The Relationship Between Georgia Public School Educational Funding Sources and Academic Achievement

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Revenues from local property taxes has been the source of public funding for schools in Georgia. This quantitative study evaluated financial management of public funding in local school districts and student academic achievement outcomes. The research examined whether there was a difference in achievement levels of economically disadvantaged students based on the 8th grade population, property valuations, and home prices from 2006 to 2014 school terms. Correlation analyses indicated the existence of an inverse relationship between the variables. Multiple regression analyses revealed that academic performance was predicted by the total number of 8th grade students who passed the test.

INTRODUCTION

Property taxes in the United States are allocated to fund public school spending. Local public schools rely on property taxes as its primary source of funding. Resources that are available to students are sometimes dependent on how much each school district receives from these taxes. It is also a known fact that the higher the income from these tax valuations, the more money is received by public school districts that belong to specific zip codes. Resources are then distributed to the different schools. Teachers, administrators, staff, and students must contend with the funding that is given to them each year.

In the United States, public education is the responsibility of individual states. Public education guidelines and regulations specify that under the states' constitutions, states are obligated to provide an adequate education to students enrolled in these institutions (Arocho, 2014; Hyman, 2011; Sciarra & Hunter, 2015). What does it mean to provide adequate education to school-aged children? Adequacy pertains to the various approaches and methodologies used to measure the cost of educating a typical or average student (Picus, 2001). The role of state educational (school) finance systems consists of state and local financial resources that use rules, processes, and policies to meet district educational goals and objectives (Baker & Corcoran, 2012).

States have numerous financial obligations that they must meet and fulfill that includes providing for adequate education to students enrolled in local school districts. Thus, the outcomes of student academic achievement and how funding is allocated to meet those needs must be of utmost priority, so these states meet their constitutional obligations (Augenblick, Myers, & Anderson, 1997; Iatorola & Stiefel, 2003).

For decades, the states' educational finance systems have evolved to ensure that resource allocations are fairly distributed to produce positive outcomes; however, the levels of positive change on student achievement gaps have not demonstrated significant improvements (Bartz, 2016). To determine whether this is the case in the state of Georgia, this study focused on Georgia's public education funding policies and budgeting systems. An evaluation of Georgia's financing and budgeting systems was needed to assess the state's equity and adequacy frameworks for educating the state's student population.

The objective of this study was to examine the financial management aspect of Georgia's reliance on local property tax revenues for funding its public schools. To address this issue, the resource allocation practices at the student, school, and district levels were reviewed. These funding allocations that were reviewed included school district costs, school-level budgeting, activity-based funding, and the generation of local tax revenue levels.

BACKGROUND

According to the state constitution, Georgia has an obligation to provide an adequate public education for its citizens (Ga. Const. art. I, § II, para. III). Georgia finances public education by revenues from federal, state, and local sources. In 1985, the state enacted a school educational finance system, the Quality Basic Education (QBE) Act, based on a foundation grant program, developed for the operation and financing of its public schools (QBE Act, 2011). Although the federal government provides a portion of Georgia's education funding, state and local governments are responsible for the bulk of school funding (Davis & Ruthotto, 2015).

As a result of the enactment of the NCLB (2002), states were required to validate their students' academic achievement outcomes. Subsequently, states turned their attention to evaluating their resource allocation schemes and determining whether they were paying for the right mix of financial measures (Baker, Taylor, & Vedlitz, 2004).

The connection between where individuals choose to reside, the type of public goods expected to be received, and the cost and allocation of public goods was first hypothesized more than 50 years ago by Tiebout (1956) in the seminal article, "A Pure Theory of Expenditures." Tiebout pointed out that individuals decide where to live based on household tastes and preferences for quality public services, that includes the public schools where they want their children to attend. Mensah, Schoderbek, and Sahay (2013) found that where families lived had a direct relationship with their willingness to pay higher property taxes if it was reflected by better schools and high-test scores. Likewise, Seo and Simons (2008) identified the positive relationship between housing prices and school quality, especially pertaining to academic student measures such as standardized test scores. As a result, in most cases, students' family income determines where the students live and the schools where these students are enrolled.

The focus of this study was to analyze the gap in the literature by comparing the correlation between student academic achievement and property tax revenue in low and high property wealth districts. Li, Fortner, and Lei (2015) analyzed test score results and found them to be an acceptable gauge to understanding student academic achievement (Neymotin, 2010). This study may contribute to the gap in the literature concerning the effects of public school resource allocation practices and student academic performance of a subgroup of students.

The general problem that is addressed in this study is that Georgia relies too much on local property tax revenue for funding public school districts and attaining student academic achievement outcomes (Chingos, Whitehurst, & Gallaher, 2013; Li et al., 2015; Niven, Holt, & Thompson, 2014; Sorenson, 2016). The specific problem that was addressed was whether a difference exists in the student academic achievement outcomes of ED students who attend middle schools located in low property wealth districts compared with ED students who attend high property wealth middle schools.

THEORETICAL FRAMEWORK

Three theoretical frameworks were selected to provide an in-depth understanding of the public education system in the United States: educational resource allocation, property taxation, and systems theory. The frameworks provide a synergistic view of public education in the United States and its evolution into one of the most important entities in society.

Public finance is an area of economics that pertains to how the U.S. government manages its revenues, expenditures, and policies concerning the overall economy. Public education finance and the decision-making processes used in the allocation of resources (how to fund schools) were the focus. Specifically, the theoretical framework addressed equity and adequacy in state public school finance systems.

Since the nineteenth century, policy makers have attempted to determine how to successfully allocate education resources to ensure that every student can receive an equal, adequate, and efficacious academic experience (Baker & Levin, 2015). The concept of adequacy pertains to the various approaches and methodologies used to measure the cost of educating a typical or average student (Picus, 2001). Equity, in school finance, pertains to fairness among all students. In their seminal work, Berne and Stiefel (1984) identified two forms of equity used to measure the distribution of educational funding. They defined horizontal equity as equals being treated equally, and vertical equity pertains to funding individuals based on their differences (i.e., the unequal treatment of students who are unlike or not the same as the general student population). The goal of equity is to guarantee each child has an opportunity to a fair education. For example, children from low-income families may need additional services and programs to assimilate into the general school population (Ananthakrishnan, 2012; Baker & Corcoran, 2012). The challenge in distributing school funding is determining when to apply the appropriate amount of resources based on the equity framework.

The method local governments employ to finance their school operations is determined by state-imposed constraints and legislation. As creations of the state, local government entities are required to operate within the confines of its budget structure to comply with its laws and statutes. Thus, states determine local revenue reliance which equates to the ratio of overall funding received by the state based on a revenue source or multiple sources of income (Pagano & McFarland, 2013, p. 10).

Many jurisdictions rely on property and non-property taxes as sources of income. Other forms of revenue include user fees and service charges, and state and federal intergovernmental transfers (National League of Cities, n.d.). The property tax administration system in many states assist local jurisdictions in obtaining property tax revenues, produce public education, and comply with local municipal budgets (Sjoquist, 2008).

From a systems theory perspective, the structure of the public education school system has many of the attributes of a system. Similar to other complex entities, an education system consists of interdependent and interrelated components whose objective is to achieve its goals on behalf of the whole system to educate students (Guevara, 2014). When the federal government issue mandates and reforms to the states, for example, these are passed down to local governments and are expected to be implemented.

DISCUSSION

The crucial point of discussion that was addressed in this study is whether a difference exists in ED students' academic achievement outcomes due to the property tax revenue funding levels based on where the middle schools and school districts are located. Because the state education finance systems are supposed to provide adequate education to students enrolled in public schools, the question is whether Georgia is doing an effective job in ensuring students are successful academically. It is also important to understand whether the amount of money the school districts receive based on the state's funding allocations are appropriately used to ensure ED middle school students receive adequate education. The funding implication may show that there is a correlation between states' education finance systems and

student academic achievement and their residence in low property versus high property areas (Baker & Corcoran, 2012).

Seo and Simon (2008) found a significant relationship between school performance and housing prices. This study, however, was focused on previous research concerning state obligations to provide the efficacious mix of resource allocation inputs and student academic performance. Quantifiable evidence is presented to determine the level of success of students' academic achievement based on high and low property value areas. Based on Georgia's current funding system, the two-tiered foundation grant program, it is important to examine the state's school finance system, the QBE Act, to determine whether it was achieving its goal to provide educational adequacy and equal opportunities at the same level of education for all students.

Education cost function (ECF) analyses served as the basis for addressing the statistical relationship between student performance, per-pupil revenue, and student academic outcomes (Baker & Levin, 2015). The ECF could reveal the different student academic achievement outcomes among similar school districts that receive the same amount of funding. The analysis also applied to school districts that produce similar outcomes but have different levels of education funding (Baker & Levin, 2015).

METHODOLOGY AND RESEARCH DESIGN

This study used a quantitative methodology to determine whether a difference existed in student academic achievement outcomes based on the location of the public middle schools and school districts, and the amount of property tax revenue that was generated to fund them. The independent variables are the total number of eight-grade students who took the Georgia EGWA, the total middle school property valuation, the total ED property valuation, and the average median sale price. The dependent variable was the total number of eight-grade ED students who passed the EGWA.

Case and Light (2011) stated that the research question influences the type of methodology the researcher selects to conduct research. Developing the appropriate research methodology was essential for supporting the theoretical framework, the research methods, and design (Case & Light, 2011). Quantitative methodology is deductive, and it tests hypotheses through empirical investigation (Gelo, Braakmann, & Benetka, 2008). Subsequently, a quantitative methodology was chosen because it explains the significance of the information collected and determines whether a relationship exists between variables.

Descriptive and correlational research designs were used for this study to determine the extent of a relationship between two or more variables, whether the relationships are positive or negative, and the strength of the relationship, but not the cause and effect (Teddlie & Yu, 2007). Cook and Cook (2008) found in their study of special education and student achievement outcomes that correlational research was the best choice when the goal is to investigate and compare the differences between specific subgroups and the relationship between the variables. The correlational design was ideal for this study to determine whether a difference existed in student academic performance of low-income students. This design was able to address the hypothesis that the contributing factor, property tax revenue, may significantly affect student academic achievement outcomes.

Population

The target population in this study was public middle schools located in Metropolitan Atlanta area school districts in the state of Georgia. The 11 school districts and 141 middle schools are located in eight counties. The student population was every eighth-grade student enrolled in one of the middle schools during the 9-year study period, 2006–2014. Georgia was chosen because each school district is adjacent to or near Fulton County, which is the largest county in the state.

To increase its generalizability, the school districts represent both urban and suburban geographic locations and a similar mix of socioeconomic features. The schools are in areas with similar residential and commercial structures which is significant since all the districts receive a portion of its education revenue from local property taxes. There are expensive, high property and low property value

neighborhoods represented in each district. The students attend neighborhood schools in which some students walk to school and other students are bussed into the school district. In Georgia, students can choose to attend the school of their choice regardless of where their home address is located (Georgia Department of Education, 2016).

Purposive or judgment sampling, which is a non-probability sampling method, was used for this study because the technique relies on the judgment of the researcher concerning the population that will be explored (Teddlie & Yu, 2007). Purposive sampling also allows the sample to be chosen prior to the launch of the study (Gelo et al., 2008). This sampling method considers the issue of generalizability or transferability (Teddlie & Yu, 2007).

The student population included ED eighth-grade students who must have passed the EGWA used to evaluate their writing skills before attending high school. In this study, ED students represented the overall student population which included race, ethnicity, gender, English Language Learners (ELLs) and students with disabilities (Georgia Department of Education, n.d.). The students in the study represented many student sub-groups enrolled in middle school between 2006–2014.

Data Plan and Analysis

This study used an education-based dataset for 11 school districts located in eight Georgia counties tracked for 9-years between 2006 and 2014 and matched to eighth-grade middle school students during this period. All information obtained for school district characteristics and the school-level measures came from the Georgia Department of Education, public sites, and online records (Georgia Department of Education, n.d.). The school district characteristics information consisted of the number of schools in each district, total school enrollment, the number of students who received free or reduced lunch, race/ethnicity totals, and the total revenues per-pupil. The basis of the student academic achievement outcomes was the individual school-level measure, the EGWA test scores.

To analyze the resource allocation policies, the 2006–2014 county property values and property tax revenue information from the Georgia Department of Revenue were obtained. The county level data included annual sales and market prices, housing values (property and assessed), and the property tax revenue. Zillow's research data online database was used (Zillow.com, 2017) to obtain information for the average median sale price data for each school district. The sales information included only residential property that sold during 2006–2014, the sale price ranged between $50,000 to $999,999, were constructed before 2005, and located within the boundaries of each middle school in the study.

Each county's tax base was used to determine property wealth, which is the basis of the per-student revenue valuation (Rubenstein & Sjoquist, 2003). Annual sales ratio studies were reviewed to identify the low property and high property wealth areas for each school district. In Georgia, policymakers use the sales ratio report to determine the level of assessment of high and low property values relative to other counties in the state. (Georgia Department of Revenue/Audits, 2016; McMillen, 2013). The Georgia Department of Education uses the local property tax assessment and revenue information to calculate the QBE Act formula program allocations (Georgia Department of Education, n.d.).

OPERATIONALIZATION OF VARIABLES

The independent variable, Total8thGradeTested, represented the total number of eighth-grade students who took the Georgia Eighth Grade Writing Assessment (EGWA). To measure the variable TotalMiddleSchoolPropertyValuation, the total dollar amount of property wealth or real estate within each school district was reviewed. To calculate the total middle school property valuation, the total school district property valuation was divided by the number of middle schools in the district. This value was used to calculate the property tax revenue for each school district. The variable, TotalEconDisadvPPPropertyValuation, was the measure that represented the property valuation of each ED middle school student. The total ED per-pupil property valuation was calculated by dividing the total middle school property valuation by the total number of ED students enrolled in each middle school. The final independent variable was AvgMedianSalePrice, which is an indication of the degree of property

wealth in each school district. This variable represents the sale price located at the mid-point of the range between the high and low sale prices for each middle school in this study.

The dependent variable, TotalEconDisadvPassedEGWA, represented the total number of eighth-grade ED students who passed the EGWA. ED students pertained to the students who participated in the free and reduced-price lunch program (Georgia Department of Education, n.d.). Accurately identifying the students who were in this student sub-group was key to conducting this research study.

The Georgia EGWA is an annual standardized test that measures eighth-grade student proficiency levels in expository and persuasive writing (Georgia Department of Education, n.d.). The EGWA was selected to quantify student academic achievement outcomes. Neymotin (2010) stated that test scores are appropriate because they measure class attendance, what the student learned, the natural intellectual ability of the student, the degree of study time, and parental inputs concerning education. However, Dee and Jacobs (2011) questioned the reliability of test scores as an indicator of student academic performance due to the limited nature of assessing one content area.

The first research question compared the academic achievement of ED students who attended middle schools located in high and low property wealth districts. For this study, a low property wealth district is represented by a middle school located in an area in which at least 10% of the owner-occupied housing had a minimum property value of $50,000. A high property wealth district is represented by a middle school located in an area in which at least 10% of the owner-occupied housing had property values that were greater than $150,000. Annual sales information and annual county property tax digests served as the basis for how high and low property assessment/property values were decided (Georgia Department of Revenue, n.d.).

The second research question examined the relationship between ED students' test scores, the location of the school, and local funding from property tax revenue. Because many education reform initiatives focused on school districts in the United States (Chingos et al., 2013), the relationship between ED academic achievement and the role of property taxes in funding public education was examined. An analysis of local property tax rates and revenues (as per-pupil expenditures and current expenditure functions) included the following: support services, expenditures, general administration, instructional staff support, pupil support services, and school administration (Baker, 2014; Pan, Rudo, Schneider, & Smith-Hansen, 2003). The variables that were selected were used to determine the relationship between student academic performance and school enrollment in either a high or low-property-wealth school district.

DATA ANALYSIS PLAN

Statistical analysis was used to measure the relationships between the independent variables and the dependent variable. The first technique was the Pearson's product-moment correlation coefficient, *r*, which was used to measure the association between interval values that ranged between -1.0 and +1.0 to reveal the direction and strength of the relationship (Teddlie & Yu, 2007). Multiple regression was selected to test the significance of the model by determining whether the independent variables could predict the dependent outcome variable (Teddlie & Yu, 2007).

Data Collection

Data was collected from public-access, online databases. The focus of the data collection covered a 9-year timeframe, 2006–2014, for education-based information obtained from the Georgia Department of Education and Department of Revenue. During the data collection phase, sales information from each County Tax Assessors Departments was obtained. However, because of the excessive cost and volume of the sales data for a 9-year period, 2006–2014, the sales information was obtained from the Zillow home value index online database (Zillow.com, 2014).

In addition, once data collection began, the number of middle schools changed throughout the study's timeframe. Although data was obtained for a total of 141 middle schools, the actual number of schools for each year of the study ranged from 119 to 138. Despite the varying number of schools and the students

who took the Georgia EGWA, there was enough data to continue with this research and produce analytical results to address the research questions.

Demographic Characteristics of Sample

Demographic information on the student population consisted of every eighth-grade student who passed the EGWA. The target population was ED students who passed the EGWA. ED students represented the overall student population based on race, ethnicity, gender, ELLs, and students with disabilities (Georgia Department of Education, n.d.). The total number of eighth-grade students tested between 2006–2014 ranged from 43,062 to 46,626, and the number of ED who took the test ranged between 18,894 and 27,136. Among the students in the general eighth-grade population who took the test, 88% passed, and 84% of the ED students passed. Table 1 shows an overview of all students who took and passed the EGWA.

TABLE 1
TOTAL EIGHTH-GRADE STUDENTS TESTED

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total Eight-Grade Tested	43,062	45,547	45,243	44,488	44,978	44,071	45,351	45,769	46,626
%Eighth-Grade Passed	88%	69%	79%	79%	82%	86%	84%	84%	83%
TotalED Tested	18,894	21,809	22,334	21,922	24,168	23,990	26,608	26,655	27,136
% ED Passed	84%	61%	73%	74%	78%	83%	81%	81%	80%

Note. ED, economically disadvantaged. Source: Georgia Department of Education (2016).

Descriptive Statistics of Variables

From 2006–2014, 141 middle schools from 11 school districts administered the Georgia EGWA. The total number of ED eighth-grade students who passed the EGWA was the dependent variable, TotalEconDisadvPassedEGWA. The total number of eighth-grade students who took the test was the variable, Total8thGradeTested; school-level property wealth was the variable, TotalMiddleSchoolPropertyValuation; the variable for ED per-pupil property valuation was TotalEconDisadvPPPropertyValuation; and AvgMedianSalePrice was the final independent variable in the study. Kurtosis and skewness values should be close to zero and range between -1 and +1 to meet normal distribution (Aczel & Sounderpandian, 2009).

Table 2 displays the mean number for the total number of ED students who passed the EGWA. The highest average number of ED students who passed the test occurred in 2014, 156 (*SD* = 91) or 80% from among the 136 middle schools. For years 2006 to 2013, the mean value and standard deviations ranged from 100 (*SD* = 70) to 155 (*SD* = 88). The kurtosis and skewness values ranged between -1 and +1, which is an indication that normal distribution requirements were met during the study period.

TABLE 2
DESCRIPTIVE STATISTICS OF THE VARIABLES: TOTALECONDISADVPASSEDEGWA

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	119	131	71	.24	-.54
2007	126	100	55	.45	.05
2008	141	114	79	.78	1.20
2009	130	122	78	1.32	3.25
2010	138	134	79	1.28	3.37
2011	138	142	83	.91	1.49
2012	138	154	82	.84	1.11
2013	137	156	88	.91	1.06
2014	136	156	91	.95	1.20

Source: Georgia Department of Education (2016).

Table 3 summarizes the mean values for the total number of eighth-graders who took the test, Total8thGradeTested. The highest average number of Total8thGradeTested occurred in 2006, which represents 43,443 students at 119 middle schools, 362 (*SD* = 148). The average range of Total8thGradeTested between 2007 to 2014 was 319 (*SD* = 126) and 361 (*SD* = 146). The kurtosis and skewness values ranged between -1 and +1, which is an indication that normal distribution requirements were met during the study period.

TABLE 3
DESCRIPTIVE STATISTICS OF THE VARIABLES: TOTAL EIGHTH-GRADE STUDENTS TESTED

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	119	362	148	1.206	2.020
2007	126	361	146	1.361	2.603
2008	131	345	152	1.603	3.441
2009	130	342	158	1.677	3.510
2010	138	326	128	1.263	2.523
2011	138	319	126	1.111	2.793
2012	138	329	120	1.052	1.75
2013	137	334	123	1.002	1.761
2014	136	343	126	.988	1.590

Source: Georgia Department of Education. (2016).

Table 4 displays the property wealth levels in assessment dollars. The variable for TotalMiddleSchoolPropertyValuation measured the dollar amount of property wealth or real estate within a school district. The TotalMiddleSchoolPropertyValuation was derived by dividing the total school district property valuation by the number of middle schools in the district. This value is used to calculate the property tax revenue for each school district.

The largest mean occurred in 2007 and consists of all properties located within the 127 middle school boundaries. The TotalMiddleSchoolPropertyValuation's mean value, $278,886,334.86 (*SD* = $100,392,626.81) reflects the real estate boom that took place between 2006–2009 and before the economic downturn that severely impacted the national economy (Bernanke, 2012; Shiller, 2007). The skewness value met the normal distribution range, however the acceptable range for kurtosis was not always met.

TABLE 4
DESCRIPTIVE STATISTICS OF THE VARIABLES:
TOTAL MIDDLE SCHOOL PROPERTY VALUATION

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	123	264,048,104.91	91,570,296.18	.619	-.111
2007	127	278,886,334.86	100,392,626.81	.710	.427
2008	132	277,164,721.70	106,500,816.78	.542	-.062
2009	130	272,863,181.15	108,356,714.70	.588	-.097
2010	138	239,409,274.00	98,615,166.92	.605	.430
2011	138	221,061,035.73	97,573,242.88	.789	1.083
2012	138	212,719,827.78	91,490,704.41	1.017	2.028
2013	137	210,800,802.51	99,573,213.60	1.152	2.463
2014	136	221,844,346.13	106,759,106.63	1.178	3.268

Source: Georgia Department of Revenue (2016).

Table 5 presents the highest level of property wealth per ED student for each middle school in assessment dollars. The independent variable, TotalEconDisadvPPPropertyValuation measured the property valuation of each ED middle school student. The total ED per-pupil property valuation was derived by dividing the total middle school property valuation by the total number of ED students enrolled in each school. The largest mean for TotalEconDisadvPPPropertyValuation also occurred in 2007. A total of 126 schools had the mean value, $463,366.26 (SD = $195,581.63). The kurtosis and skewness values ranged between -1 and +1, which means normal distribution requirements were met during the study period.

TABLE 5
DESCRIPTIVE STATISTICS FOR THE VARIABLES: ED PER-PUPIL VALUATION

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	119	300,748.21	106,460.11	.875	-.441
2007	126	463,366.26	195,581.63	1.410	1.919
2008	131	397,867.16	189,599.01	1.743	3.036
2009	130	393,082.11	179,557.39	1.369	1.271
2010	138	332,749.90	159,776.13	1.425	1.732
2011	138	288,310.73	143,088.91	1.423	1.437
2012	138	279,767.24	132,733.24	1.365	1.254
2013	137	274,349.70	146,599.82	1.584	2.057
2014	136	289,132.63	157,301.74	1.585	2.125

Source: Georgia Department of Revenue (2016).

The final independent variable is the AvgMedianSalePrice. It measured the sale price located at the mid-point of the range between the high and low sale prices for each county represented in this study. The average median sale price variable showed the degree of property wealth in each school district. The largest mean for AvgMedianSalePrice occurred in 2012, $199,282.27 (*SD* = $132,949.40). The sale prices are for residential properties situated within the boundaries of 141 middle schools. Table 6 provides the results. The kurtosis and skewness values ranged between -1 and +1, which means that normal distribution requirements were met during the study period.

TABLE 6
DESCRIPTIVE STATISTICS OF THE VARIABLES: AVERAGE MEDIAN SALE PRICE

Year	*N*	*M*	*SD*	Skewness	Kurtosis
2006	141	195,198.63	52,324.09	.809	.518
2007	141	197,384.38	58,790.05	.927	.858
2008	137	177,645.12	73,301.20	.523	.270
2009	122	182,564.40	73,525.05	.906	.891
2010	118	166,005.79	83,166.06	.898	.473
2011	111	153,948.31	85,134.43	1.163	1.025
2012	114	199,282.27	132,949.40	1.759	3.543
2013	108	176,920.94	77,411.63	.612	.270
2014	118	173,998.35	83,744.46	.921	1.265

Source: Georgia Department of Revenue (2016) and Zillow.com (2017)

CORRELATION MATRIX ANALYSIS

Correlation matrix analysis was used to examine the relationships between the dependent and independent variables required to test the hypotheses. Pearson's product moment correlation coefficient measured the association between the variables expressed as *r*. The *r* coefficient is the effect size and represents the strength and direction of the relationship; it is stated as a number in the range of -1 and +1. The closer *r* is to 1.0, the stronger the association between two variables (Vaz & Mansori, 2013).

Another aspect of correlation analysis was used to test the hypothesis. The probability p-value was used to determine the significance of the relationships and whether the conclusions based on the effect size, *r,* is accurate or an error (Vaz & Mansori, 2013). In this study, to assess whether the test is significant for $\alpha = .01$ and .05, the following must occur: if $p < .01$ or .05, then, the test is significant and there is a significant relationship between the dependent and independent variables. Also, if $p > .01$ or .05, then the test is not significant and there is not a relationship between the variables. Correlation analysis was used to evaluate the null hypothesis as evidence to reject or accept the hypothesis.

MULTIPLE REGRESSION ANALYSIS

Hierarchical multiple regression was used to discover the ability of the independent variables to predict the TotalEconDisadvPassedEGWA when $p < .05$ and $p < .01$. To assess this research question, the coefficient of determination, R^2, measured the amount of variance in the dependent variable from the predictor variables for when considered as a group (Aczel & Sounderpandian, 2009). The analysis of variance (ANOVA) tested the model using $p = .05$. to determine whether the overall regression model was significant. The coefficients tested each predictor at alpha = .05 to discover what the specific amount of variance was due to each individual predictor. The goal of this analysis was to determine how much variance the model predicted and whether it was statistically significant or greater than zero. If $p < .05$, then it accounted for the variance of the outcome variable (Aczel & Sounderpandian, 2009).

The following procedures were used to determine whether the four regression models were significant. The predictor variables that affected the outcome of the dependent variable were identified for each school year. The following is the sequence of variables entered for each model: TotalMiddleSchoolPropertyValuation was entered into Model 1. In the second step, the variable Total8thGradeTested was entered into Model 2 to determine whether it affected the overall model beyond the variable, TotalMiddleSchoolPropertyValuation to predict the TotalEconDisadvPassedEGWA. In the next step, TotalEconDisadvPPPropertyValuation was entered into Model 3. In the final step, AvgMedianSalePrice was introduced into Model 4.

Research Question 1

Was there a difference in the academic achievement outcomes of ED students who attended the middle schools located in low property wealth districts compared with ED students who attended middle schools located in high property wealth school districts? The specific variable that was used to address this question was the association between the TotalEconDisadvPassedEGWA and the AvgMedianSalePrice. The AvgMedianSalePrice was an indicator of the level of property wealth located in the boundaries of the school districts. A Pearson's product moment correlation coefficient evaluated the null hypothesis, when $\alpha = .01$ and .05, the results provided evidence to reject or accept the null hypothesis. The correlation analysis was able to answer the Research Question 1.

For school years 2006-2014, there was a moderately, small, negative statistically significant relationship between the TotalEconDisadvPassedEGWA and the AvgMedianSalePrice. The relationship ranged between r (112) = -.320, p = .001 to r (117) = -.515, p= .000 and reflects a significant inverse relationship; as average median sale prices decreased, there was a slight increase in the number of TotalEconDisadvPassedEGWA. The relationship can also mean that as sale prices increased the number of TotalEconDisadvPassedEGWA decreased.

The analysis shows the null hypothesis was rejected, and the alternate hypothesis was accepted. There is a difference in the academic achievement outcomes of ED students who attended middle schools located in low property wealth districts compared with ED students who attended middle schools located in high property wealth school districts. Tables 21, 22, 23, 24, 25, 26, 27, 28, and 29 shows the correlation analysis results for the school terms, 2006–2014.

Results of the hierarchical multiple regression analysis revealed that the model was significant, and there were two key predictive variables, Total8thGradeTested and AvgMedianSalePrice, that provided their unique influence on the number of ED students who passed the EGWA. The average sale price was the only variable that could predict the dependent variable during the study period. The variable explained the variance as 6%, R^2 = .058, F (1,108) = 9.29, p = .000, $p < .01$ to R^2 = .133, F (1,102) = 25.04, p = .000, $p < .01$ and explained the outcome variable by 13%. It was the total number of eighth-grade students who passed the EGWA that had the most influence on the total number of ED students who passed the EGWA.

For eight out of the nine school terms, it accounted for the variance by 10% to 29% and the regression ranged from R^2 =.104, F (1,123) = 15.16, p =.000 to R^2 =.294, F (1,106) = 44.91, p =.000. Although both variables were strong predictors to explain the variance, however due to the Beta value (β = .31 - β = .82, $p < .001$) for total number of eighth-grade students who passed the EGWA was the best predictor for the total number of ED students who passed the EGWA.

Research Question 2

To what extent are school districts with high property tax revenue more likely to have higher test scores than school districts located in areas with low property tax revenue districts? When $\alpha = .01$ and .05, the results reflected that there was significant evidence to reject or accept the null hypothesis. The specific variables used to address this research question were TotalEconDisadvPassedEGWA, TotalMiddleSchoolPropertyValuation, and TotalEconDisadvPPPropertyValuation. The two valuation variables are used by local jurisdictions to calculate property tax revenue.

The correlation results for the relationship between the TotalEconDisadvPassedEGWA and TotalMiddleSchoolPropertyValuation for 2007, 2009, and 2010 was a small, positive statistically significant relationship and ranged from r (136) = .170, p = .046 to r (128) = .253, p = .004. However, for most of school terms, 2006, 2008, 2011–2014, the relationship between the two variables was not statistically significant and ranged from r (136) = .054, p = .531 to r (139) = .164, p = .060.

In contrast, the correlation between the TotalEconDisadvPassedEGWA and TotalEconDisadvPPPropertyValuation for 2006, 2007, and 2010, was not statistically significant and ranged from r (117) = -.068, p = .461 to r (129) = -.155, p = .069 and the null hypothesis was rejected. However, for 2008–2009 and 2011–2014, the association between the two variables reflected a small, negative statistically significant relationship that ranged from r (134) = -.174, p = .043 to r (135) = -.237,

p = .005; the alternate hypothesis was accepted. That is, for six of the nine years, there was a difference between the test scores of schools with low property values compared with the test score of school districts located in areas with high property tax revenue. Based on these results, school districts with high property tax revenue are more likely to have higher test scores than school districts located in areas with low property tax revenue districts. See Tables 12-20 for all correlation analysis results.

Multiple regression analysis was used to determine whether ED students who attended middle schools in school districts with high property tax revenue were more likely to have higher test scores than school districts located in areas with low property tax revenue districts. The regression analysis revealed that the model was statistically significant as a predictor that school districts with high property tax revenue are more likely to have higher test scores than school districts located in areas with low property tax revenue districts.

Although TotalMiddleSchoolPropertyValuation was used to calculate property tax revenue, it was not a predictor of TotalEconDisadvPassedEGWA. The results of the regression indicated that for the majority school terms, the variable was not statistically significant and ranged from R^2 = .006, F (1, 105) = .668, p = .416 to R^2 = .050, F (1, 124) = 6.56, p = .012. However, it was significant for the 2009 school year at R^2 = .070, F (1, 110) = 8.26, p = .005 and explained 7% of variance in TotalEconDisadvPassedEGWA.

The second variable, TotalEconDisadvPPPropertyValuation, was not significant and was unable to predict TotalEconDisadvPassedEGWA because it ranged between R^2 = .007, F (1, 115) = .874, p = .352 and R^2 = .045, F (1, 110) = 7.41, p = .008. However, for two out of the nine-year analysis period, it was a significant predictor. In 2009, R^2 = .062, F (1, 108) = 11.31, p = .001 and added 6% more variance. Likewise, in 2010, R^2 = .067, F (1, 111) = 11.39, p = .001 and added 7% more variance to the model.

The best predictor of the outcome variable, TotalEconDisadvPassedEGWA, was the Total8thGradeTested between 2008–2014. During this period, the results revealed that it accounted for 10% to 29% of the variance to predict the outcome of the ED students who passed the annual test and ranged from R^2 =.104, F (1,123) = 15.16, p =.000 to R^2 =.294, F (1,106) = 44.91, p =.000. The confidence interval, which indicated the range where the sample mean was likely to fall, was 95% C.I. (.078, .397) to 95% C.I. (.329, .691). Throughout the entire study period, the AvgMedianSalePrice was a key predictor of the number of TotalEconDisadvPassedEGWA, but it accounted for less than Total8thGradeTested. The regression results are in Tables 21-29.

The correlation results for Research Question 1 produced a moderately, small, negative statistically significant relationship between the TotalEconDisadvPassedEGWA and the AvgMedianSalePrice. The null hypothesis was rejected because there was a difference in the ED student academic achievement outcomes based on the middle school location. Hierarchical multiple regression analysis showed that the influence of the total group of eighth-grade students who took the EGWA predicted the outcome of the ED students who would pass the exam.

For Research Question 2, the question focused on whether school districts with high property tax revenue are more likely to have higher test scores than school districts located in areas with low property tax revenue districts. The specific variables used to address this research question were TotalEconDisadvPassedEGWA, TotalMiddleSchoolPropertyValuation, and TotalEconDisadvPPPropertyValuation. These independent variables revealed that there was a difference between the test scores of school districts with low property values compared with the test scores of school districts located in areas with high property tax revenue.

Regression analysis for this question arrived at the same conclusion as Research Question 1, the predictor of the outcome variable was the total number of eighth-grade students who took the EGWA. The results show that for most school terms that it was the total eighth-grade student population that determined the academic achievement of the student subgroup, ED, and not the wealth or the location of the school.

DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

Interpretation of Findings

The enactment of the NCLB (2002) required states to validate their students' academic achievement outcomes by evaluating their resource allocation structures. The NCLB reform focused on whether states were paying for the right mix of education financial resources (Aroche, 2014; Baker et al., 2004). Several conclusions were identified based on the findings:

The use of test scores to determine student academic achievement was supported by research conducted by Li et al. (2015). The authors identified the existence of a strong, positive correlation between holding schools accountable to policymakers, keeping parents informed about their children's performance, and for providing access to information concerning instructional purposes. Their findings supported the fact that student performance is higher when accountability is present within the school districts.

Research Question 1

The focus of analysis for Research Question 1 is the relationship between ED students who successfully passed the EGWA and the independent variable, the average median sale price. The average sale price variable was selected for two reasons: First, annual sale prices are the basis of the local tax base and the annual county property valuation digests (Georgia Department of Revenue, n.d.). Second, it is indicative of the level of property wealth located within the boundaries of each middle school (Rubenstein & Sjoquist, 2003).

Pearson's product-moment correlation and multiple regression analyses were the statistical procedures that were used to determine whether a statistically significant relationship existed between ED students' academic achievement levels, based on whether these students attended a middle school located in a low or high property wealth school district. The criterion for establishing significance was alpha level .01.

The results of the correlation analysis revealed the existence of a small, negative, statistically significant relationship, or an inverse relationship between the ED students and the average median sale price. As the average median sale price increased, the number of ED students who passed the EGWA decreased and the opposite was true. As the average median sale price decreased, the number of ED students who passed the EGWA went up. The results support the analysis of Seo and Simon (2008) that there is a significant relationship between school performance and housing prices. Although the results revealed a slight difference in the academic achievement of ED students who attended a low or high property wealth middle school, an inverse relationship was not expected.

Conversely, because of the inverse relationship, this suggested that when ED students attended schools with lower property values, they should do better on the exam. This finding supported Sciarra and Hunter's (2015) analysis of various courts' responses to violations to states' constitutions concerning their responsibility to provide an adequate education for all students. Sciarra and Hunter concluded that if student subgroups had any chance of obtaining an equal education compared with their peers in more affluent communities, then it was essential that additional support services and programs be made available to them. If providing additional services and programs became the norm, then it is possible that ED students could achieve academic success from the schools located in the neighborhoods where they reside. However, in this study, the reason for the inverse relationship is explained by the model's predictor variable.

Results of the multiple regression analysis show that the total number of eighth-grade students who took the EGWA had the highest variance and EGWA proficiency levels for 2009-2014. Although the average median sale price was a strong predictor throughout the entire study period, it was not as strong as the unique contribution derived from the total number of eighth-grade students who took the test. This finding is aligned with Hanushek's (2016) study that there is no statistically significant relationship between the number of school resources and the learning processes that occur within each school.

The findings indicated the influence of the other eighth-grade students' test scores on the scores of low-income students. The findings may mean that the actions of the classroom teachers may be responsible for the overall performance of all the students who took the EGWA. Another explanation for this finding came from Hanna and Morris (2014) who found that regardless of the amount of money associated with each school district and subgroup of students, it is possible for schools in the same school district to have different academic outcomes. Some schools are just more successful than others at producing good academic performance outcomes even though they have the same type of students and various funding levels.

Research Question 2

Research Question 2 focused on whether school districts with high property tax revenues were more likely to have higher test scores than school districts located in areas with low property tax revenue. The ability of school systems to raise local funds varies depending on differences in property wealth per student and the taxpayers' ability or willingness to pay higher taxes (Davis & Ruthotto, 2015). Consequently, the amount of local revenue is directly related to the level of property wealth/value, location, and the actual tax revenue collected by each jurisdiction (Sjoquist, 2008).

To analyze this research question, the total middle school property valuation and the ED per-pupil property valuation levels were used as the variables to measure property tax revenue. The correlation between the number of ED students who passed the EGWA and the total middle school property valuation amount revealed a small, positive statistically significant association for three of the school years. However, for six of the nine years, the relationship was not statistically significant. Therefore, the conclusion is that there was a difference between the test scores based on enrollment in middle schools located in low or high property tax revenue areas.

The correlation between the number of ED students who passed the EGWA and the total ED per-pupil property valuation amount resulted in a moderate, negative statistically significant association for only three years. That is, as the number of ED students who passed the EGWA increased, the total ED per-pupil property valuation amount decreased, and the relationship was not statistically significant. Similarly, Neymotin's (2010) research did not find a significant relationship between per-pupil education revenue and test scores relative to the location of the school district. The conclusion is that there was a difference in the test scores depending on whether the middle schools were in areas with low or high property tax revenue.

Multiple regression analysis determined whether the total amount of middle school property valuation and the ED per-pupil property valuation influenced the number of ED students who passed the EGWA. During the study time frame, the average amount of middle school property valuation ranged from $264 million to $277 million and the ED per-pupil property valuation amounts ranged between $274 million to $463 million. Surprisingly, the amount of money that was allocated to the middle schools and ED students had virtually no effect on the academic achievement of the ED student who passed the EGWA.

The conclusions suggest that ED students who attended schools in an area with higher property wealth did not translate into them doing better academically. An assumption can be made that more access to resources is associated with schools in affluent areas; thus, would benefit the ED students. Bartz's (2016) study provides the opposite viewpoint: the quality or type of resources did not appear to influence student academic success

Aroche (2014) noted that states like Georgia that uses the foundation formula program to fund public education allowed communities with higher wealth to provide extra amenities. The additional educational amenities were due to extra funds that remained with the school district after the distribution of the federal and state funds, and the collection of local property tax revenue. Kurban, Gallagher, and Persky (2012) stated that the ability to raise funds differs among school districts and may affect student academic performance.

The overwhelming predictor was the total number of eighth-grade students who took the EGWA and the correlation between student academic achievement and school funding appeared to be minimal. These findings support Niven et al.'s (2014) analysis of the Texas school foundation program's equity

connection to student performance and SES. Niven et al. did not discover a significant correlation between funding amounts, property tax collections, and test scores. Neither was there any correlation between property values and student achievement based on the multiple regression analysis.

The research of Chingos et al. (2013) found that there was a limited number of research on the connection between school districts and student achievement. However, Chingos et al.'s findings supported the study results that show school districts have minimal influence on student achievement. Similar to Hanushek (2016), Chingos et al. acknowledged that there was more variation with the relationship between student achievement and teachers compared with student achievement and the schools they attended. The findings support previous research that for 50 years, the public school system has struggled to arrive at the right mix of resources to provide a fair, equitable, and adequate education.

RECOMMENDATIONS

The implementation of the NCLB Act was significant because it promoted higher accountability measures to monitor student achievement among various student groups (NCLB, 2002). Title I funds were provided to help students served by the grant to have accessibility to an equal opportunity education through programs and services designed to ensure state-based standards were met. The findings in this study indicate that more research is needed concerning student population subgroups' association with the total student population. To gain a firsthand understanding of the influence of the total student population's ability to pass required grade-based assessments, a qualitative study may be appropriate. Interviewing teachers and students could provide an invaluable opportunity to understand the learning processes of all students. Using a qualitative research approach could provide personal and in-depth responses that may explain why students pass and fail annual standardized tests.

In addition, this study should be replicated throughout the state of Georgia to include a more diverse group of low-income students. For instance, by expanding the research throughout the state, the range of property valuations and property wealth would include rural, coastal, and regional differences that are not associated with urban areas. In urban areas, the total tax digest includes major commercial structures that have high property values, which can create inequities when compared with non-urban areas. Therefore, if the study is conducted using school districts that reflect the state's demographics, the results could yield different outcomes.

This study was limited to eighth-grade middle school students' performance on a single test. Future studies should be conducted to include all eighth-grade standardized tests. Including other tests could show students' preparedness for high school. The results could provide a more in-depth understanding of any deficiencies that may have caused ED students' academic performance to be lower than the typical eighth-grade students. The findings suggest that while all of the students were learning in the same environment (i.e., school, teacher, and subject content), understanding why the test scores are different could lead to innovative processes to improve the academic performance of the entire ED student population.

A final recommendation is school districts could invest in training its staff to identify specific problem areas that uniquely affect low-income students' ability to learn the required coursework. In addition, districts could hire social service staff who could recognize problems that students may be experiencing outside of the classroom. The school location may not be a factor in determining student performance if the right training and staffing decisions are implemented accordingly.

Implications

This study could provide state education decision makers with information about the effectiveness of allocating funds and resources required to achieve state-based standards and assessment goals. From a practical perspective, policymakers could be made aware of how to successfully allocate education resources to ensure students receive an equal and efficient academic experience (Baker & Levin, 2015). Findings of the study revealed that despite the amount of educational funding, it did not contribute to the ED students' ability to pass a standardized test, although other factors may have contributed to this

outcome. Recognizing how the influence of the average student populations may lead to new techniques that could help reduce the achievement gap.

Previous research has indicated that student subgroups have been unable to perform at the same academic levels when compared with the average student population due to their SES (Bartz, 2016). Since the enactment of NCLB, when education decision-makers want to emphasize student academic outcomes, the focus of their analysis became performance-based (Baker, 2014). Future data analysis should include district and student characteristics relative to school funding and student academic outcomes. This is essential because to calculate the average cost of producing desired academic performance, the basis should be the average student population and district characteristics (Baker et al., 2004).

For decades, researchers have asked the question, "Does money matter relative to academic performance?" Most have concluded that what matters is how the money is spent. In Georgia, QBE is responsible for identifying how state funds are allocated to the public school systems. In FY 2014, Georgia received $14.5 billion in revenue, or $8,530 per FTE for its public K-12 school districts; federal contribution, 7.8 %; state contribution, 51.4%, and the local contribution was 40.9% (Davis & Ruthotto, 2015). Verstegen (2016) concluded that per-pupil funding should reflect comparable funding levels for all school districts. However, when per-pupil expenditures were calculated, the expenditure usually produced a wide variation of funding levels within the education finance systems (LaPlante, 2012). Based on the amount of funding that goes into the public education system, money matters but only to a degree. The key element in the student achievement debate is the relationships between the student, teacher, school, and school district.

Results of this study demonstrate that a major change should be implemented to remove all data analysis functions from the teachers and transfer that responsibility to a 'standards/quality control' division. By employing data analysts and support staff to input and interpret education-based data at the school-level would provide detailed insight and familiarity of the students and their needs. Teachers could participate in meeting students' needs based on assessments, test scores, in-class learning, and personal or external issues that may be affecting the student. A simple solution like this would allow the teaching staff to focus on teaching students how to learn, from an informed and knowledge-based perspective.

CONCLUSION

Policymakers need to address equality in public education based on the growing public concerns regarding the allocation of funds and programs (LaPlante, 2012; Niven et al., 2014). Data-driven decision making became an invaluable tool to aid policymakers, administrators, and educators in making informed decisions. Previous research revealed that accurate data could lead to better resource allocations and could increase student academic outcomes (Della Sala & Knoeppel, 2015; Mandinach, 2012). To date, equality in public education pertains to the allocation of fiscal and non-fiscal resources (Sorenson, 2016). Whereas, equity, in school finance, pertains to fairness among all students and is used to measure the distribution of educational funding (Pan et al., 2003). As a result, equity has become an important concept because it defines how to address the differences in student populations.

The topic of student academic achievement, property valuation, and property taxation are not new topics; however, the focus of this study was to understand the connection between the same type of students but in different school settings. The findings in this study supported previous research that there is a difference in the academic outcome of ED students based on where they attend school and the location of the school (Bartz, 2016; Craft & Slate, 2012). Nevertheless, a key finding revealed that there is an inverse relationship between ED students who passed a standardized test to the sale prices of homes located in the schools' boundaries. As ED students' test scores increased, sale prices decreased and as test scores decreased, sale prices increased. This was significant because at least one of the reasons why ED students excelled was due to the influence of other students who also took the test and passed it. Subsequently, this may signal to policymakers that money matters, but perhaps not as much as hiring a good teacher who can provide adequate education to all students regardless of the location of their schools.

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