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Relationship Between State Educational Fiscal Effort and State Juvenile Incarceration Rates

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RELATIONSHIP BETWEEN STATE EDUCATIONAL FISCAL EFFORT AND STATE JUVENILE INCARCERATION RATES

by

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ABSTRACT

RELATIONSHIP BETWEEN STATE EDUCATIONAL FISCAL EFFORT AND STATE JUVENILE INCARCERATION RATES

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Old Dominion University, 2015
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The issue surrounding the effect of education funding using state per pupil index spending has been the subject of research studies in connection with various student outcomes since the advent of the Coleman report in 1966. Education is indeed an investment as it alleviates a myriad of social issues, but it needs to be made wisely. Included among social concerns is incarceration. Adults in prison show a disproportionate amount of illiteracy and most lack a high school education. An analysis of each state's educational fiscal effort, viewed as a ratio of gross per capita state product and per pupil index spending, when correlated with juvenile incarceration rates, sheds light on the association between funding and incarceration.

This study examined each state's and the District of Columbia's educational fiscal effort and its impact on state juvenile incarceration rates. Using a linear regression, bivariate correlation, and time-lagged correlation design, generalized estimating equation (GEE), state fiscal effort and state juvenile incarceration rates were examined over a 25 year time period, to include 5, 10, 15, and 20 year lag analysis to account for delays in effect. A statistically significant inverse association between state educational fiscal effort and state juvenile incarceration rates was found using a GEE with raw data at a 5-year time lag across the United States. Statistically significant associations were found using Pearson's Product Moment analysis in 10 states as well.

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CHAPTER 1

INTRODUCTION

Researchers in public education have debated for decades whether there is a correlation between educational spending and student academic success. Beginning with the Coleman Report in 1966 and leading into the *No Child Left Behind Act* (NCLB) of 2002, these conversations may have never been more important. Differing opinions abound based on the wide array of variables used to measure student achievement and disagreement over the verification of student success as it correlates to funding (Burtless, 1996). However, the goal set by NCLB of all students becoming academically competent raises the stakes and increases the urgency of determining an answer.

Erick Hanushek (1981) pioneered the first significant research following the Coleman Report (1966) in spending and public education focusing on monetary input and results-based output. His conclusion of a lack of correlation between these two variables led to debate within the educational community, which continues today. Greenwald, Hedges, and Laine (1996) reviewed Hanushek's own data and drew different conclusions pointing to a flaw in methodology on the part of the primary researcher. As the debate continues, different aspects of education, such as teacher quality, have come to the forefront as viable components to increase student achievement (Darling-Hammond, 2000).

Student success in America has been defined in a multitude of ways with researchers studying a variety of variables, making some studies obsolete depending on the variable on which they focus. Goals 2000 (Hanushek & Raymond, 2001) mandated a high school graduation rate of 90%. This call for action, however, was diluted by the

varying computation rates for determining graduation between differing states and school divisions. On October 28, 2008, former Secretary of Education Margaret Spellings announced new components and clarifications to NCLB which focused on graduation rates and how they are determined, clarifying the computation process. She stated that the four-year high school graduation rate would abide by the following guidelines: "The number of students who graduate in four years with a regular high school diploma divided by the number of students who entered high school four years earlier, adjusted for transfers, students who emigrate and deceased students" (Spellings, 2008, p. 2). This announcement regarding the four-year on-time-graduation cohort model and the accompanying guidelines determine a viable research focus on graduation and includes factors that affect the graduation rate. Juvenile incarceration negatively impacts graduation rates and two-thirds to three-fourths of students returning to school following incarceration during their 9th grade school year withdraw or dropout within a year. Less than 15% of previously incarcerated juveniles complete high school within four years (Justice Policy Institute, 2009).

Due to the increased diligence associated with NCLB, the purpose of this study is to examine juvenile incarceration rates in association with the fiscal effort put forth by individual states and the District of Columbia.

Background and Context

Education as Human Capital

Public education, the education of all, as an important component in the health of a society is a new concept with old roots. In 1776 Adam Smith, a Scottish philosopher

and the father of modern political economics, recognized the influence of education as it applied to the division of labor and accumulation of wealth.

> The difference of natural talents in different men is, in reality, much less than we are aware of; and the very different genius which appears to distinguish men of different professions, when grown up to maturity, is not upon many occasions so much the cause, as the effect of the division of labour. The difference between the most dissimilar characters, between a philosopher seems to arise not so much from nature, as from habit, custom, and education. (cited in Smith, 1979, p. 29)

Expanding on the idea of movement between occupations, education is aligned with both future earning potential and the health and benefit of the community at large. Public education moves these ideals from the elite into the reach of every man but this concept was not fully embraced until almost 200 years later. Theodore Schultz's (1961) groundbreaking research tying intellectual advancement into the economic development of a society at large won the Nobel Peace Prize for Economic Science in 1979. Education impacts not only an individual's future but the future of the community associated with that individual, the effects starting with a ripple within the town and spreading outward until embracing the country itself. Reaching beyond moral imperatives, successfully educating the population dictates the country's competitiveness within the world economic market.

> About 90% of the fastest-growing jobs of the future will require some postsecondary education. For the United States to remain a world leader, it must ensure that every student graduates prepared to compete in the increasingly complex global economy. (Alliance for Excellent Education, 2006, p. 2)

On a less grand scale, education is associated with personal income and employability. Lower education levels correlate with higher unemployment. According to the Bureau of Labor Statistics for November of 2010, those with less than a high school diploma faced a 15.7% unemployment rate, with a high school diploma the rate was at 10%, some college equated with an 8.7% unemployment rate, and those with a Bachelor's degree or higher fell into a 5.1% rate. Based on these statistics earning potential is directly related to educational attainment. With a yearly salary of $20,000 per year, over a lifetime high school dropouts can earn an average of $800,000. Based on this income they would contribute $80,000 to federal income taxes at a rate of 10%. College graduates earn approximately $50,000 per year or $2 million dollars over a lifetime, contributing $400,000 in federal taxes at a rate of 20% (Owings & Kaplan, 2013). The current rate of more than 1 million students who do not receive a high school diploma costs the nation over 3 billion dollars in unavailable earnings and taxes over a lifetime. This loss is repeated yearly with more than 1 million students who fail to graduate (Alliance for Excellent Education, 2006). As an individual's ability to earn increases so does the amount of taxes paid back into the community thereby financing social services and stimulating economic growth.

The quality of education determines the quality of life within a community. Not only does education hold the key to income potential, an educated populace becomes socially responsible. Higher education levels lead to an increase in voting frequency, available health care, more volunteerism and philanthropic endeavors, and a safer community. As Owings and Kaplan (2013) state:

Education is a significant investment in human capital that has clear benefits for the

> individual, the economy, and society at large. Increased levels of education result in higher incomes, increased taxes, increased participation in the arts, decreased social service costs, and decreased levels of childbirth complications. Instead of thinking of education as a cost to taxpayers, think of education as a long-term investment that pays significant dividends. (p. 95)

Accountability and Education

A successful public K-12 education is not only socially and economically important, but with *No Child Left Behind* (NCLB) it becomes a legal responsibility as well. The vision statement of NCLB calls for the educational process to "ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging state academic achievement standards and state academic assessments" (No Child Left Behind Act of 2001, Sec. 1001, 2002). Thus, a focus of NCLB becomes accountability at all levels. This is tied into the analysis of student academic performance in an effort to support all students in reaching high academic standards.

In an endeavor to achieve the vision of NCLB where all students are educated to a proficient level in reading, mathematics, and science, Adequate Yearly Progress (AYP) has been developed and is tied into continued federal funding based on Title I.

> The NCLB Act will strengthen Title I accountability by requiring states to implement statewide accountability systems covering all public schools and students. These systems must be based on challenging State standards in reading and mathematics, annual testing for all students in grades 3-8, and annual statewide progress objectives ensuring that all groups of students reach

> proficiency within 12 years. Assessment results and State progress objectives must be broken out by poverty, race, ethnicity, disability, and limited English proficiency to ensure that no group is left behind. School districts and schools that fail to make adequate yearly progress (AYP) toward statewide proficiency goals will, over time, be subject to improvement, corrective action, and restructuring measures aimed at getting them back on course to meet State standards. Schools that meet or exceed AYP objectives or close achievement gaps will be eligible for State Academic Achievement Awards. (U. S. Department of Education, 2002, p. 1)

Currently, all states accept Title I federal funding making them accountable for all aspects of AYP in every public school whether or not they are Title I schools (NCLB Action Briefs, 2010). This includes continuous, escalating, and measurable student academic improvement, the presence of highly qualified teachers, the maintenance of safe schools, student English proficiency, and high school graduation for all students (Yell, 2006). Title 1 public school systems or schools that do not meet AYP requirements face an increasing set of yearly sanctions. While penalties are not mandatory for schools or districts that are not Title I, NCLB requires states to create them in order to continue receiving funding (NCLB Action Briefs, 2010). After failing to meet AYP for the second year a school is identified for school improvement and school systems must offer school choice for students in the underperforming school allowing students to attend a school or schools not identified for improvement. Schools that do not make AYP for three years continue to be identified for improvement. Districts must offer school choice and provide supplemental services such as tutoring. Schools that fail to

make AYP for four consecutive years are identified for corrective action. Districts must offer school choice and supplemental services. Beyond this the district must follow one of the following: replace pertinent staff, execute a new curriculum, extend the amount of time students are in school, decrease management influence, or choose an approved outside expert to design the school improvement plan. Schools who fail to accomplish AYP after five years must implement restructuring (No Child Left Behind Act of 2001, 2002).

While accomplishing the vision of NCLB with the component of AYP might seem daunting, school divisions and states that refuse lose federal funding. While the federal government historically contributes between 6 to 10% of the total public school budget, this amount would have to be recouped by localities and states should the monies be withdrawn (Owings & Kaplan, 2006). For fiscal year 2008 the federal government provided $47,707,260 towards the total educational funding amount, including local and state contributions, of $584,728,896 or 8.16% (U.S. Department of Education, National Center for Education Statistics, Common Core of Data, 2011). In comparison to the overall federal budget, the percentage spent on education in 2003 supplies the following point of view: "To keep the federal dollars spent on education in perspective, the $61 billion appropriation for the Department of Education is only 1.6% of the federal government's nearly $3.8 trillion budget in fiscal year 2011" (Owings & Kaplan, 2013, p. 58).

Funding to implement NCLB has become a concern. While the federal government furnished more than 23 billion dollars to states specifically for costs associated with the law during fiscal year 2009, there are more costs involved than the

amount provided (U. S. Department of Education Funding, 2010). From NCLB's inception, economists have declared the law under-funded. At its inception, NCLB requirements increased the cost of educating a student between 24 to 46%. Low socioeconomic students increased the amount by 100%. The federal government, however, offered a first year increase in Title I funding of only 0.4% and a flexibility to shift already earmarked local money at 4.3% (Mathis, 2003). Since this time federal spending on education has fluxed, and while it has increased since NCLB it still only represents 10.8% of the overall amount spent on education with states and localities carrying the lion's share of the financial burden, contributing approximately 89.2% (Owings & Kaplan, 2013). The mandated annual testing, data collection, and reporting alone increase state budget amounts by billions, the amount depending on the style of assessment chosen by the state (see Figure 1).

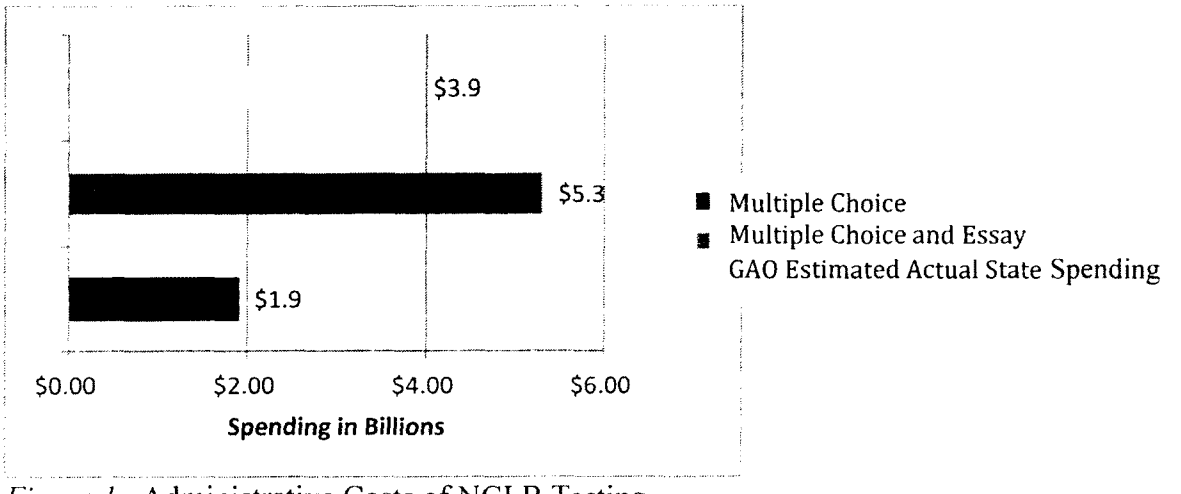

Figure 1. Administrative Costs of NCLB Testing.

Source: United States General Accounting Office: Report to Congressional Requesters, *Title I: Characteristics of Tests Will Influence Expenses: Information Sharing May Help States Realize Efficiencies,* 2003. (New America Foundation, 2010, p. 1).

Over the years, Congress has appropriated funds for NCLB, specifically Title I as the main source of funding, at an almost flat rate. This is especially startling when

compared with the authorization levels and the maximum amount of funding possible for the program, as the appropriations become a smaller percentage annually (see Figure 2).

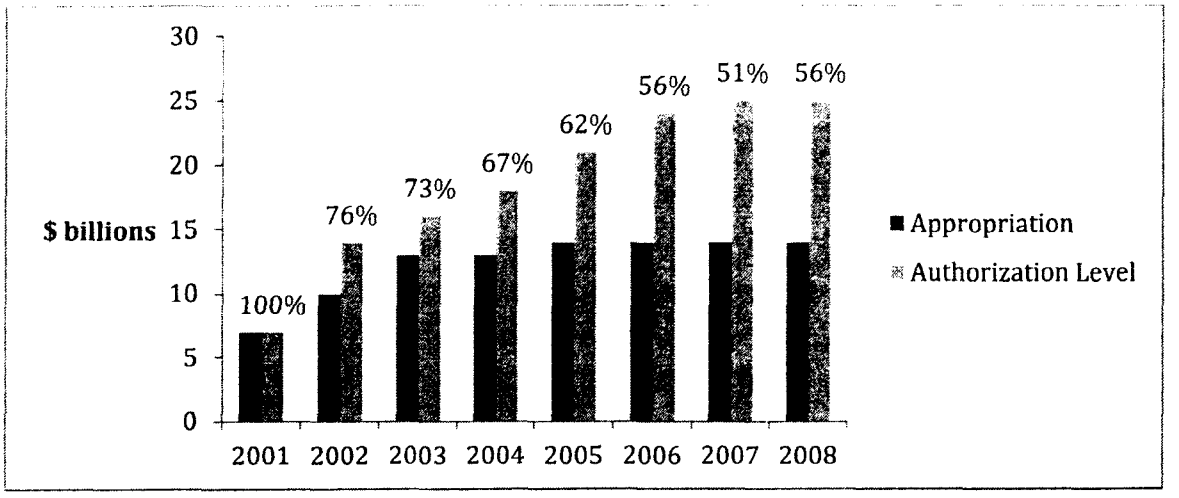

Figure 2. Appropriation vs. Authorization: Title 1 Part A Funding

Source: Elementary and Secondary Education Act, U.S. Dept. of Education Budget Tables. (New American Foundation, 2010).

With federal fiscal effort lacking, states and localities must recoup the difference of a very expensive law, making state and local fiscal effort in the associated economic time frame increasingly important.

The Expense of Public Education

The Organisation for Economic Co-operation and Development [OECD] (2010), an international economic organization with membership of 34 countries including France, England, Mexico, Poland, and the United States, called the current period in time a "global economic crisis" bringing glaring light onto the expense of education and the funding reaction of various countries (Organisation for Economic Co-operation and Development, 2010). On average, OECD partners faced an increase in educational spending of 43% between 1995 and 2007. Spending based on Gross Domestic Product (GDP) ranged between 4.3 to 7% in 2010 with the United States being among the

countries with a 7% federal GPD expense. The OECD warns, though, that it is fiscal effort, the amount of spending on education, that matters the most, and while education is a large expense, it is vital to the economic development and growth of a country along with meeting the needs of a technological society (Organisation for Economic Co-operation and Development, 2010).

A review of the United States fiscal effort in the areas of elementary and secondary education, excluding tertiary educational levels, paints a different picture than the overall percentage of GDP. As Owings and Kaplan (2013) state: "In fact, some evidence shows that U.S. spending on K-12 education as a percentage of our wealth (as measured by GDP) places us 14th in the United Nations' ranking of "highly developed" countries and lower than the average of the selected 29 countries" (p. 10).

Within the United States for the fiscal year 2008, a total of more than $584 billion was spent on elementary and secondary education with localities spending approximately $254 billion or 43.5%, states spending $282 billion or 48.29% and the federal government spending $47 billion or approximately 8.05% (National Center for Educational Statistics, 2010). What is the public's perspective on spending, especially with regard to the level of effort afforded at the K-12 level? During the most recent recession the public's backing of increased spending on education changed from 51% in 2007 to 46% in 2009, a 5% drop. Public belief that increased spending would equate to a rise in school quality also decreased between 2007 and 2009 by 6% (Howell, Peterson, & West, 2009). However, facing the most significant economic downturn since the Great Depression, most Americans continue to support increased spending on their local public schools. When queried through the Gallup Poll concerning the biggest problem facing

public education, the response most chosen by the American public at 36% was lack of financial support (Bushaw & Calderon, 2014).

Funding and Student Achievement

With the under-funding of education and NCLB, along with the imperative of a proficient K-12 public education leading to graduation for all children, many question if money matters in terms of student achievement. There is extensive debate on the subject beginning with the Coleman Report in 1966 and its finding that student academic success was not tied into any school variable and therefore achievement and funding were not related (Coleman, 1966). There are numerous studies supporting Coleman's outcome of little to no influence in achievement associated with educational funding (Odden, Monk, Wasser, & Picus, 1995; Hirth & Mitchell, 1995). Hanushek, one of the most prolific reviewers of Coleman's data concluded:

> Given these policy positions, it would at the very least be an embarrassment, and at the worst a potential policy disaster, to find that variations in resources devoted to schooling are not the primary factor determining student performance. But that appears to be the case. Three decades of intensive research leave a clear picture that school resource variations are not closely related to variations in student outcomes and, by implication, that aggressive spending programs are unlikely to be good investment programs unless coupled with other fundamental reforms. (Hanushek, 1996c, p. 9)

However, in a meta-analysis of 60 studies, Greenwald, Hedges, and Laine (1996) found that improvements in student achievement could be accomplished with fairly small increases in educational funding. In a broader study, Taylor (1997) found a statistically

significant relationship accessing the National Educational Longitudinal Study of 1988, the district level teacher cost index, and the Common Core of Data. Others have chimed in supporting increased funding and a successful student education (Grissmer, Flanagan, & Williamson, 1997; Rothstein, 2001).

While there is ongoing discussion about the relationship between funding and student achievement, there is little debate that money does matter when it comes down to where it is spent. The principal gauge of an escalation in student achievement is the combination of teacher quality and effectiveness. Increases attained through these measures continue affecting students, sometimes up to years later (Darling-Hammond, 2000; Jordan, Mendro, & Weerasinge, 1997; Rebell & Wardenski, 2004; Sanders & Rivers, 1996). Beyond this, reduced class size in the primary years (American Youth Policy Forum, 2010; Boyd-Zaharias & Pate-Bain, 2008) and building size along with facility design (Education Commission of the States, 2002; Johnson, Howley, & Howley, 2002) also provide positive impacts on student success. As these studies demonstrate, judicially increasing funding through the increase of fiscal effort is critically important as it impacts educational programs with proven results.

The Connection of Graduation Rates and Incarceration Rates

High school graduation rates have always been important from a moral, economical, and social standpoint, and with NCLB a legal emphasis as well, there is also a connection between high school graduation and incarceration. Teens who drop out of the academic setting increase their chances of incarceration by 3.5 times when compared to juveniles who complete high school (Coalition for Juvenile Justice, 2001). Approximately 7,000 teens drop out of school every day for a variety of reasons

(Alliance for Excellent Education, 2007). Teens who leave education cite frustration with instruction focused on memorization (Sacks, 1999), failure to pass benchmark assessments tied into NCLB (Hinchey, 2004), with disengagement and academic failure round out the list (Bridgeland, DiIulio, & Morison, 2006). Juveniles who become incarcerated have problems learning mathematics and experience literacy challenges as well (Coalition for Juvenile Justice, 2001).

Of the 1.6 million adults incarcerated in state and federal institutions, lack of a high school education stands out (Bureau of Justice Statistics, 2010). More than 80% of inmates did not receive a high school diploma (Coalition for Juvenile Justice, 2001). Approximately 35% of adult inmates state that they left the educational setting mainly because of a lack of academic success and boredom (Bureau of Justice Statistics, 2003).

Public schools themselves have become an aspect in the dropout and incarceration process. Poor quality curricula and unproductive teaching strategies, high classroom student to teacher ratios, limited mentoring and connection opportunities, the restriction of after school involvement by placing academic and behavioral conditions on participation, vague discipline rules, and the use of zero tolerance policies that exclude or isolate students for behavioral reasons contribute to this process (Christle & Yell, 2008).

Remedies to the situation involve a variety of strategies revolving around academic, behavioral, and even facility issues. The Coalition for Juvenile Justice (2001) recommends early childhood education, mentors, counseling, community living skills, and service learning in conjunction with a curriculum that places importance on the development of critical thinking skills in literacy, writing, and mathematics, the involvement of parents and guardians, small classrooms, and the inclusion of special

education screening and services. With a focus on the reduction of student discipline, the Advancement Project & Civil Rights Project (2000) states that all teachers should take refresher courses or professional development in classroom management, conflict resolution, child development, and discipline strategies. It also states that schools should develop in-school suspension programs that focus on continued educational opportunities, counseling, and student behavior management. The interventions mentioned along with the relationship between incarceration and high school graduation call for renewed fiscal effort in order to be successfully implemented.

Statement of the Research Problem

Funding and student achievement are among the most contentious topics in today's educational world; they are also two of the most important. As John Dewey stated, "What the best and wisest parent wants for his own child, that must the community want for all its children. Any other ideal for our schools is narrow and unlovely; acted upon it destroys our democracy" (Dewey, 1902, p. 3).

Most parents want a high quality education where their children are successful and prepared for the future. The United States government echoes this sentiment through NCLB, calling for accountability, improved standards for all students, high quality teachers, and increased graduation rates, all accomplished during a specific time frame. The focus on high school graduation by NCLB brings to light the connection between education and incarceration. The relationship between instruction (Christle & Yell, 2008; Sacks, 1999), disengagement (Bridgeland, DiIulio, & Morison, 2006; Bureau of Justice Statistics, 2003), academic failure (Bridgeland, DiIulio, & Morison, 2006; Bureau of

Justice Statistics, 2003), literacy issues, and mathematical understanding (Coalition for Juvenile Justice, 2001) are repeated both by juveniles who leave high school and those who become incarcerated.

While not everyone can agree on what programs are necessary to achieve these lofty ambitions, several areas stand out such as increased teacher effectiveness (Darling-Hammond, 2000), reduced class size in the primary years (Pate-Bain, Boyd-Zaharias, Carrilla, Landers, Achilles, Krueger, Finn, & Edward, 2010), building size and design (Johnson et al., 2002), early childhood education, mentors, and counseling (Coalition for Juvenile Justice, 2001). Unfortunately, all of these come with a price tag. NCLB itself contains huge associative costs shouldered by the individual states and localities, while under funded by the federal government.

Since resources available are affected by funding and funding is dependent upon various levels of government spending, the two, funding and resources, are intertwined. Because of the need for educating children, legally, morally, ethically, and in the end for the better good of the country, a description of financial commitment should be examined. When determining financial responsibility the use of the ratio for fiscal effort, $E = R/TB$, controls for individual levels of wealth. In this general equation, E stands for fiscal effort, R stands for revenue for school expenditures, and TB stands for the tax base or community wealth. On the state level, the specific variables would be more inclusive. Revenue (R) is determined by the current state per pupil expenditure on education. Both the Gross State Product (GSP) on a per capita basis and the State Personal Income (SPI) on a per capita basis represent the tax base (TB) in separate calculations. The use of both measures of wealth controls for movement in the economy as well as provides a stable

revenue outlook. In the end the use of fiscal effort controls for disparities between wealthy and poorer states.

Fiscal effort, reflecting in effect the states commitment to education made to their constituents, supplies localities with the ability to provide the programs and strategies necessary to accomplish the goal of an education for all students. NCLB has made this increasingly important by shedding statistical light on the issues contained in the educational process. However, the research on the impact of educational funding on juvenile incarceration rates is not extensive, therefore, further research is needed in these areas.

Research Purpose and Questions

The purpose of this study is to examine each individual state's fiscal effort in light of incarceration rates over an extended period of time. The researcher desires to determine if a relationship exists between fiscal effort and juvenile incarceration rates. The following research questions will be used in this study:

1. What type of trends exist concerning state fiscal effort and juvenile incarceration rates over an extended period of time, 1986-2011, in the United States? Are effort slopes decreasing, flat, or increasing?
    a. What are the effects of an increasing slope on juvenile incarceration rates?
    b. What are the effects of a decreasing slope on juvenile incarceration rates?
    c. What are the effects of no slope on juvenile incarceration rates?
    d. What are other effects?

2. Is there a relationship between states' fiscal effort and the trend in state juvenile incarceration rates over an extended period of time, 1986-2011, in the United States?
    a. Is there a relationship following a 5-year time lag in incarceration rates?
    b. Is there a relationship following a 10-year time lag in incarceration rates?
    c. Is there a relationship following a 15-year time lag in incarceration rates?
    d. Is there a relationship following a 20-year time lag in incarceration rates?

Significance of the Study

In light of the most recent economic climate dubbed the 'worst recession since the 1930s' by McNichol, Oliff, and Johnson (2010), states are facing a challenge when constructing their budgets, leading to cuts and a reduction of services in order to provide the balanced budget 49 of the states require by law. In fiscal year 2010, gaps in state budgets approached 29%. Federal aid, which assisted states in continuing their level of services, will soon be almost completely nonexistent. Within the myriad of services states consider each year lies education.

Education, like many other entities, contends for the same state dollars. The impact of depleted educational funding is found in several places. Education affects human capital. An educated society has the ability to obtain employment and compete globally, leading to disposable income and the ability to pay taxes. All of which add back into state coffers over time (Owings & Kaplan, 2013). Education is an investment in the economic future.

Beyond this, the ability to successfully complete a public high school education is a legal responsibility following the enactment of No Child Left Behind, however, its

implementation does not come without added expense. NCLB drastically increases the expense of educating a student (Mathis, 2003). All students must reach a proficient level of education and graduate from high school in a timely manner. The legal need for graduation was highlighted in Goals 2000 with a required 90% graduation rate (Hanushek & Raymond, 2001). During her tenure, even former Secretary of Education Spellings (2008) called the graduation rate 'abysmal' and that the 'nation can no longer tolerate' the level of students who leave the educational setting (p. 1).

Academic success and graduation from high school are more important today than they ever were. With approximately 7,000 juveniles leaving education each day (Alliance for Excellent Education, 2007) many not only fail to add economically to society, they also face incarceration. Teens who leave the academic setting increase their chances of incarceration by 3.5 times when compared to juveniles who complete high school (Coalition for Juvenile Justice, 2001).

When examining the methods used to increase academic success and keep students in school, a variety of items and programs stand out. Recruiting and hiring effective, high quality teachers proves to be one of the most successful (Darling-Hammond, 2000), reduced class size in the primary years also increases student success through the creation of a strong academic foundation (Pate-Bain et al., 2010). Early childhood education, mentors, and counseling are called for to decrease both the dropout and incarceration rate (Coalition for Juvenile Justice, 2001). Unfortunately, all of these initiatives require significant funding.

Overall public education is expensive, at least if it is to be successful. The determination of a relationship between the fiscal effort a state places on education may

make a difference in these important student indicators. Therefore, a study of state fiscal effort when compared to juvenile incarceration rates over more than twenty years is important. Funding should be carefully analyzed before being addressed and assigned to a line item on a budget. A national, longitudinal review of state fiscal effort when compared with the student indicators of high school graduation and juvenile incarceration rates would provide direction for the public, school boards, and state and local legislators when creating budgets or lobbying for funding.

Methods

Research Design

The design of this study is correlational, examining change over time with repeated measures, focusing on analyzing the relationship between state fiscal effort and juvenile incarceration rates. Ex post facto correlational design will be used to address the research questions including data at the state level spanning more than 20 years. Research Question 1, "What type of trends exist concerning state fiscal effort and juvenile incarceration rates over an extended period of time, 1986-2011, in the United States? Are fiscal effort and juvenile incarceration rates correlated? Are effort slopes decreasing, flat or increasing?" will be studied using bivariate correlation to measure the strength of the relationship.

Research Question 2, "Is there a relationship between states' fiscal effort and the trend in state juvenile incarceration rates over an extended period of time, 1986-2011, in the United States?", will be studied using a repeated measures Analysis of Variance (ANOVA) with a 5, 10, 15, and 20 year time lag. As with most fiscal changes in large

institutions, other change does not occur simultaneously. The effects of changes in funding upon juveniles may not be revealed until years later. The time-lagged research design will allow for any delayed effect between variables to be effectively studied.

Variables

The targets of this study consist of juvenile incarceration rates for each of the fifty states and the District of Columbia over an extended period of time. With over 24% of the United States classified as 18 years old and under in 2008 Census data (U.S. Census Bureau, 2009), this population is significant. States range from a 31% juvenile population in Utah to a 20.8% rate in Vermont. Incarceration rates range from 534 per 100,000 youth committed in South Dakota, the highest rate in states that recognize 17 as the upper age range for juveniles, to 59 per 100,000 youth in Vermont (Office of Juvenile Justice and Delinquency Prevention, 2010).

Fiscal effort for each state and the District of Columbia was calculated using a ratio of education expenditures in relation to the tax base. Owings and Kaplan (2013) state this ratio as $E = R/TB$, where E represents fiscal effort, R represents school expenditure revenue, and TB represents community wealth based on Gross State Product.

Data Collection and Source

Pre-existing quantitative data were collected from multiple sources including the current state per pupil expenditure on education, the Gross State Product (GSP) on a per capita basis, State Personal Income (SPI) on a per capita basis, and juvenile incarceration rates. Various databases were utilized including U.S. Department of Commerce Bureau of Economic Analysis, Educational Finance Statistic Center, and Office of Juvenile Justice and Delinquency Prevention.

Analysis Techniques

When completed, the rich data will allow the researcher to carry out statistical analyses that include ANOVA calculations designed to determine a possible relationship between fiscal effort and incarceration rates.

Conclusion

With the need for monetary funding in the current economic climate, State Departments of Education in conjunction with schools themselves will have to justify their specific needs for funding. In order to avoid increasing cuts and continue to advance in student achievement, a clear picture of why educational dollars are well spent and how these dollars provide a valuable asset to the state is needed. The connection between juvenile incarceration with its ongoing negative impact on both the individual and the economy aligned with the budgetary distribution of state funds, provides a stunning picture of the health of the economic system and the importance of how money is utilized and where positive impact for society lies. The link between the fiscal effort of states with regard to education and a decrease in incarcerated juveniles would provide additional resources for the budget argument and the possible reallocation of available money to provide additional impact on the economy and the welfare of the country.

Overview of the Study

Chapter 1 focuses on an introduction of the issues facing education and the juvenile population today, the background and context of these questions, a statement of the research problem, research purpose and questions providing direction to the study, the

significance of the study, and a brief research methods overview. A definition of important terms follows. Chapter 2 contains a review of important literature existing on the topic. This includes background information on the history of school funding, fiscal capacity and effort, educational reforms and accountability, student achievement and funding, and outcome measures. A discussion of the research methodology is included in Chapter 3 that centers on the chosen research design and data collection. An analysis of the data collected as it pertains to the research questions is contained in Chapter 4. Chapter 5 concentrates on the summary and discussion of the research findings. This also includes limitations to the study and implications for both practice and future research.

Delimitations

Correlational studies, while being statistically significant in determining relationships between two variables, do not necessarily determine causation or express a perfect correlation. The use of the CJRP data, while the most comprehensive available to the public, presents limitations due to the variables of collection and state incarceration regulations. State juvenile custody rates vary with respect to the upper age of the offender considered a juvenile. While most states consider 17 years old to be the upper range, ten states set the age range to 16 years old, and three states to 15 years old. Juveniles aged sixteen to seventeen comprise at least 50% of the residential population (Office of Juvenile Justice and Delinquency Prevention, 2014). Thus states with higher upper age ranges might have larger residential juvenile populations. States with large urban and low social economic areas can influence the residential placement rate, as these

factors are related to crime statistics. States with large rural areas face their own anomalies with regard to available bed space. CJRP does not include juveniles in adult facilities or those confined in drug treatment or mental health placements. Juveniles held in tribal facilities are not included in the data due to incomplete reporting and the uniqueness of each facility. However, the number of youth in these facilities is small, 150 juveniles on average per year (Office of Juvenile Justice and Delinquency Prevention, 2014). Also, prior to 1997 data collection was not available for each state consistently.

Correlational designs allow a prediction of scores and possible explanation of the relationship between the two, leading to generalization of results, a strength of the study. Since data from the entire nation, the examination of the national juvenile population, over a significant period of time was used, external validity is strong and generalization less problematic. The study will expand on previous educational research by inspecting the amount of educational funding supplied by individual states in conjunction with reliable outcome indicators over a substantial amount of time, more than fifteen years, adding to the current literature.

Definition of Terms

Adjudication- A process carried out by the court system that establishes that the juvenile in question carried out the act of which they are accused. This corresponds with the term convicted in the adult court system (Office of Juvenile Justice and Delinquency Prevention, 2008).

Age- In relationship to incarceration rates, age is the juveniles chronological age based on date of birth on the last Wednesday in October, when the census is conducted (Office of Juvenile Justice and Delinquency Prevention, 2008).

Committed- Juveniles who are committed are in either adult or juvenile facilities, both public and private, who have been either adjudicated and disposed as a juvenile or convicted and sentenced as an adult (Office of Juvenile Justice and Delinquency Prevention, 2008).

Drop-out Rate- The process for determining state high school drop-out rates focuses on the cohort of students who began high school four years earlier and the number of these students who graduate at the end of that four year period. The number of students who began in the cohort divides the number of graduating students who earned a regular high school degree. The denominator is amended for students who leave the building to continue their education at another institution and those who pass away (Spellings, 2008).

Fiscal Capacity- The ability of a government, for this study a state government, to raise its own revenue.

Fiscal Effort- A simple ratio of expenditures to the tax base, specifically $E = R/TB$. In this equation E represents fiscal effort, R represents revenue for school expenditures, and TB represents the tax base or a measure of wealth (Owings & Kaplan, 2006). At the state level the variable for revenue (R) is determined by the current state per pupil expenditure on education. Both the Gross State Product (GSP) on a per capita basis and the State Personal Income (SPI) on a per capita basis represent the tax base (TB) in separate calculations.

Graduation Rate- The number of students who graduate in four years with a regular high school diploma divided by the number of students who entered high school four years earlier, adjusted for transfers, students who emigrate and deceased students (Speller, 2008).

Gross State Product (GSP)- The sum of all the goods and services produced in that state in a one-year period (Owings & Kaplan, 2006).

Juvenile Incarceration Rate- Number of juveniles committed to correctional facilities including detention facilities (Office of Juvenile Justice and Delinquency Prevention, 1997).

Revenue- At the individual state level revenue is determined by the current state per pupil expenditure on education (Owings & Kaplan, 2006).

State Personal Income- Per capita personal income within the state level consists of "monetary earnings in return for labor, property income from land, and transfer receipts" (Bureau of Economic Analysis, 2010, p 24).

CHAPTER 2

LITERATURE REVIEW

With the implementation of No Child Left Behind the focus on student achievement has never been greater. The components that allow for student academic success are varied and many, however, the pathway leading to many of these components are found through funding. Therefore, this chapter contains a review of the federal, state, and local governments' role, funding, fiscal capacity, fiscal effort, educational reform, and accountability. The literature review also focuses on educational production function, student achievement and funding, and student outcome measures.

The Federal, State, and Local Government's Role in School Finance History

In the eighteenth century, Thomas Jefferson endorsed public education and the development of public schools as espoused in Adam Smith's *Wealth of Nations*, published in 1776. Smith linked an educated public to the development and continuance of a healthy economy (Hanushek, 1994). Unfortunately, public education for all remained an ambitious dream until much later. Widespread, free public schools were not established until the mid to late 1800s due to the influence and persistence of both Henry Barnard and Horace Mann (Odden & Picus, 2004). School finance, however, was addressed during the infancy of public education in 1647 with the "Old Deluder Satan Act" requiring localities to erect and financially support a school or pay a neighboring town to educate its children through the utilization of local taxes (Odden & Picus, 2004). As education grew in importance, state governments began to incorporate requirements

for its funding into their constitutions. In 1820 over half the existing states had formally addressed public education (Odden & Picus, 2004).

Funding and the Federal Government

The federal government's role in the administration and funding of public schools has been limited due to the Tenth Amendment which assigns powers not specifically outlined as a responsibility of the federal government to state and local government bodies (Education Commission of the States, 2006). This assignment of responsibility reduces the monetary input by the federal government towards education within individual states (Alliance for Excellent Education, 2004). For every dollar spent on education, the federal government contributes only 12.7 cents (Snyder & Dillow, 2013). Therefore, funding of education falls mostly on the state and local governments' shoulders.

Funding and the State and Local Government

Prior to the involvement of the state within the funding formula of schools, historically, funding was a local initiative. This stand-alone perspective led to academic inequities based on where a child lived; therefore, wealthier areas could support better instruction and poorer areas lacked this capacity. As education became more costly, financial assistance from the state was sought and has increased throughout the 20th century. Currently there is a "partnership between state and local governments in an effort to educate all children in an equitable manner" (Brimley & Garfield, 2002, p.77). Local funding is the most diverse monetary source and forms the bedrock other types of funding is built upon. Property taxes, the tax placed upon land and buildings, is the most common form of local tax revenue. Based on the Massachusetts Law of 1647, created

when income was generated by agriculture or independent businesses, property taxes are still levied and heavily relied upon. Other local funding sources include local sales taxes, property sales, and investments (Owings & Kaplan, 2013). State education funding sources are based on the gross state product. The GSP can include per capita income or state income tax, property tax, and sales tax (Owings & Kaplan, 2013). Additional sources of funding can include lotteries, severance taxes, or taxes on the use of naturally occurring products such as oil or timber, corporate income tax, and sumptuary or sin taxes (Owings & Kaplan, 2013).

While both local and state governments provide a portion of the cost of running school districts, each contributes differently depending on the state and their equalization formulae. A review of relevant literature reveals: The amounts of funding districts receive varies and is determined by several different programs. The most popular program is a foundation program where the state provides a minimum amount for every student in the state, regardless of the school districts' ability to fund education, forming a foundation for localities to build upon. Modified foundation programs try to equalize funding in school districts across individual states by following funding formulas. Funding formulas adjust the state's share of the education dollar depending on the localities ability to provide for education through taxes. Localities with a greater ability to fund education receive less financing from the state government. Those who have less of an ability to carry the debt receive more, thus providing a monetary base from which districts can operate. District power equalization programs follow an inverse ratio formula. The state determines the amount of funding needed to successfully educate a child then provides funds in an inverse proportion to the district's ability to pay. Of the

three main programs most states, 46%, subscribe to foundation programs, 18% of states use a modified formula program, and 10% use a power equalization formula (Brimley & Garfield, 2002).

Differences

The variance in funding between the federal government, individual states, and localities leads to different amounts of funding applied towards education. Table 1 below illustrates the difference among states.

Table 1. Summary of Public School System Revenues for Elementary and Secondary School Districts, by State: Fiscal Year 2011

[in thousands of dollars]

State	Elementary-secondary revenues[1] Total	Federal revenue	State revenue	Local revenue
United States	$607,256,777	$74,943,767	$267,762,416	$264,550,594
Alabama	7,375,156	1,077,070	3,965,614	2,332,472
Alaska	2,357,828	420,152	1,416,163	521,513
Arizona	9,312,673	1,367,644	3,839,130	4,105,899
Arkansas	5,209,009	834,685	2,667,090	1,707,234
California	68,637,755	9,995,705	37,793,351	20,848,699
Colorado	8,768,244	979,904	3,543,208	4,245,132
Connecticut	9,673,216	799,526	3,254,757	5,618,933
Delaware	1,800,918	202,501	1,073,154	525,263
District of Columbia	1,837,222	227,234	†	1,609,988
Florida	26,446,473	4,710,376	9,069,119	12,666,978
Georgia	18,035,305	2,267,612	7,499,327	8,268,366
Hawaii	2,499,513	347,363	2,088,870	63,280
Idaho	2,152,439	299,354	1,371,789	481,296
Illinois	28,700,441	2,895,524	9,304,948	16,499,969
Indiana	12,047,434	1,059,777	7,483,801	3,503,856
Iowa	5,876,820	596,688	2,537,754	2,742,378
Kansas	5,537,274	612,100	2,945,175	1,979,999
Kentucky	7,103,292	1,164,688	3,704,126	2,234,478
Louisiana	8,217,220	1,570,393	3,404,656	3,242,171
Maine	2,600,312	289,346	1,045,786	1,265,180

Table 1 (*continued*)

Maryland	13,439,078	1,255,964	5,508,339	6,674,775
Massachusetts	15,255,880	1,197,383	5,783,240	8,275,257
Michigan	19,463,241	2,677,078	10,710,646	6,075,517
Minnesota	11,185,403	886,619	6,657,769	3,641,015
Mississippi	4,507,702	1,006,465	2,071,467	1,429,770
Missouri	10,102,453	1,389,362	2,963,196	5,749,895
Montana	1,618,618	264,594	713,886	640,138
Nebraska	3,801,928	571,969	1,153,077	2,076,882
Nevada	4,195,561	447,888	1,388,154	2,359,519
New Hampshire	2,845,195	184,768	1,061,011	1,599,416
New Jersey	25,688,539	1,320,021	9,521,328	14,847,190
New Mexico	3,634,068	641,925	2,390,635	601,508
New York	57,583,114	5,127,425	23,189,453	29,266,236
North Carolina	14,778,244	2,086,278	7,690,062	5,001,904
North Dakota	1,262,676	186,844	630,430	445,402
Ohio	23,718,610	2,762,051	10,510,451	10,446,108
Oklahoma	5,840,364	970,577	2,745,748	2,124,039
Oregon	6,062,018	848,637	2,792,762	2,420,619
Pennsylvania	27,223,440	3,469,273	9,309,365	14,444,802
Rhode Island	2,273,004	244,530	830,220	1,198,254
South Carolina	7,845,796	1,051,679	3,408,719	3,385,398
South Dakota	1,295,143	262,395	374,648	658,100
Tennessee	8,645,594	1,272,825	3,955,476	3,417,293
Texas	52,211,699	8,009,703	20,699,461	23,502,535
Utah	4,321,123	519,547	2,211,870	1,589,706
Vermont	1,518,109	107,275	1,339,844	70,990
Virginia	14,418,028	1,427,301	5,351,177	7,639,550
Washington	11,816,324	1,367,629	6,758,505	3,690,190
West Virginia	3,464,575	510,256	1,927,726	1,026,593
Wisconsin	11,405,841	1,002,909	5,226,954	5,175,978
Wyoming	1,646,865	154,955	878,979	612,931

† Not applicable. The District of Columbia revenues comes from local and federal sources only.

1Interschool system transactions are excluded to prevent double counting.

2Funds spent operating local public schools and local education agencies, including such expenses as salaries for school personnel, student transportation, school books and materials, and energy costs, but excluding capital outlay, interest on school debt payments to private schools.

and payments to public charter schools.

3Includes payments to state and local governments, payments to private schools, interest on school system indebtedness, and non-elementary-

secondary expenditures, such as adult education and community services expenditures.

NOTE: All local education agencies reported in the School District Finance Survey (F-33) are included in this table

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "School District Finance Survey (F-33)," fiscal year 2011, Provisional Version 1a

The various ways funding is determined leads to a wide range of monies spent on the individual student. In the 2012/13 school year, the per pupil index spending, average per pupil expenditures by state, ranged from a high of $19,752 in Vermont to a low of $6,9479 in Arizona (National Education Association, 2014). Funding differences such as these appear between states and have an impact on the quality of education. In the 2003/04 school year, Liu (2006) found that "the ten highest spending states spent an average of more than 50% more dollars per pupil than was spent by the lower spending ten states" (p. 2). With such a discrepancy in spending between states on education, student academic achievement can be effected.

Fiscal Capacity

Capacity is the ability of a body of government, local, state, or federal, to fund the items it believes are important in this case, education. Owings and Kaplan (2013) define fiscal capacity as the "tax base compared to some measure of wealth" (p.132). This applies to all three areas of educational funding, local, state, and federal. Alexander and Salmon (1995) also define fiscal capacity as "a governmental tax base as measured by income or some other fiscal gauge" (p. 158). Capacity can be measured in a variety of ways and at different governmental levels; however, its measurement is not as clear-cut as may seem. Localities have different levels of income determined mainly by property taxes. Local capacity is determined by the state based on a ratio using property values as the numerator and divided by the denominator of the number of students within the community (Owings & Kaplan, 2006). This simplistic formula leads to inequities, as not every locality has the same wealth or tax base but may have the same number of students.

Therefore, localities struggling economically cannot bring the same resources to bear on education requiring states to equalize for the difference through the use of funding formulas. These rely on state income tax and sales tax for income. Funding formulas require high capacity localities to provide a greater proportion of the education dollar while lower capacity districts are funded to a greater level by the state. Just as variances exist within localities, they exist at the state level as well. States can measure capacity based on capita or total population, others on a per student enrolled in public school basis (Owings & Kaplan, 2013). Income measures are cautionary as state wealth can quickly change as determined by employment rates and cost of living fluctuation.

National fiscal capacity is measured in different ways. The Gross National Product (GNP) is the total value of all goods and services during a fiscal year. The Gross Domestic Product (GDP) includes the total output of a country regardless of where that production occurs over a fiscal year (Owings & Kaplan, 2013). Currently GDP is favored when determining national fiscal capacity. Fiscal capacity in itself does not determine funding for education; it couples with the governing bodies desire to fund education, or fiscal effort.

Fiscal Effort

Fiscal effort and capacity work together when determining the amount of funding for education. Owings and Kaplan (2013) define this balanced relationship.

> Fiscal effort measures how much a locality, state, or nation spends of its resources in relation to capacity-or the ability to pay. Measuring capacity is a good place to start examining how much a nation, state, or locality can afford to spend on

education. The relative effort of that spending-the degree of exertion or fiscal struggle a community commits to its resources for education-tells a more robust story about what people value. (p. 152)

There are varying combinations of fiscal capacity and fiscal effort. Communities can be poverty stricken with low capacity but still place a lot of effort, commitment of the monetary resources available, into education. Likewise, a community can be wealthy with a high capacity but when examined closely place little effort, or a small amount of the possible monetary resources, into its schools. Both may ultimately provide the same level of education but the community with fewer resources has expended more effort and made a greater commitment. The ratio between monetary resources and the actual amount spent per pupil is effort. Figure 3 below illustrates the possible relationships between capacity and effort.

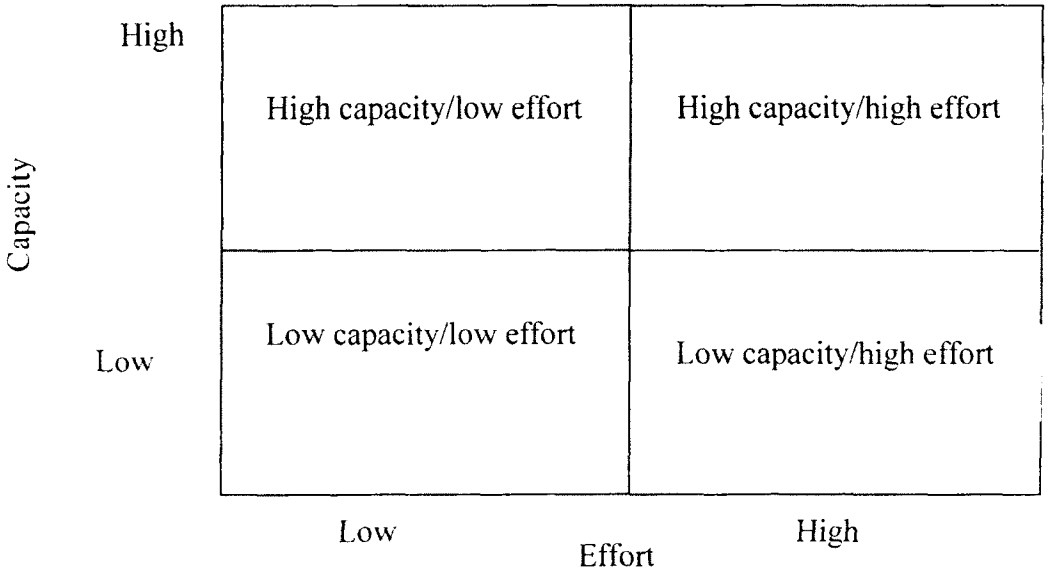

Figure 3- Relative Fiscal Capacity and Effort.

Source: Owings and Kaplan (2013, p. 132).

Several factors influence how much effort a community is willing to put forth toward education. These can be widely varying in nature. The attitude the public has regarding education, schools, and teaching influences how they will vote when levying taxes. Does the public feel welcome within the schools? Is there positive communication between the two entities? The economic condition of the community and the public attitude concerning taxes themselves contribute to funding resources. Also, the amount of children within a community determines if education is valued. Communities with an older population tend to put forth less effort towards education and more towards other services (Owings & Kaplan, 2013). Likewise, the number of students within private schools versus public schools can determine effort. There is no clear factor that determines how a locality will react to education and the effort it will endorse (Owings & Kaplan, 2013).

While the concept of fiscal effort and the factors that drive it seem complex, computing it falls to the use of a simple ratio of expenditures to the tax base. Owings and Kaplan (2013) state the ratio as:

$$E = \frac{R}{TB}$$

In this equation E stands for fiscal effort, R stands for revenue for school expenditures, and TB stands for the tax base or community wealth. Using this ratio the index for effort will never rise above 1.0. A number above one would mean that the community spent 100% of its revenue on education, with nothing spent on other community expenses.

Effort can be determined for each level of government, federal, state, and local. At the state level the variable for revenue (R) is determined by the current state per pupil

expenditure on education. Both the Gross State Product (GSP) on a per capita basis and the State Personal Income (SPI) on a per capita basis represent the tax base (*TB*) in separate calculations. States tend to measure their wealth based on SPI, which provides relatively stable revenue because the measure of wealth is spread across various sources such as real estate, income, and sales tax. GSP provides a control for fluctuations in the economy. However, the use of both GSP and SPI creates a more reliable statistical representation and a better assessment of effort. The ratio makes fiscal effort a more accurate description of educational financial commitment by states due to the comparison against the tax base, equalizing for disparities between wealthy and poor localities.

Educational Reform and Accountability

A Nation At Risk

In 1981 the Secretary of Education, T. H. Bell, created the National Commission on Excellence in Education as a response to the perception of the ineffectiveness of the public education system. The Commission was directed to review the quality of teaching in elementary and secondary schools, colleges, and universities, to compare the American school experience with other developed countries, to determine the extent of a student's high school experience with their ability to be accepted into college, to identify educational programs that lend themselves to student success in college, to determine how social changes have affected student achievement, and to outline issues in education that must be overcome to create a successful educational program (National Commission on Excellence in Education, 1983).

The findings of the Commission were wide and varying. Comparison of student achievement between industrial nations, based on 19 different assessments, showed American students fell behind their international peers, at times placing last. Adults and students were found to be functionally illiterate with rates ranging from 13% to 40%. Scholastic Aptitude Tests, SAT's, revealed a decline in scores for high school students beginning in 1963. Businesses and the military reported on the need for remedial instruction in reading, mathematics, and science for recent college graduates. The Commission concluded, "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. The negative impact of this fact cannot be overstated" (National Commission on Excellence in Education, 1983, p 25).

With the release of the Commission's findings, *A Nation At Risk,* in 1983, scrutiny was placed on the educational system with a call for accountability for student educational success. Commission recommendations centered around five areas: content, educational expectations, time spent on schooling, teaching and leadership, and fiscal support (National Commission on Excellence in Education, 1983). Among the specific recommendations were:

- Raised expectations for student achievement and behavior at both the high school and college level.
- Increasing high school graduation requirements to include four years of English, three years of mathematics, three years of social studies, three years of science,

and half a year of computer science. Two years of a foreign language was recommended for students planning on attending college.

- Raised admission requirements at colleges and universities.
- Increasing the public school day to seven hours and a 200-220 day school year was recommended.

The reaction to *A Nation At Risk* in the educational community was immediate. Most states, 45, underwent an evaluation process and implemented some sort of educational reform in order to increase student learning and rigor in the classroom as well as establish accountability (Jennings, 1995). Spending on schools and instruction was increased. Curriculum and required classes were structured to raise academic rigor. Administrative supervision of teachers was stressed as part of the push for quality educators. Requirements for licensure of both teachers and administrators were reviewed and tests to determine student competency were developed (Finn, 1988). Assessments supplied a measure to determine student progress and achievement. Schools reorganized around the desire to create this outcome, high test scores, forming a business model (Murphy, 1991). The business model, with a centralized method, was predicted to improve the educational system (Hallinger, 1992). However, the reform was unsuccessful and assessment scores did not rise (Finn, 1992).

Goals 2000: Educate America Act

Following *A Nation At Risk* in 1994 was *Goals 2000: Educate America Act.* P.L. 103-227, President G. H. W. Bush's statement on the need for and development of educational goals at a nationwide level (Hanushek & Raymond, 2001). This law provided a framework and funds to apply towards increased student achievement. To

receive funding, states created school improvement plans focusing on student achievement, professional development, and pre-service teacher training. *Goals 2000* included raising the high school graduation rate, increasing student readiness to learn, ensuring a demonstration of subject area competency by students in the 4^{th}, 8^{th} and 12^{th} grades determined by state chosen or created assessments, focusing on quality teacher development along with professional development for current teachers, making the United States first in the world in mathematics and science student achievement, creating safe schools, increasing parental participation, and ensuring continued adult literacy (Paris, 1994). The law led to the first national curriculum standards. States could choose to assume the standards or use them as a base for creating their own. All standards are submitted to the U.S. Department of Education (Hoff, 1998).

No Child Left Behind Act of 2001

While *Goals 2000* and *A Nation At Risk* focused the United States attention on student achievement and assessment, *No Child Left Behind* (NCLB) cemented these ideas into the public consciousness. NCLB, or Public Law 107-110, went in effect in 2002, impacting state and local school systems across the country. Rod Paige, former Secretary of Education under President G. W. Bush, succinctly stated the areas the law would directly impact in an open letter to the nation's educators:

> This historic reform gives states and school districts unprecedented flexibility in how they spend their education dollars, in return for setting standards for student achievement and holding students and educators accountable for results. The No Child Left Behind Act also provides more options for parents so that their children can get the best possible education. It also invests in teaching practices

> that have been demonstrated to work. In short, it aims to "foster an environment in which every child can learn and succeed". (U. S. Department of Education, Office of Elementary and Secondary Education, 2002, p. 3)

No Child Left Behind, NCLB, revolves around several premises including:

- Accountability for student results
- Flexibility in the distribution of federal funds
- The inclusion of scientifically-based teaching methods and strategies
- Increased reading instruction and ability, especially for young students
- A focus on teacher quality
- Parental choice
- The assessment of students determined to be Limited English Proficient

Because of the scope of NCLB it "affects almost everything under the Elementary and Secondary Education Act, influencing and changing programs as wide ranging as Title I and the Safe Schools Initiative" (U. S. Department of Education, Office of Elementary and Secondary Education, 2002, p. 3).

The main focus of NCLB is accountability at the state, district, and school level as determined through the analysis of student performance in an effort to assist all students in reaching high academic standards. Toward this goal, NCLB required states to create annual assessments based on challenging curriculum benchmarks for reading, mathematics, and science. These assessments will show that the state department of education, as well as local educational districts, have instituted a series of minimal academic assessments in reading or language arts, mathematics, and science to be utilized

as the main determining factor of the yearly student performance and a reflection of the efforts made to meet the state's academic standards (NCLB, 2002, Sec. 1111 (j)).

A requirement of three separate testing occasions is mandated during a student's academic career within public school. Testing must occur between the 3rd through 5th grades, 6th through 9th grades, and 10th through 12th grades. States can assess students more than three times but not less (NCLB, 2002, Sec. 1111 (b) (3)).

Assessments are a critical component of Adequate Yearly Progress (AYP). Each state improvement plan must show AYP as determined by student performance on state-based assessments in an effort for all public school students to meet the state's curriculum standards. This is to be accomplished while narrowing achievement gaps between identified groups of students and while maintaining challenging academic requirements. NCLB, through AYP, mandates states to guarantee the academic success of all students including racial and ethnic minorities, students with disabilities, students with a low socioeconomic status, and students with limited English proficiency (NCLB, 2002, Sec. 1111 (2) (B)). Academic student success is to be accomplished with assessments that are valid and reliable and result in continuous academic improvement. These assessments are to be used to measure the progress of public elementary and secondary schools and local educational agencies based on the outcome, student academic success. They are to include separate measurable annual objectives for continuous improvement for all students (Council Of Chief State School Officers, 2002).

A starting point for adequate yearly progress was determined through the data collected during the 2001/02 school year. Based on these data, every state must set its starting point and determine the percentage of students that meet or surpass the minimum

pass rate or proficient level on the created state assessments. There are two possible ways to develop the starting point. States may base the position utilizing school enrollment focusing on the school ranked at the 20th percentile in enrollment among a listing of all schools ranked by the percentage of students at the proficient level or the position can be determined by identifying the lowest achieving identified group of students within the state then assessing their pass percentage at the proficient level. States must use the higher percentage as the baseline (NCLB, 2002, Sec. 3217 (c) (1)).

NCLB requires all states to meet the goal of a 100% pass proficient rate on state assessments. In an effort to turn this into a reality, states are to incorporate timelines into the AYP parameters.

> Each state shall establish a timeline for adequate yearly progress. The timeline shall ensure that not later than 12 years after the end of the 2001-2002 school year, all students in each group described in the subparagraph (C) (v) will meet or exceed the State's proficient level of academic achievement on the State assessments under paragraph (3) (NCLB, 2002, Sec. 1111, (b) (1) (F)).

The timelines must contain annual measurable objectives constant for each district and based on the individual state's determined proficient level. The requirements for meeting the AYP goals are established individually for mathematics and reading but will be the same for all schools within the state, recognizing a minimum percentage of students who must meet or exceed the predetermined proficiency level applicable to each subgroup of students. All students, in every subgroup, must meet or exceed the set proficiency level on state academic assessments within the predetermined timeline (NCLB, 2002, Sec. 411, (b) (3)). Intermediate goals will be included in reaching the plan to meet the final goal.

These short-term goals will also include measurable objectives reflective of the main state goals and increase in equivalent increments over the length of the timeline. The first increase must occur within two years (NCLB, 2002, Sec. 1111, (b) (2) (H)).

A minimum of 95% of each identified sub-group of students must be assessed and meet or exceed the state objectives in order for each state to meet the requirements of AYP. Schools within the state will have also successfully achieved AYP, if the percentage of students in a sub-group that did not meet or exceed the proficient level on state created assessments increased by at least 10% from the previous year and if the same sub-group showed an increase on one or more other academic indicators. This can be achieved utilizing accommodations and alternative assessments as outlined under the Individuals with Disabilities Education Act (IDEA). If, however, the number of students in a sub-group does not provide a statistically significant result, creating unreliable information, or if the individual student can be identified, the requirement for the testing of 95% of the population of a sub-group would not apply (NCLB, 2002, Sec. 1111, (b) (I)).

The large impact of *A Nation At Risk* that led up to *No Child Left Behind* with an ever-increasing focus on accountability began a series of reforms within other areas of education. These were designed to support student achievement while scrutinizing and defining all areas of public education.

Efficiency and Reform

Funding and accountability revolve around the idea of efficient education, forming the core of reform movements.

An effective reform effort requires a stable and useful definition of the focus of

> the reform. If efficiency is an important objective of school finance reform, then we need to examine and adopt an operational definition of efficiency. (Anderson, 1996, p. 157)

To address this need, the Center for the Study of Educational Finance (CSEF) developed the quadriform approach. This production-based method focuses on the relationship between expenditures and outcomes (Anderson, 1996). Four definitions of efficient schools were created by Anderson in 1996, falling into a quadrant system:

- Efficient Schools are those with high outcomes and low expenditures.
- Inefficient Schools are those with low outcomes and high expenditures.
- Frugal Schools have both low outcomes and low expenditures.
- Lighthouse Schools have both high outcomes and high expenditures.

Curriculum Reform

Standards-based reform, beginning in the 1980s, pulls all the current educational reform together to focus on setting measurable academic standards, or goals, determined by student achievement. There are three main components involved which are a challenging curriculum, standards of student learning, and assessments. Therefore, curriculum, instruction, and assessments must be aligned to effect student performance (Barton, 2001). However, there is a commitment required of educators to successfully implement this reform.

> In order to create an operating environment conducive to restructuring using a whole school, high-performance design districts must also restructure themselves. They must convert the district to one that supports a school based decentralized strategy and raise awareness that major and fundamental changes are needed to

> reach the goals of teaching more students to high standards. (Odden & Busch, 1998, p.53)

While standards-based reform might be limited, the current social and political climate favors its continuation as long as positive results are seen and attitudes do not change (Barton, 2001).

Finance Reform

In the past, school finance has been focused on the elimination of fiscal capacity disparities between schools and districts whether through equalizing per-pupil index spending or taxpayer equity (Picus, 2000). This view has shifted and transformed into providing the opportunity for the success of all students while ensuring high student academic performance results (Goldberg, 2000). However, this change has just begun. Currently, there are significant differences in spending practices and funding within school districts and states. Factors such as at-risk and special needs students contribute to spending differences as well as variations in teacher salaries (Goldberg, 2000). Connections could be made between funding and educational factors, an overall interdependence. According to Shoup and Studer (2010) the theory of complexity can be used to describe the association between variables, as opposites along the line for homeostasis.

Spending dissimilarities are reflective of the property wealth of the community and the fiscal effort expended in the form of taxes. Direct correlations between per pupil expenditures and property wealth occur, where both either rise or fall in concert (Odden, 1999).

Low property wealth districts are doubly disadvantaged, they not only had high

> tax rates but also had low education expenditures and a lower quality education program. High property wealth districts are doubly advantaged; they have both low tax rates and high education expenditures and, in most cases, a higher quality education program (Odden, 1999, p. 5).

Reallocating wealth across the district or state focuses on student equality but does not address the need for increased student achievement. Even though educational finance is in disarray, the move for reform remains in the forefront for both federal and state governments (Odden, 1994).

Educational Production Function

With the focus on increasing student achievement, analysts utilized a business-like viewpoint used in microeconomics and began using educational production functions (Hanushek, 1979). The production function depicts the maximum output possible based on various input factors. Outcomes usually reflect student performance on standardized assessments, while inputs follow family, student, and school characteristics (Hanushek, 1979).

While Hanushek (1979) employs production functions in his research, he does recognize problems associated with the methodology when used indiscriminately. For instance, the lack of external validation of the standardized assessments chosen for outputs is a major concern. Do the standardized assessments chosen measure knowledge the public finds constructive such as increasing a student's value in the labor market or socialization? At times, inputs seem to be chosen by the availability of data. Variables are omitted, such as innate ability, which affects the model through their correlation with

studied variables (Hanushek, 1979). Even so, Hanushek feels that production functions have their place and have remained viable over time.

"The strength of the production function studies lies in their policy relevance through investigation of the independent influences of various factors-student characteristics, teacher and school inputs, and other environmental attributes- on performance of the schooling system" (Hanushek, 1979, p. 376).

A simple production model lies behind much of the analysis in the economics of education. "The common inputs are things like school resources, teacher quality, and family attributes, and the outcome is student achievement. This area is, however, distinguished from many because the results of analyses enter quite directly into the policy process.... quality differences in schools have a dramatic impact on productivity and national growth rates" (Hanushek, 2007, p. 2).

Odden and Picus (2004) also have identified concerns in the educational production function and why it has not been used successfully to ascertain a correlation between student performance and resources or funding, which are as follows:

- Inputs are hard to distinguish or clarify.
- The relationship between variables and how they influence each other are difficult to discern.
- Production functions assume that all schools used in research have the mission of increasing student achievement on assessments while this may not be true. Schools might be focused on the dropout rate or the student transition into the work force.

- Researchers assume that all teachers and administrators are working to increase student performance (Odden & Picus, 2004).

Monk (1990) uses a complex multivariate approach to analysis that he feels has a greater potential for use in educational policy. This includes all outcomes balancing an equation consisting of family backgrounds, peer inputs, and school resources multiplied by the function connecting the outputs (Monk, 1990).

Student Achievement and Funding

School resources and student academic success have been the subject of several studies, however, the wide variety of variables and analysis methods made integrating the studies difficult and the results contradictory. The study of the relationship between achievement and finance began with the Coleman Report in 1966. This report, written for the United States government, began as a study of inequality between schools and branched out, focusing on student performance. Named the Equality of Educational Opportunity Study (EEOS) and later renamed for the researcher, James Coleman, the study is one of the most comprehensive and significant of the late 20th century (Kiviat, 2000). The report was and is the largest project with the goal of understanding student achievement (Koski & Levin, 1998).

Coleman's nationwide study encompassed more than 600,000 survey responses from both students and teachers. Questions focused on family make-up, socioeconomic status, school funds and resources, and educational programs (Koski & Levin, 1998). Student achievement was examined using standardized assessment scores recording student ability in mathematics, verbal proficiency, and nonverbal relationships of selected

first, third, sixth, and twelfth grade students (Inter-University Consortium For Political And Social Research, 2007). Unlike most equity studies of the time, the data revolved around the outcome of student performance (Kiviat, 2000). The results painted an unexpected portrait. According to the study, student academic success was not tied into any school-related variable, such as class size or various programs. Instead, Coleman found that the largest influence on student achievement was the family demographics, specifically the mother's educational level and family socioeconomic status (Coleman, 1966; Kiviat, 2000). Based on Coleman's conclusions, funding and student achievement are not related (Hanushek, 1996a). However, the Coleman Report and the style of analysis was just the beginning, opening a floodgate of related studies and new interpretations on his data (Hanushek, 1979).

> The attention paid to the input-output analysis in the Coleman Report clearly reflects the direct policy importance of the analysis. Such information is critical not only to 'school management' but also to such diverse policy issues as school integration, accountability in schools, and the finance of elementary and secondary schools. The policy relevance of input-output studies has led to both rapid growth in number of analyses and a concerted effort to interpret the many different, and apparently contradictory, results. (Hanushek, 1979, p. 352)

In a response to the call for more educational dollars, Hanushek (1989) offers a response referencing the Coleman Report. He concluded in his meta-analysis of per pupil expenditures and school facilities that many of the studies reviewed were not statistically significant or contained negative results. "There is no strong or systematic relationship between school expenditures and student performance" (p. 47). He proposes that there

has been a large, 3% per year, increase in spending over the last 20 years leading to increased resources such as smaller class sizes, more programs, and increases in teacher salary coupled with a decline in student performance. Traditional uses of funding do not work to improve student academic success. To be effective, the organizational structure of education has to be addressed with an emphasis on teacher quality and the retention of teachers.

Hanushek's work drew its own criticism. Fortune (1993) examined the methodology of the analysis, especially the use of the production function. Validity of the outcome was questioned based on several factors.

- Confounded data elements were included.
- There was information missing on the sample sizes from the studies utilized.
- Case studies were of insufficient size and were deficient concerning the ability to generalize.
- The specific performance measures chosen.
- Research that was contrary to the summary was not cited or included.

A meta-analysis by Hedges, Laine, and Greenwald (1994) of Hanushek's data found that resources that make an impact include teacher experience, teacher salary, and small class sizes. The previous data were reviewed with controls set on student characteristics. Furthermore this analysis showed that an increase of per pupil expenditures by "$500 (approximately 10% of the national average) would be associated with a 0.7 standard deviation increase in student outcomes" (Hedges, et al., 1994, p. 11).

Production functions in education were reviewed by Odden, Monk, Yasser, and Picus in 1995. The study focused on the effective use of educational dollars to achieve

the greatest outcome in student achievement from 1960 to 1994. The researchers found that most of the funding was allocated for hiring teachers, reducing class size, and on special education programs. There was no significant positive impact on student achievement found through these methods. Odden, Monk, Yasser, and Picus (1995) concluded that the money utilized by education is not allocated effectively.

A study on the production function trend by Hirth and Mitchell (1995) explored the relationship between spending and student achievement in Indiana. The research focused on the 1993-1994 school year involving a variety of variables among homogeneous subgroups. While socioeconomic status of the family and performance were found to be positively correlated, spending and achievement were not related.

Per-pupil index spending and student academic success were found to be positively related by Greenwald et al. (1996) using production functions. The research, which included 60 studies, found that a wide collection of resources contributed to student academic success. This relationship was particularly true in the areas of small class size, teachers with more experience, and higher teacher salaries. The effect sizes found were significant enough to propose that increases in student performance could be attained with modest increases in educational funding.

Hanushek (1996b) argues that quality in education is lacking. Spending has increased over the years; however, there has been no correlating boost in student achievement. Hanushek goes on to compare student achievement to consumer goods, stating that while items such as toasters have improved in design quality over time and spending on them has increased due to inflation, school output or productivity quality has not as determined by scores on standardized assessments (Hanushek, 1996b).

In a study conducted with fifteen Texas elementary schools Murname and Levy (1996) concluded that increasing educational spending did not increase student achievement. Each school was given an increase of $300,000 in their yearly operating budget with little direction on how to spend the funds. Most of the schools, thirteen, chose to create smaller classes and hire additional teachers. In addition to this, the other two schools restructured their special education department to encompass a full inclusion model and included parents in several aspects of the governance of the schools such a budgeting, curriculum, and the hiring of staff. In the thirteen schools that participated in minimal changes, there was no significant increase in student achievement due to the extra funding. However in the two schools that restructured, student achievement did increase.

Eide and Showalter (1997) addressed the issue of student performance and spending using a quantile regression model instead of a straight production function model. The regression model did not focus on the student average performance. It allowed the researchers to determine if performance changes at various points in the distribution of gains in scores. The model chosen demonstrated the effect of independent variables on a dependent variable. The researchers concluded that student achievement was not effected by funding (Eide & Showalter, 1997).

Researchers from the RAND Corporation, including Grissmer, conducted a study of student performance and the accountability system in 1997. Family demographics were used as a control to determine if academic assessment gaps were closing and comparable on the Texas Assessment of Academic Skills compared to NAEP assessment scores. Data were collected for all Texas public schools and NAEP data from 1992 to

1996. Findings revealed that while Caucasian students made small gains with regards to increased financial input, minority and disadvantaged students made substantial increases. During the 1970 to 1990 time frame, educational spending and resources targeted minority and disadvantaged students, the same students who made positive gains in achievement.

Using several national data sets in an empirical study, Taylor (1997) determined a statistically significant relationship between student achievement and funding at the high school level. Information was compiled using the National Educational Longitudinal Study of 1988, the district level teacher cost index, and the Common Core of Data and utilized in a production function analysis making the study wide ranging (Taylor, 1997).

Rothstein (1999) studied student performance and spending on education in Texas elementary schools. To compensate for outside influences variables such as student academic potential and family socioeconomic status were kept constant. Data analysis revealed that there was a positive relationship between student achievement and funding, however, where the money is spent makes a difference (Rothstein, 2001). Rothstein found that quality teachers, student resources, and building maintenance all impacted student performance.

Hanushek and Somers (1999) conducted a study focused on government backed funding and the quality of schools to address the widening of the income distribution gap in the workforce as it relates to education. The research used data that spanned 30 years. Between 1965 and 1995, class size was drastically reduced while spending doubled. Despite this, the researchers found no increase in student performance. They went on to

further state that there was no connection found between per pupil spending by state and student achievement in mathematics and reading.

Teacher quality, experience, and class size were found to be determining factors of student success by both Ferguson (1991) and Darling-Hammond (1998). Darling-Hammond went on to state "teacher education, ability and experience, along with smaller schools and lower teacher-pupil ratios, are associated with significant increases in student achievement" (p. 7). Darling-Hammond (2000) exposed specific teacher characteristics that produce quality instruction such as more than three years of teaching experience, questioning techniques such as higher order questions paired with active, responsive listening, flexibility, a love of learning, instructional methods courses in the content area, knowledge of their subject area, and the ability to verbalize.

> In all cases, the proportion of well-qualified teachers is by far the most important determinant of student achievement. Other teacher quality variables contribute modestly to explaining student achievement. The proportion of teachers with master's degrees exerts a small, generally positive effect on achievement, while the proportion of uncertified new teachers exerts a small, generally negative effect. Together, these three teacher quality variables account for between 40% and 60% of the total variance in student achievement. (p. 30)

Studies of teacher quality and effectiveness in both Tennessee and Texas echoed Darling-Hammond's research and stance. Sanders and Rivers (1996) in a study encompassing data from 1990 through 1996, found within Tennessee schools that students with an effective teacher for three consecutive years increased their score on the Tennessee Comprehensive Assessment Program (TCAP) by 50 points in mathematics.

Students with three years of instruction with an ineffective teacher scored in the 29th percentile, while students with effective teachers scored in the 83rd. This effect was cumulative over the years. Jordan, Mendro, and Weerasinge (1997) focused on both reading and mathematics using longitudinal data from the Iowa Tests of Basic Skills in the Dallas, Texas, Public School System. Teachers were ranked in quintiles with 1 being the least effective and 5 being the most effective. Results were significant.

> In effect, if you were in a student group with no quintile 1 teacher you had a 7 out of 10 chance of being in the top half of the effect size distribution. If you had no quintile 5 teacher you had a 2 out of 3 chance of being in the bottom half of the effect size distribution (Jordan et al, 1997, p. 6).

Weglinsky (2000) reviewed teacher education, classroom practices, and professional development while studying the results of 8th grade students in mathematics and science on the 1996 NAEP. He found that students scored better in both mathematics and science if their teacher had a college major or minor in the subject (Weglinsky, 2000). Professional development focusing on students with special needs, higher order thinking skills, laboratory skills, and how to incorporate hands-on learning also contributed to student success. Using the same NAEP data, Blair (2000) found that professional development in cultural diversity, special needs populations, and limited English proficiency has an impact on student mathematics performance.

In a study on the input/output model, Lee and Barro (2000) investigated whether there was a correlation between student family characteristics, school resources, and student performance utilizing assessment scores, student repetition of a grade level(s), and graduation rates. School resources included teacher salary, class size, and the length

of the school day. Analysis revealed an inverse relationship between dropout rates and the repeating of a grade level with family characteristics; thus, family inputs affect student achievement. On the other hand, it was also shown that student performance was positively affected by school resources including per pupil expenditure, class size, availability of materials, teacher salary, and the education level of the teacher.

Student achievement and the decrease in class size has been the focus of several studies. Two main efforts involve Project STAR, Student-Teacher Achievement Ratio, in Tennessee and Project SAGE, Student Achievement Guarantee in Education, in Wisconsin. Project STAR focused on 11,601 students over four years assigning some students to classes between thirteen to seventeen students, the small classroom setting, or 22 to 25 students, the regular classroom setting. Some of the regular classroom settings contained instructional aids. Results showed that students who attended smaller classes for three consecutive years in the primary grades increased their academic performance and maintained a higher level of performance through the eighth grade. This was especially true for minority and urban students (Pate-Bain et al., 2010). A follow up to STAR, the Health and Education Research Operative Services, found that when the cohort of STAR students from the small classroom setting reached high school, they were more apt to graduate, had higher grades, and were more likely to apply to college than the students from the regular classroom setting. Project SAGE, a longitudinal study conducted in Wisconsin, focused on more than 3,000 kindergarten and first grade students assigned to SAGE schools and used 1,600 students as a comparison group. SAGE schools limited the student to teacher ratio to approximately 12 to 15 students, while the regular classrooms contained 21 to 25 students. Outside variables were

adjusted for and students were tested using the Comprehensive Test of Basic Skills. While the SAGE students overall showed a statistically significant increase in mathematics and language arts, the biggest impact was with minority students across all subjects tested (American Youth Policy Forum, 2010).

In 2001 Hanushek asserted that to increase student achievement educational systems have to undergo reform and a review of how and where money is spent. Just adding additional money will not bring about an improvement, as there is no correlation between funding and student achievement. Outside inputs such as family economic status have a larger impact (Hanushek, 2001).

In the Report Card on American Education, LeFevre and Hederman (2001) concluded that additional spending did not translate into improved performance. In an analysis of trends and educational finance spanning from 1976 to 2000, educational spending per pupil expenditures rose by 22% in adjusted dollars, while there was a slight increase in achievement as determined by examining several standardized test scores. A review of more than 100 data sources including assessment results and resources led to the opinion that there is no correlation between class size, educational spending, teacher salaries, and student achievement. There was a slight relationship between family structure, the involvement of parents in education, and the increase of site-based decision making in schools with increased student performance (LeFevre & Hederman, 2001).

Overall school size has also come under study in several states including Alaska, California, Georgia, Montana, Ohio, Texas, West Virginia, and Arkansas. School and school district size were found to be inversely related to student achievement as applied to low socioeconomic status and minority students. In areas with an increased level of

poverty, students benefited academically from smaller schools and smaller school districts on both norm-referenced and state designed criterion-referenced tests (Johnson et al., 2002). "Widespread consolidations of either districts or schools, by contrast, would be predicted to increase inequality and to degrade academic accomplishment" (p. 37). However, Morsy and Rothstein (2015) state the impact of poverty goes beyond the school itself and into the community. They address disadvantages students living in poverty bring with them to school: parenting practices that are detrimental to intellectual development, the implications of single parenthood, irregular work schedules, access to health care, the age of housing in conjunction with lead-based paint, and advocate for social reform along with educational reform.

Increased attendance, improved academic test scores, decreased discipline issues, increased graduation rates, and increased parent, student and teacher satisfaction were found in several studies on decreased school size. Small school size increased student achievement in urban areas and narrowed the achievement gap between wealthy districts and those in poverty. However, there is no clear idea of exactly how small a school should be to reap the benefits listed. For high schools, studies have recommended between 400 to 1,000 students leaving room for interpretation (Education Commission of the States, 2002).

Beyond the size of the school or district, the facility itself has been found to impact student achievement. Berner (1993), in a study of elementary schools in the District of Columbia, found that students in schools ranked excellent had an increase of 10.9 percentage points on standardized assessments than those in schools ranked poor when controlled for ethnicity, income, and free or reduced lunch. Earthman (2002) found

that the age of the building, temperature within the classrooms, lighting both in hallways and rooms, and acoustics influence student academic performance. When controlling for socioeconomic status, a 5-17 percentile point difference on standardized assessments was found between students in a substandard building (a building with extremes in temperature, leaking, poor lighting, etc.) and those in a standard building. Overcrowded buildings also negatively affect student learning, especially for minority or impoverished students. Even teachers were found to be negatively impacted by substandard conditions, lowering teacher effectiveness (Earthman, 2002).

In a 2004 study of Minnesota schools and student performance on the Grade Eight Basic Skills Test (BST), O'Connell Smith (2004) found negligible correlation between spending and achievement. In an effort towards accountability, school instructional success in the state is mainly determined through the results of the BST assessment. The state of Minnesota has a relatively small per pupil spending index and 25% of the students live below the poverty level. In contrast, they have high student achievement levels on the BST (O'Connell Smith, 2004).

While Rebell and Wardenski (2004) determined that resources and spending do influence student academic achievement, they linked the funding to specific resources. Smaller class size, qualified teachers, intervention programs, and preschool initiatives were found to increase student performance, particularly in low socioeconomic families. School accountability and adequate funding measures were recommended.

The effect of funding has shown to be obscured, with research showing varied results and different areas of positive and null impact of monies spent due to the limitations of the scope of the studies. Starting with Coleman in 1966, America has been

attentive to educational outcomes and looking for reforms that increase student achievement. Money, it seems, does matter, but as Hanushek (2001) concluded how money is spent is important. Owings and Kaplan (2013) concur, asserting, "The data show that increased spending targeted to delivery of quality instruction directly to students produces the greatest achievement return for the dollars spent" (p. 288).

Teacher quality and effectiveness is the greatest indicator of increased student academic achievement, even supporting increases years later (Darling-Hammond, 2000; Jordan et al., 1997; Rebell & Wardenski, 2004; Sanders & Rivers, 1996). To a smaller extent, reduced class size in the primary years has shown a benefit, especially for minority students (American Youth Policy Forum, 2010; Pate-Bain et al., 2010). Building size and facility design may provide positive impact but are expensive to accomplish (Education Commission of the States, 2002; Johnson et al., 2002).

While there is extensive debate on spending, there are some consistent student variables that can be identified across the nation and tracked through reliable means over a significant amount of time.

Consistent Student Outcome Measures

High School Graduation Rates/Dropout Rates

The U. S. Department of Education Institute of Education Sciences uses the averaged freshman graduation rate to determine the number of public high school students who graduate after completing four consecutive years beginning with 9th grade and are awarded a standard diploma (National Center for Educational Statistics: U. S. Department of Education Institute of Education Sciences, 2014). The averaged freshman

class size is determined over a three-year period. The 8th grade class size is counted the first year, the 9th grade class the second, and the 10th grade class the third. The numbers are added and divided by three. This process eliminates the possible overage during the 9th grade year due to higher retention rates. Rates are based on state self-reporting with 48 of the states providing information. The District of Columbia, Pennsylvania, and South Carolina either did not report substantial information or did not report at all. The national average for the year 2005-06 was 73.2%. This is lower than the rate for 2004-05 at 74.7%. When the three areas not included in the national average are removed from the 2004-05 data set, a national average of 74.6% emerges. On the state level Nevada had the lowest graduation rate at 55.8% and Wisconsin had the highest at 87.5%. Fourteen states had graduation rates of 80% and higher.

The national trend for teens between the ages of 16 to 19 years old who were not attending school and who were also are not high school graduates has decreased by 45% between 2000 at 11% and 2008 at 6%. The current percentage translates into approximately 1.1 million teens between 16 and 19 years old who are not in high school. When more closely examined, the dropout rate differs drastically between ethnic and racial groups with 5% of non-Hispanic white teens not in high school, 8% of African American teens, 2% of Asian and Pacific Islander teens, 13% of American Indian and Alaskan Native teens, and 11% of Hispanic and Latino teens, demonstrating a wide range of uneducated youth (The Annie E. Casey Foundation, 2010a).

Although large gaps still exist, more teens across all five of the largest racial and ethnic groups stayed in school and obtained a high school diploma or completed the General Educational Development (GED) program in 2008 than in 2000. However, since

2006, "American Indians have seen a slight increase in the percent of teens that left school and did not receive a high school diploma" (The Annie E. Casey Foundation, 2010a, p. 4).

Regarding gender, males had a higher dropout rate than females with 9.8% versus 7.7% respectively (National Center for Educational Statistics: U. S. Department of Education Institute of Education Sciences, 2010). Planty, Hussar, Snyder, Provasnik, Kena, Dinkes, KewalRamani, and Kemp (2008) determined a difference between socioeconomic grouping and dropout rates during the 2006 school year. Students in the lowest income bracket, lowest quartile, had a 16.5% dropout rate, while those in the upper quartile had a 3.8% dropout rate. This was a repetition of the varying ranges found in 2001 with teens from the lowest socioeconomic status 2.4 times more likely to dropout than middle-income teens and 10.5 times more likely than upper-income teens (Coalition for Juvenile Justice, 2001).

The dropout rate in 2008 decreased in 43 states, rose in 6, and stayed the same in one. States with the lowest teen population not attending high school are Iowa, Minnesota, and New Hampshire at 3%. States with the highest population are Alaska, Louisiana, Nevada, and New Mexico with 10% (The Annie E. Casey Foundation, 2010b).

Every day close to 7,000 teens drop out of school (Alliance for Excellent Education, 2007). A variety of reasons emerge including instructional strategies based on memorization and low scores on benchmark standardized assessments. Benchmark assessments are a focal part of reforms such as No Child Left Behind and have become tied into grade promotion. Historically, students who are retained just once are more

likely to drop out of school altogether (Sacks, 1999). Beyond this, students reaching a benchmark test used as a gatekeeper for promotion that they believe they will not pass, are more apt to leave the educational setting (Hinchey, 2004). Also, high-stakes assessment has contributed to the dropout rate for lower socioeconomic minorities (Fine, 2006; Hicks & Jones, 2007) as witnessed in the Texas public school system where only 12% of African American and Latino students who were retained for a grade reached the tenth grade benchmark assessment (Darling-Hammond, 2007). Children in poverty for a year or more with low reading levels had a dropout rate of 26%. Those who also lived in high-density poverty had a dropout rate of 35% (Hernandez, 2012). Close to half of the students who drop out also reported that disengagement with the educational process and boredom were reasons for leaving school and one third stated that failing grades prompted their decision (Bridgeland, DiIulio, & Morison, 2006).

Research has associated higher levels of state educational fiscal effort with higher graduation rates. According to Cedo (2014), "states with high fiscal effort had the highest high school graduation rate average when reviewed over time. The lowest graduation rate over time were states with low but increasing fiscal effort" (p. 95).

A new phenomenon has emerged-dropout factories. Dropout factories are schools that fail to graduate 50% or more of their incoming 9th grade class. Together these schools account for 50% of the nation's dropouts (Balfanz, 2007). There are approximately 2,000 high schools with a 60% or higher dropout rate. When viewed by race, these schools account for 73% of the African American, 66% of the Latino, and 34% of the Caucasian dropouts (Balfanz & Legters, 2004). Darling-Hammond (2007)

stated that Latino and African American high school diploma attainment has become equal to the rates that pre-date the *Brown v. the Board of Education* decision.

Teens who drop out of school face a number of problems. In 2007 the median income for people between 18 and 65 who had dropped out of school was approximately $24,000, while those with a high school degree or General Educational Development (GED) was $40,000. There are fewer people without high school degrees working, even among those 25 years old and above, when compared to those with high school degrees. Reported health issues are more prevalent in people who have dropped out of school than those with degrees. There are also more dropouts in prison and on death row (National Center for Educational Statistics: U. S. Department of Education Institute of Education Sciences, 2010).

Incarceration Rates of Juveniles and Adults

While dropping out of school is not the only indicator of ultimate incarceration, it is a reliable one. Juveniles who drop out of school are 3.5 times more likely to be incarcerated when compared to those who remain in the educational setting and earn a degree (Coalition for Juvenile Justice, 2001). Academically, juveniles in legal trouble have been retained in school, have high rates of discipline within the educational setting, have problems with mathematics, and face literacy issues making them often illiterate or marginally literate.

More than 400,000 juveniles are incarcerated every year and 100,000 are in a correctional institution consistently throughout the year in the United States (Christle & Yell, 2008). The definition of a youth who are considered a juvenile offender by the court system varies between states with most recognizing those between 10 and 17 years

old as a juvenile. However 10 states set the age range as 10 to 16 years and 3 states as 10 to 15 years. The offense rate for juveniles fluctuates by state (see Table 2). Of those with an upper age range of 17 years, California ranks the highest with 15,240 youth per every 100,000 and Vermont the lowest with 54 youth per every 100,000 during 2006 (Office of Juvenile Justice and Delinquency Prevention, 2010). These offences lead to 534 per 100,000 youth committed in South Dakota, the highest rate in states who recognize 17 as the upper age range for juveniles, to 59 per 100,000 youth in Vermont (Office of Juvenile Justice and Delinquency Prevention, 2010).

Table 2. Juvenile Custody Rates by State, 2006

		Custody rate per 100,000		
State of offense	Number	Total	Detained	Committed
U.S. total	92,854	295	84	205
Upper age 17				
Alabama	1,752	342	96	244
Alaska	363	430	181	234
Arizona	1,737	246	90	153
Arkansas	813	261	46	212
California	15,240	351	141	206
Colorado	2,034	397	75	315
Delaware	303	327	146	178
District of Columbia	339	671	421	172
Florida	7,302	397	91	303
Hawaii	123	92	22	72
Idaho	522	297	79	219
Indiana	2,616	364	96	260
Iowa	1,062	323	60	250
Kansas	1,053	335	95	236
Kentucky	1,242	273	77	192
Maine	210	152	35	115
Maryland	1,104	174	90	83
Minnesota	1,623	280	67	211
Mississippi	444	128	50	63
Montana	243	235	49	183
Nebraska	735	368	176	126

Table 2 (*continued*)

Nevada	885	317	115	201
New Jersey	1,704	176	85	90
New Mexico	471	204	56	144
North Dakota	240	355	27	328
Ohio	4,149	322	96	225
Oklahoma	924	232	74	157
Oregon	1,254	319	58	260
Pennsylvania	4,323	321	61	246
Rhode Island	348	308	13	292
South Dakota	597	672	132	534
Tennessee	1,419	216	57	158
Utah	864	267	78	188
Vermont	54	81	23	59
Virginia	2,310	283	104	178
Washington	1,455	206	61	143
West Virginia	579	320	89	230
Wyoming	315	559	48	511
Upper age 16				
Georgia	2,631	276	49	147
Illinois	2,631	206	58	146
Louisiana	1,200	279	86	187
Massachusetts	1,164	198	85	112
Michigan	2,760	268	61	205
Missouri	1,293	227	79	145
New Hampshire	189	148	19	129
South Carolina	1,320	317	121	196
Texas	8,247	335	74	260
Wisconsin	1,347	251	42	204
Upper age 15				
Connecticut	498	170	58	107
New York	4,197	270	47	221
North Carolina	1,029	144	31	113

Note: Custody rate is the count of juvenile offenders in custody per 100,000 youth ages 10 through the upper age of original juvenile court jurisdiction in each state.
U.S. total includes 1,466 juvenile offenders in private facilities for whom state of offense was not reported and 133 juvenile offenders in tribal facilities.
Internet citation: OJJDP Statistical Briefing Book. Online. Available: http://ojjdp.ncjrs.org/ojstatbb/corrections/qa08601.asp?qaDate=2006. Released on September 12, 2008.
Data Source: Office of Juvenile Justice and Delinquency Prevention Census of Juveniles in Residential Placement, 2006 (machine-readable data files). Washington, D.C.:OJJDP

Of those in residential placement, using the 2006 census information, 16 year olds comprised approximately 25,000 with 17 year olds following closely behind. Those offenders 12 or younger captured less than 2% of incarcerated youth with 1,200 in placement within a juvenile facility. Since the census followed juvenile placement, the number of 17 year olds is higher than reported, as several states count them as adults and house them in adult facilities. Overall, females comprised 15% of the population (Office of Juvenile Justice and Delinquency Prevention, 2010).

The number of offenders varies by race and ethnicity. Within the current number of incarcerated juveniles, 61% are minorities (Snyder & Sickmund, 2006). The Caucasian offender rate consists of 170 youth in custody per 100,000 youth age 10 to the age of juvenile incarceration, either 15, 16, or 17 depending on the state. Overall, the minority rate is 486 per 100,000. The rate for African Americans is 767, Latino is 326, American Indian is 540 and Asian is 85 per 100,000 (Office of Juvenile Justice and Delinquency Prevention, 2010). While African American teens comprise 15.4% of the total teen population, they are 1.4 times more likely to be held in custody than white teens. In the United States, one third of the juvenile black male population is involved in the court system (Coalition for Juvenile Justice, 2010a).

According to the Office of Juvenile Justice and Delinquency Prevention (2010) in all but 8 states, the custody rate for black juvenile offenders exceeded the rate for other race/ethnicity groups. Nationally the ratio of the custody rate for minorities to that for whites was 2.9 to 1. They further add, in 33 states, the ratio between minority-to-white custody rate was above the national average. In 5 states the minority-to-white custody

rate was more than 6 to 1. In Idaho, Nevada, Oregon, Arizona, Florida, and Maine the ratio was less than 2 to 1.

While the current custody rates seem daunting, the projections offer a small ray of hope with juvenile offenses expected to rise less than other categories of offenders including adult and senior citizen. From 1995 to 2015, those retained in a correctional facility under the age of 18 is expected to increase by 8%. Between 2005 and 2015 trend data reveal the number of juveniles in custody is expected to decline across one third of the United States with the largest drops occurring in North Dakota, New York, the District of Columbia, Vermont, West Virginia, and Maine. Conversely, Nevada, Arizona, Florida, and Texas will see the largest increases (Office of Juvenile Justice and Delinquency Prevention, 2010).

In December 2012, over 1,571,000 adults were incarcerated in state and federal prisons. This was a 1.7% decrease from 2011, revealing the third year in a row where state prison populations declined and federal populations grew (Bureau of Justice Statistics, 2013). In the most recent comprehensive data released from the Bureau of Justice Statistics, records showed the 2008 inmate population to be over 90% male with a small, 7%, female contingent. Of these inmates, 38% were African American, 34% were Caucasian, and 20% were Latino. African American males were incarcerated at a rate more than six times higher than Caucasian males. However the decrease in the growth rate for incarceration has been linked to a reduction in adult African American prisoners between 2000 through 2008. The black inmate population has decreased by more than 18,000 during this timeframe bringing the number of African American prisoners to approximately 592,000 in 2008. Imprisoned Caucasian rates during the same year

reached more than 528,000, an increase of 57,200 inmates, and Latino rates rose to 313,100, an increase of over 96,000.

Education is linked to the adult prison population with more than 80% of inmates lacking a high school diploma (Coalition for Juvenile Justice, 2001). Comparatively 40% of state inmates and 34% of federal inmates did not have a high school diploma (U.S. Department of Justice, 2004). Those 25 years old and older on death row showed 51% dropped out of school compared to 15% in the general prison population (U.S. Department of Justice, 2007). African American and Latino prisoners are more likely to lack a high school diploma (Bureau of Justice Statistics 2003, 2009). Within the state prison population approximately 53% of Latino and 44% of African American inmates had not received a high school diploma or GED compared to 27% of Caucasian inmates. This lack of education is especially prevalent when viewing black and white male inmates between 20 through 39 years old against the general population of the same demographic and age group. Those in prison are twice as likely to have dropped out of school as their counterparts. Also, inmates without a high school diploma or GED are also shown to be from single parent households, have an incarcerated parent, receive welfare, have parents who did not graduate high school, or have parents with a difficulty with drugs or alcohol (Bureau of Justice Statistics, 2003). Nearly 66% stated they have a disability such as learning, seeing, hearing, mental, or emotional (Bureau of Justice Statistics, 2003).

The Bureau of Justice Statistics (2003) asserted that when surveyed, adult inmates gave several reasons why they did not attain a high school diploma. Academic issues and boredom had the most impact affecting close to 35% of dropouts. Emotional issues

including issues with family stopped 16.4% from obtaining a high school diploma. Approximately 11% left the educational setting because they were already convicted and incarcerated. Almost 5% stopped attending school because they were engaged in illegal activities. Financial issues claimed less than 9%. Leaving the academic setting for work or the military was listed by 13%.

An academic portrait of incarcerated youth at the eighth grade level shows that they read at least one grade below their peers, attend school less than half the required time, and fail a fourth of their classes or more (Balfanz et al., 2003). Vacca (2008) and Foley (2001) found similar characteristics within the incarcerated youth population including problems with the educational system, academic failure including grade retention as well as class failure, and behavioral issues ranging up to long-term suspensions and expulsions. Youth at-risk are not engaged in the learning process or the educational setting and schools themselves are a factor through the use of substandard curricula and ineffective teaching strategies, high classroom student to teacher ratios which limit mentoring and connection opportunities, placing academic and behavioral conditions on student involvement in after school activities, ambiguous discipline rules, and the use of zero tolerance policies that exclude or isolate students for behavioral reasons (Christle & Yell, 2008).

School exclusion policies, such as the zero tolerance policy, lead to disenfranchised youth, negative school associations, and increasingly, incarceration. Within the school setting black teens face discipline, including suspension and arrest, more than their white counterparts. Students with special education needs, such as

emotional disabilities, are 3 times more likely to be arrested while in school (Coalition for Juvenile Justice, 2010b).

Suspension or expulsion has been shown a primary reason for dropping out of school and high school drop-outs are three and a half times more likely than high school graduates to be incarcerated. In that way, through suspensions and expulsions, "schools may be indirectly pushing certain students into the juvenile justice system" (Coalition for Juvenile Justice, 2010b, p.1).

Zero tolerance policies within schools spread across the country in the late 1980s as a reaction to narcotics laws and the associated standardized criminal sentencing constructed earlier in the decade and the public's perception that juveniles were becoming more violent (Mayer & Leone, 2007; Skiba, 2000). New York, California, and Kentucky contained school districts that enacted the first zero tolerance discipline policies at the school level focusing on gang activity, fighting, and drugs. The idea of an automatic discipline procedure within the academic setting was further strengthen by the inaction of the federal Gun-Free Schools Act of 1994. This Act required schools to assign a 365-day expulsion and criminal referral for any juvenile caught with a firearm on school property. Schools that did not follow the guidelines outlined faced losing federal funding (Skiba, 2000). Using the Gun-Free Schools as an inspiration, zero tolerance policies have reached out to encompass illegal substances and behavioral problems in an effort by school systems to send a message that certain discipline infractions would not be tolerated (Skiba, 2000). By the year 2000 the expansion of zero tolerance offenses had extended to include other weapons with a focus on those with a blade, disruption within the school, fighting, drugs including alcohol, cigarettes, and over the counter

medications, and inappropriate language (Advancement Project & Civil Rights Project, 2000; Skiba, 2000; Skiba & Peterson, 1999).

According to the most recent data of national implementation of zero tolerance policies, "94% of schools have zero tolerance policies for weapons or firearms, 87% for alcohol and 79% have mandatory suspensions or expulsions for violence or tobacco" (Coalition for Juvenile Justice, 2010b, p.1).

While following the law is a noble endeavor and safety within the educational setting is paramount, the understanding of school policy on zero tolerance offenses can become unclear and the intent of the policy misinterpreted leading to overwhelming discipline in the form of exclusion from the school setting. Suspensions include a broad range of infractions. Florida suspended a student who loaned her nail clippers to another student considering it a weapon (Skiba, 2000). Pennsylvania disciplined a five year old for bringing a plastic ax to school, a look alike weapon, as part of a firemen's costume for Halloween (Skiba, 2000). California expelled a five year old for showing a teacher a razor blade he found at a bus stop (Skiba & Peterson, 1999). In Maryland during the morning announcements, a student stated that his French teacher could not speak French. The school responded by suspending him under the category of a verbal threat upon a staff member (Skiba, 2000). "Aspirin, Midol, and even Certs have been treated as drugs, and paper clips, nail files, and scissors have been considered weapons" (Advancement Project & Civil Rights Project, 2000, p.1).

When looking beyond the consequences of the discipline actions within the school resulting from zero tolerance policies, the automatic involvement of law enforcement creates a direct link between education and criminalization. More than 40 states require

specific discipline issues to be reported to the authorities regardless of circumstances (Fuentes, 2003). Most of these infractions revolve around weapons, firearms, and illegal substances. However, property damage offenses are included in three states and phones in one state (Advancement Project & Civil Rights Project, 2000).

The Advancement Project & Civil Rights Project (2000) in their report on the effectiveness and impact of zero tolerance policies offer the following recommendations for avoiding suspension and possible law enforcement involvement that include:

- Strong principal leadership with an emphasis on education over management.
- Engaging students academically through the use of resources such as updated textbooks, supplemental materials, and access to as well as use of technology.
- Requiring highly qualified teachers to create meaningful learning experiences that further engage students.
- The addition of support resources especially school counselors. School counselors are assigned based on the number of students. However, at risk students require more intervention and increased counselor assistance.
- Increased professional development for teachers on classroom management and mediating student conflict.
- The tracking of school discipline referrals to determine patterns such as teachers with poor classroom management, discrimination, or individuals with a focus on a specific student. Intervention through increased training should result when this is detected.

The Coalition for Juvenile Justice (2010b), in their publication *Ensuring School Engagement and Success vs. Exclusion for Youth at Risk of Delinquency,* suggests

schools avoid unyielding discipline policies such as the zero tolerance policy and focus on alternatives such as community service referrals or in-school suspensions. They further advocate the implementation of teacher professional development on identifying learning disabilities and behavioral problems, classroom management, and positive reinforcement incentives.

The Cost of Education vs. Incarceration

The expense of educating a student in public elementary and secondary school sounds astronomical when reviewing a yearly total expenditure, local, state, and federal, of approximately $643 billion, averaging around $12,743 per pupil including capital outlay, school operations, and interest on debt for the school year 2009 to 2010 (National Center for Education Statistics, 2012). However, when compared to the fiscal cost of incarcerating a juvenile for a year in 2007 to 2008, the expense seems quite reasonable (see Table 3). Beyond the social and emotional cost of the incarceration of a young person, the fiscal cost averages $240.99 per day or approximately $88,000 per year per juvenile, with a low of $24 dollars a day in Wyoming to a high of $726 dollars a day in Connecticut (Justice Policy Institute, 2009). When compared to the average per pupil spending for education in the United States in the same year, 2007-2008, of $10,259 versus the $88,000 per year for incarceration, education is actually a bargain (U. S. Census Bureau, 2009).

Table 3. Reporting States Spent an Average of $7.1 Million Per Day Locking Up Youth in Residential Facilities

State	Youth in residential placement	Cost per day per youth	Total cost per day based on total population
Alabama	1,251	$137.21	$171,649.71
Alaska	198	$252	$49,896
Arizona	1,083	$314	$340,062

Table 3 (*continued*)

California	8,955	$67.51	$604,552.05
Colorado	1,617	$161	$260,337
Connecticut	312	$726	$226,512
Georgia	1,398	$200.68	$280,550.64
Indiana	1,866	$153.78	$286,953.48
Louisiana	807	$387.12	$312,405.84
Maine	159	$412.05	$65,515.95
Maryland	525	$229	$120,298.50
Michigan	2,115	$391	$827,451.45
Mississippi	219	$426.51	$93,405.69
Missouri	825	$133	$109,791
Nebraska	252	$173	$43,596
New Jersey	870	$174	$151,380
North Carolina	804	$262	$210,648
North Dakota	222	$146.64	$32,554.08
Ohio	2,898	$216	$624,924.72
Oklahoma	624	$158.96	$99,191.04
Pennsylvania	3,318	$362	$1,201,116
Rhode Island	330	$58.95	$19,453.50
South Dakota	474	$219.79	$104,180.46
Utah	606	$195	$118,170
Virginia	1,455	$280	$407,400
West Virginia	417	$227	$94,659
Wisconsin	1,092	$259	$282,828
Wyoming	288	$24.44	$7,038.72
Total for states reporting	**34,980**		**$7,146,521**

Note: Data not available for Arizona, Arkansas, Delaware, Illinois, Iowa, Kansas, Michigan, Minnesota, Nevada, New Hampshire, New York, Oregon, Tennessee, Vermont, and Washington.
Source: Melissa Sickmund, T. J. Sladky and Wei Kang. (2008) "Census of Juveniles in Residential Placement Databook." http://ojjdp.ncjrs.gov/ojstatbb/cjrp/asp/State_Adj.asp; American Correlational Association, 2008 *Directory: Adult and Juvenile Correctional Departments, Institutions, Agencies, and Probation and Parole Authorities* (Alexandria, VA: American Correctional Association, 2008).

When considering the cost of education versus incarceration, the expense does not stop there. Beyond incarceration there are three other related costs - the justice system costs for trials and police, costs incurred by the victims for state funded medical care and lost taxes from wages, and the cost of crime prevention programs (Levin, Belfield, Muenning, & Rouse, 2006). The Justice Policy Institute (2014) also included reoffending

and recidivism, employment, and victimization of incarcerated youth when reviewing overall cost (see Table 4).

Table 4 Additional Costs of Youth Incarceration

	Low End of Range in Billions of Dollars	High End of Range in Billions of Dollars
Cost of Recidivism	$0	$7.03
Lost Future Earnings	$4.07	$7.60
Lost Future Gov. Tax Revenue	$2.07	$3.87
Additional Medicare/Medicaid Costs	$0.86	$1.50
Cost of Sexual Assault on Youth	$0.90	$1.37
Total, All Costs	$7.90	$21.47

Source: Justice Policy Institute
http://www.justicepolicy.org/uploads/justicepolicy/documents/sticker_shock_final_v2.pdf
Retrieved 6/25/15

Juveniles who drop out of school are more than 3.5 times more likely to be incarcerated when compared to those who remain in the educational setting and earn a degree (Coalition for Juvenile Justice, 2001). Incarceration of juveniles increases their likelihood to leave school by between 11.1 and 18.3% (Justice Policy Institute, 2014). When focusing on 9th grade students who were incarcerated, two-thirds to three-fourths drop out of school within a year of returning and less than 15% complete high school with in four years (Justice Policy Institute, 2009). When focusing on the five major criminal categories, murder, rape, violent crime, property crime, and drug offenses. Levin, Belfield, Muenning and Rouse (2006) determined the impact of high school graduation on the cohort of twenty-year-old offenders who were also high school dropouts. They found that high school graduation would decrease the commission of these crimes within this cohort by 10-20%. Furthermore, Levin et al. (2006) calculated

the cost per crime in terms of police presence, government programs, and victim costs and found an average savings of $26,600 for each high school diploma earned.

Summary

Research reveals a multi-faceted relationship between student academic success and the level of resources provided. The Coleman Report in 1966 and *A Nation At Risk* in 1981 led to numerous studies showing both pros and cons when the amount of funding is used as a determining factor. With per pupil index spending by states ranging between $6,434 up to $15,117 supplied by taxes, the American public is looking for something more substantial; Americans are looking for direction leading to increased educational outcomes. While spending is important, what appears to matter more is how the money is spent. Owings and Kaplan (2006) concluded in their review of funding studies:

> The relationship between spending and student achievement remains incomplete and confusing, but education dollars appear to be best spent in hiring and keeping the highest quality teachers, providing meaningful professional development, and maintaining school facilities to permit comfortable and safe learning environments. (p. 336)

To truly examine funding and education, society needs to determine why a quality education matters. Long before NCLB, Thomas Jefferson (1816) said it quite eloquently: "If a nation expects to be ignorant and free in a state of civilization, it expects what never was and never will be" (p.1). Jefferson's concern becomes our concern today in light of the consistent student outcome measures, graduation rates, and incarceration rates.

All educational resources available are affected by funding. Fiscal inequalities arise within states based on the type of foundation program used. The basic foundation program provides an equal funding floor for localities to build upon, leaving poorer districts unable to close the monetary gap between wealthier districts. Modified foundation programs try to compensate by reviewing localities ability to tax and determining their share of the education dollar, accordingly. District power equalization programs provide the greatest equity between districts using an inverse ratio formula where the state determines the amount of money it takes to educate a child and provides .funds in an inverse proportion to the district's ability to pay. Unfortunately, most states use the basic foundation program, leaving economically challenged localities under-funded.

On a larger scale, differences in funding appear between states themselves. Capacity, the ability of a state to pay for education, and effort, the fiscal level a state actually supports education, are linked. States can have few financial resources, low capacity, but appropriate significant funds applied toward education, high effort. Conversely, a state can have a large amount of capital, high capacity, but place very little of it into education, low effort. Effort provides an equalizing factor between states when reviewing expenditures on education, eliminating differences in capacity and providing a fair comparison. Per pupil index spending in itself may only reveal how wealthy a state is. Effort determines how much of the state's capacity is spent on education, revealing education's fiscal priority.

Research on a national level, including all fifty states and the District of Columbia, conducted over a span of several years, and incorporating the possible

relationship between state fiscal effort and the incarceration rates of juveniles would provide insight into the effect of funding beyond per pupil index spending. The information and data analysis would be useful to school districts, local governments, state educational departments, and the federal government in determining equity between states and the importance of adequate school funding. A correlational study in this area could provide insight on these topics.

CHAPTER 3

METHODOLOGY

With the number of services states consider when constructing annual budgets and the recent cuts those services are experiencing, the need for clarity and understanding of the impact of a fiscal reduction is imperative. Education matters. Education influences society at large. An educated population can obtain employment and compete globally, leading to disposable income and the ability to pay taxes, returning the investment dollar to the state coffer (Owings & Kaplan, 2013). With the advent of No Child Left Behind, the capability of a student to successfully complete high school is a legal requirement (U. S. Department of Education, 2002). Graduation has become more important than ever as nearly 7,000 students leave education daily (Alliance for Excellent Education, 2007) and many not only fail to add economically to society, they also face incarceration. Juveniles who leave the academic setting increase their chance of incarceration by 3.5 times when compared to those who complete high school (Coalition for Juvenile Justice, 2001). Educating a society is expensive, at least if it is to be successful. Does the amount of fiscal effort a state places on education reflect a relationship in important student indicators. specifically the juvenile incarceration rate? This study identified trends between state fiscal effort and juvenile incarceration rates and provided insight.

This chapter on methodology will detail the procedures and components utilized to conduct the proposed research. Due to the nature of the research questions a correlational study is appropriate to identify a relationship and variance between the two variables, state educational effort and juvenile incarceration rates (Levin & Fox, 2006).

The data used to complete the analysis were pre-existing and available to the public. Pre-existing data will be used as Muijs (2007) explained that quantitative research methods uncover an already existing reality. This design perspective, ex post facto ANOVA, will uncover if preexisting conditions have influenced outcomes in compared groups (Cohen, Manion, & Morrison, 2007). The dependent variable is the juvenile incarceration rates for all fifty states and the District of Columbia from 1986 to 2011, all years reported by the Office of Juvenile Justice and Delinquency Prevention (2014) in the Census of Juveniles in Residential Placement, encompassing the years 1997, 1999, 2001, 2003, 2006, 2007, 2010, and 2011, and the Children in Custody/Juveniles Taken into Custody reports, encompassing the years 1987, 1989, 1991, 1992, and 1995. The independent variable is the state fiscal effort from 1986 through 2011, the most recent possible. The juvenile incarceration data will follow five-year lags from the state effort to allow for effect of effort to be reflected in incarceration rates. Research shows that it takes approximately five to seven years to correctly correlate effort with other indicators (Berman & McLaughlin 1978; Fullan, 2000).

Individual states within the United States vary in their juvenile incarceration rates and the amount of fiscal effort each state contributes toward education. The ex post facto correlational research design will determine the strength of the relationship on the outcome, revealing a causal link between groups, uncovering if the differing amounts of state educational fiscal effort had a relationship with the state's juvenile incarceration rate. This chapter encompasses research purpose, a statement of the research questions, a narrative of study participants, description of the research design, the instruments used, analysis methods, and limitations of the study.

Research Purpose and Questions

The purpose of this study is to examine each individual states' fiscal effort in light of incarceration rates over an extended period of time. The researcher desires to determine if a relationship exists between fiscal effort and juvenile incarceration rates. The following research questions will be used in this study:

1. What type of trends exist concerning state fiscal effort and juvenile incarceration rates over an extended period of time, 1986-2011, in the United States? Are effort slopes decreasing, flat or increasing?
    a. What are the effects of an increasing slope on juvenile incarceration rates?
    b. What are the effects of a decreasing slope on juvenile incarceration rates?
    c. What are the effects of no slope on juvenile incarceration rates?
    d. What are other effects?
2. Is there a relationship between states' fiscal effort and the trend in state juvenile incarceration rates over an extended period of time, 1986-2011, in the United States?
    a. Is there a relationship following a 5-year time lag in incarceration rates?
    b. Is there a relationship following a 10-year time lag in incarceration rates?
    c. Is there a relationship following a 15-year time lag in incarceration rates?
    d. Is there a relationship following a 20-year time lag in incarceration rates?

Participants

The target of this study encompasses juveniles across the United States. Data were utilized over a significant time span focusing on the information collected by the

OJJDP (2014) complied from a series of censuses titled, Census of Juveniles in Residential Placement (CJRP), conducted in the years 1997, 1999, 2001, 2003, 2006, 2007, 2010, and 2011 including all fifty states and the District of Columbia. For this study, incarcerated juveniles are considered younger than 21 years of age, contained in a residential facility at the time of the census, court adjudicated, and in the facility based on that adjudication.

The CJRP captures information on the state where the juvenile committed the offense. The state of offense is presumed to be the state that has jurisdiction over the juvenile, although this was not reported directly. Thus, the CJRP for the first time allows presentation of state-based custody rates that include juveniles sent to both public and private facilities (Office of Juvenile Justice and Delinquency Prevention, 2014).

The census numbers reflect a one-day snapshot of the juvenile population within residential facilities and not reflective of the day-to-day change in population as would be found in admission and release data. Prior to 1997, the OJJDP managed but did not collect the data on incarceration. Data collection, while conducted mostly bi-annually, was incomplete, with some states not reporting and others reporting on juveniles placed in state facilities but not adjudicated within the reporting state.

Variables

In order to answer the research questions: What type of trend exists concerning state fiscal effort over an extended period of time, 1986-2011, in the United States? How do changes in state fiscal efforts over time predict the trend in state juvenile incarceration

rates in the United States? The following independent and dependent variables will be used in the study.

Independent Variable: State Educational Fiscal Effort

Fiscal effort is a valid reflection of a states' dedication to education (Adams, 1983). While per pupil expenditures could be solely used in the study, they can be deceiving. For example, wealthy states may have a high per pupil expenditure, but when examined from the perspective of the ratio between capacity and effort, they may actually be placing low, or little, effort into education regardless of the overall dollars. Conversely, a poorer state may have a low per pupil expenditure but when the ratio between capacity and effort is examined, this state may have expended more effort into education using its available resources. Fiscal effort compensates for these phenomena by focusing on the ratio between per pupil expenditure and the Gross State Product on a per capita basis, or a measure of the states' capacity (Owings & Kaplan, 2006).

While the concept of fiscal effort and the factors that drive it seem complex, computing it falls to the use of a simple ratio of expenditures to the tax base. Owings and Kaplan (2006) state the ratio as "$E = R/TB$" (p. 186). In this equation E stands for fiscal effort, R stands for revenue for school expenditures or per pupil spending for the state, and TB stands for the state wealth as defined by GSP on a per capita basis. The ratio makes fiscal effort a more accurate description of educational financial commitment by states due to the comparison against the tax base, equalizing for disparities between wealthy and poor localities. Fiscal effort will be calculated from 1986 through 2011.

Dependent Variable: Juvenile Incarceration Rates

The Office of Juvenile Justice and Delinquency Prevention (2014) began conducting a comprehensive collection of data, through the use of a census, in 1997, focusing on both public and private residential juvenile facilities. This census, entitled the Census of Juveniles in Residential Placement (CJRP), provides information based on the state where the juvenile committed the offence and was adjudicated in, not the location of the facility in which the juvenile is residing. This is important since, for example, a juvenile can be adjudicated in Virginia and sent to a facility in West Virginia. The CJRP census considers the state where the juvenile broke the law to have jurisdiction, or responsibility for, the juvenile. Censuses were conducted in 1997, 1999, 2001, 2003, 2006, 2007, 2010, and 2011, including all fifty states and the District of Columbia. Those subjects included were less than 21 years old, in either a public or private juvenile residential facility, court adjudicated, and in placement based on that adjudication. Prior to 1997, the OJJDP managed but did not collect the data on incarceration. Data collection, while conducted mostly bi-annually, was incomplete, with some states not reporting and others reporting on juveniles placed in state facilities but not adjudicated within the reporting state. Information was collected and reported through either the Children in Custody Report or the Juveniles Taken into Custody Reports for the years 1987, 1989, 1991, 1992, and 1995.

In the reported findings from the CJRP the incarceration rates are computed per 100,000 juveniles in residential facilities. The definition of a youth who is considered a juvenile offender by the court system varies between states with most recognizing those between 10 and 17 years old as a juvenile. However 10 states set the age range as 10 to

16 years and 3 states as 10 to 15 years. Thus, the Office of Juvenile Justice and Delinquency Prevention (2014) placed a limitation on the age of the resident included in the CJRP, ten years old at the low end of the range through the upper age of authority based on the state that has jurisdiction. While offenders may be younger than the ten-year-old beginning range, the actual number of offenders in residential placement younger than ten is not statistically significant to warrant inclusion.

Research Design

The design was an ex post facto correlational study, investigating the relationship between state fiscal effort and juvenile incarceration rates by individual states over time. Quantitative methods were used to address all research questions using statistical analyses. Based on the nature of the study, the identification of variables and search for measurable relationships, the quantitative method design for the investigation was the most productive. The collection of data along with its analysis and interpretation of the results, lend themselves to the preexisting numerical data collected over time making a quantitative research approach essential (Siegle, 2011).

With the inclusion of two variables over time, correlational designs allow a prediction of scores and possible explanation of the relationship between the two, leading to generalization of results (Creswell, 2003). A correlational study is also appropriate for the research being conducted due to the analysis of the relationship and variance between two variables, state educational effort, observed from 1986 through 2011, and juvenile incarceration rates, observed at specific times between 1986 through 2011 (Levin & Fox, 2006). The juvenile incarceration data followed a five-year lag from the state educational

fiscal effort to allow for effect of effort to be reflected in juvenile incarceration rates. The five-year lag was chosen since, according to Miller and Feld (2010) while the recession ended in 2009, and its greatest impact on state funding should be one to two years following that, the slow recovery patterns reveal that states will struggle with funding several years later, some studies placing it at 2014.

Data Collection

The Office of Juvenile Justice and Delinquency Prevention, through the Census of Juveniles in Residential Placement, provides public access to data, including juvenile incarceration, commitment, rates by state for the years 1997, 1999, 2001, 2003, 2006, 2007, 2010, and 2011, to include all fifty states and the District of Columbia. The website tool, Easy Access to the Census of Juveniles in Residential Placement: 1997-2011, was used to locate the offense profile of committed residents, providing the total number of committed juveniles in each researched year, for each state and the District of Columbia. Prior to 1997 the information is housed on a website maintained by the National Criminal Justice Reference Service (NCJRS, 2010). Public access to juvenile incarceration rates by state is available for the years 1987, 1989, 1991, 1992, 1995, however not all states participated in the census each year it was given. Fiscal effort was calculated using a variety of sources based on the requirements of the formula $E = R/TB$ where E stands for fiscal effort, R stands for revenue for school expenditures or per pupil spending for the state, and TB stands for the state wealth as defined by GSP on a per capita basis (Owings & Kaplan, 2006). Per pupil expenditure by state for public elementary and secondary education is publically accessible through the United States

Education Finance Statistics Center website. State wealth, GSP on a per capita basis, is accessible through the United States Bureau of Economic Analysis website. A database spanning twenty-five years of data, including state fiscal effort, state per pupil expenditure, and GSP on a per capita basis, has been compiled by William Owings and Leslie Kaplan.

Data Analysis

Educational fiscal effort was calculated for all fifty states and the District of Columbia for the years 1986 through 2011 using the formula $E=R/TB$. R is determined by revenue denoted for school per pupil spending for each state. TB stands for the state wealth as defined by GSP on a per capita basis and E stands for calculated fiscal effort. Using the mean of the differences for state fiscal effort from each previous year, beginning in 1986 and ending in 2011, average percent change will be determined and the results analyzed by state rank and margin of change.

The relationship between state educational fiscal effort and juvenile incarceration rates was analyzed. The mean of the difference of each variable, effort and juvenile incarnation rates, was ranked and reviewed for reliability and consistency.

Using an analysis of the above data and focusing on the first research question: What type of trend exists concerning state fiscal effort and juvenile incarceration rates over an extended period of time, 1986-2011, in the United States? Are fiscal effort and juvenile incarceration rates correlated? Are effort slopes decreasing, flat or increasing? The slope for the twenty-five years of fiscal effort data points corresponding with the slope for the incarceration rate points determined if fiscal effort (FE) and juvenile

incarceration rates are correlated. A computation of the variables for the state educational fiscal effort and the juvenile incarceration rates by state was conducted using a bivariate correlation to determine the strength of the relationship.

Focusing on the second research question: Is there a relationship between states' fiscal effort and the trend in state juvenile incarceration rates over an extended period of time, 1986-2011, in the United States? Data were computed using a five-year time-lagged correlation. A time-lagged model was chosen so the effects of effort would be reflected in the incarceration rates as the results of changes in effort and their effects do not happen concurrently. A five-year lag was used to reflect both changing economic intervals and the current four-year high school cohort model used to calculate the Federal Graduation Index (U.S. Department of Education, 2012). Juvenile incarceration rates, the dependent variable, was represented by the variable "X" for the study and fiscal effort, the independent variable, will be represented by the variable "Z". These were measured over five-year intervals including 0, 5, 10, and 15 years using the following formula:

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

Within this formula "X" represents the juvenile incarceration rates, "T" represents the year studied for juvenile incarceration rates, "Σ" represents the sum of all computations of the juvenile incarceration rates, "β" represents the slope determined in the equation between effort and juvenile incarceration rates, "Z_{T-1}" represents the juvenile incarceration rate at specific time intervals. The value of "X" at the time "T" is a function of "Z" and measured at predetermined intervals of time "T" creating a time-lag for "Z" of specified periods, 1-4, representing 5, 10, 15, and 20 year lags. This allows the change in juvenile incarceration rates, increases or decreases, to be positively or

negatively correlated with the increase or decrease in state educational fiscal effort. If statistical significance is found during this ANOVA, it would signify a correlation between effort and incarceration rates.

Summary

The methodology chosen, a non-experimental, *ex post facto* correlational design, created a technique to effectively answer the research questions and analyze the impact that state educational fiscal effort had on juvenile incarceration rates over time. The lagged data provided perspective on the impact funding decisions have on future outcomes. Based on the literature review the relation between state educational fiscal effort and juvenile incarceration rates could be inversely linked, when fiscal effort has a positive slope, juvenile incarceration rates should have a negative slope. The research study, with its 25 year time frame and sample size encompassing every state and the District of Columbia, substantiated this providing a possibility of valid generalization leading to insight on future funding decisions.

In Chapter 3, the methodology that was used to determine what type of trend, or relationship, exists concerning state fiscal effort over an extended period of time, 1986-2011, in the United States and how changes in state fiscal effort over time predict the trend in state juvenile incarceration rates in the United States are outlined and described. The research questions, description of the research design, a narrative of the sample or participants, the instruments used, and analysis methods are illustrated. The variables that were used, state fiscal effort and juvenile incarceration rates, were examined in-

depth. The strength of the correlational study using pre-existing data were discussed as were the strengths and limitations of the study.

CHAPTER 4

RESULTS

In Chapter 4, the results of the research are presented in a narrative format as well as with tables. The results of Chapter 4 are divided into three sections: population and descriptive findings, investigation of assumptions as relates to inferential analysis, and inferential analysis. SPSS v22.0 was used for descriptive and inferential analyses pertaining to Research Question 1. STATA v12.0 was used for multiple imputation of the dataset and inferential analyses pertaining to Research Question 2. All inferential analyses were tested at the 95% level of significance.

The purpose of this study was to examine each individual state's educational fiscal effort in light of juvenile incarceration rates over an extended period of time. Additionally, the researcher wanted to determine if a relationship exists between educational fiscal effort and juvenile incarceration rates. The research questions of the study are as follows:

1. What type of trends exist concerning state fiscal effort and juvenile incarceration rates over an extended period of time, 1986-2011, in the United States? Are effort slopes decreasing, flat or increasing?
    a. What are the effects of an increasing slope on juvenile incarceration rates?
    b. What are the effects of a decreasing slope on juvenile incarceration rates?
    c. What are the effects of no slope on juvenile incarceration rates?
    d. What are other effects?

2. Is there a relationship between states' fiscal effort and the trend in state juvenile incarceration rates over an extended period of time, 1986-2011, in the United States?
    a. Is there a relationship following a 5-year time lag in incarceration rates?
    b. Is there a relationship following a 10-year time lag in incarceration rates?
    c. Is there a relationship following a 15-year time lag in incarceration rates?
    d. Is there a relationship following a 20-year time lag in incarceration rates?

Correlational and regression analyses were performed to address the research questions of the study.

Population and Descriptive Findings

The population of this study included $N = 51$, consisting of all fifty United States and the District of Columbia. A total of 1326 records were obtained from a retrospective dataset of information collected between 1997 and 2011 by the Office of Juvenile Justice and Delinquency Prevention (OJJDP, 2014). These data were compiled from a series of censuses titled Census of Juveniles in Residential Placement (CJRP). Prior to 1997 the information was housed on a website maintained by the National Criminal Justice Reference Service (NCJRS). Juvenile incarceration rates were available for the years 1987, 1989, 1991, 1992, 1995; however, not all states participated in the census each year it was given. According to the OJJDP, the numbers reflect a one-day snapshot of the juvenile population within residential facilities and were not reflective of the day-to-day change in population as would be found in admission and release data. Data were investigated over a significant time span of 26 years, 1986 through 2011, including all

fifty states and the District of Columbia. Descriptive and/or demographic information was not collected for this study. This includes the measures of central tendency, measures of central location, for the variables of state educational fiscal effort and juvenile incarceration rate for each of the 50 states and the District of Columbia. Additionally, information pertaining to the correlational analyses of study, including the correlation coefficient (*r*), p-value, and direction of slope were included. Information pertaining to correlation coefficients and associated p-values are presented with the Research Question 1 findings.

Assumptions

The dataset was investigated to ensure that it satisfied the assumptions of the correlational and regression analyses of study: absence of missing data, absence of outliers, normality, linearity, and homoscedasticity.

Many records were missing data on the juvenile incarceration rates used to construct the dependent variable used for inferential analysis. SPSS software offers an option of pairwise deletion of records with missing data. Pairwise deletion is a technique that excludes cases only when they are missing data for a particular analysis, but includes the case for all analyses for which they have the needed information (Pallant, 2013). Therefore, to help retain as much power as possible for the study, the individual records missing information on the juvenile incarceration rate variable were excluded only for the analyses in which they did not contain full data. However, the records were included for analyses on which they contained a full set of data. Pairwise deletion was only used for

Research Question 1. Therefore, the assumption of absence of missing data was considered met for the correlational analyses.

The regression analyses addressing Research Question 2 made use of imputed datasets. Multiple imputation is an iterative process in which missing values are replaced using information obtained from the observed data (McKnight, McKnight, Souraya, & Figueredo, 2007). For this study, five datasets of imputed values were created in order to fill the gaps and provide a complete set of values for the dependent variable of juvenile incarceration rate. The independent variable was not imputed. This process was completed in STATA v. 12 using multiple imputation commands. The imputed dataset was only used for inferential analysis pertaining to Research Question 2, thus retaining as much data and power as possible. Therefore, the assumption of absence of missing data was also met for the regression analyses.

Outliers in a dataset have the potential to distort results of an inferential analysis. A check of box plots for the juvenile incarceration rate variable for each state was performed to visually inspect for outliers. A data point is considered an outlier if it is +/- 1.5 standard deviations from the mean. A data point is considered an extreme outlier if it is +/-3 standard deviations from the mean (Pallant, 2013). Outliers were found in 16 of the 50 states and the District of Columbia. Mean and 5% trimmed mean values were examined for each of the states with outliers. All of the means and 5% trimmed means were relatively close in value within each of the states, indicating that outliers were not causing a problem in the dataset. Therefore, it was determined that the outlier assumption was met.

Required assumptions for correlational analysis include linearity and homoscedasticity between study variables. These assumptions were checked with scatterplots of the data for each state. The assumptions of linearity and homoscedasticity were met.

Inferential analysis involved regression via generalized estimating equations (GEE). The GEE is similar to standard regression. But unlike standard regression, GEE allows for dependence within clusters, such as in the longitudinal data of the states included in this study. GEE models make no distributional assumptions for missing data and outliers in data. However, GEE models require three specifications: a mean function, a variance function, and a "working" correlation matrix for the clusters, which models the dependence of each observation with other observations in the same cluster. The appeal of a GEE model is that it gives consistent estimates of the parameters, and consistent estimates of the standard errors can be obtained using a robust "sandwich" estimator even if the working correlation matrix is incorrectly specified (Zorn, 2011). This estimator is consistent as the number of case clusters becomes large. GEE models a known function of the marginal expectation of the dependent variable as a linear function of the explanatory variables. The parameters estimated are derived as population-averaged. The Wald test was used to test the value of the sample estimate within the parameters.

GEE in STATA requires a fitting distribution, the default being a Gaussian (or Normal) distribution. Normal distributions are often assumed for models with continuous outcomes. The models in this study include the dependent variable of juvenile incarceration rate, which was measured as the number of juveniles incarcerated per 100,000. Although the dependent variable was a count, it was assumed as a continuous

level of measurement for use in the correlation and regression analyses. The dependent variable of juvenile incarceration rate was plotted with histograms and Normal Q-Q Plots according to state to visually inspect the distributions for normality. A normal Q-Q plot is a plot of the first data set against the second using a 45-degree reference line. The two sets of data should fall along the reference line. The greater the deviation from the line the assumption is that the populations within the data sets have different distributions. The histograms and Normal Q-Q plots for many states appeared to have a normal distribution. The Shapiro-Wilk test for normality was examined for each state and the District of Columbia. A significant value for this test indicates a deviation from normality. According to the Shapiro-Wilk test, the variable of juvenile incarceration rate had a non-normal distribution for 14 of the 50 states and the District of Columbia. However, the Shapiro-Wilk test is sensitive to larger sample sizes. Mean and median values for the dependent variable across the study time-frame were relatively close in value within each of the states. Therefore it was determined that the assumption of normality was adequately met for each state and the District of Columbia.

Inferential Analysis

A total of $N = 1326$ records representing 26 years of data for $N = 51$, 50 states and the District of Columbia, were included in inferential analyses. The results of the analyses are presented according to each research question. Table 5 presents measures of central tendency for the variables of state educational fiscal effort and juvenile incarceration rate along with the results of the correlational analyses performed to address Research Question 1. Tables 5 through 7 present the results of the regression analyses

performed using raw data to address Research Question 2. Tables 8 through 12 present the results of the regression analyses performed using imputed data to address Research Question 2.

1. What type of trends exist concerning state fiscal effort and juvenile incarceration rates over an extended period of time, 1986-2011, in the United States? Are effort slopes decreasing, flat or increasing?

    a. What are the effects of an increasing slope on juvenile incarceration rates?
    b. What are the effects of a decreasing slope on juvenile incarceration rates?
    c. What are the effects of no slope on juvenile incarceration rates?
    d. What are other effects?

A series of Pearson's Product Moment correlational analyses were performed according to each individual state to investigate the relationship between state educational fiscal effort (percentage) and juvenile incarceration rate (per 100,000 juveniles). Effects of correlation coefficients can be defined as (a) +/- .10 to +/- .29 = weak effect; (b) +/- .30 to +/-.49 = moderate effect; and (c) +/- .50 to +/- 1.0 = strong effect (Pallant, 2013). Additionally, scatterplots of the data for each state were inspected visually to determine trends in the juvenile incarceration rate according to state educational fiscal effort. Significant relationships between state educational fiscal effort and juvenile incarceration rate were found for only 10 of the 50 states and the District of Columbia.

An indirect, strong, statistically significant relationship was found between the state educational fiscal effort and juvenile incarceration rate variables for the following nine states: Colorado (r = -.581, p = .037), Florida (r = -.695, p = .008), Hawaii (r = -

.570, p = .042), Mississippi (r = -.618, p = .032), New Hampshire (r = -.567, p = .043), New Jersey (r = -.685, p = .010), New York (r = -.586, p = .035), Ohio (r = -.613, p = .026), and Virginia (r = -.657, p = .015). The magnitude and direction of these correlation coefficients indicate that for these states, an increase in fiscal effort is associated with a decrease in juvenile incarceration rates.

However, a direct, strong, statistically significant relationship was found between the state educational fiscal effort variable and juvenile incarceration rate for Idaho (r = .802, p = .003). The magnitude and direction of this correlation coefficient indicates that for this state, an increase in state educational fiscal effort is associated with an increase in juvenile incarceration rates.

The correlation coefficient was squared (R^2) for each state in order to determine the variance between the two variables of state educational fiscal effort and juvenile incarceration rate. This calculated R^2 value is known as the coefficient of determination, which is the amount of variation in the dependent variable that is explained by the regression line (Triola, 2010). Higher R^2 values indicate more shared variance between a variable pair.

The R^2 values for the significantly correlated states were as follows: Colorado (R^2 = .338, indicating that about 34% of the variability can be explained between the variables), Florida (R^2 = .483, indicating that about 48% of the variability can be explained between the variables), Hawaii (R^2 = .325, indicating that about 33% of the variability can be explained between the variables), Idaho (R^2 = .643, indicating that about 64% of the variability can be explained between the variables), Mississippi (R^2 = .382, indicating that about 38% of the variability can be explained between the variables),

New Hampshire (R^2 = .321, indicating that about 32% of the variability can be explained between the variables), New Jersey (R^2 = .469, indicating that about 47% of the variability can be explained between the variables), New York (R^2 = .343, indicating that about 34% of the variability can be explained between the variables), Ohio (R^2 = .376, indicating that about 38% of the variability can be explained between the variables), and Virginia (R^2 = .432, indicating that about 43% of the variability can be explained between the variables).

Trends were determined via regression slopes obtained from scatterplots of the variables of state educational fiscal effort and juvenile incarceration rate according to each state. It was assumed that a slope of less than 0.05 was flat, positive slopes above the 0.05 cutoff were increasing, and negative slopes below the cutoff of -0.05 were decreasing. The direction of the slope for each state can be found in Table 5. Slopes for all 50 states and the District of Columbia are contained in Appendix A.

The range in correlation coefficients was r = .003 to r = .802 for all positive correlations and from r = -.005 to r = -.695 for all negative correlations; r = .802 for significant positive correlations, and r = -.567 to r = -.695 for significant negative correlations. The range in coefficients of determination was from R^2 < .0005 to R^2 = .643 for positive correlations, and R^2 < .0005 to R^2 = .483 for negative correlations; R^2 = .643 for significant positive correlations, and R^2 = .321 to R^2 = .483 for significant negative correlations. This indicates that up to 64% of the variance was explained for the states with a positive correlation between state educational fiscal effort and juvenile incarceration rate, and up to 48% of the variance was explained for the states with a

negative correlation between state educational fiscal effort and juvenile incarceration rate.

Using the information obtained from the correlation coefficients and regression slopes, the items of Research Question 1, "What type of trends exist concerning state fiscal effort and juvenile incarceration rates over an extended period of time, 1986-2011, in the United States? Are effort slopes decreasing, flat or increasing?" can be addressed as follows:

a. What are the effects of an increasing slope on juvenile incarceration rates?

Only one positive slope, for the state of Idaho, was significant for the 50 states and the District of Columbia. A direct, strong, statistically significant relationship was found between the state educational fiscal effort variable and juvenile incarceration rate for Idaho ($r = .802, p = .003$). The magnitude and direction of this correlation coefficient indicates that for this state, an increase in fiscal effort is associated with an increase in juvenile incarceration rates. The regression coefficient, slope, for the predictor of state educational fiscal effort on the dependent variable of juvenile incarceration rate was $B = 39.69$, indicating that each 1 percentage point increase in state educational fiscal effort is associated with an incarceration increase of approximately 40 juveniles.

b. What are the effects of a decreasing slope on juvenile incarceration rates?

The range of significant, negative correlation coefficients was $r = -.567$ to $r = -.695$. The range in statistically significant coefficients of determination was $R^2 = .321$ to $R^2 = .483$. This range in R^2 values indicates that between 32% and 48% of the shared variance was attributed to the bivariate relationship. The magnitude and direction of the correlation coefficients indicate that a decrease in juvenile incarceration rates implies an

increase in state educational fiscal effort. Furthermore, the regression coefficient, slope, for the predictor of state educational fiscal effort on the dependent variable of juvenile incarceration rate was as follows:

Colorado (B = -112.00), Florida (B = -0.05), Hawaii (B = -7.20), Mississippi (B = -64.85), New Hampshire (B = -5.37), New Jersey (B = -152.00), New York (B = -158.00), Ohio (B = -147.00), and Virginia (B = -85.63). These slopes indicate that each 1 percentage point increase in state educational fiscal effort is associated with an incarceration decrease of: 112 juveniles in Colorado, less than 1 juvenile in Florida, approximately 7 juveniles in Hawaii, approximately 65 juveniles in Mississippi, approximately 5 juveniles in New Hampshire, 152 juveniles in New Jersey, 158 juveniles in New York, 147 juveniles in Ohio, and approximately 86 juveniles in Virginia.

c. What are the effects of no slope on juvenile incarceration rates?

Only one state, Delaware, was found to have a flat slope. However, results from the correlational analyses for this state were not significant. Therefore, the effects of the slope were not further examined.

d. What are other effects?

No other effects were noted

Table 5

Measures of Central Tendency of the Variable Constructs of the Study ($N = 51$)

	Fiscal Effort (%)			Juvenile Incarceration Rate (per 100,000 juveniles)			Normality	Pearson's Correlation			Slope
State	*N*	*M*	*SD*	*N*	*M*	*SD*	Shapiro-Wilk Test Sig.	*r*	*p* value	Sig.	*B*, Direction
Alabama	26	21.65	3.07	13	1067.38	222.09	.506	-.150	.625	No	-10.50, Decreasing
Alaska	26	23.35	4.36	12	199.25	62.36	.742	-.129	.691	No	-2.33, Decreasing
Arizona	26	20.51	1.58	12	1200.92	505.70	.034	.227	.455	No	72.88, Increasing
Arkansas	26	23.65	3.44	13	513.83	168.58	.116	.457	.136	No	18.04, Increasing
California	26	18.35	1.94	13	4634.68	4634.68	.660	-.467	.108	No	<-0.005, Flat
Colorado	26	19.64	1.62	13	335.36	335.36	.752	-.581	.037	Yes	<-0.005, Flat
Connecticut	26	23.70	1.91	13	367.62	134.26	.471	-.540	.057	No	-35.87, Decreasing
Delaware	26	20.26	4.81	13	167.85	48.92	.528	.003	.993	No	0.03, Flat
District of Columbia	26	28.15	4.91	12	199.75	137.58	.003	.492	.104	No	10.97, Increasing
Florida	26	23.05	1.61	13	3851.46	1317.40	.315	-.695	.008	Yes	-0.05, Decreasing
Georgia	26	21.34	3.83	13	1514.38	486.76	.207	-.498	.083	No	-60.90, Decreasing
Hawaii	26	21.44	4.14	13	116.00	53.37	.001	-.570	.042	Yes	-7.20, Decreasing
Idaho	26	20.20	2.07	11	271.55	111.92	.030	.802	.003	Yes	39.69, Increasing
Illinois	26	22.08	1.85	13	2006.62	471.70	.065	-.503	.080	No	-0.01, Flat
Indiana	26	24.11	1.93	13	1766.85	334.25	.252	.229	.451	No	39.61, Increasing
Iowa	26	22.88	1.42	13	625.92	172.03	.046	-.146	.634	No	-19.63, Decreasing
Kansas	26	23.49	1.13	13	727.38	106.83	.090	.166	.587	No	20.85, Increasing
Kentucky	26	23.61	3.14	12	677.50	132.09	.130	-.080	.805	No	-3.16, Decreasing
Louisiana	26	21.26	3.52	13	1211.85	577.44	.036	-.260	.392	No	-43.67, Decreasing
Maine	26	29.99	3.50	13	226.23	89.32	.137	-.534	.060	No	-12.44, Decreasing
Maryland	26	25.88	1.68	13	757.69	248.24	.779	-.309	.304	No	-39.71, Decreasing
Massachusetts	26	23.81	2.01	13	528.38	228.27	.734	-.051	.868	No	-5.69, Decreasing
Michigan	26	27.25	2.18	11	2101.18	518.63	.430	-.584	.059	No	-0.02, Flat
Minnesota	26	21.64	1.82	13	886.31	388.95	.448	-.449	.123	No	-95.64, Decreasing
Mississippi	26	22.53	3.02	12	487.08	336.32	.020	-.618	.032	Yes	-64.85, Decreasing
Missouri	26	22.31	2.01	13	934.92	83.72	.489	-.007	.981	No	-0.33, Decreasing
Montana	26	29.04	1.13	12	212.08	99.39	.002	-.045	.889	No	-2.96, Decreasing

Table 5 (*continued*)

	Fiscal Effort (%)			Juvenile Incarceration Rate (per 100,000 juveniles)			Normality	Pearson's Correlation			Slope
State	*N*	*M*	*SD*	*N*	*M*	*SD*	Shapiro-Wilk Test Sig.	*r*	*p* value	Sig.	*B*, Direction
Nebraska	26	22.92	1.38	13	448.23	179.91	.006	-.005	.986	No	-0.86, Decreasing
Nevada	26	17.39	1.87	13	516.77	101.52	.061	-.085	.781	No	-4.60, Decreasing
New Hampshire	26	23.30	3.14	13	144.54	33.41	.371	-.567	.043	Yes	-5.37, Decreasing
New Jersey	26	29.36	2.17	13	1199.54	492.80	.031	-.685	.010	Yes	-0.02, Flat
New Mexico	26	22.16	3.79	13	535.46	254.16	.012	-.538	.058	No	-33.06, Decreasing
New York	26	30.05	3.16	13	2840.69	795.85	.118	-.586	.035	Yes	-0.02, Flat
North Carolina	26	19.87	1.98	13	856.31	215.69	.476	-.519	.069	No	-58.97, Decreasing
North Dakota	26	22.53	1.43	13	161.15	51.26	.364	.026	.932	No	1.01, Increasing
Ohio	26	24.81	2.63	13	3001.38	621.41	.022	-.613	.026	Yes	-0.01, Flat
Oklahoma	26	21.52	1.42	13	492.46	180.48	.099	.471	.105	No	63.19, Increasing
Oregon	26	25.57	1.96	13	981.85	232.06	.954	-.213	.484	No	-22.39, Decreasing
Pennsylvania	26	28.32	1.93	12	2507.92	966.21	.022	.021	.948	No	8.92, Increasing
Rhode Island	26	30.61	2.02	13	254.31	145.50	.093	-.106	.730	No	-6.84, Decreasing
South Carolina	26	23.80	2.88	13	1046.92	551.79	.003	-.396	.180	No	-73.40, Decreasing
South Dakota	26	20.41	1.27	12	345.67	91.14	.472	-.155	.629	No	-10.13, Decreasing
Tennessee	26	19.05	2.04	13	1053.23	318.97	.433	-.518	.070	No	-79.36, Decreasing
Texas	26	19.53	1.44	13	4306.62	1646.11	.079	-.078	.800	No	-90.77, Decreasing
Utah	26	16.40	1.57	13	520.54	182.95	.596	.106	.731	No	12.13, Increasing
Vermont	26	31.53	4.55	13	22.69	12.60	.672	-.256	.399	No	-0.63, Decreasing
Virginia	26	20.28	2.24	13	1534.92	293.53	.185	-.657	.015	Yes	-85.63, Decreasing
Washington	26	20.35	1.14	13	1331.08	350.83	.494	-.132	.667	No	-40.00, Decreasing
West Virginia	26	31.37	2.95	12	287.67	117.46	.368	.369	.239	No	11.87, Increasing
Wisconsin	26	26.91	1.48	13	1124.54	337.85	.214	-.543	.055	No	-0.01, Flat
Wyoming	26	22.97	3.89	12	235.50	55.57	.616	-.021	.949	No	-0.27, Decreasing

Note. *N* = Sample Size; *M* = Mean; *SD* = Standard Deviation; *r* = Pearson's Correlation Coefficient; *B* = Regression Coefficient (slope).

2. Is there a relationship between states' fiscal effort and the trend in state juvenile incarceration rates over an extended period of time, 1986-2011, in the United States?

   a. Is there a relationship following a 5-year time lag in incarceration rates?
   b. Is there a relationship following a 10-year time lag in incarceration rates?
   c. Is there a relationship following a 15-year time lag in incarceration rates?
   d. Is there a relationship following a 20-year time lag in incarceration rates?

A generalized linear mixed-effects model, generalized estimating equation or GEE, was used to address Research Question 2. Two sets of models were performed, one set on raw data, the other on imputed data. The dependent variable was juvenile incarceration rate, and the independent variable was state educational fiscal effort, with the following model specification:

$$(\text{Juvenile Incarceration Rate})_T = \sum^{\beta}1 * (\text{Fiscal Effort})_{T-1}$$

This model was forced in STATA. The force command requests that the estimates are computed even if the observations are not equally spaced in time.

Regression Analysis for Raw Data

The forced GEE model using the sample data with a 5-year time lag was significant (Wald χ^2 (1) = 32.06, $p < .0005$), indicating that the predictor model including the variable of state educational fiscal effort was improved over a constant only model. State educational fiscal effort was a significant predictor of juvenile incarceration rate, B = -36.28; 95% Confidence Interval (CI) for B = (-48.84, -23.72): z = -5.66, $p < .0005$, indicating that the number of juveniles incarcerated decreased by a factor of 36.28 for each 1% increase of fiscal effort.

A second forced GEE model was attempted using the sample data with a 10-year time lag, but the model did not converge. This could be due to the large amount of missing data on the dependent variable. STATA returned estimates are for the last iteration of the model, but these estimates cannot be further assessed because of the non-convergence of the model. Additionally, a third and fourth forced GEE model was attempted using the sample data with a 15-year time lag and a 20-year time lag, respectively. The estimates for these models could not be computed due to the large amount of missing data on the dependent variable of juvenile incarceration rate. Tables 6 and 7 present the results of the regression analysis performed with raw data to address Research Question 2. STATA output for the raw data is available in Appendix B.

Table 6

Generalized Estimating Equation Regression of Juvenile Incarceration Rate on Fiscal Effort for Raw Data with a 5 Year Time Lag on the Dependent Variable

					95% CI for B	
Analysis/Variable	B	*SE* B	*Z*	*p*-value	Lower	Upper
GEE						
Fiscal Effort	-36.28	6.41	-5.66	<.0005	-48.84	-23.72
Constant	1831.23	285.01	6.43	<.0005	1272.62	2389.84
Wald $\chi^2(1) = 32.06, p < .0005$						

Note. B = Regression coefficient; *SE* B = Standard error of regression coefficient; *z* = test statistic; CI = 95% confidence interval.

Table 7

Generalized Estimating Equation Regression of Juvenile Incarceration Rate on Fiscal Effort for Raw Data with a 10 Year Time Lag on the Dependent Variable

Analysis/Variable	B	*SE* B	*Z*	*p*-value	95% CI for B Lower	95% CI for B Upper
GEE						
Fiscal Effort	-9.04	16.50	-0.55	.584	-41.38	23.30
Constant	882.49	401.33	2.20	.028	95.89	1669.08
Wald $\chi^2(1) = 0.30, p = .584$						

Note. B = Regression coefficient; *SE* B = Standard error of regression coefficient; *z* = test statistic; CI = 95% confidence interval. Model did not converge.

Regression Analysis for Imputed Data

Missing data for the dependent variable of juvenile incarceration rate was imputed in STATA in an attempt to obtain results for a 10, 15, and 20 year time lag. About 12-13 years of juvenile incarceration rates were missing from each state, adding up to a total of 677 missing data on the dependent variable.

The GEE model was performed on imputed data with a 5-year time lag on juvenile incarceration rate, but the overall model was not significant, $F(1, 17.7) = 4.09, p = .059$. Additionally, the overall models were not significant for imputed data with a 10-year time lag on juvenile incarceration rate. $F(1, 10.5) = 3.18, p = .103$; a 15-year time lag on juvenile incarceration rate, $F(1, 9.1) = 3.31, p = .102$; or a 20-year time lag on juvenile incarceration rate, $F(1, 8.5) = 3.14, p = .112$. These results indicate that with a time lag of 5, 10, 15, or 20 years, state educational fiscal effort is not a significant predictor of juvenile incarceration rate for any of the 50 states and the District of Columbia in the regression model. Tables 8 through 11 present the results of the

regression analyses with the use of imputed data. Imputed STATA output is available in Appendix C.

Table 8

Generalized Estimating Equation Regression of Juvenile Incarceration Rate on Fiscal Effort for Imputed Data with a 5-Year Time Lag on the Dependent Variable

Analysis/Variable	B	*SE* B	*T*	*p*-value	95% CI for B Lower	95% CI for B Upper
GEE						
Fiscal Effort	-44.25	21.88	-2.02	.059	-90.29	1.79
Constant	2167.56	538.96	4.02	.001	1030.17	3304.95

$F(1, 17.7) = 4.09, p = .059$

Note. B = Regression coefficient; *SE* B = Standard error of regression coefficient; *t* = test statistic; CI = 95% confidence interval.

Table 9

Generalized Estimating Equation Regression of Juvenile Incarceration Rate on Fiscal Effort for Imputed Data with a 10-Year Time Lag on the Dependent Variable

Analysis/Variable	B	*SE* B	*T*	*p*-value	95% CI for B Lower	95% CI for B Upper
GEE						
Fiscal Effort	-43.33	24.29	-1.78	.103	-97.12	10.47
Constant	2134.66	602.34	3.54	.005	804.17	3465.16

$F(1, 10.5) = 3.18, p = .103$

Note. B = Regression coefficient; *SE* B = Standard error of regression coefficient; *t* = test statistic; CI = 95% confidence interval.

Table 10

Generalized Estimating Equation Regression of Juvenile Incarceration Rate on Fiscal Effort for Imputed Data with a 15-Year Time Lag on the Dependent Variable

Analysis/Variable	B	*SE* B	*T*	*p*-value	95% CI for B Lower	95% CI for B Upper
GEE						
Fiscal Effort	-45.01	24.73	-1.82	.102	-100.86	10.84
Constant	2181.31	620.32	3.52	.006	781.67	3580.95

$F(1, 9.1) = 3.31, p = .102$

Note. B = Regression coefficient; *SE* B = Standard error of regression coefficient; *t* = test statistic; CI = 95% confidence interval.

Table 11

Generalized Estimating Equation Regression of Juvenile Incarceration Rate on Fiscal Effort for Imputed Data with a 20-Year Time Lag on the Dependent Variable

Analysis/Variable	B	*SE* B	*T*	*p*-value	95% CI for B Lower	95% CI for B Upper
GEE						
Fiscal Effort	-45.31	25.57	-1.77	.112	-103.61	13.00
Constant	2169.34	639.87	3.39	.008	714.27	3624.41

$F(1, 8.5) = 3.14, p = .112$

Note. B = Regression coefficient; *SE* B = Standard error of regression coefficient; *t* = test statistic; CI = 95% confidence interval.

Using the information obtained from the regression analyses, the items of Research Question 2, "Is there a relationship between states' fiscal effort and the trend in state juvenile incarceration rates over an extended period of time, 1986-2011, in the United States" can be addressed as follows:

a. Is there a relationship following a 5-year time lag in incarceration rates?

The forced GEE model using the sample data with a 5-year time lag was significant (Wald χ^2 (1) = 32.06, $p < .0005$). Fiscal effort was a significant predictor of juvenile incarceration rate, B = -36.28; 95% CI for B = (-48.84, -23.72); z = -5.66, $p <$ .0005, indicating that the number of incarcerations is associated with a decrease of approximately 36 juveniles for each 1% increase of fiscal effort. The GEE model was performed on imputed data with a 5-year time lag on juvenile incarceration rate, but the overall model was not significant, F (1, 17.7) = 4.09, p = .059.

b. Is there a relationship following a 10-year time lag in incarceration rates?

A forced GEE model was attempted using the raw sample data with a 10-year time lag, but the model did not converge. This was possibly due to the large amount of missing data on the dependent variable. STATA returned estimates are for the last iteration of the model, but these estimates were not further assessed because of the non-convergence of the model. The 10-year time lag regression model was attempted with imputed data, but the overall model was not significant, F (1, 10.5) = 3.18, p = .103, indicating that with a 10-year time lag, fiscal effort is not a significant predictor of juvenile incarceration rate for any of the 50 states and the District of Columbia in the regression model.

c. Is there a relationship following a 15-year time lag in incarceration rates?

A forced GEE model was attempted using the raw sample data with a 15-year time lag, but the model could not be computed due to a large amount of missing data on the dependent variable of juvenile incarceration rate. The 15-year time lag regression model was attempted with imputed data, but the overall model was not significant, F (1, 9.1) = 3.31, p = .102, indicating that with a 15-year time lag, state educational fiscal

effort is not a significant predictor of juvenile incarceration rate for any of the 50 states and the District of Columbia in the regression model.

d. Is there a relationship following a 20-year time lag in incarceration rates?

A forced GEE model was attempted using the raw sample data with a 20-year time lag, but the model could not be computed due to a large amount of missing data on the dependent variable of juvenile incarceration rate. The 20-year time lag regression model was attempted with imputed data, but the overall model was not significant, $F(1, 8.5) = 3.14$, $p = .112$, indicating that with a 20-year time lag, state educational fiscal effort is not a significant predictor of juvenile incarceration rate for any of the 50 states and the District of Columbia in the regression model. Where findings differ, precedence was given to the findings of the imputed data models because imputation gives a better estimation of standard errors and variability in the dataset.

Summary

Chapter 4 began with a description of the population of this study. Following the report of population, the required assumptions for the inferential analyses were presented and discussed. Following the descriptive and assumption sections, inferential analyses were performed to investigate both research questions of the study.

A series of Pearson's Product Moment correlational analyses were performed to address Research Question 1. A negative, statistically significant association was found between state educational fiscal effort and juvenile incarceration rate for nine states: Colorado ($r = -.581$, $p = .037$), Florida ($r = -.695$, $p = .008$), Hawaii ($r = -.570$, $p = .042$), Mississippi ($r = -.618$, $p = .032$), New Hampshire ($r = -.567$, $p = .043$), New Jersey ($r =$ -

.685, p = .010), New York (r = -.586, p = .035), Ohio (r = -.613, p = .026), and Virginia (r = -.657, p = .015). A positive, statistically significant association was found between state educational fiscal effort and juvenile incarceration rate for Idaho (r = .802, p = .003). Furthermore, the slope of each state was assessed. Idaho was the only state with an increasing slope, (B = 39.69), indicating that each 1 percentage point increase in state educational fiscal effort is associated with an incarceration increase of approximately 40 juveniles. There were nine states with a decreasing slope: Colorado (B = -112.00), Florida (B = -0.05), Hawaii (B = -7.20), Mississippi (B = -64.85), New Hampshire (B = -5.37), New Jersey (B = -152.00), New York (B = -158.00), Ohio (B = -147.00), and Virginia (B = -85.63). These decreasing slopes indicate that each 1 percentage point increase in state educational fiscal effort is associated with an incarceration decrease of: 112 juveniles in Colorado, less than 1 juvenile in Florida, approximately 7 juveniles in Hawaii, approximately 65 juveniles in Mississippi, approximately 5 juveniles in New Hampshire, 152 juveniles in New Jersey, 158 juveniles in New York, 147 juveniles in Ohio, and approximately 86 juveniles in Virginia.

A generalized linear mixed-effects model, generalized estimating equation or GEE, was used to address Research Question 2. The forced GEE model using the raw sample data with a 5-year time lag was significant (Wald χ^2 (1) = 32.06, p < .0005), indicating that the predictor model including the variable of state educational fiscal effort was improved over a constant only model. State educational fiscal effort was a significant predictor of juvenile incarceration rate, B = -36.28; 95% CI for B = (-48.84, -23.72); z = -5.66, p < .0005, indicating that the number of juveniles incarcerated was associated with a decrease of a factor of 36.28 for each 1% increase of fiscal effort. Chapter 5 will

present a discussion of major findings, the results, as well as implications of the findings as relates to the literature review and further research.

CHAPTER 5

DISCUSSION

Currently, there is a need for further research on the association between state educational fiscal effort and juvenile incarceration rates based upon the open debate of the relationship between funding and student success. The impact of funding and student academic success were both originally researched in the Coleman Report in 1966 and followed up by Erick Hanushek (1981) where neither determined a correlation between funding and student academic achievement. However, Greenwald, Hedges, and Laine (1996) discovered associations between per-pupil index spending and student academic success, leading to the foundation of the No Child Left Behind Act of 2002, setting standards of accountability for education. Research results differ on the impact of funding based on a wide range of student indicators (Burtless, 1996). Indicators such as teacher quality and classroom size have come to the forefront as viable components to increase student achievement (Darling-Hammond, 2000; Owings & Kaplan, 2013). However, the goal set by NCLB of all students becoming academically competent raises the stakes and increases the urgency of determining an answer.

Research on a national level, including all fifty states, conducted over a span of several years, and incorporating the association between state educational fiscal effort and the incarceration rates of juveniles, provides insight into the effect of funding beyond the current student indicators, enhancing the existing literature. The use of educational fiscal effort, instead of per-pupil index spending, provides an equalizing factor among states when reviewing expenditures on education, eliminating differences in capacity and providing a fair comparison (Owings & Kaplan, 2013). Per pupil index spending in itself

may only reveal how wealthy a state is. Effort determines how much of the state's capacity is spent on education, revealing education's fiscal priority. Change in fiscal effort is not associated with instant change in student indicators. Funding cannot be increased and have an immediate associated impact on juvenile incarceration rates. Sustained increases in fiscal effort take five to seven years to show associated change in any variable (Berman & McLaughlin, 1978; Fullan, 2000). Thus, lag time is an important part of research over time when tied into funding. The information and data analyses would be useful to school districts, local governments, state educational departments, and the federal government in determining equity between states and the importance of adequate school funding.

The purpose of this study was to examine each individual states educational fiscal effort in light of incarceration rates over an extended period of time. The researcher determined relationships between educational fiscal effort and juvenile incarceration rates. The study answered the following research questions:

1. What type of trends exist concerning state fiscal effort and juvenile incarceration rates over an extended period of time, 1986-2011, in the United States? Are effort slopes decreasing, flat or increasing?
    a. What are the effects of an increasing slope on juvenile incarceration rates?
    b. What are the effects of a decreasing slope on juvenile incarceration rates?
    c. What are the effects of no slope on juvenile incarceration rates?
    d. What are other effects?

2. Is there a relationship between states' fiscal effort and the trend in state juvenile incarceration rates over an extended period of time, 1986-2011, in the United States?
    a. Is there a relationship following a 5-year time lag in incarceration rates?
    b. Is there a relationship following a 10-year time lag in incarceration rates?
    c. Is there a relationship following a 15-year time lag in incarceration rates?
    d. Is there a relationship following a 20-year time lag in incarceration rates?

A variety of statistical tests were used including descriptive, inferential, correlational, regression analyses. These tests included all 50 states and the District of Columbia over a period of time ranging from 1986 through 2011.

Major Findings

This study revealed a way to change the juvenile incarceration expenses by focusing fiscal effort on education. The research study revealed two major findings, one in each research question. Across the country, a statistically significant association between state fiscal education effort and juvenile incarceration rates at the 5-year timeframe was revealed in all 50 states and the District of Columbia. This study determined that when state educational fiscal effort is increased an associated decrease in juvenile incarceration rates occurred at the national level. Using the Pearson's Product Moment correlational analysis, 9 of the 50 states and the District of Columbia revealed a statistically significant inverse association between state educational fiscal effort and juvenile incarceration rates. Specifically, this association showed that if state educational fiscal effort was increased by 1%, juvenile incarceration would decrease by: 112

juveniles in Colorado, less than 1 juvenile in Florida, approximately 7 juveniles in Hawaii, approximately 65 juveniles in Mississippi, approximately 5 juveniles in New Hampshire, 152 juveniles in New Jersey, 158 juveniles in New York, 147 juveniles in Ohio, and approximately 86 juveniles in Virginia. There was one state with a statistically significant positive association, Idaho. This revealed an association between an increase in state educational fiscal effort and an increase in juvenile incarceration rates. Each 1% increase in state educational fiscal effort is associated with approximately 40 more incarcerated juveniles. These results and a summary of additional findings will be discussed further in Chapter 5.

Results

Results for the first research question and sub-questions regarding trends between educational fiscal effort rates and juvenile incarceration rates revealed significant correlations between the two variables. In reviewing the first sub-question, which asked, "What are the effects of an increasing slope on juvenile incarceration rates?" a Pearson's Product Moment correlational analyses revealed that there was only one positive significant slope, for the state of Idaho ($r = .802, p = .003$). This finding showed an association between an increase in educational fiscal effort and an increase in juvenile incarceration rates. The slope, regression coefficient, showed that each 1 unit increase in Idaho's educational effort was associated with approximately 40 more incarcerated juveniles.

The second sub-question, "What are the effects of a decreasing slope on juvenile incarceration rates?" the Pearson's Product Moment correlation analyses showed that

there were nine states with significant negative slopes. The magnitude and direction of the correlation coefficient demonstrated that an increase in educational fiscal effort implies a decrease in juvenile incarceration rates. The nine states are as follows: Colorado (B = -112.00), Florida (B = -0.05), Hawaii (B = -7.20), Mississippi (B = -64.85), New Hampshire (B = -5.37), New Jersey (B = -152.00), New York (B = -158.00), Ohio (B = -147.00), and Virginia (B = -85.63). These slopes indicate that each 1 percentage point increase in Fiscal Effort is associated with an incarceration decrease of: 112 juveniles in Colorado, less than 1 juvenile in Florida, approximately 7 juveniles in Hawaii, approximately 65 juveniles in Mississippi, approximately 5 juveniles in New Hampshire, 152 juveniles in New Jersey, 158 juveniles in New York, 147 juveniles in Ohio, and approximately 86 juveniles in Virginia.

The third sub-question, "What are the effects of no slope on juvenile incarceration rates?" using a 95% confidence interval to determine lack of slope, revealed one state with a flat slope, Delaware. However, the results were not significant.

The last sub-question regarding any other effects, none were noted.

The second research question asked, "Is there a relationship between state educational fiscal effort and the trend in state juvenile incarceration rates over an extended period of time, 1986-2011, in the United States?" Research Question 2 contained four sub-questions revolving around time lags of 5, 10, 15, and 20 years and their effect on juvenile incarceration rates and state educational fiscal effort. A generalized estimating equation (GEE) was used with both raw and imputed data. Using raw data there was significance at the 5-year lag showing that the predictor model for educational fiscal effort was improved over the constant only model and is associated

with a decrease of 36.28 juveniles incarcerated for every 1 percentage point increase in educational effort. The 10, 15, and 20 year raw data results for the generalized estimating equation could not be computed due to a large amount of missing data on the dependent variable of juvenile incarceration rate.

Regression analyses for imputed data were performed using the GEE model with a 5, 10, 15, and 20 year time lag. With the 5-year time lag the imputed data were not significant, $F(1, 17.7) = 4.09, p = .059$, however, it was tenable, or had a substantively important negative effect (Institute of Education Sciences, 2014). The confidence interval of 95% kept the data from significance. With a lower confidence interval it would reveal an association between the two variables. The imputed data models were not significant with a 10-year time lag, $F(1, 10.5) = 3.18, p = .103$; a 15-year time lag on juvenile incarceration rate, $F(1, 9.1) = 3.31, p = .102$; or a 20-year time lag on juvenile incarceration rate, $F(1, 8.5) = 3.14, p = .112$. These results indicate that based on imputed data with a time lag of 5, 10, 15, or 20 years, using the GEE regression model, the variables are not associated.

Summary of Findings

The study reviewed data from 50 states and the District of Columbia regarding state fiscal effort and juvenile incarceration rates over a significant period of time, from 1986 through 2011. Research question two included a time lag of 5, 10, 15, and 20 years. The study revealed several statistically significant findings regarding the two variables for both research questions. Using a Pearson's Product Moment correlational analysis, a statistically significant negative association between educational fiscal effort and juvenile

incarceration rates was revealed in nine states, Colorado, Florida, Hawaii, Mississippi, New Hampshire, New Jersey, New York, Ohio, and Virginia. There were nine states with a decreasing slope between state educational fiscal effort and juvenile incarceration rates: Colorado, Florida, Hawaii, Mississippi, New Hampshire, New Jersey, New York, Ohio, and Virginia. This means that when educational fiscal effort increases, juvenile incarceration decreases. The slope indicated that a 1 percent increase in fiscal effort was associated with a decrease in juvenile incarceration ranging from a low of less than 1 to a high of 158 juveniles incarcerated.

An unexpected, but statistically significant positive association between state educational fiscal effort and juvenile incarcerations rates was found in one state, Idaho. With Idaho, it was found that a 1 percentage point increase in fiscal effort was associated with an increase in incarceration of approximately 40 juveniles. This did not occur with any other state.

The generalized estimating equations revealed a statistically significant, negative, association using the raw data at the 5 year lag for the nation. This revealed that a 1 percentage point increase in fiscal effort was associated with a decrease of 36.28 juvenile incarcerations, which is the average for all 50 states and the District of Columbia. Due to the amount of missing data for the dependent variable of juvenile incarceration, an imputation was done in a generalized estimating model. In this process missing variables are replaced using information obtained from the raw data set. This revealed an inverse substantively important negative effect, tenable association, using imputed data at the 5-year lag timeframe.

Discussion of Results

Using raw data, the GEE analysis revealed an overall negative association between educational fiscal effort and juvenile incarceration rates with a 5-year time lag. Additionally, a substantively important negative effect was observed using imputed data at the same timeframe. This means that an increase in educational fiscal effort is associated with a decrease in juvenile incarceration rates. Nine states had a significant negative association between educational fiscal effort and juvenile incarceration rates as revealed by the Pearson's Product Moment analysis. This also means that an increase in educational fiscal effort was associated with juvenile incarceration decreases. However, only one state had a significant positive association revealing that when educational fiscal effort increases, juvenile incarceration also increases. Berman and McLaughlin (1978) noted that data must be examined over time. Therefore, a time-lagged model was chosen for the general estimating equation so the effects of effort would be reflected in the juvenile incarceration rates as the results of changes in effort as these effects do not happen concurrently. Fullan (2000) asserted that it takes five to seven years to see impacts of systemic change. A 5-year lag model was used to reflect both changing economic intervals and the current four-year high school cohort model. This model begins with a review of students in eighth grade and continues through four years of high school and is used to calculate the Adjusted Cohort Graduation Rate (U.S. Department of Education, 2015).

The results for the general estimating equation were not significant at the 10, 15, and 20 year iterations using the imputed data and could not converge at the same time points using the raw data. This can be attributed to the missing data points in the juvenile

incarceration data set. Prior to 1997, the Office of Juvenile Justice and Delinquency Prevention, OJJDP, managed but did not collect the data on incarceration. Data collection, while conducted mostly bi-annually, was incomplete, with some states not reporting and others reporting on juveniles placed in state facilities but not adjudicated within the reporting state. Following 1996 information on incarcerated juveniles was directly collected by the OJJDP (2014) complied from a series of censuses titled, Census of Juveniles in Residential Placement (CJRP), conducted in the years 1997, 1999, 2001, 2003, 2006, 2007, 2010, and 2011. This included all fifty states and the District of Columbia. These data were complete but also collected at varying time periods. Annual data collection would have increased the data points, possibly allowing for connections to have been made at the 10, 15, and 20 year marks.

According to Shoup and Studer (2010) the theory of complexity can be used to describe the association between variables, as opposites along the line for homeostasis. This is the theory that for each action in a variable there are multiple reasons or reactions trying to bring about a balance between the group. Actions are complex and nonlinear. Therefore, connections between among policy, poverty, graduation rates, and juvenile incarceration rates will be discussed.

Policy

A review of state educational fiscal effort over time during the 25-year period shows a slight effort increase beginning between the years 1986 and 1991 and a sharp rise from 2001 to 2011 (Cedo, 2014). This increased educational fiscal effort coupled with the results of this study, showing an association between increased state educational fiscal effort and a reduction in juvenile incarceration rates with a 5-year lag, reflects the

emphasis of national policies on education and juvenile incarceration. Educational policies during the study's time frame, 1986-2011, have shifted with accountability taking the forefront. This accounts for the increase in funding as a response to implemented policies. Beginning in 1981 with the National Commission on Excellence in Education leading to *A Nation at Risk: The Imperative for Educational Reform* (1983), the Elementary and Secondary Education Act (1994) and ending with No Child Left Behind Act (2001) accountability in education, with students both demonstrating content mastery and obtaining a high school diploma, became fundamental. The increase in state educational fiscal effort that began in 2001 and continued through 2011 may have been influenced by the standards set for state testing, graduation rates, and content mastery in reading and mathematics (Cedo, 2014). This policy implementation and its focus on student achievement and graduation rates may have been associated with the lowering of juvenile incarceration rates.

The emphasis on equity and attainment of a high school diploma impacted students considered at risk or in danger of not completing their standard public education. Dropping out of high school is an identifying factor of adults in penal institutions (Coalition for Juvenile Justice, 2001). The review of educational policy and practices begun with the Coleman Report (1966) led to a review of all juvenile educational practices. In 1974 the Juvenile Justice and Delinquency Prevention Act was passed. This allowed the federal government to establish standards for youth incarceration, provide funding, training, education, and evaluation of systems (Center for Children's Law and Policy, 2015). However, juvenile crime rates had increased across the United States at the beginning of the study, 1986 through the early 1990's. This led to tougher policies on

youth crime (Juvenile Law Center, 2015). Mandatory sentencing following the Armed Career Criminal Act and the Anti-Drug Abuse Act of 1986 required judges to pass sentences automatically, without consideration of circumstances (The Heritage Foundation, 2015). This was followed by the first of the zero tolerance laws which included educational ramifications in the Gun-Free Schools Act of 1994 (U. S. Department of Education, 1994). Zero Tolerance policies were often misinterpreted leading to juveniles being excluded from the school setting. Their exclusion led to unintended consequences such as incarceration and recidivism.

Beginning in the late 1990's the number of incarcerated juveniles decreased as juvenile crime rates declined. States have, and continue to, reassess practices put into place in the late 1980's, leading to a reduction of institutional placement and an increase in community-based interventions. This has led to more at risk students being served in the public school systems (Center on Juvenile and Criminal Justice, 2015). Various state-based programs have been implemented within public schools to aid in educating juveniles who are at risk for incarceration such as Fast Track in Indiana and Program for At Risk Students in Florida (Indiana Department of Correction, 2015; State Attorney's Office for the Fourth Judicial Circuit Duval, Clay and Nassau Counties in Northeast Florida, 2015). Currently, the juvenile justice system focuses on education, training, and reform practices, assessing juveniles using developmental psychology (Juvenile Law Center, 2015).

The educational policies, juvenile incarceration policies, crime rates, state fiscal effort expenditures, and the results of the study showing an inverse association between juvenile incarceration rates and state educational fiscal effort between 1986 and 2011 can

be viewed together using complexity theory (Shoup & Studer, 2010). State educational fiscal effort increased slightly between 1986 and 1991, however, juvenile crimes rates were also increasing continuing until mid-1990. This led to mandatory sentencing in 1986 and zero tolerance in schools in 1994. The Elementary and Secondary Education Act was also authorized in 1994, focusing on educational accountability. Juvenile crime rates began to fall at the end of the 1990's increasing the focus on education and literacy in juvenile institutions and placement in community based alternatives. Beginning again in 2001 state educational fiscal effort increased substantially, accountability focusing on graduation rates following NCLB became increasing urgent, and more at risk juveniles were attending public school, creating more programs designed to aid the at risk student, decreasing juvenile incarceration rates.

Poverty

Communities can be poverty stricken with low capacity but still exert a lot of effort, commitment of the monetary resources available, into education. Likewise, a community can be wealthy with a high capacity but when examined closely exert little effort, or a small amount of the possible monetary resources, into its schools (Owings & Kaplan, 2013). Various indicators, specifically school size and early childhood intervention, influence poverty's impact on education. Small school size increased student achievement in urban areas and narrowed the achievement gap and students benefited academically from smaller schools and smaller school districts on both norm-referenced and state designed criterion-referenced tests (Education Commission of the States, 2002; Johnson et al., 2002).

However, beyond the school day, poverty itself has an impact. Morsy and Rothstein (2015) highlighted five disadvantages students living in poverty bring with them to school: parenting practices that are detrimental to intellectual development, the implications of single parenthood, irregular work schedules, access to health care, and the age of housing in conjunction with lead based paint. They advocate for social reform along with educational reform.

The number of children under eighteen in poverty across the United States is disproportional compared with all those in poverty. For instance, in 2011, the end year of the study, impoverished juveniles represented 33.6%, above a third, of all those in poverty. This is an overall rate decrease from 1986, where children represented 37.9% of people in the United States living in poverty. Even though juveniles comprised a lower proportion in the poverty calculations over the years of the study, the number of children in poverty has risen from 12,257,000 in 1986 to 15,539,000 in 2011. The overall number of people below the poverty line has climbed for the country between 2006 and 2011 (U. S. Census Bureau, 2015).

The association of poverty and juvenile incarceration rates required further analysis, given the nine states with an inverse association between state educational fiscal effort and juvenile incarceration rates and one state with a positive association. It was important to examine if poverty created a pattern within the effected states. Therefore, the researcher examined median household income for these specific states (see Table 12). The most recent median household income in the United States between the years 2009 and 2013 is at $53,046. In the states that showed an association between state educational fiscal effort and juvenile incarceration rates, the highest median salary is in

New Jersey ($71,629) and the lowest is in Florida ($46,956). Five states, Florida ($46,956), Idaho ($46,767), Mississippi ($39,031), New York ($52,259) and Ohio ($48,308) residents' median salary is less than the median salary for the United States as a whole. The remaining states, Colorado ($58,433), Hawaii ($67,402), New Jersey ($71,629), New Hampshire ($64,916), Ohio ($48,308), and Virginia ($63,907), are well above the USA median household income. Regarding poverty levels, New Hampshire has the lowest poverty rate at 8.7%, while Mississippi had the highest at 22.7%. The only state with a positive association between educational fiscal effort and juvenile incarceration rates, Idaho, had a poverty level near the median of the states with a negative association, at 15.50%. This is also below the overall poverty rate of the United States, 15.40% (U. S. Census Bureau, 2015).

Table 12

Poverty Level in the 10 States Showing Association Between State Educational Fiscal Effort and Juvenile Incarceration Rates

	State	United States
People QuickFacts	**Colorado**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$31,109	$28,155
Median household income, 2009-2013	$58,433	$53,046
Persons below poverty level, percent, 2009-2013	13.2%	15.4%
People QuickFacts	**Florida**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$26,236	$28,155
Median household income, 2009-2013	$46,956	$53,046
Persons below poverty level, percent, 2009-2013	16.3%	15.4%
People QuickFacts	**Hawaii**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$29,305	$28,155
Median household income, 2009-2013	$67,402	$53,046
Persons below poverty level, percent, 2009-2013	11.2%	15.4%

Table 12 (*continued*)

People QuickFacts	**Idaho**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$22,568	$28,155
Median household income, 2009-2013	$46,767	$53,046
Persons below poverty level, percent, 2009-2013	15.50%	15.40%

People QuickFacts	**Mississippi**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$20,618	$28,155
Median household income, 2009-2013	$39,031	$53,046
Persons below poverty level, percent, 2009-2013	22.7%	15.4%

People QuickFacts	**New Hampshire**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$33,134	$28,155
Median household income, 2009-2013	$64,916	$53,046
Persons below poverty level, percent, 2009-2013	8.7%	15.4%

People QuickFacts	**New Jersey**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$36,027	$28,155
Median household income, 2009-2013	$71,629	$53,046
Persons below poverty level, percent, 2009-2013	10.4%	15.4%

People QuickFacts	**New York**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$32,010	$28,155
Median household income, 2009-2013	$52,259	$53,046
Persons below poverty level, percent, 2009-2013	20.3%	15.4%

People QuickFacts	**Ohio**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$26,046	$28,155
Median household income, 2009-2013	$48,308	$53,046
Persons below poverty level, percent, 2009-2013	15.8%	15.4%

People QuickFacts	**Virginia**	**USA**
Per capita money income in past 12 months (2013 dollars), 2009-2013	$33,493	$28,155
Median household income, 2009-2013	$63,907	$53,046
Persons below poverty level, percent, 2009-2013	11.3%	15.4%

Source: US Census Bureau State & County QuickFacts
http://quickfacts.census.gov/qfd/states/
Retrieved 6/5/15

Therefore, poverty alone does not seem to be the identifying factor in the association between fiscal educational effort and juvenile incarceration rates but may be a contributing factor. However, there is a relationship between poverty and graduation rates and graduation rates are tied to juvenile incarceration rates.

High School Graduation

Juvenile incarceration and high school graduation rates are related. The predominate school of thought is that high school drop outs are at greater risk for incarceration. Juvenile incarceration, however, also negatively impacts graduation rates. Two-thirds to three-fourths of students returning to school following incarceration during their 9th grade school year withdraw or dropout within a year and less than 15% complete high school within four years (Justice Policy Institute, 2009). The lack of a high school education also stands out in the adult prison indicators (Bureau of Justice Statistics, 2010). More than 80% of inmates did not receive a high school diploma (Coalition for Juvenile Justice, 2001). Thus, fiscal educational effort targeting increasing graduation rates also affects juvenile incarceration rates.

One recent research study revealed that increased state educational fiscal effort over time was associated higher graduation rates. According to Cedo (2014), "States with high fiscal effort that increased over time had the highest high school graduation rate average. States with low but increasing fiscal effort were shown to have the lowest high school graduation rate average" (p. 95). Cedo further concludes that educational fiscal effort has increased since 2001. While the study examines overall state educational fiscal effort it does not examine where the money is expended. Research reveals that there are specific, high impact expenditures that result in increased student academic achievement

(Owings & Kaplan, 2013). For instance, teacher quality and effectiveness is the greatest indicator of increased student academic achievement, even supporting increases years later (Darling-Hammond, 2000; Jordan et al., 1997; Rebell & Wardenski, 2004; Sanders & Rivers, 1996). To a smaller extent, reduced class size in the primary years has shown to be a benefit, especially for minority students (American Youth Policy Forum, 2010; Pate-Bain et al, 2010).

The national average freshman graduation rates have increased from 74% in 1990 to 81% in 2012 (National Center for Educational Statistics, 2015c). The answer to the first research question revealed states with positive and inverse associations between state educational fiscal effort and juvenile incarceration. Focusing on these states through the lens of high school graduation shows mixed information, see Table 13. The most recent freshman graduation rate in the United States for the year 2011-2012 is 81%. In the states that showed an association, the highest graduation rate is in New Hampshire and New Jersey (87%) and the lowest is in Mississippi (68%). Four states, Florida (75%), Hawaii (78%), Mississippi (68%), and New York (78%) had graduation rates below the national average. The remaining six states, Colorado (82%), Idaho (84%), New Hampshire (87%), New Jersey (87%), Ohio (84%), and Virginia (84%), are above the USA median graduation rate. Idaho, the only state with a positive association between state educational fiscal effort and juvenile incarceration rates. had a graduation rate that was higher than the national average at 84%.

Therefore, graduation rates alone do not seem to be the identifying factor in the association between state fiscal educational effort and juvenile incarceration rates but may be a contributing factor. An examination of the relationship between poverty and

graduation rates in the nine states with a negative, inverse, association between state educational fiscal effort and juvenile incarceration rates could shed light on any interdependencies.

Table 13

Graduation Rates (in percentages) in the Ten States Showing Association Between State Educational Fiscal Effort and Juvenile Incarceration Rates

State	Total 2010-11	Total 2011-12
United States	80	81
Colorado	82	82
Florida	72	75
Hawaii	74	78
Idaho	83	84
Mississippi	69	68
New Hampshire	87	87
New Jersey	87	87
New York	78	78
Ohio	82	84
Virginia	83	84

Source: National Center for Educational Statistics
https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014391
Retrieved 6/24/15

The Interconnection of Poverty, Graduation Rates, and Incarceration Rates

Twenty-two percent of juveniles who live in poverty fail to graduate high school and if over half of the student's childhood is spent in poverty this number rises to 32% (Hernandez, 2012). Graduation rates and poverty are related to juvenile incarceration. An incarcerated youth at the eighth grade level reads at least one grade level below their peers, attends school less than half the required time, and fails a fourth of their classes or more (Balfanz et al., 2003). Education is also linked to the adult prison population with more than 80% of inmates lacking a high school diploma (Coalition for Juvenile Justice, 2001). When viewed independently both poverty and graduation rates for the nine states

inversely associated between state educational fiscal effort and juvenile incarceration rates do not seem to form a consistent pattern, when viewed together this changes. With Colorado, New Hampshire, New Jersey, and Virginia graduation rates are above the 81% national graduation rate and poverty is below the 15.4% national poverty rate. Florida, Mississippi and New York, however, have graduation rates below the national graduation rate and poverty rates above the national poverty rate. Ohio has graduation rates and poverty rates above the national norm. Hawaii has graduation rates and poverty rates below the national norm. Therefore, it appears that when poverty is high, graduation rates are low and when poverty is low, graduation rates are high, as reflected in Table 14.

Table 14

Comparison of State Graduation and Poverty Rates Between States Inversely Associated With State Educational Fiscal Effort and Juvenile Incarceration Rates

State	Graduation Rates	Percent Below Poverty Level
Colorado	82	13.2
Florida	75	16.3
Hawaii	74	11.2
Mississippi	69	22.7
New Hampshire	87	8.7
New Jersey	87	10.4
New York	78	20.3
Ohio	82	15.8
Virginia	84	11.3

Source: US Census Bureau State & County QuickFacts
http://quickfacts.census.gov/qfd/states/
Retrieved 6/5/15
Source: National Center for Educational Statistics
https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014391
Retrieved 6/24/15

A correlational analysis for the nine states showing an inverse association between state educational fiscal effort and juvenile incarceration rates between graduation rates and poverty rates produced significant results. The results were

significant (r = -.738, p = .023). This strong, negative correlation coefficient indicates that overall for these nine states, as graduation rates go up, poverty rates go down.

Cost of Juvenile Incarceration vs. Education

Educating a student in public elementary and secondary school seems an expensive endeavor when reviewing local, state, and federal yearly expenditures. The total cost is approximately $643 billion, averaging around $12,743 per pupil including capital outlay, school operations, and interest on debt for the school year 2009 to 2010 (National Center for Education Statistics, 2015a). However, when looking at the expense of keeping a juvenile incarcerated, educational expense becomes reasonable. Beyond the social and emotional cost of the incarceration of a young person, the fiscal cost averages $407.58 per day or approximately $148,767 per year per juvenile, with a low of $127.84 dollars a day in Louisiana to a high of $966.20 dollars a day in New York (Justice Policy Institute, 2014). The costs of recidivism, lost future earnings, lost government tax revenue, additional Medicare and Medicaid spending, and sexual assault on juveniles in prison adds an additional eight to twenty-one billion dollars a year (Justice Policy Institute, 2014). Furthermore, Levin et al. (2006) calculated the cost per crime in terms of police presence, government programs, and victim costs and found an average savings of $26,600 for each high school diploma earned in 2006.

This study revealed a way to change the juvenile incarceration expenses by focusing fiscal effort on education. An overall inverse association between state educational fiscal effort and juvenile incarceration rates using a general estimating equation model as well as strong statistically significant inverse relationship in nine states using a Pearson's Process Moment were discovered. The generalized estimating equation

revealed a statistically significant negative association using the raw data at the 5-year lag period. This suggested that the number of juveniles incarcerated decreased by 36.28 juveniles for each 1 percentage increase in state educational fiscal effort. Using imputed data, a substantively important negative effect was found at the 5-year lag period as well. The slopes found using the Pearson's Product correlation indicate that each 1 percentage point increase in state educational fiscal effort is associated with an incarceration decrease of: 112 juveniles in Colorado, less than 1 juvenile in Florida, approximately 7 juveniles in Hawaii, approximately 65 juveniles in Mississippi, approximately 5 juveniles in New Hampshire, 152 juveniles in New Jersey, 158 juveniles in New York, 147 juveniles in Ohio, and approximately 86 juveniles in Virginia.

Reviewing the United States and each of the individual states and comparing the cost of increasing educational fiscal effort by 1%, or unit, the impact on potential savings to states becomes clear. Table 15 is a combination of statistics from the U.S. Department of Commerce, Bureau of Economic Analysis (2015), the Justice Policy Institute (2014), and the National Education Association (2015).

Table 15

Nine States with an Inverse Association and the United States 2014

State	Cost of Juv. Incarceration (Per individual)	Per Capita GDP	Per Pupil Expenditure	Ed. Effort Index
Colorado	104,985	52,214	11461	0.2195
Florida	55,407	38,690	9179	0.2372
Hawaii	199,319	49,686	13315	0.268
Mississippi	153,300	31,551	9048	0.2868
New Hampshire	214,620	49,951	16876	0.3379
New Jersey	196,133	56,405	18441	0.3269

Table 15 (*continued*)

New York	352,663	64,818	16349	0.2522
Ohio	202,502	45,887	12610	0.2748
Virginia	260,019	51,338	11804	0.2299
United States	148,767	49,469	11722	0.237

When the 1% is added to the educational fiscal effort a new per pupil index can be calculated relative to this increase. The difference between the amount of funding needed and the cost of incarcerating a juvenile for each state is shown. This is the potential amount saved for each juvenile that is not incarcerated. Table 16 is a combination of statistics from the U.S. Department of Commerce, Bureau of Economic Analysis (2015), the Justice Policy Institute (2014), and the National Education Association (2015) reflecting this difference. The cost of juvenile incarceration provided by the Justice Policy Institute (2014) was collected from information self-reported by the states and used the most expensive placement listed. Table 16 revealed the per pupil index for 2014 after adjusting for a 1% educational effort increase. The difference between the cost of juvenile incarceration and the adjusted per pupil index is shown.

Table 16

Difference Between A 2014 Juvenile Incarcerated and the Needed 1% Increase in Per Pupil Index Spending Related to the Study

State	Cost of Juv. Incarceration	Per Capita GDP	Per Pupil Index adjusted	Ed. Effort plus 1%	Difference Incar. & Per Pupil
Colorado	104,985	52,214	11983.11	0.2295	93,001.89
Florida	55,407	38,690	9564.17	0.2472	45,842.83
Hawaii	199,319	49,686	13812.71	0.278	185,506.29
Mississippi	153,300	31,551	9364.34	0.2968	143,935.66
New Hampshire	214,620	49,951	17377.95	0.3479	197,242.05
New Jersey	196,133	56,405	19002.84	0.3369	177,130.16

Table 16 (*continued*)

New York	352,663	64,818	16995.28	0.2622	335,667.72
Ohio	202,502	45,887	13068.62	0.2848	189,433.38
Virginia	260,019	51,338	12315.99	0.2399	247,703.01
United States	148,767	49,469	12218.84	0.247	136,548.16

Differences range from an overall United States average of $136,548.16, the potential savings for one juvenile who is kept in school and out of prison, with a high of $335,667.72 in New York and a low of $45,842.83 in Florida. However, this is not the total possible potential savings. The overall results from the study using the general estimating equation showed that if one increased the state educational fiscal effort by 1%, this would be associated with a decrease in juvenile incarceration by 36.28 juveniles. This multiplied by the amount saved between the cost of incarceration and the per pupil spending index, $136,548.16, provides a total average yearly potential savings across the United States of $4,953,967.25. This also holds true for the nine states with the significant inverse association between state educational fiscal effort and juvenile incarceration rates found by using the Pearson's correlation. These slopes indicate that each 1 percentage point increase in fiscal effort is associated with an incarceration decrease in the nine states as follows: 112 juveniles in Colorado, less than 1 juvenile in Florida, approximately 7 juveniles in Hawaii, approximately 65 juveniles in Mississippi, approximately 5 juveniles in New Hampshire, 152 juveniles in New Jersey, 158 juveniles in New York, 147 juveniles in Ohio, and approximately 86 juveniles in Virginia. This could lead to a potential total savings of $10,416,211.68 in Colorado, less than $45,842.83 in Florida, $1,298,544.03 in Hawaii, $9,355,817.90 in Mississippi,

$986,210.25 in New Hampshire, $26,923,784.32 in New Jersey, $53,035,499.76 in New York, $27,846,706.86 in Ohio, and $21,302,458.86 in Virginia.

Table 17 reveals the per pupil index (National Education Association, 2015) of the nine states increased by 1%, the amount needed to decrease juvenile incarceration populations by: 112 juveniles in Colorado, less than 1 juvenile in Florida, approximately 7 juveniles in Hawaii, approximately 65 juveniles in Mississippi, approximately 5 juveniles in New Hampshire, 152 juveniles in New Jersey, 158 juveniles in New York, 147 juveniles in Ohio, and approximately 86 juveniles in Virginia. The difference between per pupil expenditures and this 1% increased number were found. This is the dollar amount, per pupil, needed to decrease the incarcerated population in each state. This ranges from $384.17 in Florida to $646.28 in New York.

Table 17

Difference in Per Pupil Expenditure with the Additional 1%

State	Per Pupil Index	Per Pupil Index plus 1%	Difference
Colorado	11461	11983.11	522.11
Florida	9179	9564.17	385.17
Hawaii	13315	13812.71	497.71
Mississippi	9048	9364.34	316.34
New Hampshire	16876	17377.95	501.95
New Jersey	18441	19002.84	561.84
New York	16349	16995.28	646.28
Ohio	12610	13068.62	458.62
Virginia	11804	12315.99	511.99
United States	11722	12218.84	496.84

Implications

Results from this study reveal an inverse association between state educational effort and juvenile incarceration rates. These results have several possible implications at the state and national level, more importantly where fiscal effort could be focused to ensure state dollars are used to impact students more efficiently. The amount of funding required to incarcerate a juvenile has become astronomical with a high of $352,663 in New York at the most expensive facility to a low of $46,662 in Louisiana in fiscal year 2014 (Justice Policy Institute, 2014). Educating a juvenile has a much different price tag, a high of $28,254 in Vermont to a low of $7,921 in Utah during school year 2013-2014 (National Education Association, 2015). Juvenile incarceration and high school graduation are linked, giving states the ability to change their expenditures and funding patterns. The focus on high school graduation by NCLB brings to light this connection between education and incarceration. The relationship between instruction (Christle & Yell, 2008; Sacks, 1999), disengagement (Bridgeland, DiIulio, & Morison, 2006; Bureau of Justice Statistics, 2003), academic failure (Bridgeland, DiIulio, & Morison, 2006; Bureau of Justice Statistics, 2003), literacy issues, and mathematical understanding (Coalition for Juvenile Justice, 2001) are repeated both by juveniles who leave high school and those who become incarcerated. Beyond the cost of incarceration and the social and ethical issues associated with detaining a juvenile, there are additional costs. These additional costs are recidivism, lost future earnings, lost government tax revenue, additional Medicare and Medicaid spending, and the cost of sexual assault on juveniles in prison increase costs by an additional eight to twenty-one billion a year for juvenile incarceration (Justice Policy Institute, 2014). The data from this study support the

inverse association between state educational fiscal effort and juvenile incarceration rates. These results could lead to a reduced incarcerated juvenile population, more students kept in the educational setting, an increased look at where educational spending makes an impact on student achievement, and programs at the state and regional level that focus on at risk students and education.

Recommendations for Further Research

Results from this study, the inverse association between state educational fiscal effort and juvenile incarceration rates have implications for future research. Due to the lack of systematic data collection of juvenile incarceration information prior to 1997, the study could be replicated using 1997 as the first data point. In conjunction, even though sustained fiscal effort takes 5 to 7 years to show associated change (Berman & McLaughlin, 1978; Fullan, 2000), using a 2-year lag in time would encompass more data points for juvenile incarceration rates using raw data for the GEE analysis since the information is collected bi-annually.

A review of the study results dividing the time-frame based on the implementation of No Child Left Behind would be informative. Since high school graduation and juvenile incarceration impact each other it may reveal if the inverse association is based on the push for increased accountability, focus on student academic success, and the increased pressure for students to graduate high school.

Further analysis of the interconnectedness of juvenile incarceration, graduation rates, and poverty could be conducted, expanding on the study. A review of graduation requirements in each state may shed light on differences between states. Racial and

socioeconomic disparities of students in relation to juvenile incarceration, high school graduation, and poverty by state would be interesting and provide information useful to state budget committees.

A closer look at the nine states with a statistically significant association between state educational fiscal effort and juvenile incarceration, Colorado, Florida, Hawaii, Mississippi, New Hampshire, New Jersey, New York, Ohio, and Virginia, might reveal differences in programs and policies that could be replicated in other states. Where these nine states expend their fiscal effort and the policies they follow matters to both education and juvenile incarceration. This could include a review of class size, teacher quality, programs designed to aid at risk students in the school setting, community-based programs, and programs designed as alternatives to juvenile incarceration such as group homes and mentors. Additionally, the study could be replicated controlling for the percentage of college educated adults in the nine states.

Additionally, the study could be replicated within the state level, at the school division level, bringing a micro-economic focus to the results. This focus could allow school divisions to determine if the programs and policies already in place are effective and economically efficient.

Conclusion

This study revealed several statistically significant findings regarding state educational fiscal effort and juvenile incarceration rates for both research questions. The generalized estimating equations found an overall statistically significant negative association between state educational fiscal effort and juvenile incarceration rates using

raw data at the 5-year lag timeframe. This suggested that the number of juveniles incarcerated decreased by 36.28 juveniles for each 1 percentage increase in fiscal effort. There was also a substantively important negative effect, tenable association, using imputed data at the 5-year lag timeframe.

A statistically significant inverse, negative, association between educational fiscal effort and juvenile incarceration rates in nine states, Colorado, Florida, Hawaii, Mississippi, New Hampshire, New Jersey, New York, Ohio, and Virginia was revealed. The slope indicated that a 1% increase in fiscal effort was associated with a decrease in juvenile incarceration ranging from a low of less than 1 to a high of 158 juveniles incarcerated. One state, Idaho, revealed a positive association.

States have a responsibility to make sure public funds are used in the most efficient and effective manner to ensure the prosperity of future generations. This study's results suggest that a focus on education, reviewing support systems in the community and schools, along with alternatives to youth incarceration make better fiscal sense than pouring more money into juvenile incarceration. Therefore, with the inverse association between state educational fiscal effort and juvenile incarceration rates, where increasing educational fiscal effort is associated with a decrease in juvenile incarceration, states may want to review their funding habits. It is essential that states consider alternative solutions to juvenile crime other than incarceration. The implementation of results-oriented and preventative-type programs lend themselves to lower juvenile crime rates, fewer incarcerated youth, more high school graduates, and therefore, more productive citizens.

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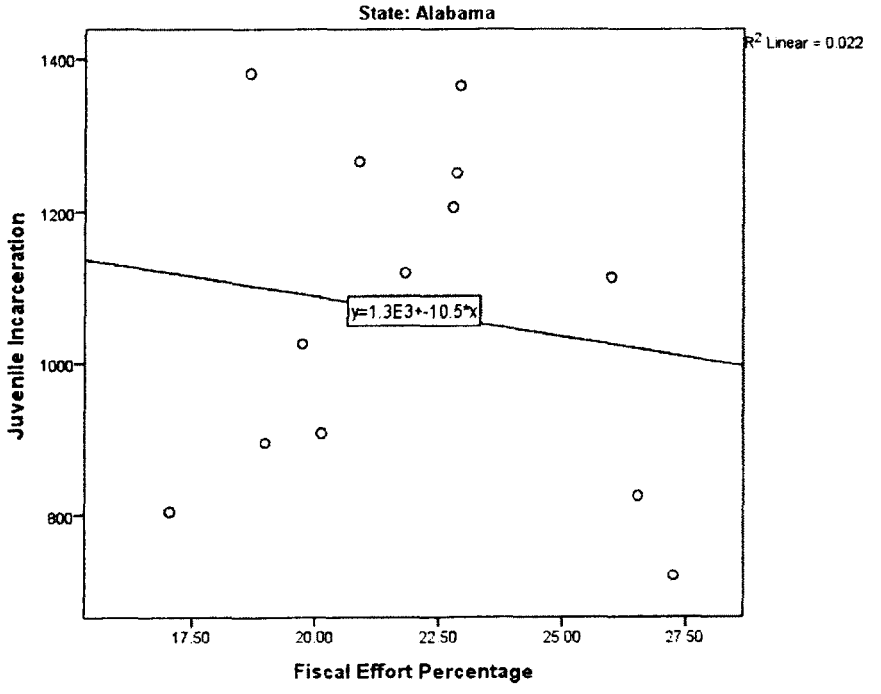
Appendix A

Slopes of All 50 States and the District of Columbia

Figure A1



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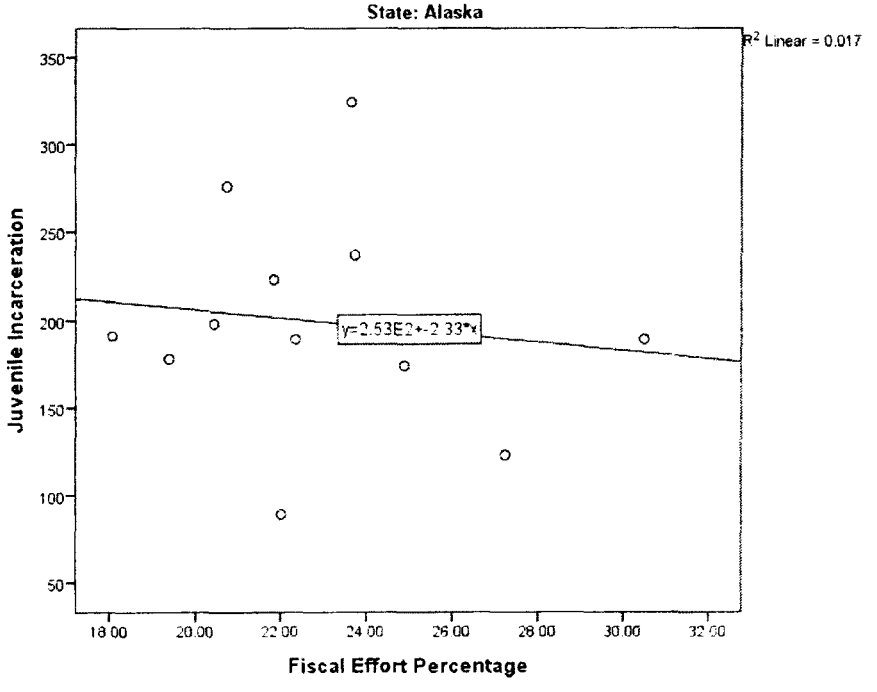

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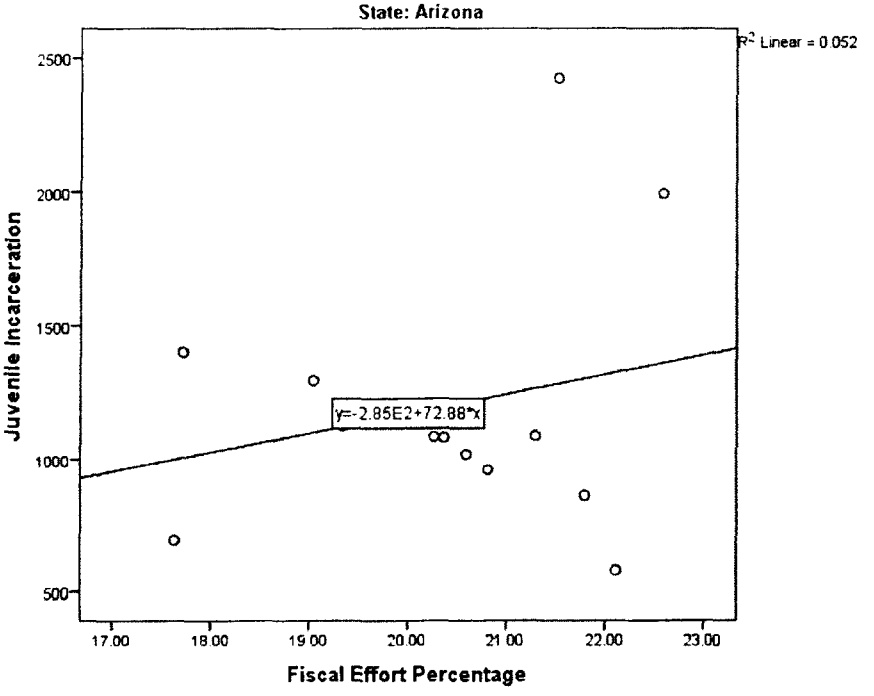

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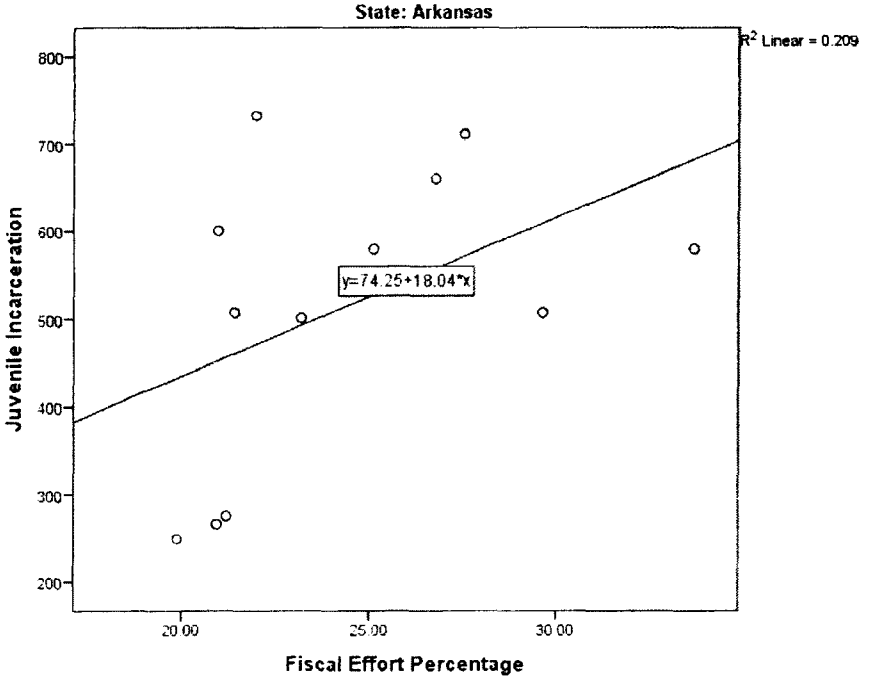

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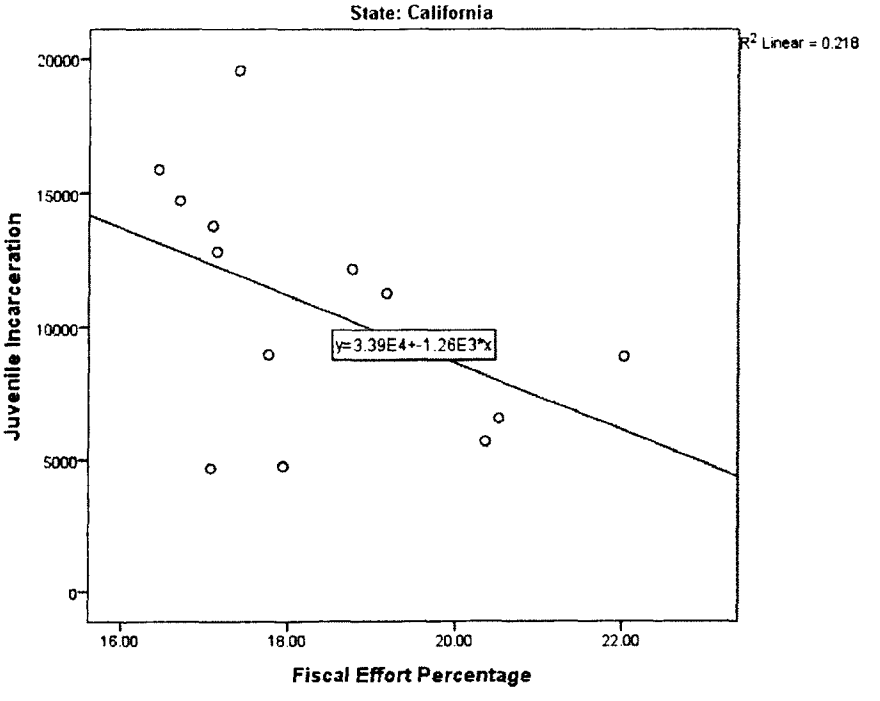

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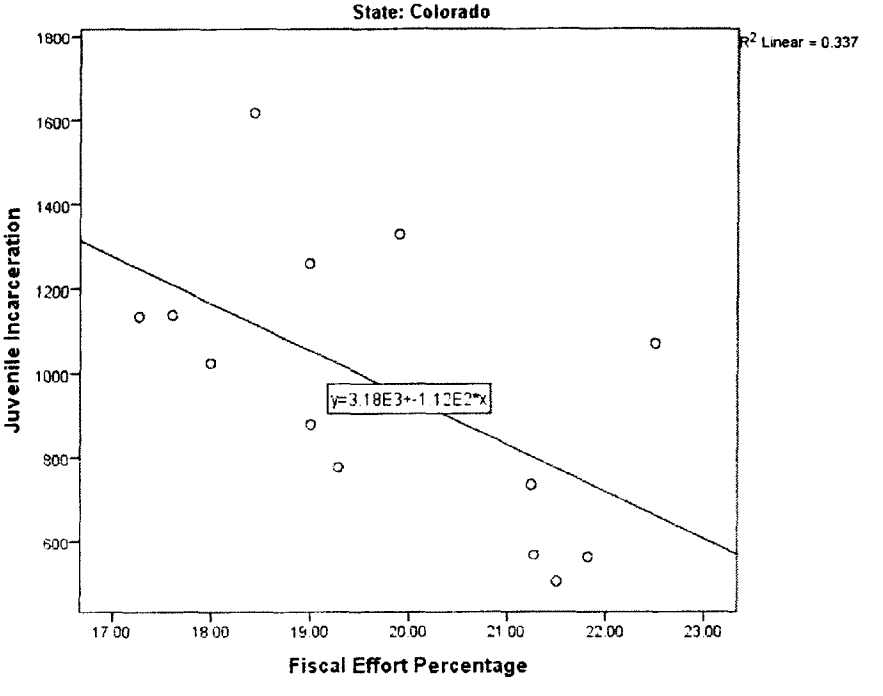

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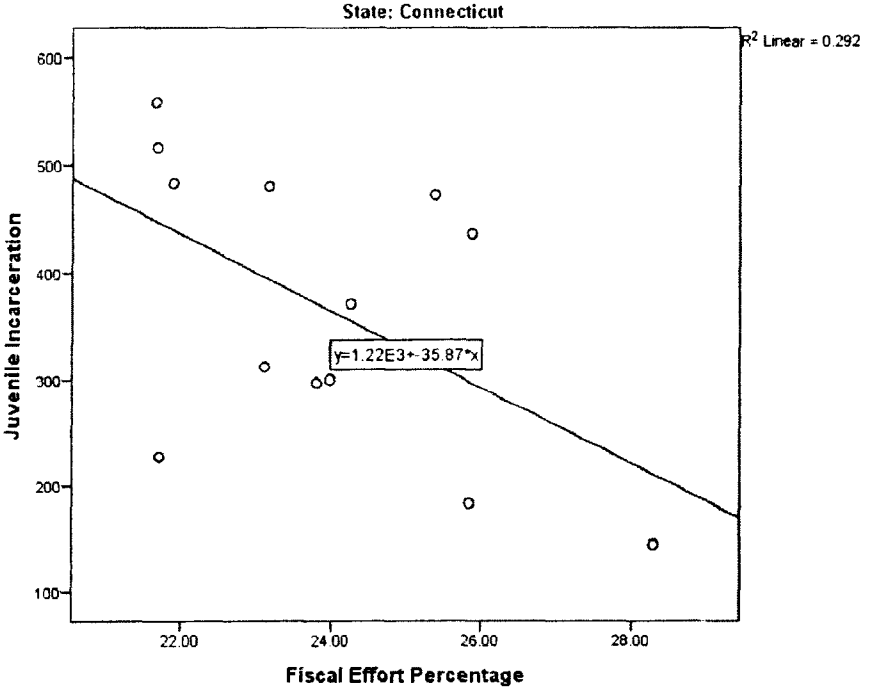

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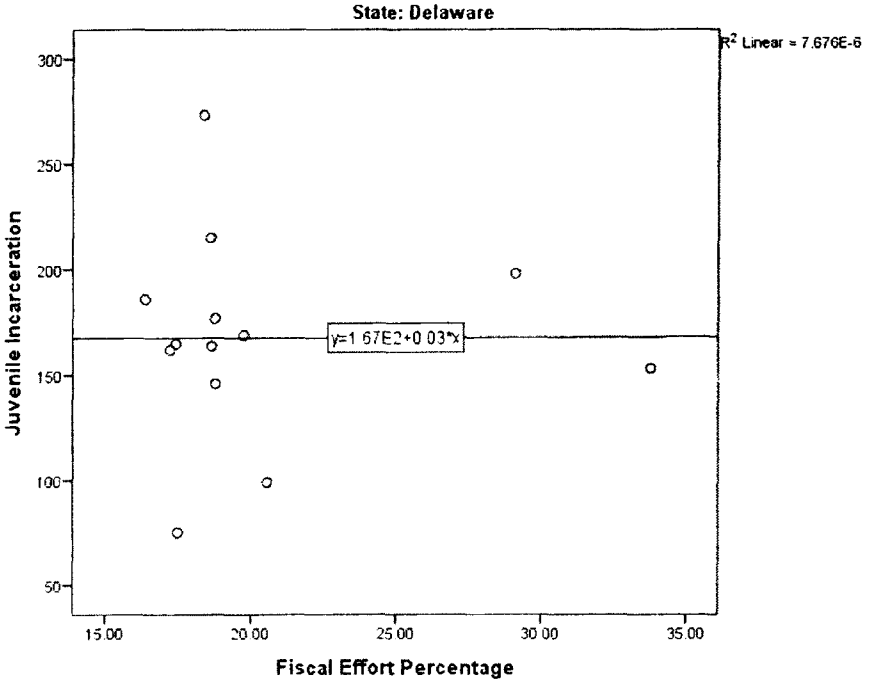

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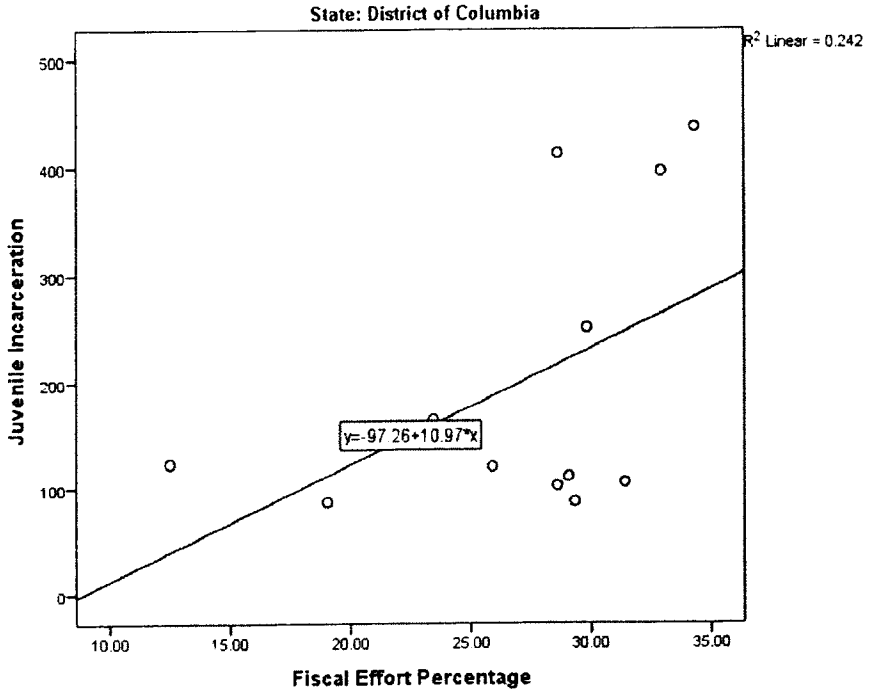
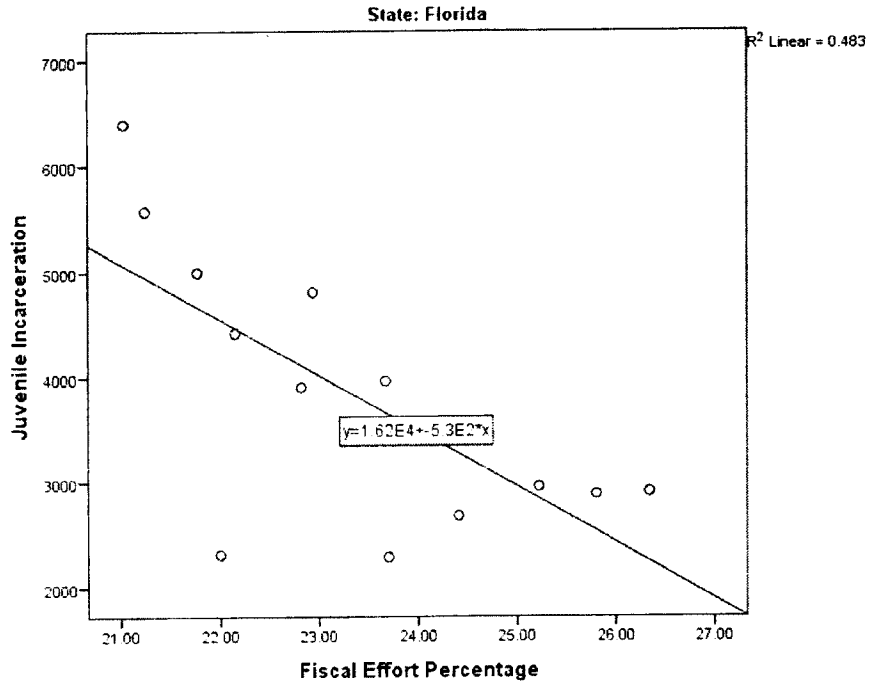


Figure A10



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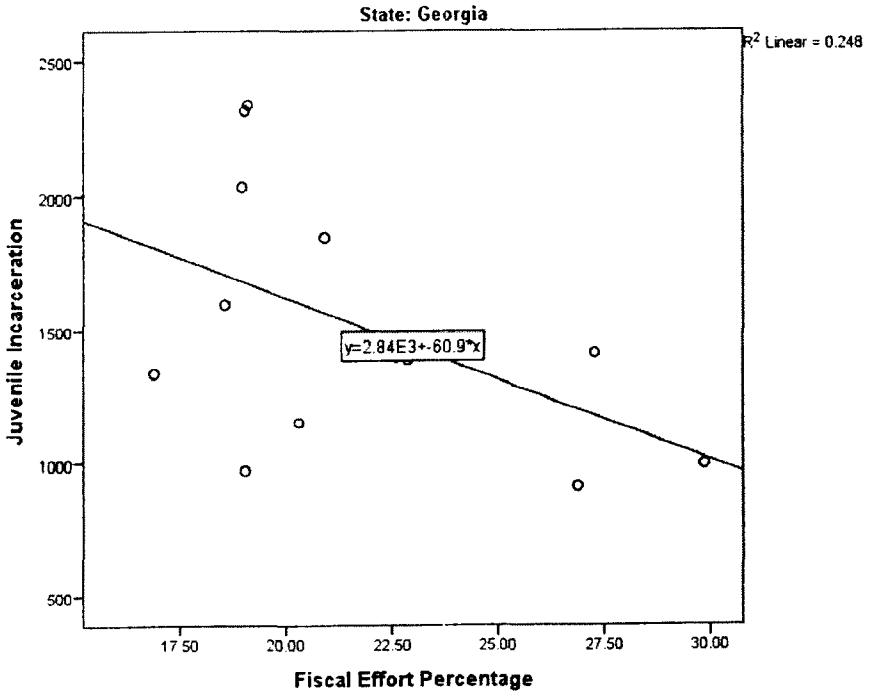

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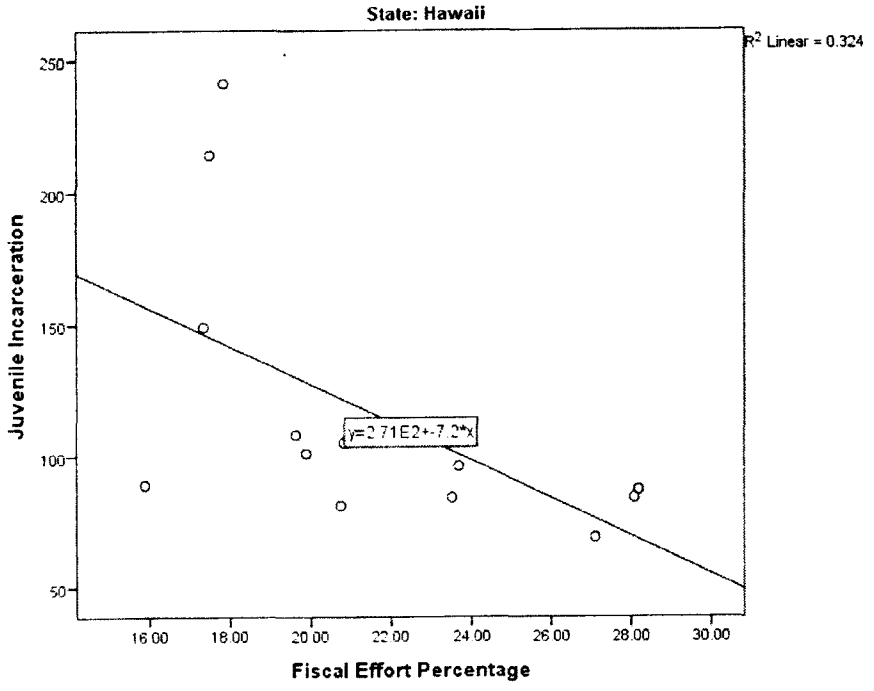


Figure A13

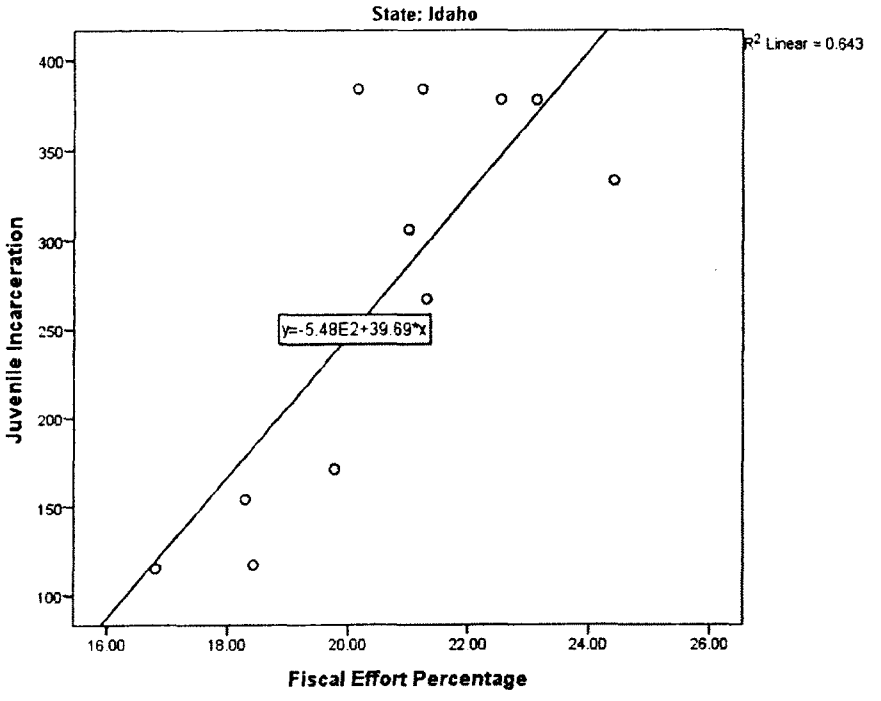


Figure A14

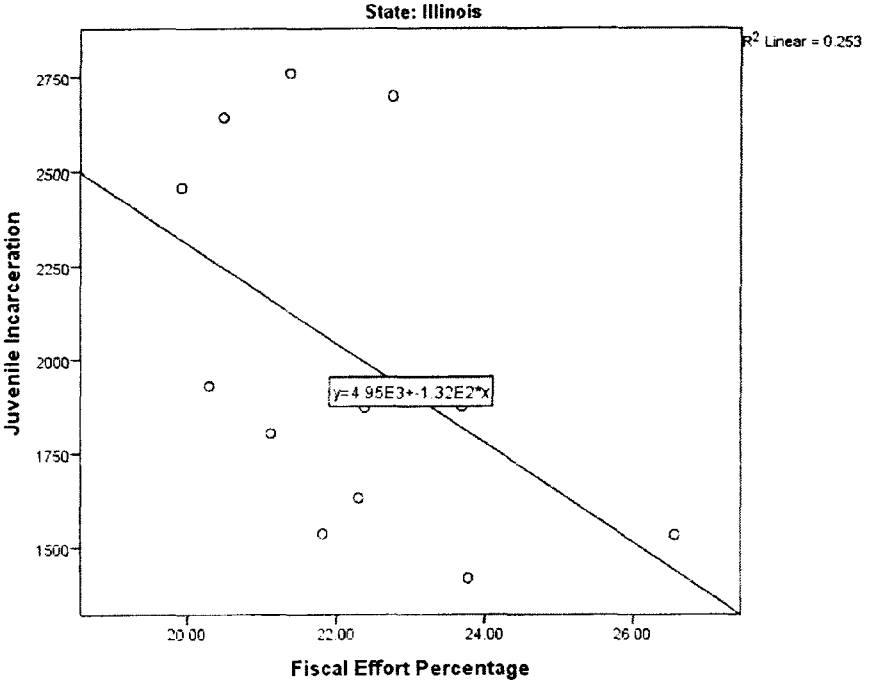


Figure A15

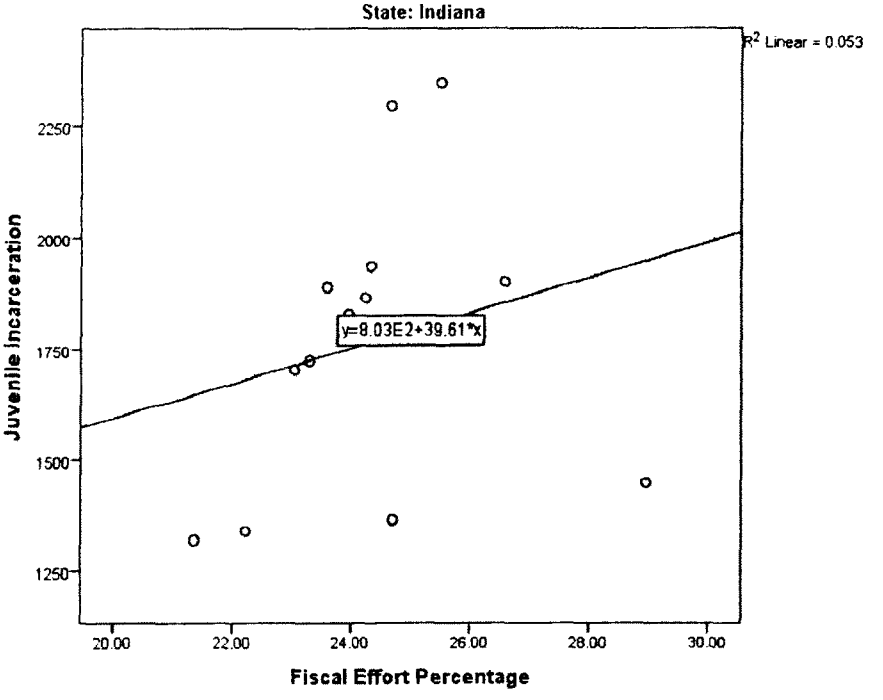


Figure A16

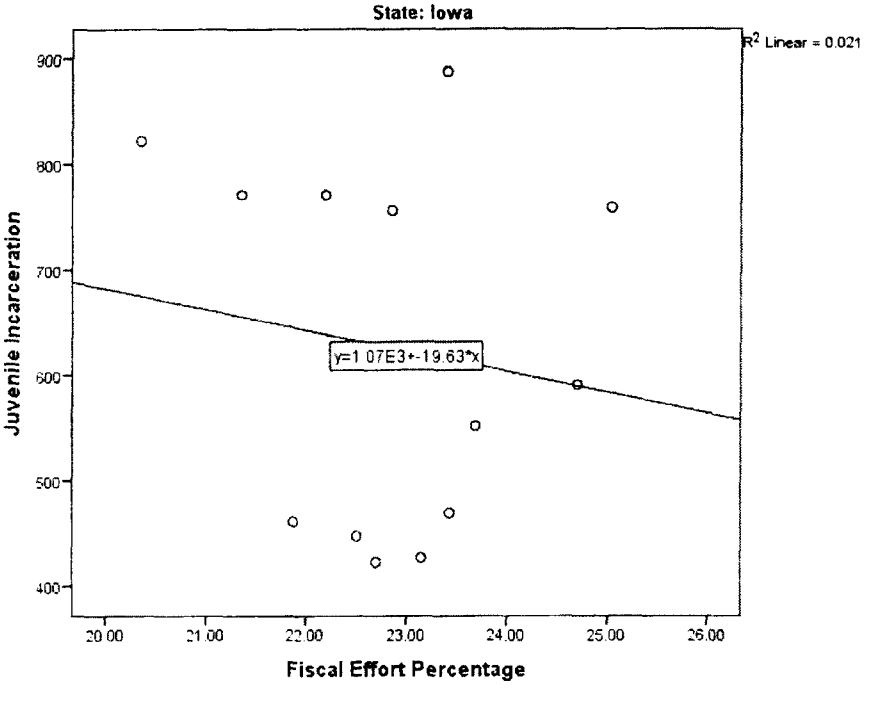


Figure A17

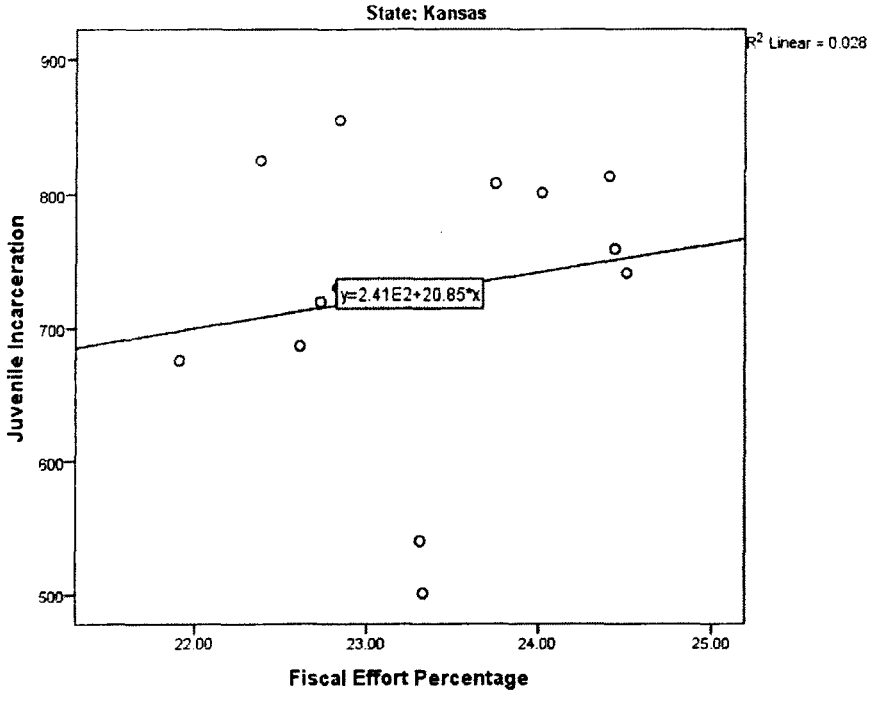


Figure A18

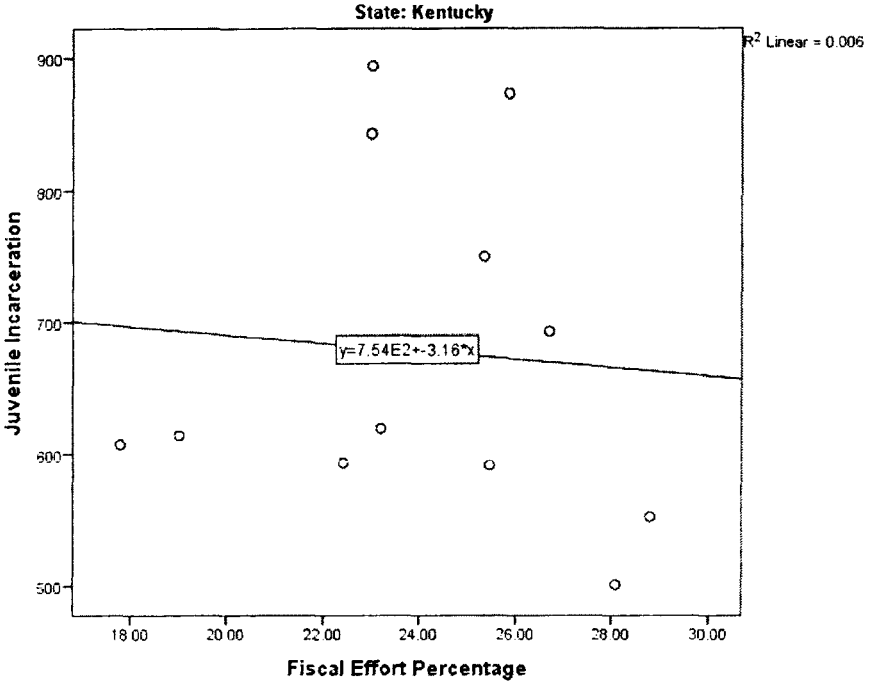


Figure A19

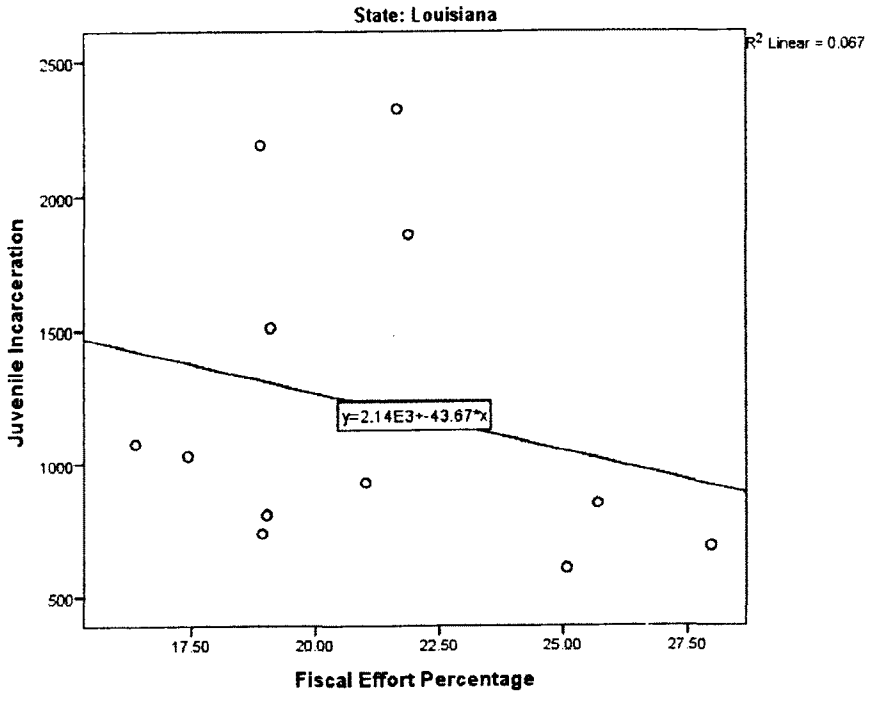


Figure A20

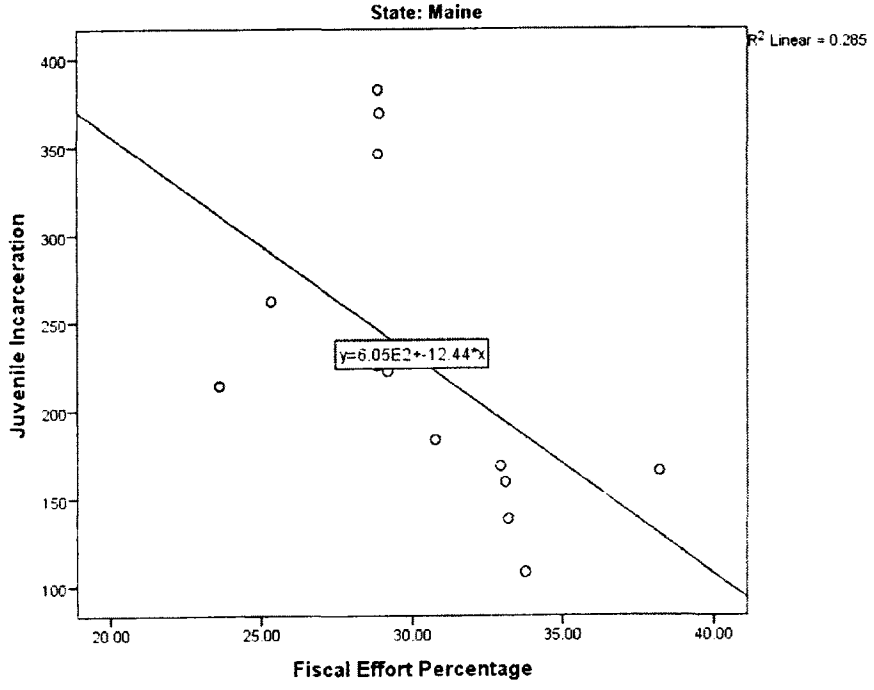


Figure A21

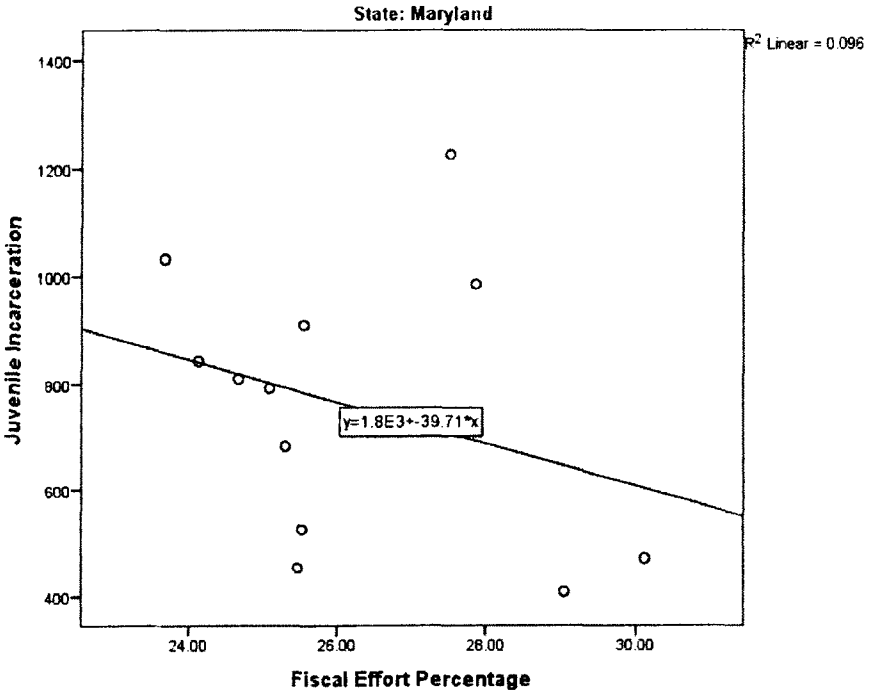


Figure A22

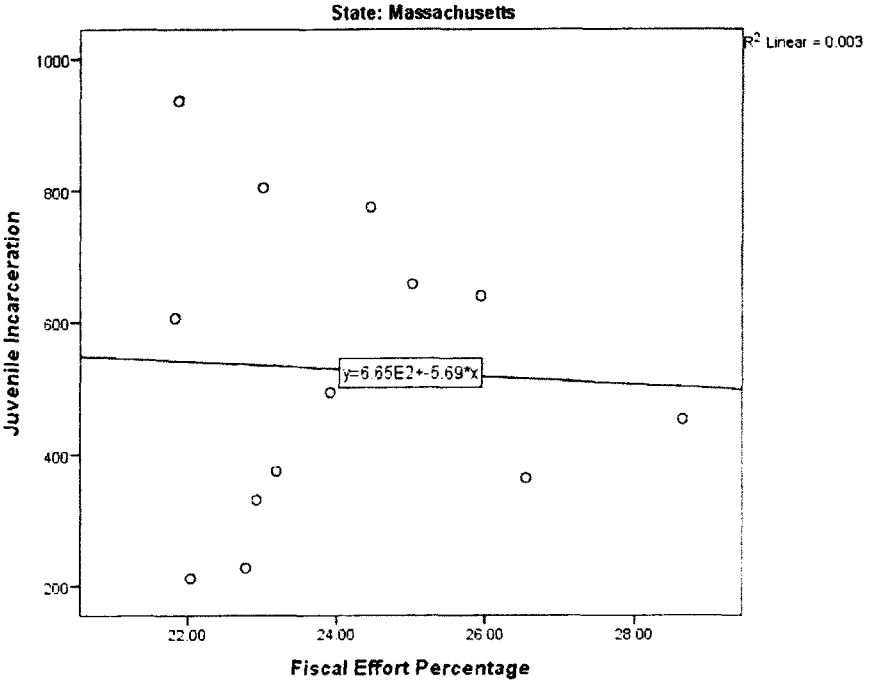


Figure A23

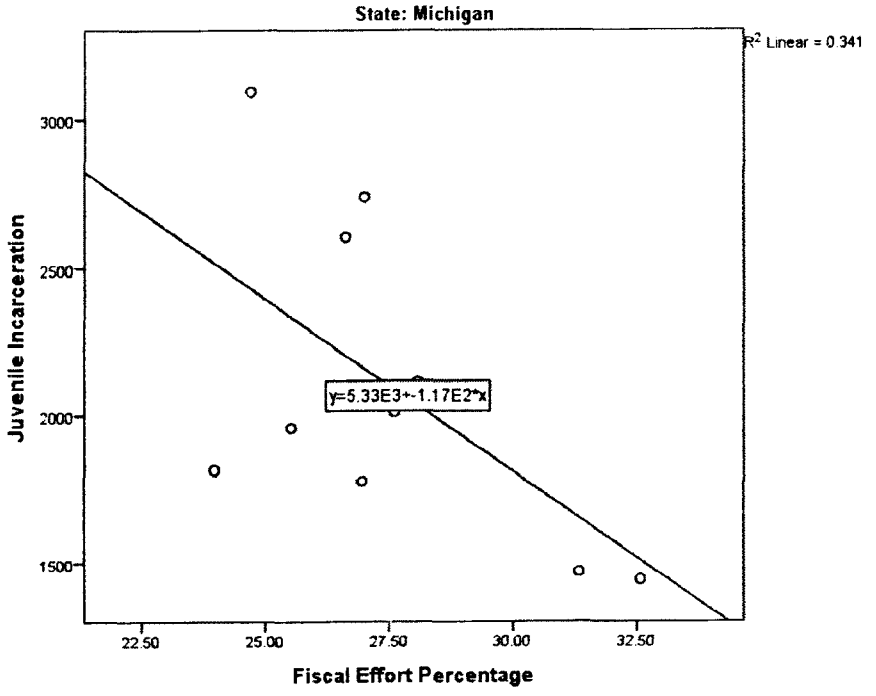


Figure A24

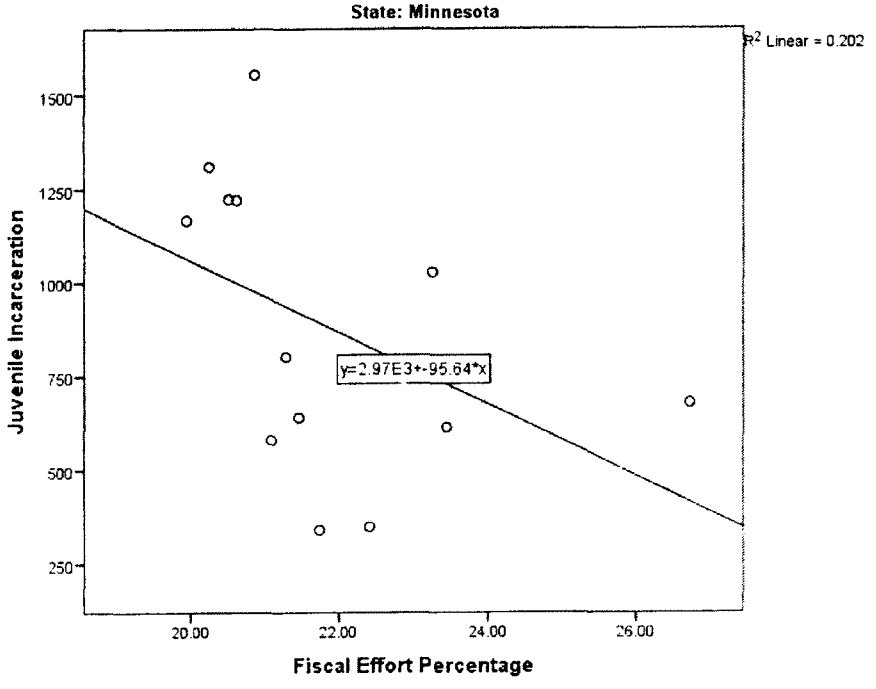


Figure A25

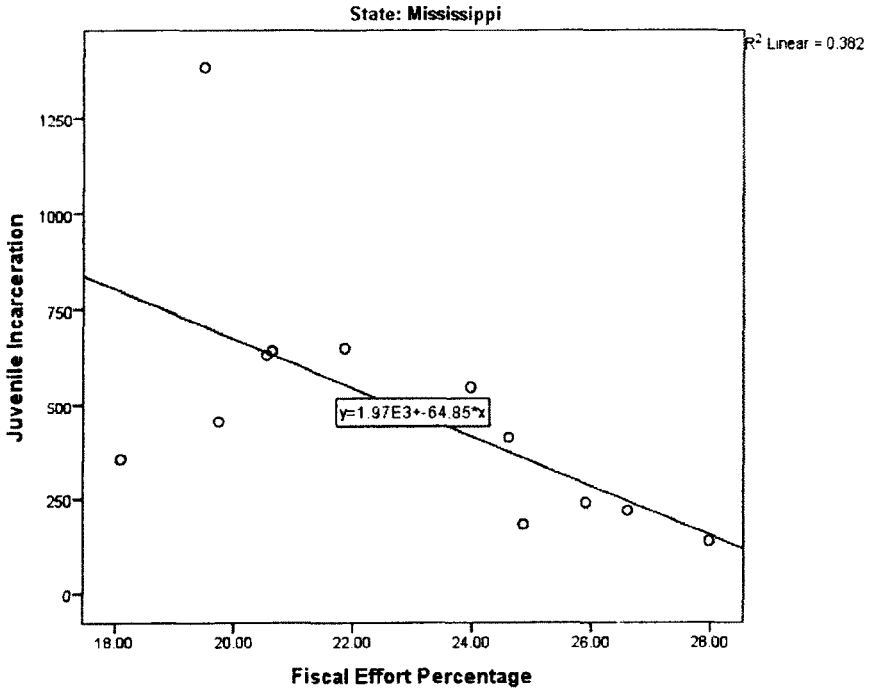


Figure A26

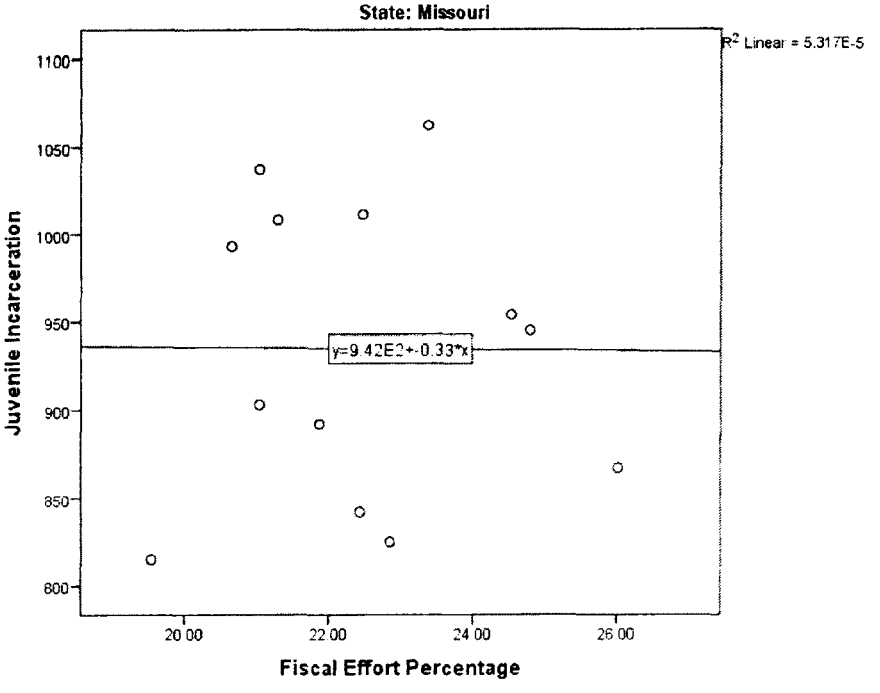


Figure A27

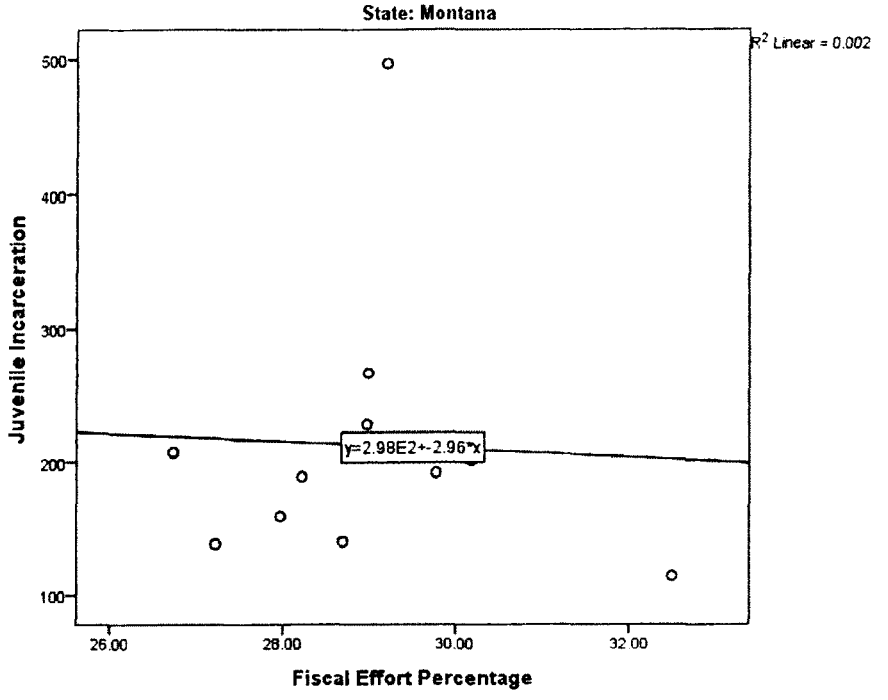


Figure A28

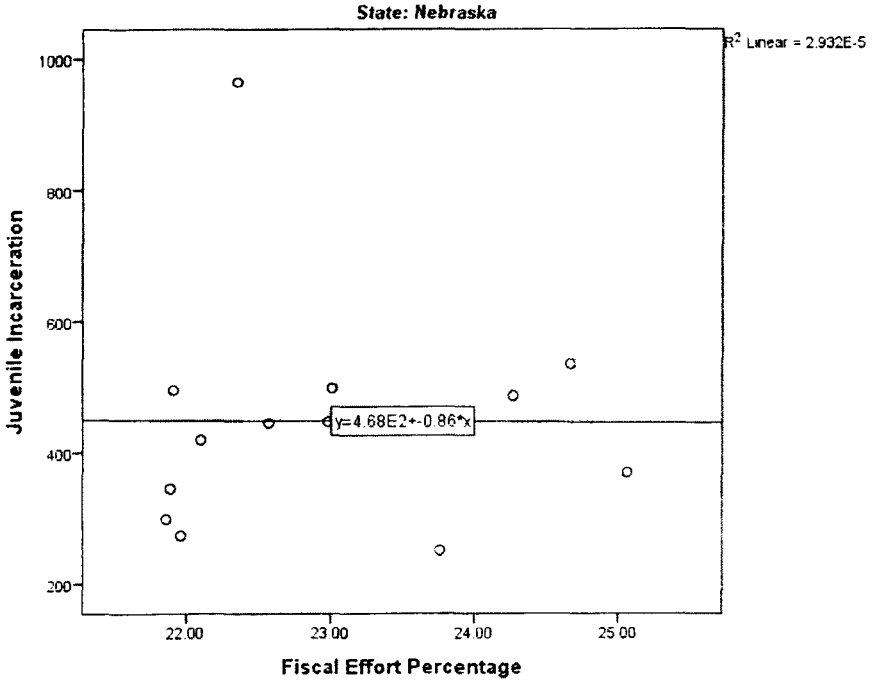


Figure A29

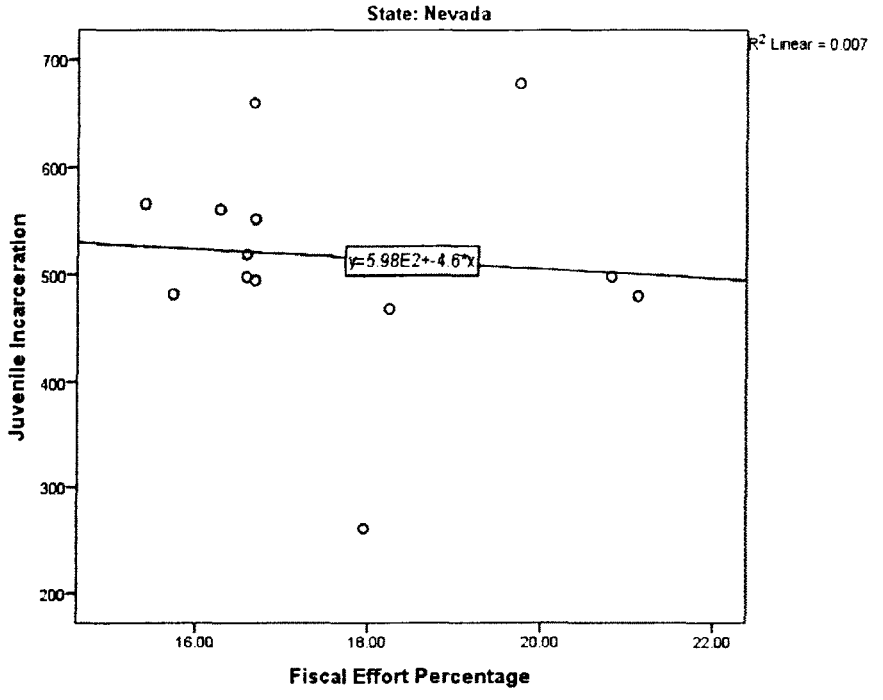


Figure A30

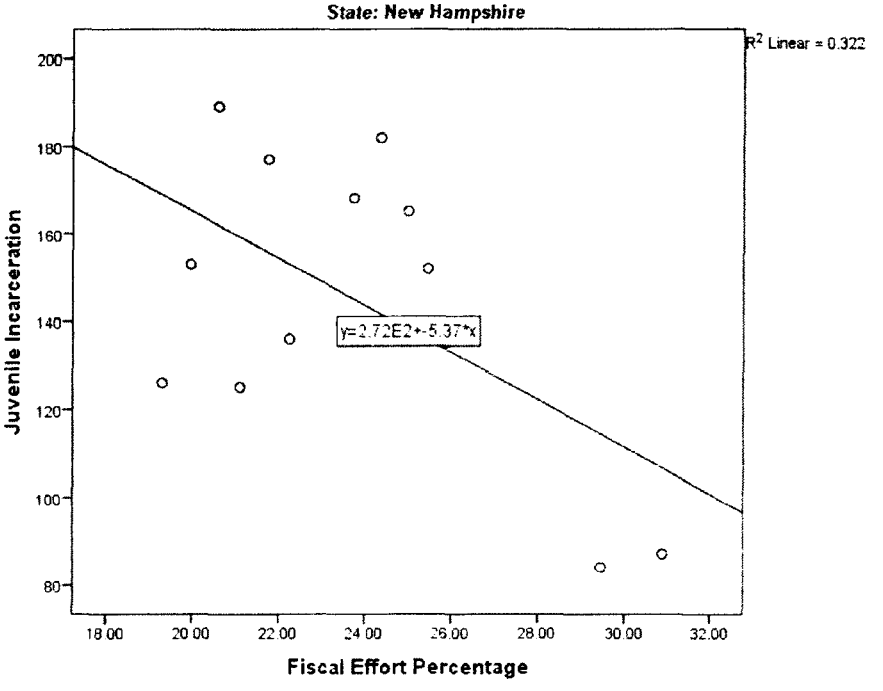


Figure A31

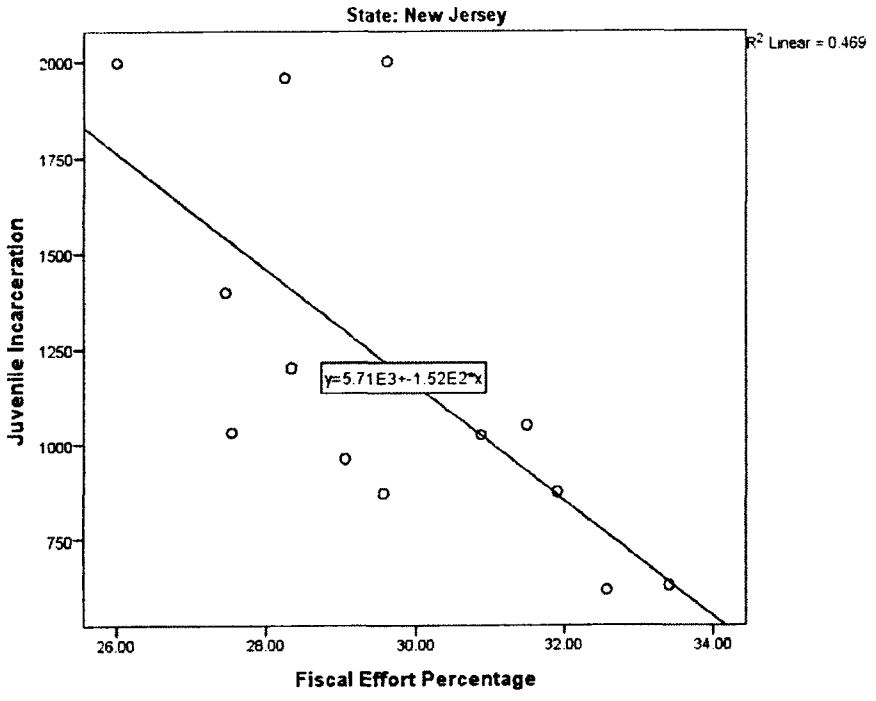


Figure A32

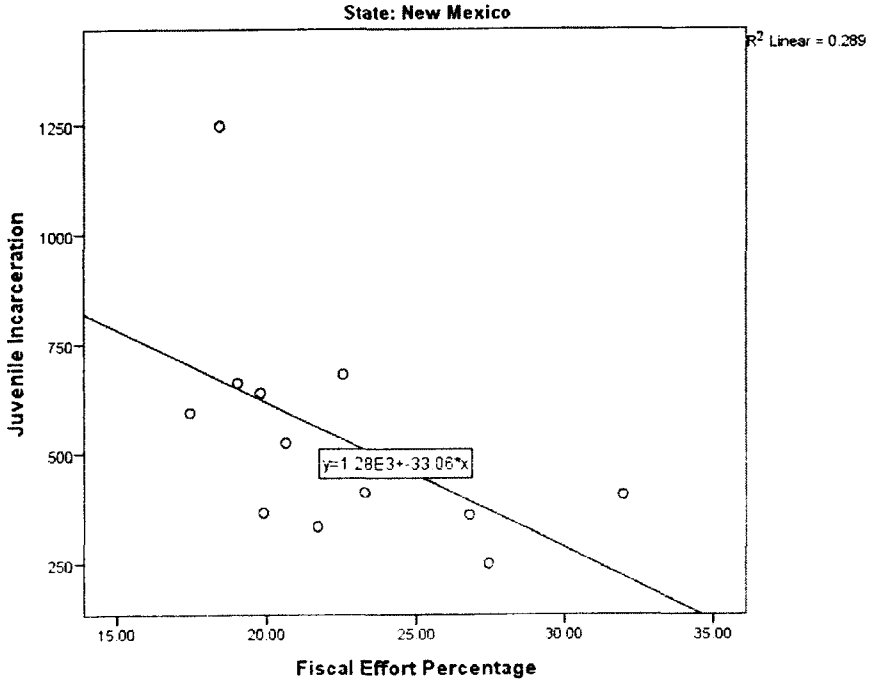


Figure A33

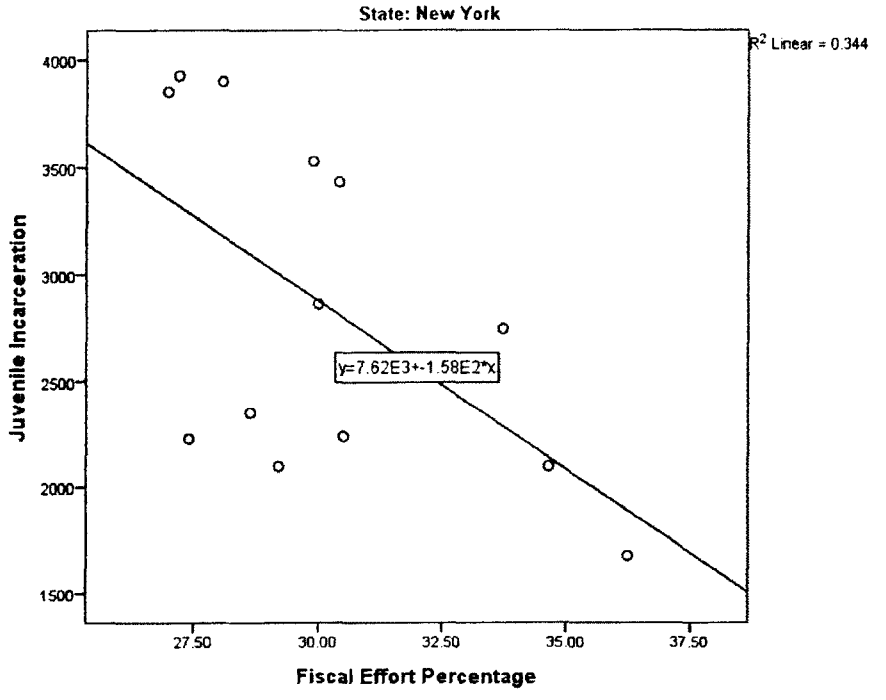


Figure A34

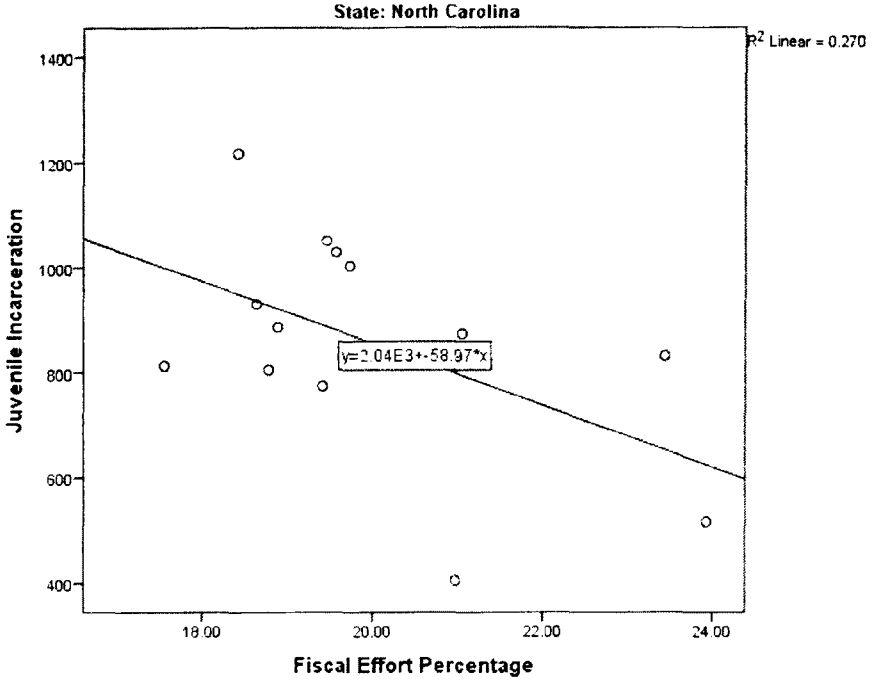


Figure A35

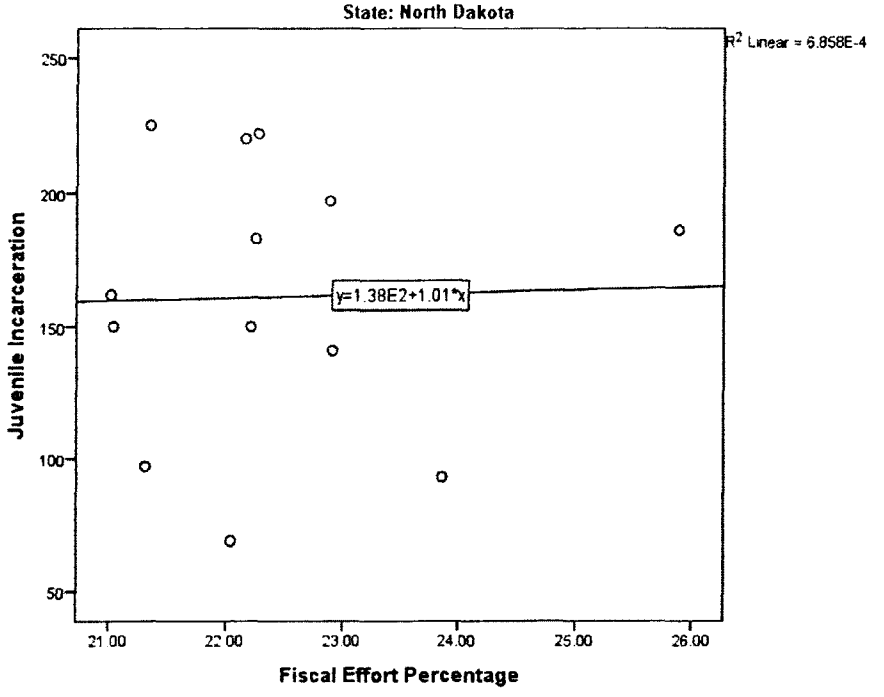


Figure A36

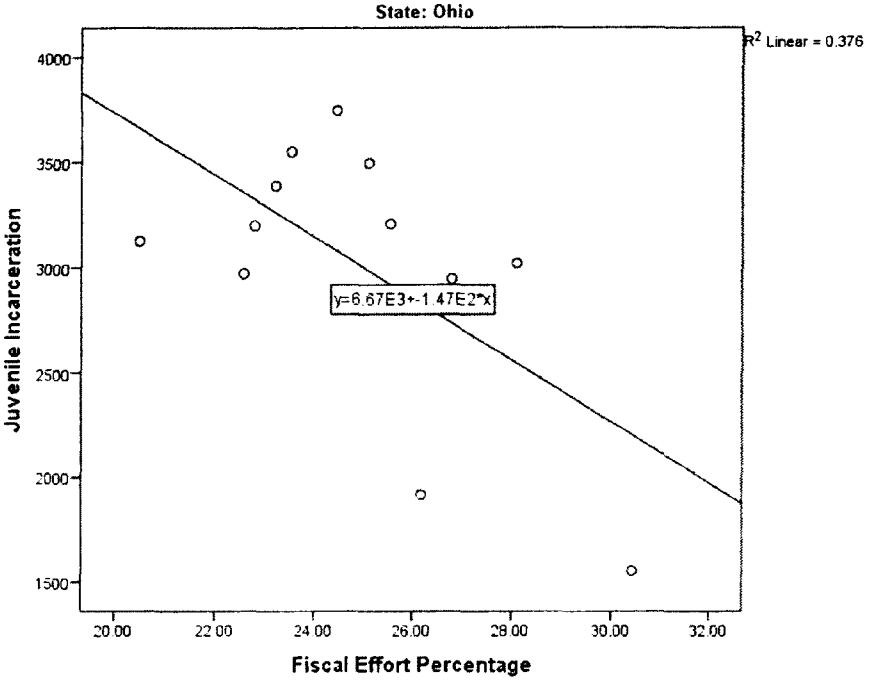


Figure A37

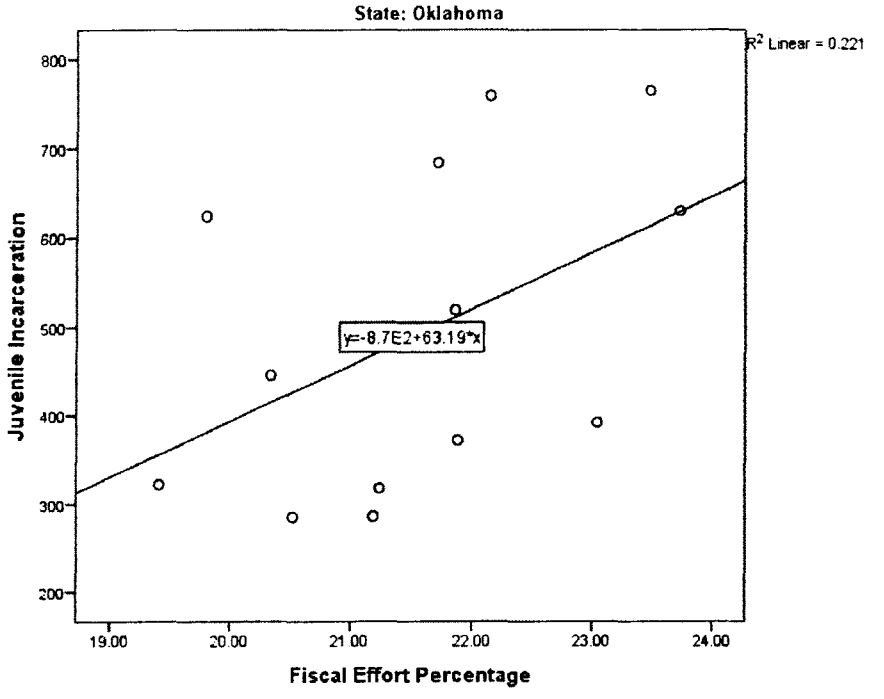


Figure A38

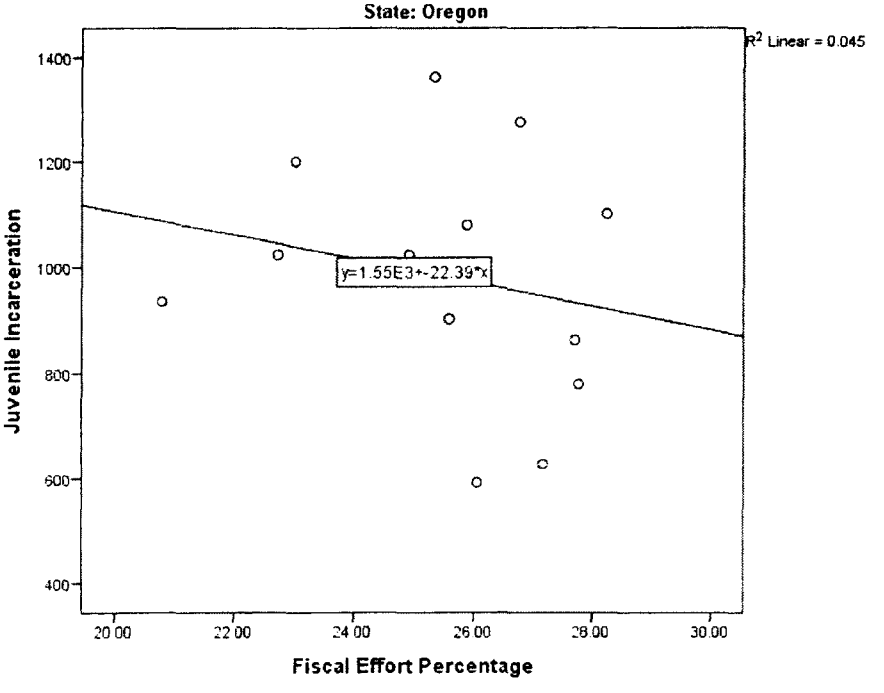


Figure A39

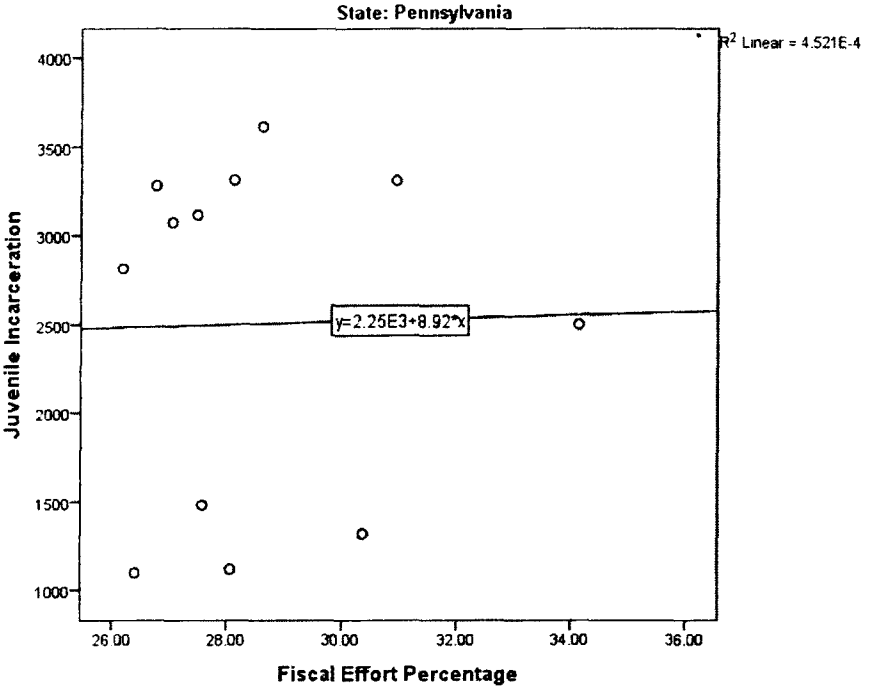


Figure A40

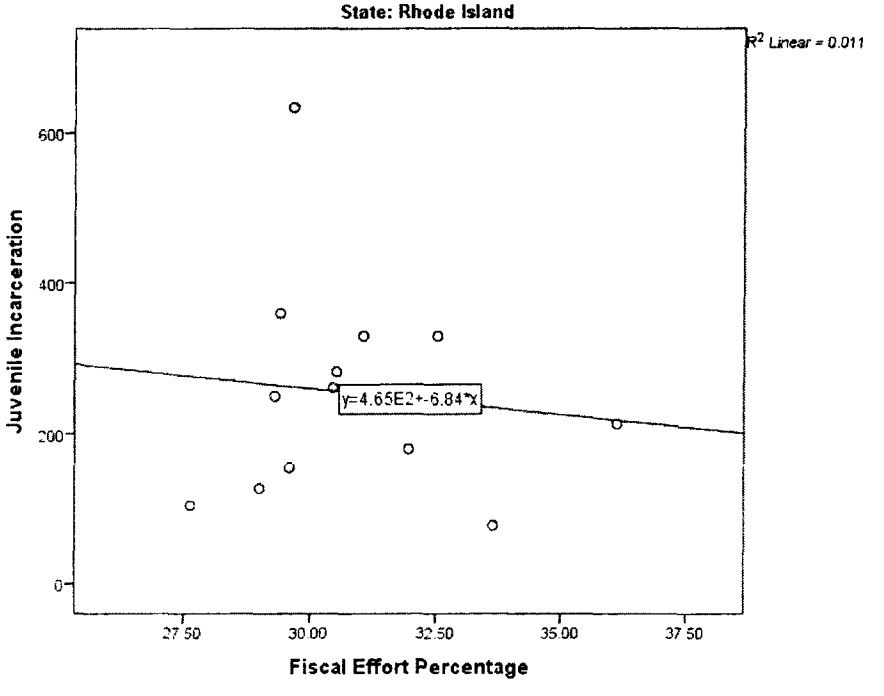


Figure A41

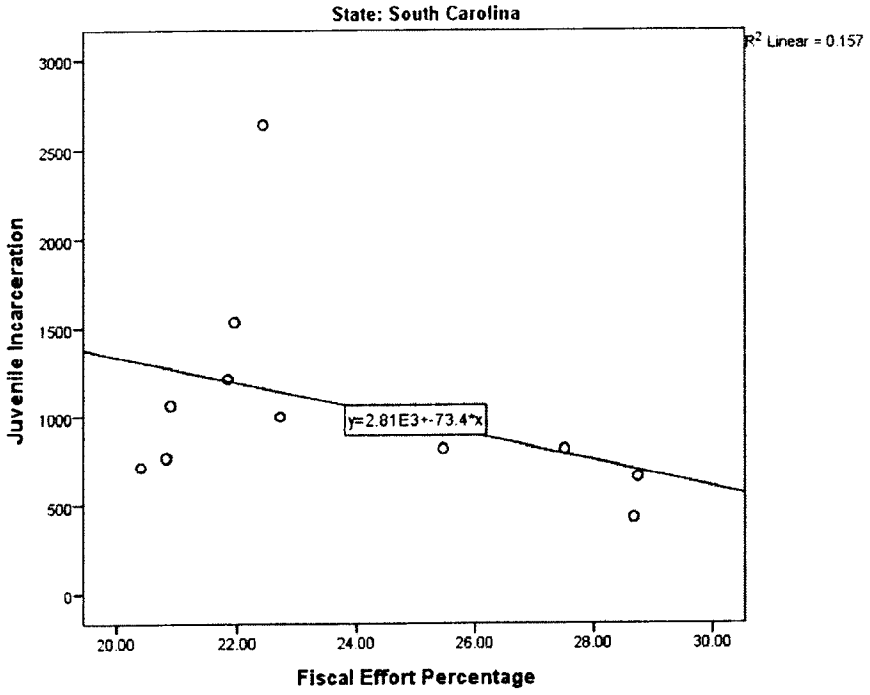


Figure A42

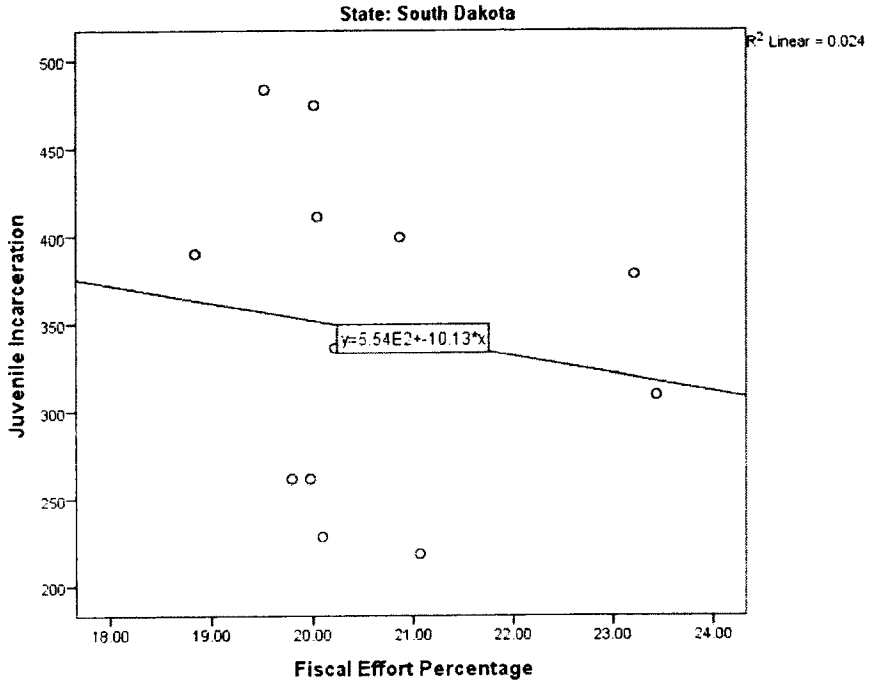


Figure A43

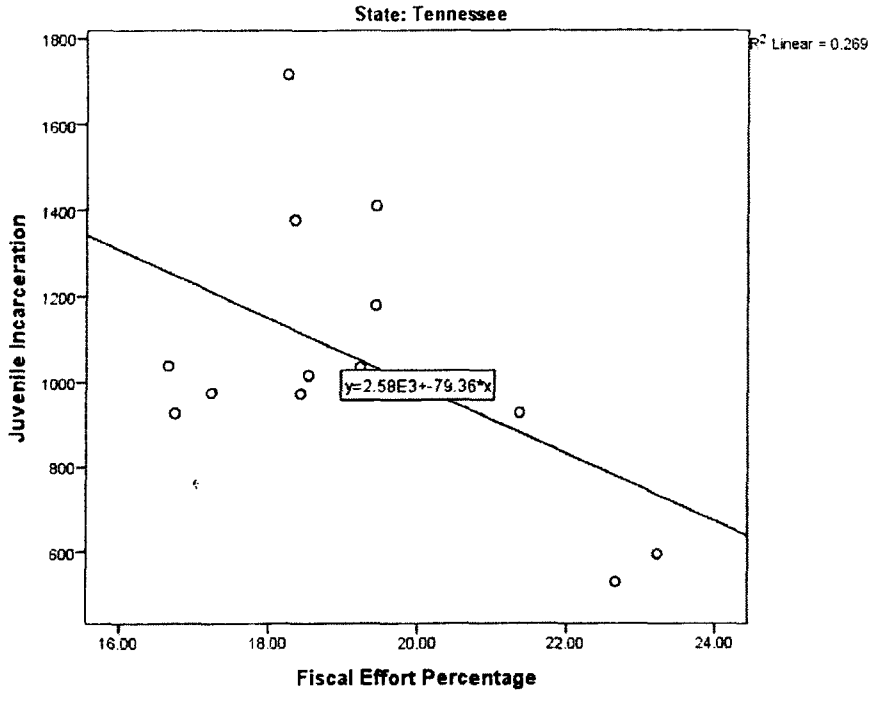


Figure A44

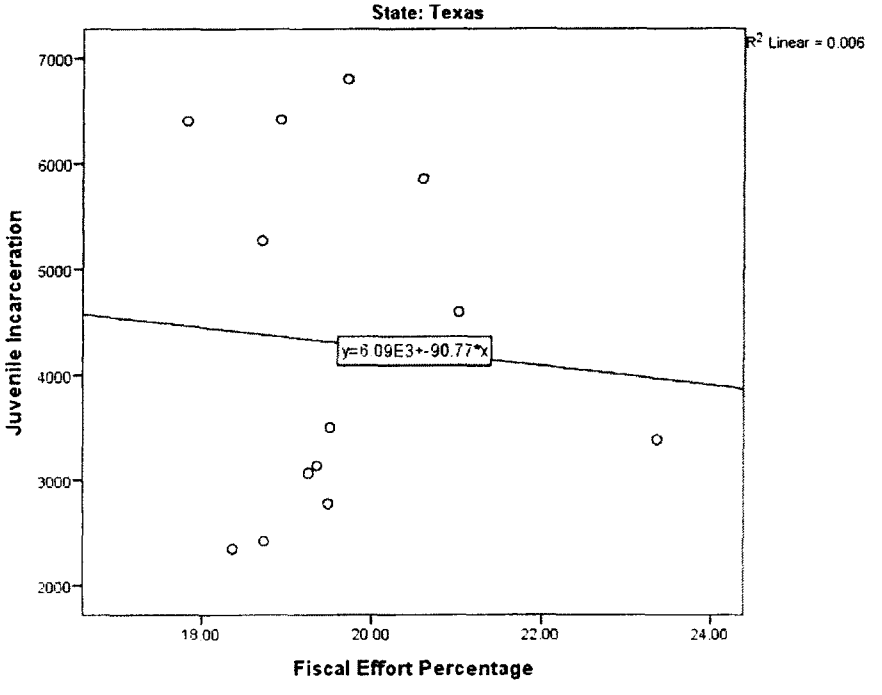


Figure A45

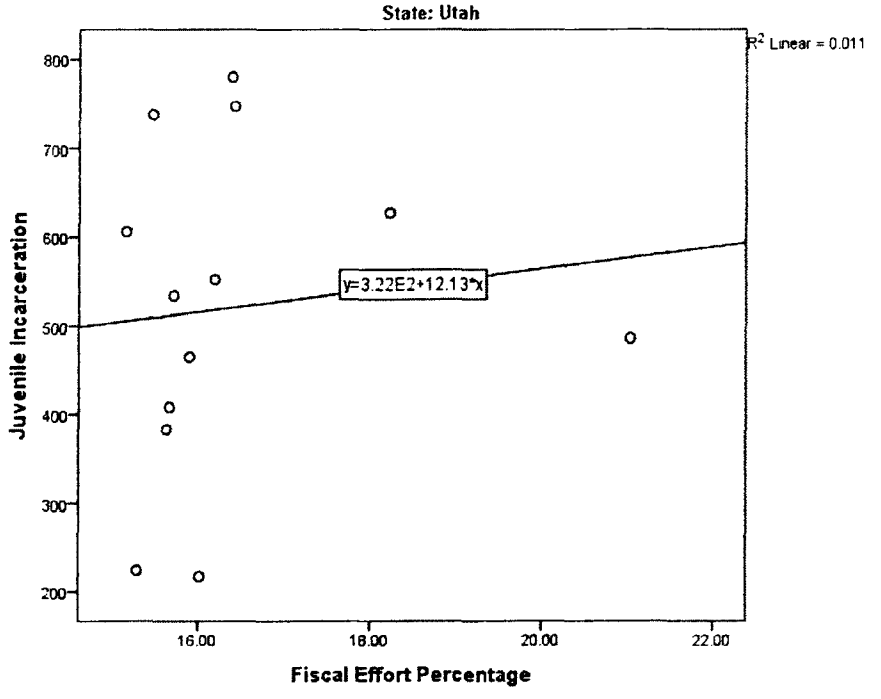


Figure A46

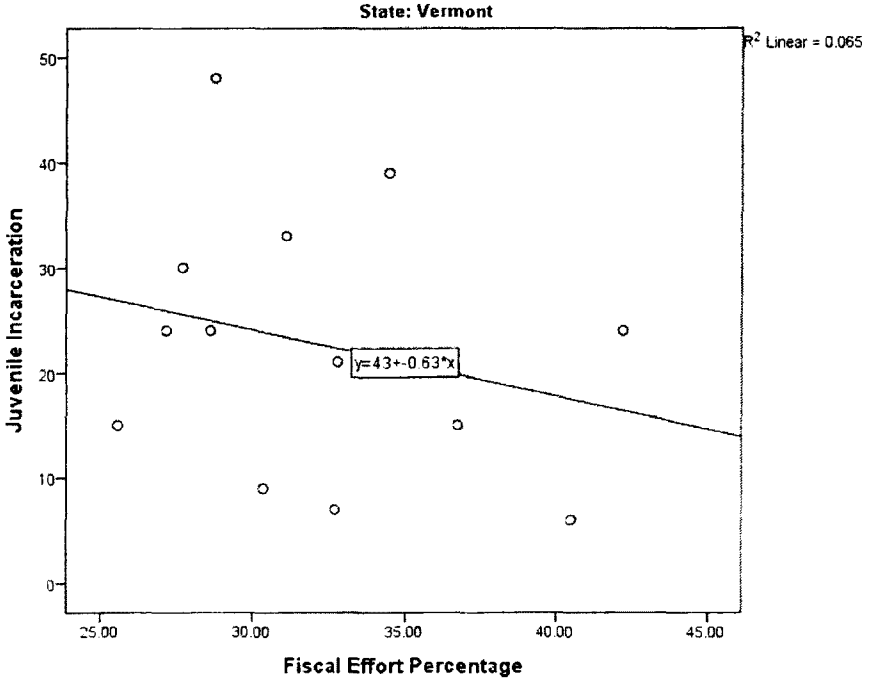


Figure A47

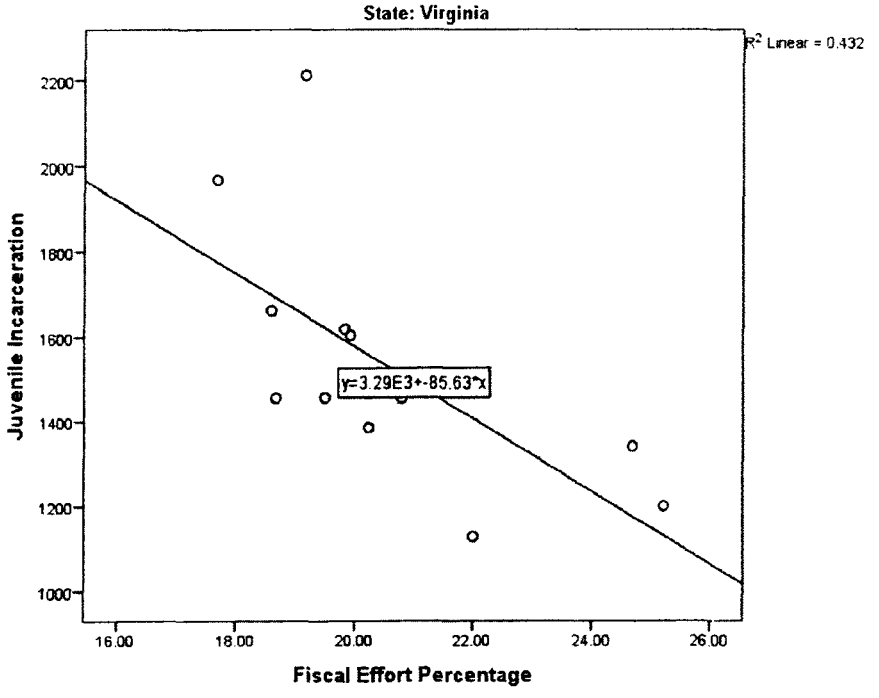


Figure A48

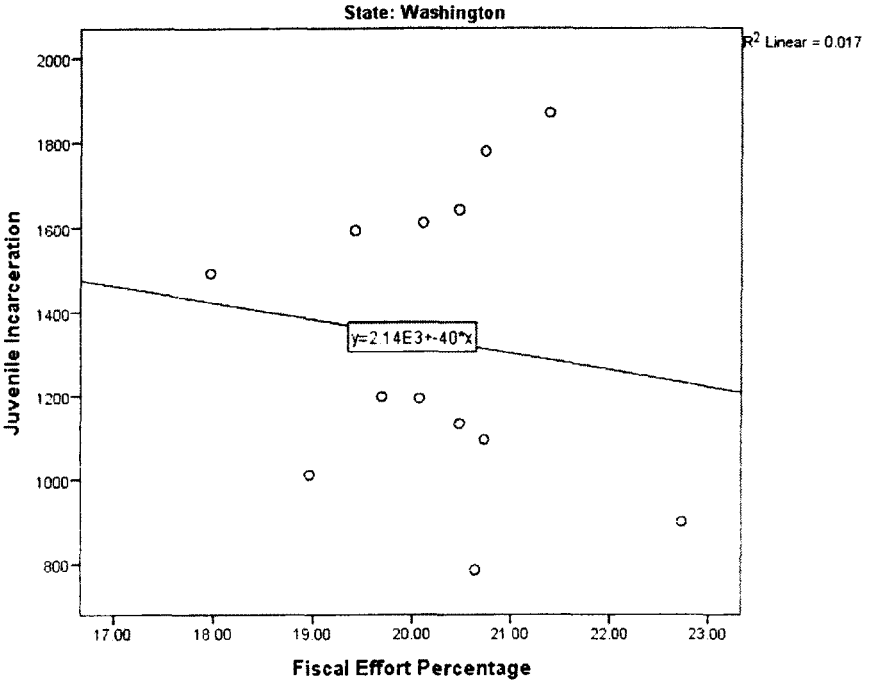


Figure A49

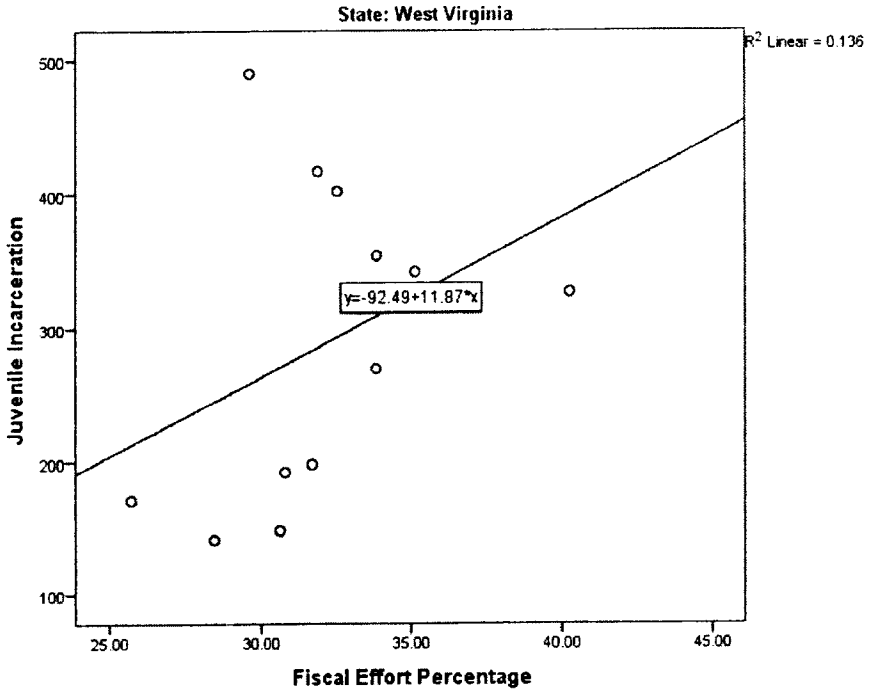


Figure A50

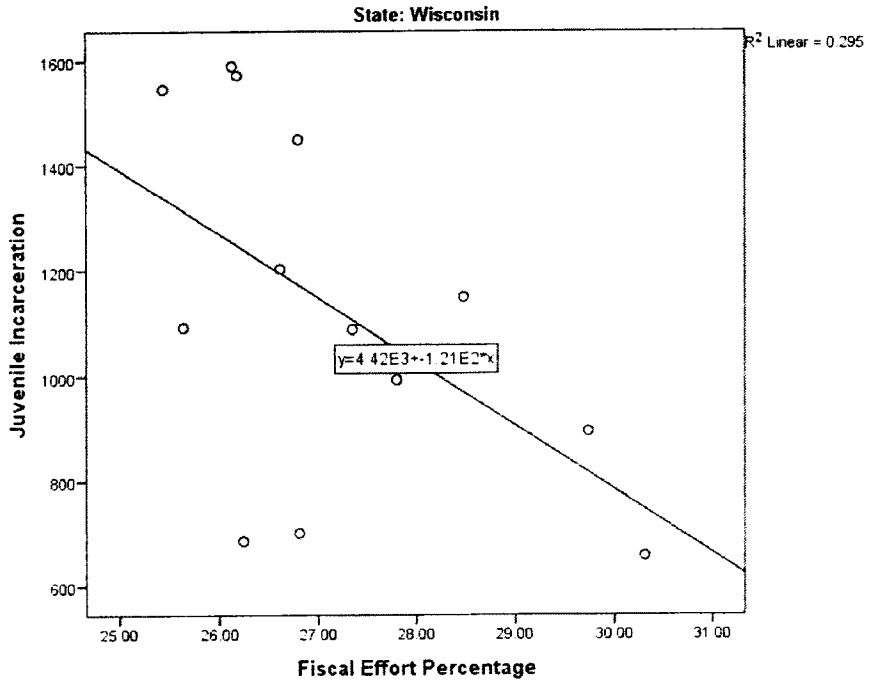
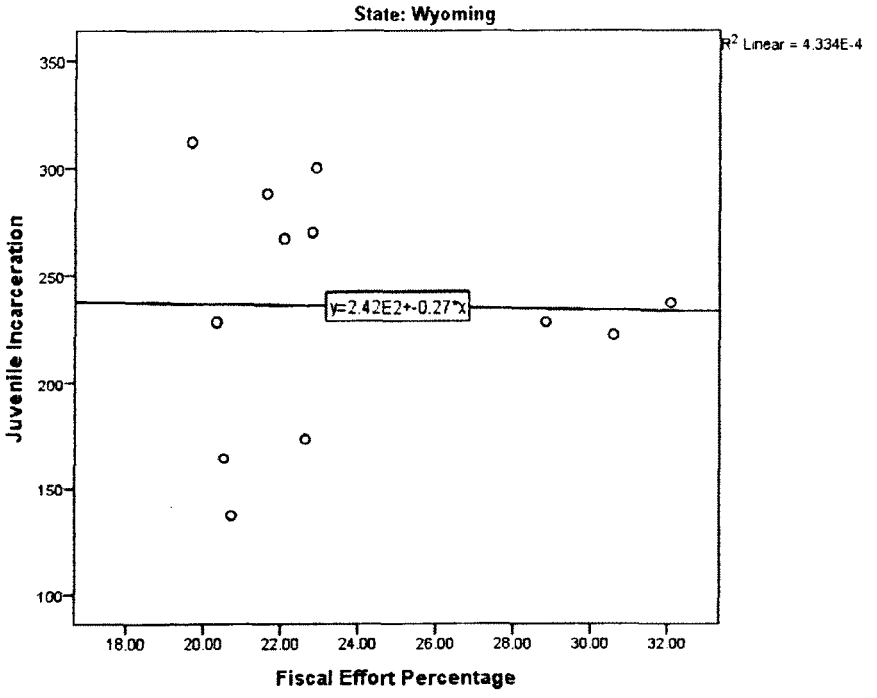


Figure A51


State: Wyoming
R² Linear = 4.334E-4
Y=2.42E2+-0.27*X
Juvenile Incarceration
350
300
250
200
150
100
18.00
20.00
22.00
24.00
26.00
28.00
30.00
32.00
Fiscal Effort Percentage

Appendix B

STATA Output Raw Data

```
  ___  ____  ____  ____  ____ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   12.1   Copyright 1985-2011 StataCorp LP
  Statistics/Data Analysis             StataCorp
                                       4905 Lakeway Drive
     Special Edition                   College Station, Texas 77845 USA
                                       800-STATA-PC        http://www.stata.com
                                       979-696-4600        stata@stata.com
                                       979-696-4601 (fax)
```

STATA RAW DATA TABLE 1

```
GEE population-averaged model                   Number of obs      =       649
Group and time vars:        StateID Year_C      Number of groups   =        51
Link:                            identity       Obs per group: min =        11
Family:                          Gaussian                   avg =      12.7
Correlation:                       AR(1)                    max =        13
                                                Wald chi2(1)       =      2.14
Scale parameter:                  3284804       Prob > chi2        =    0.1438

------------------------------------------------------------------------------
     Juv_Inc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      FE_100 |  -21.64748    14.8086    -1.46   0.144    -50.67181    7.376851
       _cons |   1539.206   404.2458     3.81   0.000     746.8984    2331.513
------------------------------------------------------------------------------
```

STATA RAW DATA TABLE 2

```
GEE population-averaged model                   Number of obs      =       649
Group and time vars:        StateID Year_C      Number of groups   =        51
Link:                            identity       Obs per group: min =        11
Family:                          Gaussian                   avg =      12.7
Correlation:                       AR(5)                    max =        13
                                                Wald chi2(1)       =     32.06
Scale parameter:                  3280770       Prob > chi2        =    0.0000

------------------------------------------------------------------------------
     Juv_Inc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      FE_100 |  -36.28233   6.407602    -5.66   0.000      -48.841   -23.72366
       _cons |   1831.227   285.0091     6.43   0.000      1272.62    2389.835
------------------------------------------------------------------------------
```

STATA RAW DATA TABLE 3

```
GEE population-averaged model                   Number of obs      =       649
Group and time vars:        StateID Year_C      Number of groups   =        51
Link:                            identity       Obs per group: min =        11
Family:                          Gaussian                    avg =      12.7
Correlation:                       AR(10)                    max =        13
                                                Wald chi2(1)       =      0.30
Scale parameter:                  3555869       Prob > chi2        =    0.5837

------------------------------------------------------------------------------
    Juv_Inc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     FE_100 |  -9.041786   16.49903    -0.55   0.584    -41.37929     23.29571
      _cons |   882.4868   401.3304     2.20   0.028     95.89357     1669.08
------------------------------------------------------------------------------
convergence not achieved
r(430);
```

Notes for Table 3:

. xtgee Juv_Inc FE_100, fam(gauss) link(iden) i(StateID) t(Year_C) force corr(ar15)
Some groups have fewer than 16 observations;
Not possible to estimate correlations for these groups.
51 groups omitted from estimation.
Insufficient observations.
r(2000)

. xtgee Juv_Inc FE_100, fam(gauss) link(iden) i(StateID) t(Year_C) force corr(ar20)
Some groups have fewer than 21 observations;
Not possible to estimate correlations for those groups.
51 groups omitted from estimation
Insufficient observations.
r(2000)

Appendix C

STATA Output Imputed Data

```
  ___  ____  ____  ____  ____ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   12.1   Copyright 1985-2011 StataCorp LP
  Statistics/Data Analysis             StataCorp
                                       4905 Lakeway Drive
     Special Edition                   College Station, Texas 77845 USA
                                       800-STATA-PC        http://www.stata.com
                                       979-696-4600        stata@stata.com
                                       979-696-4601 (fax)
```

STATA IMPUTED DATA TABLE 1

```
Univariate imputation                          Imputations =        5
Linear regression                                    added =        5
Imputed: m=1 through m=5                           updated =        0

------------------------------------------------------------------------
                  |                Observations per m
                  |----------------------------------------------------
         Variable |   Complete   Incomplete    Imputed |      Total
------------------+-----------------------------------+----------
          Juv_Inc |        649          677        677 |       1326
------------------------------------------------------------------------
```

STATA IMPUTED DATA TABLE 2

```
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     Juv_Inc |       649    1187.444    1821.084         6      19567

m=1 data:
-> summarize Juv_Inc

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     Juv_Inc |      1326    1135.827    1844.899  -4259.105      19567

m=5 data:
-> summarize Juv_Inc

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
     Juv_Inc |      1326    1202.738    1830.193  -5030.685      19567
```

STATA IMPUTED DATA TABLE 3

```
Multiple-imputation estimates                     Imputations       =          5
GEE population-averaged model                     Number of obs     =       1326

Group and time vars:          StateID Year_C      Number of groups  =         51
Link:                             identity        Obs per group: min =         26
Family:                           Gaussian                       avg =       26.0
Correlation:                      AR(1)                          max =         26
Scale parameter:                  x2

                                                  Average RVI       =     1.1328
                                                  Largest FMI       =     0.6981
DF adjustment:                Large sample        DF:     min       =       9.71
                                                          avg       =      10.45
                                                          max       =      11.19
Model F test:                 Equal FMI           F(   1,   11.2)   =      12.96
Within VCE type:              Conventional        Prob > F          =     0.0041

------------------------------------------------------------------------------
    Juv_Inc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     FE_100 |  -65.43894   18.17429    -3.60   0.004    -105.3562   -25.52164
      _cons |   2706.357   459.8826     5.88   0.000     1677.572    3735.142
------------------------------------------------------------------------------
```

STATA IMPUTED DATA TABLE 4

```
Multiple-imputation estimates                     Imputations       =          5
GEE population-averaged model                     Number of obs     =       1326

Group and time vars:          StateID Year_C      Number of groups  =         51
Link:                             identity        Obs per group: min =         26
Family:                           Gaussian                       avg =       26.0
Correlation:                      AR(5)                          max =         26
Scale parameter:                  x2

                                                  Average RVI       =     0.4965
                                                  Largest FMI       =     0.5374
DF adjustment:                Large sample        DF:     min       =      16.94
                                                          avg       =      17.32
                                                          max       =      17.69
Model F test:                 Equal FMI           F(   1,   17.7)   =       4.09
Within VCE type:              Conventional        Prob > F          =     0.0586

------------------------------------------------------------------------------
    Juv_Inc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     FE_100 |  -44.25066   21.88489    -2.02   0.059    -90.28715    1.785831
      _cons |    2167.56   538.9563     4.02   0.001      1030.17    3304.949
------------------------------------------------------------------------------
```

STATA IMPUTED DATA TABLE 5

```
Multiple-imputation estimates                   Imputations        =          5
GEE population-averaged model                   Number of obs      =       1326

Group and time vars:          StateID Year_C    Number of groups   =         51
Link:                               identity    Obs per group: min =         26
Family:                             Gaussian                   avg =       26.0
Correlation:                        AR(10)                     max =         26
Scale parameter:                        x2
                                                Average RVI        =     0.8386
                                                Largest FMI        =     0.6753
DF adjustment:                Large sample      DF:     min        =      10.45
                                                        avg        =      10.57
                                                        max        =      10.69
Model F test:                    Equal FMI      F(   1,   10.5)    =       3.18
Within VCE type:                 Conventional   Prob > F           =     0.1034

------------------------------------------------------------------------------
     Juv_Inc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      FE_100 |  -43.32655   24.28535    -1.78   0.103    -97.12201    10.46892
       _cons |   2134.663   602.3419     3.54   0.005     804.1698    3465.156
------------------------------------------------------------------------------
```

STATA DATA TABLE 6

```
Multiple-imputation estimates                   Imputations        =          5
GEE population-averaged model                   Number of obs      =       1326

Group and time vars:          StateID Year_C    Number of groups   =         51
Link:                               identity    Obs per group: min =         26
Family:                             Gaussian                   avg =       26.0
Correlation:                        AR(15)                     max =         26
Scale parameter:                        x2
                                                Average RVI        =     1.0299
                                                Largest FMI        =     0.7190
DF adjustment:                Large sample      DF:     min        =       9.09
                                                        avg        =       9.12
                                                        max        =       9.16
Model F test:                    Equal FMI      F(   1,    9.1)    =       3.31
Within VCE type:                 Conventional   Prob > F           =     0.1017

------------------------------------------------------------------------------
     Juv_Inc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      FE_100 |  -45.01147   24.72717    -1.82   0.102    -100.8632    10.84023
       _cons |   2181.311   620.3157     3.52   0.006     781.6727    3580.949
------------------------------------------------------------------------------
```

STATA IMPUTED DATA TABLE 7

Multiple-imputation estimates		Imputations	= 5
GEE population-averaged model		Number of obs	= 1326
Group and time vars:	StateID Year_C	Number of groups	= 51
Link:	identity	Obs per group: min	= 26
Family:	Gaussian	avg	= 26.0
Correlation:	AR(20)	max	= 26
Scale parameter:	x2		
		Average RVI	= 1.1150
		Largest FMI	= 0.7387
DF adjustment:	Large sample	DF: min	= 8.55
		avg	= 8.63
		max	= 8.70
Model F test:	Equal FMI	F(1, 8.5)	= 3.14
Within VCE type:	Conventional	Prob > F	= 0.1119

Juv_Inc	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
FE_100	-45.30694	25.56715	-1.77	0.112	-103.6122	12.9983
_cons	2169.339	639.8724	3.39	0.008	714.2714	3624.407

Vita

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Education:

2015	Old Dominion University Norfolk, VA 23529 Doctor of Philosophy *Educational Leadership*
2005	Old Dominion University Norfolk, VA 23529 Educational Specialist *Educational Leadership*
1994	Old Dominion University Norfolk, VA 23529 Master of Science *Educational Leadership*
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Professional Experience:

2014 – Present	Principal Lois S. Hornsby Middle School 850 Jolly Pond Road Williamsburg, VA 23188
2012 – 2014	Assistant Principal of Instruction Hampton High School 1491 West Queen Street Hampton, VA 23669
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2001 – 2005	Science Teacher Specialist, K-12 Hampton City Schools 1 Franklin Street Hampton, VA 23669
1995 – 2001	Physical Science Teacher Jefferson Davis Middle School 1435 Todds Lane Hampton, VA 23666

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