievement is measured for a given year (Hanushek, 1986). This would lead to delay when analyzing the impact of fiscal inputs on student achievement and as expected the graduation rate increased with respect to the four, six, and eight-year lag for school divisions that demonstrated a positive correlation between fiscal effort and graduation rate. Four school divisions displayed a statistically significant positive two-year time-lagged correlation while two schools displayed a statistically significant negative time-lagged correlation. These six school divisions equate to 4.5% of the total school

divisions having significant time-lagged correlations which is slightly smaller than the seven school divisions (5.2%) that demonstrated significance regarding all graduation rates for the bivariate correlation. Seven school divisions displayed a statistically significant positive four-year time-lagged correlation while two schools displayed a statistically significant negative time-lagged correlation. These seven school divisions equate to 5.3% of the total school divisions having significant time-lagged correlations. Five school divisions displayed a statistically significant positive six-year time-lagged correlation while three schools displayed a statistically significant negative time-lagged correlation. These five school divisions equate to 3.8% of the total school divisions having significant time-lagged correlations. Three school divisions displayed a statistically significant positive eight-year time-lagged correlation while five schools displayed a statistically significant negative time-lagged correlation. These three school divisions equate to 2.3% of the total school divisions having significant time-lagged correlations. The time-lagged correlation, like the bivariate correlation, had few examples of significance between division fiscal effort and high school graduation rates. These findings indicate that after controlling for socio-economic status, division fiscal effort had little impact on the annual rate of change in Virginia's high school graduation rates. The lag time analyzed may be too short to allow fiscal effort to impact graduation rates. Prior research finds that student ability is a product of years of development (Hanushek, 1986). A possible reason for the minimal effect fiscal effort had on graduation rate viewed during the time-lagged correlation could be that fiscal effort does not always result in additional funding being spent on in those areas that increase

graduation rates. Generally, poorer localities must increase their available funding towards education as they have increased risk factors for students.

Finally, the relationships among division fiscal effort and high school graduation rate were studied with a fixed effects least squares dummy variable model. Two variables, high school graduation rate and division fiscal effort, were studied for the years 2007, 2009, and 2011. The data also included categories such as socio-economic status, gender and race. The use of a lag analysis on the fixed effects least squares dummy variable model allows for longitudinal analysis of the variables and covariance. The study used three different models to explore the relationship between high school graduation rate and division fiscal effort. Model 1 studied the predictive impact of covariance factors of socio-economic status, gender, and race on high school graduation rate. Model 2 added the division fiscal effort variable with the covariates to explore its significance. Model 3 ranked each division's fiscal effort scores into tertiles and studied the significance on high school graduation rate.

Reviewing the data from Model 1, the effect of socio-economic status determined that students eligible for free or reduced-price lunch had a lower graduation rate than those students who were not eligible. Analyzing race, it was observed that Black students had a lower graduation rate than White students. Comparing gender it was observed that female students had a lower graduation rate than male students. No findings were found to be at the level of significance.

Model 2 added the variable of division fiscal effort within the covariance from Model 1. The data indicated that varying amounts of division fiscal effort had a small effect on high school graduation rate. The findings demonstrated that in school divisions

where fiscal effort increased high school graduation rate increased compared to school divisions exerting lower levels of fiscal effort. Reviewing race in Model 2, Black students had a slightly higher graduation rate compared to White students. Likewise in Model 2, students who were eligible for free or reduced price lunch had a higher graduation rate compared to those not eligible for free or reduced price lunch. These results vary from typical findings. Finally, females graduated at a slightly higher rate compared to males.

Model 3 employed a fixed effects least square dummy variable model. Effort tertile scores were labeled as high, middle, or low with comparison to each other. Although high effort displayed a greater impact on graduation rates compared to middle and low levels of effort, overall effort levels displayed no significant impact on graduation rate. Black students had a slightly higher graduation rate than White students while female students also had a slightly higher graduation rate than male students.

Division fiscal effort, on certain occasions, was observed to be a negative indicator of graduation rate. The bivariate correlation and time-lagged correlation produced results where increased fiscal effort produced lower graduation rates. This phenomenon is rarely found in prior studies and generally observed in situations where populations studied have a higher percent of at-risk populations (Biniaminov & Glassman, 1983). This explanation that fiscal effort may negatively impact graduation rate was observed for this study in localities that displayed high levels of poverty and a larger percentage of minorities. Prior research has concluded that students of lower SES often underperform the remaining population and that Hispanic and Black students tend to score lower on math and reading assessments. This demographic would be associated

with lower graduation rates (Sirin, 2005).

Overall, results from the study gave no findings to support research Question 1 and 2. The results displayed minimal significant correlations among division fiscal effort and high school graduation rate. The simple linear regression analysis also displayed minimal significant correlations between division fiscal effort and high school graduation rates. Finally, incorporating a fixed effects least square dummy variable model displayed covariance such as gender and race had a significant impact on graduation rate when compared to division fiscal effort.

Summary

Even with the lack of significant findings, this study did provide some examples to consider regarding fiscal effort and graduation rates. The study reviewed data over a 9-year period and explored research questions that most prior education finance studies fail to consider. Due to the large influence of money on an academic variable such as graduation rate, it was necessary to have a broad range of the dependent variable (graduation rate) which encompassed Virginia's 132 school divisions from 2003 - 2012.

Prior studies use of a common finance tool (such as fiscal effort) to analyze school divisions or states is limited in education finance. Division or local fiscal effort is often studied consistently regarding division or state wealth and funding given to education. This division or state level funding is often not consistent and equalization formulas are generally not used to compare educational funding equally and conclude the educational funding required. School divisions differ in the amount of funding allowed for education and prior literature did not detail these differences in policy. As noted in

the literature review, most previous studies reviewed the effect of educational funding to increase academic achievement (often through one assessment), minimize student to teacher ratios and bridge the achievement gap. The design of this study evaluates division level fiscal policy and the overall impact of fiscal effort on achievement though graduation rate.

The study compared Virginia's 132 school divisions over a 9-year time span. This broad time frame adds to the current literature due to the limited time frame of prior studies. The study's validity is increased due to variables being analyzed over longer durations.

The experimental models incorporated in the study may have value to future studies. The data analysis could be referenced to predict significant variables that impact graduation rate at the local, state, and federal level. The least squares dummy variable model would aid in predicting reasons for gaps in graduation rate. Due to the inevitable accountability that surrounds education and the constant push to bridge achievement gaps, the data analysis may aid school divisions in identifying the most significant sources of variance among students.

Results from the study display what types of relationships are found among socio-economic status, gender, race, and graduation rate. Increased fiscal effort was found to slightly increase graduation rates for Black and female students. This trend was generally observed in school divisions with high concentrations of minorities and poverty. In contrast of this result, some school divisions with lower poverty rates and fewer minorities put forth less fiscal effort and displayed higher graduation rates.

Discussion

The construct of division fiscal effort is complex and can be challenging to use for division and state comparisons. Examining division level fiscal effort does not necessarily mean that any increased funding will be allocated towards increasing graduation rates at the neediest of schools where the greatest number of potential non-completers are located (Owings & Kaplan, 2010). Reviewing discrepancies in fiscal effort would be informative regarding a school division's policy and use of available funds towards education. School divisions vary regarding their financial needs, services needed by its citizens and resources available to fund these services (Tannenwald, 1999). It should be noted that analyzing discrepancies in division fiscal effort and their relationships with graduation rate increases the complexity of the model. The discrepancies in educational funding increase their complexity when studying their effect on an academic variable such as high school graduation rate. Tannenwald (1999) found that a school division may display high fiscal effort but considering the high needs of the population and low capacity the division may demonstrate low productivity. This trend could be explained from the covariance often linked with race and socio-economic status and may demonstrate the great needs of a school division instead of the effect of funding policy.

Divisions such as Richmond, Norfolk, Surry, and Lynchburg may have high levels of fiscal effort but are not experiencing increased high school graduation rates. This could be in light of the higher percentages of students that live in poverty in these divisions (U.S. Census Bureau, 2012a). The data in analyzed show that students linked to poverty tend to have a lower graduation percentage (Grissmer et al., 2000).

On the contrary, divisions that displayed high fiscal effort may have greater percentages of their population classified as minorities. Divisions with higher fiscal effort such as Giles, Covington, King William, Buchanan, and Franklin City also had larger percentages of Hispanic populations (U.S. Census Bureau, 2012c). Virginia Beach, Norfolk, Richmond, Newport News, and Hampton demonstrated high fiscal effort and had larger percentages of Black populations (U.S. Census Bureau, 2012b). The data analyzed detail that Black and Hispanic students often displayed a lower graduation rate compared to White students (U.S. Census Bureau, 2012b, U.S. Census Bureau, 2012c).

By comparison, Lee County had the 6th highest level of fiscal effort and had the lowest level of wealth as detailed by the state per capita income. Lee County has a small portion of its population living in poverty or being labeled a minority (U.S. Census Bureau, 2012a, U.S. Census Bureau, 2012b, U.S. Census Bureau, 2012c). Lee County's high school graduation rate ranked 19th out of the 132 Virginia school divisions. This phenomenon of a high graduation rate could be due to less racial diversity and poverty within the county (Kelly, 2012, U.S. Department of Commerce, 2008). This finding will be further discussed in the Implications for Future Research section.

Last, analyzing fiscal effort and high school graduation rates when viewing per pupil spending displayed some noteworthy findings. Falls Church ranked second regarding wealth (as measured by SPCI index) and also ranked in the top quartile regarding fiscal effort. Unfortunately, Falls Church ranks in the bottom quartile regarding graduation rate (Virginia Department of Education, 2012). Falls Church has nearly half of its K-12 student population (2,266) attend a private school with roughly 200 of these students attending a private high school. The large percent of students not

enrolled in public school would impact the quartile ranking as they are not included in the division's graduation rate (Virginia Department of Education, 2011a). On the contrary, Charlottesville displayed high wealth while having a graduation rate that ranked 121st (Virginia Department of Education, 2012).

Interestingly, Lee County and Charlotte County ranked in the top five poorest divisions and scored in the top quartile regarding fiscal effort (Virginia Department of Education, 2012). These two examples display school divisions committed to funding education and modeling high fiscal effort. The two divisions ranked in the top quartile regarding graduation rate for each subgroup. These divisions show fiscal effort to be an indicator of graduation rate. Additionally, it should be discussed that both Lee and Charlotte County have a small portion of their population living in poverty or being labeled a minority (U.S. Census Bureau, 2012a, U.S. Census Bureau, 2012b, U.S. Census Bureau, 2012c). Again, the association between division fiscal effort and graduation rate is mixed and the results display few examples where the variables are significantly related.

Socio-economic status, gender, and race were the most obvious factors related to graduation rate. Fiscal effort did not play a significant role in graduation rates. This trend was visible when the data from the least squares dummy variable model were analyzed to study group effects in regression. The independent variable (division fiscal effort) displayed no significance as a predictor of graduation rate. On the contrary, in some instances such as Richmond and Roanoke County, additional fiscal effort was linked to lower achievement. Some of these examples could be due to a division having more people living in poverty or an increase in minorities. With these examples, the

impact on graduation rate by high poverty and ethnicity may outweigh the benefit of additional fiscal effort as measured by this study. Federal regulations to raise accountability within school divisions and reduce achievement gaps are pushing divisions to increase their fiscal effort. This pressure may cause divisions to adjust their educational funding and policies to meet these standards. Some school divisions observed a reduction in their graduation rate even with increased fiscal effort. These examples should not be perceived as models for reduced fiscal effort but signals that more fiscal effort may be required for the division's disadvantaged students. As stated before, in the majority of divisions studied increased fiscal effort was not a negative factor on graduation rate.

Discussion of this Research and Prior Studies

In an effort to analyze this study with prior research, comparisons are made among fiscal indicators that may impact graduation rate. Prior research that analyzed fiscal variables and their effect on educational achievement are compared with this study. Prior studies that detail the impact of socio-economic status, gender and race are analyzed for relevant findings that may give insight to the current study.

The majority of prior research detailed in the literature review had studied various spending measures or dependent variables linked to student achievement. Prior studies often review the impact of additional funding on fiscal variables like teacher retention programs, reducing the student to teacher ratio, tutoring, and the general reallocation of funds for education. Often, prior research has studied achievement through the content of math or reading. The results from these studies often discovered that additional funding

is not required to increase achievement (Miles & Darling-Hammond, 1998; NCREL, 2000; Odden & Archibald, 2000). Results from these studies imply that smarter allocation of fiscal resources may positively impact achievement. These findings were consistent with this study in part that additional fiscal effort did not always equate to higher graduation rates. State localities that allocated additional funding to education did not always display increased graduation rates. The current study does deviate from prior research with respect to the variables studied. Generally, prior research studied a small sample of schools over a short time frame (Grissmer & Flanagan, 1998; Miles & Darling-Hammond, 1998; NCREL, 2000; O'Connell-Smith, 2004; Archibald 2006; Grubb, 2006). This trend reduces validity and limits results or generalizability to schools with similar backgrounds. The current study explored all 132 Virginia school divisions over a 9-year time frame. The larger scope and broad time span allows for greater generalizability and data validation.

Overall, prior research has failed to link increased public school spending to greater student achievement but has displayed that effective allocation of public school spending can positively impact student achievement. These results are similar to the conclusions of the current study. Alternatively, this study moves away from prior research by isolating each localities share towards their education budget and analyzing their funding through the fiscal effort formula.

Often prior research examined specific strategies seeking to reduce the student to teacher ratio, increase school resources or improve the teacher's performance in the classroom (Archibald 2006; Grissmer et al., 2000; O-Connell-Smith, 2004). These studies tend to explore the noted strategies that are often linked to increased spending and

its overall effect on a chosen academic variable. This study deviates from the traditional focus on broad education spending initiatives as many prior studies explored. It is challenging to identify and isolate the impact of money, as prior studies attempted to accomplish, when a study focuses on the impact of a new strategy or policy and assumes increased or decreased spending effected this change rather than simply the new policy.

Generally, the strategies linked to more educational spending display a positive effect on achievement. Grubb (2006) determined that reducing the student to teacher ratio positively affected achievement. Kelly (2012) studied 4th and 8th grade math NAEP scores and fiscal effort for all 50 states and the District of Columbia from 1992 – 2009. Results demonstrated that increased fiscal effort in low poverty states did result in increased student achievement over time.

On the contrary, other studies displayed no correlation regarding additional educational funding and achievement. Morris's 2012 study examined the relationship between state fiscal effort and graduation rates over time (2002 – 2009). The twenty states analyzed were selected based on their sustained increasing or decreasing fiscal effort. The results showed no significant interaction effect between the fiscal effort categories and on time graduation rates. Pirim's 2011 study inquired whether there is a significant correlation between education and economy in terms of the impacts of investment in human capital on unemployment over a 25-year time frame. The study concluded that education spending per pupil and health spending were the only variables with an impact on employment. The findings imply that the only way to effectively reduce unemployment is investment in improving the quality of human capital through better education and health services (Pirim, 2011). Several empirical studies have

contended that more funding is not necessary to increase student test scores (Miles & Darling-Hammond, 1998; NCREL, 2000; Odden & Archibald, 2000).

Ultimately, the broad range of education finance research has displayed an array of results concerning increased educational funding and its impact on a selected academic variable. This study produced minimal data to aid the argument over public school funding. The focus of this study differs from other studies by incorporating the variable of division fiscal effort, which makes it challenging to compare. Division fiscal effort does not measure a dollar amount, but measures a division's focus and policy to fund their schools. The study aimed to uncover if a certain amount or type of funding would result with increased graduation rates. Funds for all public schools stems from three sources, local government, state government, and federal government. This study sought to examine differences in amounts of local budget funding towards education. The main result this study produced was that differences in student populations such as socio-economic status, gender, and race had a greater impact on graduation rate than division fiscal effort.

Possible Explanation of Findings

This study deviated from prior research that generally found an increase in funding to be positively linked to student outcome measures. This study analyzed fiscal effort which is the proportion of a locality's wealth invested in K-12 public education. Fiscal effort is related to funding but not directly comparable. This study's results often varied when comparing division fiscal effort to high school graduation rate. The study had minimal significant positive or negative correlations. When a significant correlation

was observed, a split of roughly 50% was observed to be positive or negative. This mixed correlation makes it challenging to predict that increasing a division's fiscal effort would result in a higher graduation rate. This 50% split warrants further examination of the factors associated with school divisions that demonstrated a positive correlation between fiscal effort and graduation rate.

When a bivariate correlation was completed to compare the relationship between the two variables of division fiscal effort and high school graduation rate, the results failed to produce a significant relationship. Possible reasons for the results could be the broad range of division wealth, variety of population demographics, and variability of funding policies towards education. School divisions must minimally fund to the required minimum local expenditure and meet the mandated Virginia Standards of Quality (SOQ) requirements. The flexibility given to each locality in deciding their educational funding level allows school divisions to vary in their cost per pupil (Commission on Local Government: Virginia, 1996).

Certain results displayed division fiscal effort to be a negative indicator of graduation rate. A linear regression analysis was completed and displayed several results where increased fiscal effort was found to lower high school graduation rate. These results are worth noting and may be due to the localities higher percentage of minorities or students living in poverty. Sirin's 2005 meta-analysis study reviewed the literature on socio-economic status and achievement from 1990 to 2000 of over 100,000 students and found a medium to strong correlation between socio-economic status and achievement. The Schott Foundation (2008) reported that minority students have a lower high school

graduation rate. Regardless of these hurdles, some divisions continued to display high fiscal effort with lower graduation rates in an effort to bridge the achievement gap.

Finally, no correlations were observed from the time-lagged correlation test between division fiscal effort and high school graduation rate. Analyzing the cumulative impact of all the years of effort on graduation rates through the time-lagged correlation test, roughly half of Virginia's school divisions (65) showed a positive correlation between fiscal effort and graduation rate with 64 school divisions displaying a negative correlation. Due to the limited amount of significant data, the results show no significant relationship between division fiscal effort and graduation rate at a two-year, four-year, six-year and eight-year lag. This lack of correlation could be because increased fiscal effort does not always mean more funding is being given towards education. A current trend in education, that may generate litigation, revolves around the fiscal disparities located within school districts. Funding gaps exist not only between school districts but also between schools within the same school district. Evidence suggests that school districts that serve predominantly poor and minority students are receiving inadequate funding to achieve state-mandated standards. Several states (Kentucky, Massachusetts and New York) have deviated from this trend and appropriately allocated resources for poorer districts and improved results for schools and students (Rebell 2008b). Several factors contribute to within-district fiscal inequities. These include misaligned incentives, local policies about teacher assignments, lack of decision-making transparency, opaque and ineffective budgeting practices, and local social/political dynamics. Often these variables interact and are within the districts control (Owings & Kaplan, 2010). Careful analysis of these variables and their impact should be considered

when divisions decide where to allocate funding. Generally divisions with less wealth need to budget more funding to education. As previously noted there are numerous examples of high fiscal effort with a low graduation rate. Further study on school divisions with similar demographics that demonstrated a positive correlation regarding fiscal effort and graduation rate via the time-lagged correlation and displayed a high (quartile 1) graduation rate should be completed. This analysis would isolate strategies regarding fiscal effort that divisions with similar demographics could emulate.

Implications

Results from this study have several overall implications. First, prior research shows that improving a teacher's impact in the classroom (effectiveness) and reducing the teacher to student ratio have a positive impact on achievement. School divisions with low graduation rates should seek to target their increased fiscal effort and adjust policy to support these two strategies (Greenwald, 1996; Grub, 2006; O'Connell-Smith, 2004). At a state level, Virginia should monitor the impact of these two strategies and allocate incentives for localities to adjust their budgets and policies to provide the noted strategies.

Additionally, results from the study detailed that divisions with a higher percentage of minority students or students living in poverty tend to display a higher level of division fiscal effort. Often, poverty and equity concerns are visible in education because of the fluctuations in wealth across school divisions. In other words, this trend could lead school divisions to increase their fiscal effort and ensure their students are given an education experience similar to wealthier divisions. The data from this study

support this implication by showing some divisions had high levels of fiscal effort with high percentages of students classified as living in poverty or a minority and increased their graduation quartile ranking by one compared to similar divisions with less fiscal effort. Rappahannock and Page school divisions were examples of this.

Implications for Future Research

Results from this study have significant implications for future research. Over the last decade, Virginia has introduced more accurate reporting of on time graduation rates and should allow this study to be replicated and expanded. As noted in the literature review, this study used the Graduation and Completion Index (GCI) when comparing graduation rates. The federal graduation indicator (FGI) was not used in this study due to its full implementation occurring in 2008. Additional research could include the FGI with comparison to fiscal effort.

Due to the results of this study, further analysis of school divisions with high fiscal effort, high percentages of students classified as living in poverty or a minority and higher graduation rates their school divisions with similar demographics should be completed. The additional quantitative and qualitative study could isolate specific schools and their best practices used to raise achievement and increase their graduation rate. A further analysis of how and where these divisions allocate the resources should be undertaken. These strategies could then be replicated in the school divisions with similar demographics.

A limitation to this study concerns Virginia's local composite index and how the revenue is determined in the effort formula. The local composite index determines how

much funding the locality must pay. A school division with a low composite index indicates that the state pays a larger share of the Standards of Quality. The formula used for fiscal effort (E=R/TB) where fiscal effort is a ratio of the total local current expenditure per pupil (R) in the numerator divided by a measure of wealth (state per capita income) does not consider that the state paying a greater share of the SOQ which may mask the fiscal effort of poorer school divisions. This scenario would inflate the local fiscal effort. A recommendation for future research would be to compensate for this inflation with the following formula where E equals the per pupil expenditure of division *i* (PPE d_i) multiplied by the quantity 1.00 minus the composite index of division *i* and divided by the per capita income in division *i* (Figure 10):

$$E = \frac{PPE\ d_i(y1, y2 \ldots) \times [1.00 - CI\ d_i(y1, y2 \ldots)]}{PCI\ d_i(y1, y2 \ldots)}$$

Figure 10. Calculation of Local Fiscal Effort with LCI Consideration for Inflation

Another recommendation for research would be to examine various achievement variables within the scope and range of the current study. Analysis of the division's performance on achievement variables such as standardized test scores, SAT performance and core subject class average with respect to their fiscal effort could identify effective schools and strategies. These results could be beneficial and worth emulating for school divisions with similar demographics and lower performance in these achievement variables.

Finally, additional statistical treatments such as an ANCOVA and controlling for SES may allow for systemic changes. Further analysis of the seven school divisions (5.4%) that had significant linear regression relationships and displayed evidence that over 90% of the variance in graduation rates was predicted by division fiscal effort is warranted. This analysis could review the funding allocation of these seven school divisions with comparison to the other Virginia school divisions.

Conclusion

The findings displayed in this study do not entirely support the hypothesis that increased fiscal effort would result in increased high school graduation rate while decreased fiscal effort would result in decreased high school graduation rate over time. The results displayed that division fiscal effort alone was not the only predictor of academic success. Results showed that other variables like poverty status and minority classification had a greater impact on graduation rate than fiscal effort. Regardless, further investigation should be conducted on school divisions with similar demographics and varying fiscal effort levels to identify effective strategies for increasing student achievement and graduation rate.

REFERENCES

Abbott v. Burke. (1970). 119 N.J. 287, 575 A.2d 359.

Acemoglu, D., & Jorn-Steffen, P. (2001). Changes in the wage structure, family income, and children's education. *European Economic Review, 45*(4), 890–904.

Alexander, N. (2004). Exploring the changing face of adequacy. *Peabody Journal of Education, 79*(3), 81-103.

Alexander, F.K., & Salmon, R.G. (1995). *Public school finance*. Boston: Allyn & Bacon.

Altenbaugh, R. (1999). *Historical dictionary of American education*. Westport, CT: Greenwood Press.

Archibald, S. (2006). Narrowing in on educational resources that *do* affect student achievement. *Peabody Journal of Education, 81*(4), 23-42.

Aud, S., and Hannes, G. (Eds.) (2010). *The condition of education 2010 in brief* (NCES 2010-029). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC: U.S Department of Education Publications.

Augenblick, J., Myers, J., & Anderson, A. (1997). Equity and adequacy in school funding. *Financing Schools, 7*(3), 63-78.

Balfanz, R., Bridgeland, M., Moore., & Fox, J. (2010). *Building a grad nation: Progress and challenge in ending the high school dropout epidemic*. Johns Hopkins University. Retrieved from: http://www.americaspromise.org/~/media/Files/Our%20Work/Grad%20Nation/Building%20a%20Grad%20Nation/Building%20a%20Grad%20Nation_Full Report_FINAL%2011-30-10.ashx

Balfanz, R., & Legters, N. (2004). *Locating the drop out crisis.* Baltimore, MD: Center for Social Organization of Schools.

Balfanz, R., Neild, R., & Herzog, L. (2007). An early warning system. *Educational Leadership, 65*(2), 28-33.

Belfield, C., & Levin, H. (2007). *The Price We Pay.* Washington, DC: Brookings Institution Press.

Biniaminov, I., Glasman, N. (1983). School determinants of student achievement in secondary education. *American Educational Research Journal, 20*(2), 251-268.

Bridgeland, M., DiIulio, J., & Morrison, B. (2006). *The silent epidemic.* Retrieved from: http://www.civicenterprises.net/pdfs/thesilentepidemic3- 06.pdf

Brown v. Board of Education. 1954. Va. 349 U.S. 294.

Burruss v. Wilkerson. 1970. Va. 864 U.S. 397.

Butler, A. R. (2006). *The relationship between resource allocation patterns in Missouri K—12 public school districts and student performance.* Unpublished doctoral dissertation. Saint Louis, MO: University of Missouri.

Butts, R. F. (1978). *Public education in the United States: From revolution to reform.* New York: Holt, Rinehart & Winston.

Carnoy, M. (1983). Educational adequacy: Alternative perspectives and their implications for educational finance. *Journal of Education Finance, 8*(3), 286-299.

Carstensen, V. (1988). Patterns on the American land. *Journal of Federalism, 18*(4), 31-39.

Coons, J., Clune, W., & Sugarman, S. (1969). Educational Opportunity: A workable constitutional test for state financial structures. *California Law Review 57*(2), 305–421.

Cohen, J. (2010). The stat fiscal stabilization fund and higher education spending in the states. *New American Foundation.* Retrieved from: http://education.newamerica .net/sites/newamerica.net/files/policydocs/NAF_The_SFSF_and_Higher_Ed_Spe nding_in_the_States.pdf

Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education.* New York, N.Y.: Routledge Printing Press.

Coleman, J., Campbell, E., Hobson, C., McPartland, J., Mood, A., Weinfeld, F., & York, R. (1966). *The Coleman Report: Equality of educational opportunity.* Washington, D.C.: U.S. Government Printing Press.

Commission on Local Government: Commonwealth of Virginia. (1996). Report on the Comparative Revenue Capacity, Revenue Effort, and Commonwealth of Virginia, *Constitution*, Article VIII, 1-2, 1971.

Condron, D. J., & Roscigno, V. J. (2003). Disparities within: Unequal spending and achievement in an urban school district. *Sociology of Education*, *76*(1), 18 – 36.

Cross, C. T. (2004). *Political education: National policy comes of age*. New York, NY: Teachers College Press.

Cubberley, E. (1920). *The history of education.* Boston, MA: The Riverside Printing Press.

Dillow, S.A., Snyder, T.D., & Hoffman, C.M. (2008). *Digest of education statistics 2007* (NCES 2008-020). Washington, D.C.: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Dillow, S. A., Snyder, T.D., & Hoffman, C.M. (2012). *Digest of education statistics 2011* (NCES 2012-001). Washington, D.C.: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Education Commission of the States. (2006). *Helping state leaders shape education policy.* Retrieved from: http://www.ecs.org/html/issue.asp?print=true&issueID=47&subIssueID=0

Elias, C.G., & McDowell, G.R. (1992). *Paying for school in Virginia: An analysis of the distributional implications of state aid in the fiscal year 1992 – 93.* Virginia Cooperative Extension Publication 448-209/ REAP R010. Blacksburg, VA: Virginia Tech.

Enrich, P. (1995). Leaving equality behind: New directions in school finance reform. *Vanderbilt Law Review, 48*(1), 101.

Finn, C. (1991). *We must take charge: Our schools and our future.* New York, NY: The Free Press.

Fischel, W. (1989). Did Serrano cause proposition 13? *National Tax Journal, 42*(4), 465-473.

Foner, E. (2006). *Give me liberty! An American history.* New York, NY: W. W. Norton & Company, 376-377.

Franciosi, R. J. (2004). *The rise and fall of American public schools: The political economy of public education in the twentieth century.* Westport, CT: Praeger.

General Accounting Office. (1998). Goals 2000: Flexible funding supports state and local education reform. Retrieved from: http://www.gao.gov/archive/1999/he99010.pdf

Goals 2000: Educate America Act, H.R. 1804 (1993). Retrieved from: http://www.govtrack.us/congress/bills/103/hr1804#overview

Greene, J., Winters, M. (2006). Leaving boys behind: Public school graduation rates. Civic Report (48). Retrieved from: http://www.manhattan- institute.org/html/cr_48.htm

Greenwald, R., Hedges, L. V., & Laine, R. (1996). Interpreting research on school resources and student achievement: A rejoinder to Hanushek. *Review of Educational Research, 66*(3), 411-416.

Griffith, M. (2005). State education funding formulas and grade weighting. *Education Commission of the States*. Retrieved from: http://www.ecs.org/clearinghouse/59/81/5981.htm

Grissmer, D., David, W., & Flanagan, A. (1998). Exploring rapid score gains in Texas and North Carolina," commissioned paper, Washington, D.C.: National Education Goals Panel. Retrieved from: http://govinfo.library.unt.edu/negp/reports/grissmer.pdf

Grissmer, D., Flanagan, A., Kawata, J., & Williamson, S. (2000). *Improving student achievement. What state NAEP test scores tell us.* Santa Monica, CA: Rand Corporation. Retrieved from: http://www.rand.org/pubs/monograph_reports/MR924/MR924.chap5.pdf

Grubb, W. (2006). When money might matter: Using NEL88 to examine the weak effects of school funding. *Journal of Education Finance, 31*(4), 360-378.

Hallinger, P. (1992). School leadership development: Evaluating a decade of reform. *Education and Urban Society, 24(*3), 300-316.

Hamm, R. (2004). Building America's future workforce: *Employers, immigrants and skills: A review of the recent literature.* Washington, DC: NAM Manufacturing Institute/Center for Workforce Success, Jobs for the Future, and the National Immigration Forum.

Hanushek, E. (1986). The economics of schooling: Production and efficiency in public schools. *Journal of Economic Literature*, *24*(3), 1141-1177.

Hanushek, E. (1995). Moving beyond spending fetishes. *Educational Leadership, 53*(3), 60-64.

Hanushek, E. (1998). *Making schools work.* Washington, DC: The Brookings Institution.

Hanushek, E., & Raymond, M. (2001). The confusing world of educational accountability. *National Tax Journal*, *54*(2), 365-384.

Hess, F., & Downs, W. (2010). *K-12 budget picture: learn years ahead.* Washington, DC: American Enterprise Institute for Public Policy. Retrieved from: www.aei.org/docLib/2010-11-No-10-g.pdf

Hightower, A. M. (2009). Securing progress, striving to improve. Quality Counts. *Education Week, 28*(17), 44-47.

Holahan, J., Coughlin, T.A., Bovbjerg, R. R., Hill, I., Ormond, B. A., & Zuckerman, S. (2004). *State Responses to 2004 Budget Crises: A Look at Ten States.* Washington, D.C.: The Urban Institute.

Hunt, J. (2007). Making politics work to dramatically improve American education. In B. Wehling and C. Schneider (Eds.), *Building a 21st century U.S. education system.* (pp. 116-122). Washington, DC: National Commission on Teaching and America's Future. Retrieved from: http://www.nctaf.org/resources/research_and_reports/nctaf_research_reports/index.htm

Horton v. Meskill. 1977. 172 Conn. 615, 376 A.2d 359.

Hyndman, R. (1996). Sample quantiles in statistical packages. *American Statistician, 50*(4), 361-365.

Jennings, J. (1995). *Why national standards and tests?* Thousand Oaks, CA: Sage.

Johnson, N., Oliff, P. & Williams, E. (2010). An update on state budget cuts. *Center for Budget and Policy Priorities.* Washington, DC: Retrieved from: http://www.cbpp.org/cms/index.cfm?fa=view&id=1214

Jordan, K. (1982). *Precollege science and mathematics education: Experiences with the National Defense Education Act and the Teacher Institutes conducted by the National Science Foundation.* Washington, DC: Library of Congress. Retrieved from: http://www.ida.org/upload/stpi/pdfs/ida-d-3306.pdf

Judge, G., Griffiths, W., Hill, R., Luetkepohl, H. & Lee, T. (1985). *Theory and practice of econometrics*, New York: Wiley.

Kaplan, L., & Owings, W. (2010). *American education: Building a common foundation.* Belmont, CA: Wadsworth Cengage Publishing.

Kelly, L. (2012). *The impact of state fiscal effort on student achievement measured by math scores from the National Assessment of Educational Progress (NAEP).* Doctoral dissertation. Norfolk, VA: Old Dominion University.

Kerlinger, F.N. (1973) *Foundations of behavioral research.* New York: Holt, Rinehart and Winston, Publishing.

Ladd, H. (Ed.). (1996). *Holding schools accountable: Performance-based reform in education.* Washington, D.C.: The Brookings Institution.

LaMorte, M. (1996). *School law.* Boston, MA: Allyn & Bacon.

Landefeld, S., & Marcuss, R. (1999). State personal income 1929-97. *Bureau of Economic Analysis.* Washington, DC: Retrieved from: http://www.bea.gov/scb/pdf/ regional/perinc/meth/spi2997.pdf

Liu, G. (2006). Interstate inequality in educational opportunity. *New York Law Review, 81*(5), 2044-2128.

Losen, D. (2006). Losing our future: The graduation rate crisis and longitudinal data pitfalls. *Education Week, 25*(41), 5.

Mann, H. (1844). *The Common School Journal.* Boston, MA: Fowle and Capen.

McDonnell, L. M. (2005). No Child Left Behind and the federal role in education: Evolution or revolution? *Peabody Journal of Education, 80*(2), 19-38.

McInnis v. Shapiro. 1968. 293 Il. F. Supp. 327.

McNichol, E., Oliff, P., & Johnson, N. (2010). States continue to feel recession's impact. *Center on Budget and Policy Priorities*. Washington, DC: Retrieved from: http://www.cbpp.org/ cms/index.cfm?fa=view&id=711.

McUsic, M. (1999). The law's role in the distribution of education: The promises and pitfalls of school finance litigation. *Law and School Reform: Six Strategies For Promoting Educational Equity*, *88*(1), 114.

Miles, K., & Darling-Hammond, L. (1998). Rethinking the allocation of teaching resources: Some lessons from high-performing schools. *Educational Evaluation and Policy Analysis*, *20*(1), 9-29.

Morgan, K.O., & Morgan, S. (2010). *State rankings 2010: A statistical view of America.* Washington, DC: CQ Press, p.142.

Morris, M. (2012). *The relationship between state fiscal effort and state graduation rates: A longitudinal study.* Doctoral dissertation. Norfolk, VA: Old Dominion University.

Murphy, J. (1991*). Restructuring schools: capturing and assessing the phenomena.* Nashville, Tenn.: National Center for Educational Leadership, Vanderbilt University.

National Center for Educational Statistics. (2008). *Digest of education statistics 2008.* Washington, D.C.: U.S. Printing Office. Retrieved from: http://nces.ed.gov/ programs/digest/d09/tables/dt09_086.asp

National Center for Education Statistics, U.S. Department of Education. (2012). *Digest of education statistics*. Washington, D.C.: U.S. Printing Office.

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform.* Washington, D.C.: U.S. Printing Office.

National Education Association, *Estimates* (2005). Washington, D.C.: NEA. (2005). Washington, D.C.: U.S. Printing Office.

National Education Association, *Estimates* (2011). Washington, D.C.: NEA. (2011). Washington, D.C.: U.S. Printing Office.

No Child Left Behind Act of 2001. (2002). *Public law 107–110.* Washington D.C.: U.S. Printing Office.

North Central Regional Educational Laboratory (NCREL). (2000). *A better return on investment: Reallocating resources to improve student achievement.* Oak Brook, IL.: North Central Regional Education Lab. Retrieved from: www.ncrel.org/policy/pubs/pdfs/booklet.pdf

Northshore School District v. Kinnear. 1974. 84 Wash. 2d 685, 530 P. 2d 178.

O'Connell-Smith, M. (2004). How the apportionment of district money is associated with differences in the grade 8 mathematics and reading achievement scores for Minnesota students. *Journal of Education Finance, 29*(4), 299-314.

Odden, A., & Archibald, S. (2000). Reallocating resources to support higher student achievement: An empirical look at five sites. *Journal of Education Finance, 25*(4), 545-564.

Odden, A. (2000). The new school finance: Providing adequacy and improving equity. *Journal of Education Finance, 25*(6), 467-487.

Odden, A., & Picus, L. (2004). *School finance: A policy perspective.* Boston, MA: McGraw Hill.

Orlofsky, G. (2001). The other gap: Poor students receive fewer dollars. *Bulletin of Education Trust, 1,* 1-3. Retrieved from: http://www.edtrust.org/sites/edtrust.org/files/publications/files/Edtrustdatabulletin.pdf

Owings, W., & Kaplan, L. (2013). *American public school finance.* Belmont, CA: Thomson Wadsworth.

Owings, W., & Kaplan, L. (2010). The Alpha and Omega Syndrome: Is Intra-District Funding Disparity the Next "Ripeness" Factor? *Journal of Education Finance, 36* (2), 162-185.

Pauley v. Kelley. 1979. 162 W. Va. 672, 225 S. E. 2d 859.

Picus, L. O. (2000). *How schools allocate and use their resources.* ERIC Digest. Eugene, OR: ERIC Clearinghouse on Educational Management. (ERIC Document Reproduction Service No. ED452578)

Pirim, Z. (2011). *Education and economy: The impact of investment in human capital through education on unemployment.* Doctoral dissertation. Norfolk, VA: Old Dominion University.

Rado, D. (2007). *Disparities in school spending found in Chicago suburbs.* Chicago, IL: Chicago Tribune. Retrieved from: http://www.chicagotribune.com/news/local/chicago/chi0702040055feb04,1,3512404.story?ctrack=1&cset=true.

Rampey, B. D., Dion, G. S., & Donahue, P. L. (2009). *NAEP 2008 Trends in academic progress* (NCES 2009-479). Washington, D.C.: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Ravitch, D., & Finn, C. E. (1988). *What do our 17-year-olds know?* New York, NY: Harper and Row.

Rebell, M. (2002). *Education adequacy, democracy and the courts. Achieving high educational standards for all.* Washington, D.C.: National Academy Press.

Rebell, M. (2008b). Sleepless after Seattle? There's Still hope for Equal Educational Opportunity. *Education Week, 27*(23), 32-33.

Roberts, C. (2011). *Student achievement as an investment in human capital: Using longitudinal patterns of per pupil instructional and capital expenditures, socio-economic status, and past performance in predicting student achievement.* Doctoral dissertation. Norfolk, VA: Old Dominion University.

Robinson v. Cahill. 1973. 62 N.J. 473, 303 A.2d 273.

Roosevelt Elementary School District No. 66 v. Bishop. 1994. 179 Ariz. 233, P.2d 806.

Roza, M. (2006). *How districts shortchange low-income and minority students.* Funding Gap 2006. Washington, D.C.: The Education Trust, p. 9-10.

Salmon, R., et. al., (1988). *Public school finance programs of the United States and Canada 1986-87.* Blacksburg, VA: American Education Finance Association and Virginia Polytechnic Institute and State University.

San Antonio v. Rodriquez. 1973. 411 Tx. U.S. 1

Schwartz, R., & Robinson, M. (2000). *Goals 2000 and the standards movement.* Baltimore, MD: Brookings Papers on Education Policy, 173-206.

Seber, G. (1977). Linear regression analysis. New York: Wiley.

Serrano v. Priest. 1971. 5 Cal. 3d 584, 487 P. 2d 1241.

Sirrin, S. R. (2005). Socio-economic status and student achievement: A meta-analytic review of research. *Review of Educational Research*, *75*(3), 417-453.

Stoddard, C. (2009). Why did education become publicly funded? Evidence from the nineteenth-century growth of public primary schooling in the United States. *The Journal of Economic History*, *69*(1), 172-201.

Tannenwald, R. (1999). Fiscal disparity among the states revisited. *New England Economic Review* (July/August), 3-25.

Tyack, D. (1974). *The one best system: A history of American urban education.* Cambridge, MA: Harvard University Press.

U.S. Census Bureau. (2012a). Poverty Status in the Past 12 Months by School 2008-2012. American Community Survey 5-Year Estimates. Washington, D.C.: Retrieved from: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_12_5YR_B14006&prodType=table

U.S. Census Bureau. (2012b). School Enrollment by Detailed Level of School for the Population 3 Years and Over: Black or African American, 2008-2012. American Community Survey 5-Year Estimates. Washington, D.C.: Retrieved from: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_12_5YR_B14007B&prodType=table

U.S. Census Bureau. (2012c). School Enrollment by Detailed Level of School for the Population 3 Years and Over: Hispanic or Latino, 2008-2012. American Community Survey 5-Year Estimates. Washington, D.C.: Retrieved from: http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_12_5YR_B14007I&prodType=table

U.S. Department of Commerce, Census Bureau, Current Population Survey (CPS). (2008). *Status drop out rates of 16-though 24-year-olds by race/ethnicity and sex.* Retrieved from: http://nces.ed.gov/pubs2011/dropout08/figures/figure_03.asp

U.S. Department of Education, Common Core of Data (CCD). (2011). *National Public Education Financial Survey.* Washington, D.C.: National Center for Education Statistics. Retrieved from: http://nces.ed.gov/pubs2013/2013305.pdf

U.S. Department of Education, Current Population Survey (CPS). (2001). *Dropout rates in the United States: 2000*, NCES 2002-114. Washington, D.C.: National Center for Education Statistics. Retrieved from: http://nces.ed.gov/pubs2002 /droppub_2001/

U.S. Department of Education, Common Core of Data (CCD). (2007). *National public education financial survey, fiscal year 2005, version 1a.* (Report). Washington, D.C.: National Center for Education Statistics. Retrieved from: http:// nces.ed.gov/pubs2007/expenditures/tables/table_1.asp?referrer=edfin

U.S. Department of Education. (2009*). State fiscal stabilization fund.* Washington, D.C.: National Center for Education Statistics. Retrieved from: http://www2.ed.gov/policy/gen/leg/recovery/factsheet/stabilization-fund.html

Verstegen, D. A., & Salmon, R. G. (1988). Virginia education finance reform: Have excellence and equity been achieved? *Journal of Education Finance*, *14*(2), 200-220.

Verstegen, D. A., & Jordan, T. S. (2009). A fifty-state survey of school finance policies and programs: An overview. *Journal of Education Finance, 34*(3), 222-226.

Virginia Department of Education. (2011a). *Virginia Graduation Rates & Indicators.* Retrieved from: http://www.doe.virginia.gov/statistics_reports/graduation_completion/cohort_reports/va_ontime_gradrate_estimated.pdf

Virginia Department of Education. (2011b). *Overview of the standards of quality funding process.* Retrieved from: http://www.doe.virginia.gov/school_finance/index.shtml

Virginia Department of Education. (2012). *Composite index of local ability to pay.* Retrieved from: http://www.doe.virginia.gov/school_finance/budget/compositeindex_local_abilitypay/index.shtml

Walden, J. (2011). *The economic impact of the Virginia Beach Public School System.* Retrieved from: http://www.vbschools.com/administration/Lowdown/pdfs/virginiabeachstudy.pdf

Warren, J. R. & Manners, A. (2009). Measuring high school graduation rates at the state level: What difference does methodology make? *Social Methods & Research, 38*(1), 3-37.

Wenglinsky, H. (1998). *School district expenditures, school resources and student achievement: Modeling the production function.* Developments in School Finance 1997 (NCES 98-212), Washington, D.C.: National Center for Education Statistics, U. S. Department of Education, Institute of Education Sciences. Retrieved from: http://nces.ed.gov/pubs98/dev97/98212h.asp

West, M., & Peterson, P. (2007). *School money trials.* Washington DC: Brookings Institution Press.

Wise, A. (1983). Educational adequacy: A concept in search of a meaning. *Journal of Education Finance, 8*(3), 300-315.