An Examination of Teacher Characteristics by School Locales in Georgia Elementary Schools

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ABSTRACT

This explanatory sequential mixed methods study examined teacher sorting patterns in Georgia schools. Teacher and school characteristics from a sample of 1,057 Georgia elementary schools were examined in the quantitative phase while, for the qualitative phase, interviews with five human resources directors provided a better understanding of the teacher sorting documented in the quantitative phase.

Results from this study demonstrated that teacher quality gaps existed across Georgia elementary schools. Additionally, economically disadvantaged students were more likely to be taught by less experienced and lower paid teachers. Particular geographic locales also employed more experienced and higher paid teachers than did others. Teacher sorting based on school characteristics was also found within geographic locales. Human resources directors explained how teacher sorting occurred in what were geographically small labor markets. Reasons for this sorting included salaries, local amenities, student demographics, and building leadership.

This study contributes to the literature on teacher sorting by corroborating other studies that suggested teacher sorting is affected by salary and student demographics, while supplementing the few studies analyzing the role of geography on teacher quality gaps. This study was the first to investigate the role of human resources directors in teacher sorting. Implications from the findings in this study could be used by policymakers to reduce educational inequalities.

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ACKNOWLEGEMENTS

Thank you, God, for all you have given.

Mandy, my companion, you are a fountain of strength. I am inspired by your consistency and devotion. Thank you for reminding me to calm down.

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Mom, thank you for the love, support, and capers.

Dad, thank you for the example of hard work.

DEDICATION

I dedicate this dissertation to my wife, Mandy. I would not have pursued higher education, much less a doctorate, had it not been for you. Thank you for continuing to keep me on the straight and narrow.

Chapter I

INTRODUCTION

In July of 2014, then Secretary of Education Arne Duncan sent a letter to all state school superintendents stating the Department of Education would begin to focus on minimizing teacher quality gaps (Duncan, 2014). Though the effects of this statement were minimal, the statement reveals that access to quality teachers is a concern among many Americans and policymakers (Dynarski, 2014). The same year Max and Glazerman (2014), produced a brief that explained major research findings about access to effective teaching. There were two findings from the brief: disadvantaged students were less likely to be taught by effective teachers and access to effective teachers varied across school districts (National Center for Education Evaluation and Regional Assistance, 2014). Many have argued access to quality teachers is essential to eliminating the achievement gap in America (Long, 2011). One reason achievement gaps persist in American schools is that disadvantaged students are more likely to be taught by less effective teachers than other students (Adamson & Darling-Hammond, 2012).

Teacher sorting describes where teachers choose to work (Mason-Williams & Gagnon, 2017). However, because of how teacher sorting occurs, it often means some schools become staffed by more effective teachers than others (Steele, Pepper, Springer, & Lockwood, 2015). Differences in teacher qualifications from one school to another are called teacher quality gaps (Goldhaber, Lavery, & Theobald, 2015). To resolve the

problem of teacher quality gaps, it is important to better understand teacher sorting patterns. Researchers and policymakers should understand the characteristics of the schools where effective teachers choose to work in order to better address the problem of those gaps (Atteberry, Loeb, & Wyckoff, 2017).

Teacher sorting is a complex issue. Many factors contribute to why teachers choose to work in particular schools (Boyd, Lankford, Loeb, & Wyckoff, 2013). Additionally, many factors have contributed to educational achievement gaps (Hung et al., 2019). However, one way in which schools can reduce achievement gaps is through quality staffing decisions (Talbert-Johnson, 2004). Through identification and a better understanding of teacher quality gaps, researchers can help policy makers reduce educational inequalities.

Georgia provides a unique opportunity to analyze teacher sorting (Angioloni & Ames, 2015; Winters, 2009). In Georgia, the majority of teacher salaries are determined by the state salary schedule (Winters, 2009). In addition to the base state salary, school districts offer additional local supplements to teachers who work in their district (Winters, 2009). The majority of teacher salaries are determined at the state level. Thus, salary differences across Georgia's geographic regions may not be sufficiently significant to affect teacher sorting decisions. Thus, based on previous research, one should expect to see teacher quality gaps arise because experienced teachers move into schools they perceive as more favorable (Clotfelter, Ladd, & Vigdor, 2011; Hendricks, 2015). For instance, Hendricks (2015), in an analysis of pay policies in an urban school district, found schools not paying significant compensating wage differentials resulted in those schools being staffed by less experienced teachers and having lower student achievement.

Statement of the Problem

Public schools have long been seen as one of the great democratic institutions of America (Parker, 1996). Politicians, teachers, and the public like to believe education is an equalizer. In America, regardless of a person's economic or social background, they can receive a high-quality education (Muller & Schiller, 2000). Others argue because of certain characteristics in the American school system, from standardized testing to funding schools from local property taxes, American schools have not created a level playing field for all students (Ladson-Billings, 2006; Muller & Schiller, 2000; Ravitch, 2016). One source of continued inequality in American schools is the inequitable distribution of teachers (Clotfelter, Ladd, & Vigdor, 2005).

Teacher quality gaps exist when one school employs higher quality teachers than another (Goldhaber et al., 2015). Teacher quality gaps should be eliminated because they perpetuate educational inequalities (Darling-Hammond, 2006). Researchers such as Scafidi, Sjoquist, and Stinebrickner (2007) and Glazerman and Max (2011) identified teacher quality gaps across many student groups delineated by race and economic background. Unless teachers, administrators, researchers, and policymakers understand where teacher quality gaps exist, based on specific school characteristics, negative student outcomes associated with teacher quality gaps will persist (Darling-Hammond, 2006).

Research has not fully explored the extent to which teacher quality gaps exist across geographic locales (Goldhaber & Startz, 2017; Papay, Bacher-Hicks, Page, & Marinell, 2017). Most research on teacher quality gaps has analyzed the degree to which teacher quality gaps exist across schools based on student demographics (Knight, 2017).

Other researchers found both race and economic disadvantage can predict access to effective teachers (Clotfelter et al., 2005). Darling-Hammond (2003) noted the identification of teacher quality gaps based on student characteristics carries important policy implications. Before policies can be made which address inequalities in educational outcomes, an equitable distribution of teachers must exist (Darling-Hammond, 2003). For this reason, the lack of information about teacher quality gaps in Georgia is a problem for educational equity.

Schools can vary greatly based on geographic locale. For instance, students in rural and urban schools are found to have many disadvantages compared to students in suburban schools (Rhodes & Warkentien, 2017). Goff and Bruecker (2017) found teachers perceived jobs in rural and urban schools as less desirable than those in suburban schools. Because teachers perceive some schools to be more desirable to teach in than others, an investigation of whether or not teacher quality gaps exist based on school geographic locale may identify inequalities in access to effective teachers in Georgia elementary schools. The identification of teacher quality gaps may aid in increasing educational opportunities across Georgia schools.

Purpose of the Study

A few years ago, I noticed a phenomenon; many teachers were leaving the high school where I work in order to teach at other, more suburban schools. These departing colleagues were people I admired and respected as professionals. In other words, they were people I thought of as good teachers. These people gave several reasons for transferring schools. Some moved to be closer to their home, others because of salary increases, and others because the school had better working conditions (like additional

planning time). A single, unifying reason for these teachers transferring to more suburban schools did not emerge from the answers I received. However, I noticed, almost without exception, the schools people transferred seemed to have more affluent student populations.

The purpose of this study was twofold. Teacher characteristics and sorting patterns were analyzed in Georgia elementary schools to determine if teachers with more experience and education tend to sort into particular types of schools. The researcher compared salaries, teacher experience, teacher education, and student poverty levels by geographic locale type, student economic disadvantage, and school CCRPI score. This analysis identified teacher quality gaps in Georgia schools (Clotfelter et al., 2011). In analyzing school characteristics, the intention was to determine if teacher sorting occurs differently for different types of schools throughout the state. The second purpose of the study was to interview directors of human resources in order to determine the degree to which teacher sorting is a concern for them. In order to better understand the personnel challenges faced in Georgia, interviews were conducted with human resources directors. Directors were selected based on the findings in the quantitative analysis.

Teacher sorting can result in diversity within school districts. Researchers have indicated teacher sorting within districts can mean schools within districts have varying degrees of teacher quality and pay (Horng, 2009; Martin, 2010a; Steele et al., 2015). Limiting the analysis to district-level data may obscure the specific effects on elementary classrooms. Because a school may be labeled as one geographic locale and the district of which it is a part labeled as a different geographic locale, understanding the impact of teacher characteristics at the school level is important when investigating teacher sorting.

Theoretical Framework

The theoretical framework for this study was based on economic theory and previous research on teacher quality gaps. Teacher quality greatly affects student achievement (Chetty, Hendren, & Katz, 2016). Teacher quality varies from teacher to teacher and school to school. When some students have greater access to more effective teachers than others, a systematic educational inequality exists (Knight, 2017). By reducing teacher quality gaps, policymakers could reduce student achievement gaps (Goldhaber & Startz, 2017). Prominent researchers in the area of teacher quality gaps have established disadvantaged students tend to be taught by less qualified teachers (Clotfelter, Glennie, Ladd, & Vigdor, 2008a; Clotfelter et al., 2005; Goldhaber et al., 2015). They have advocated for policies to equitably distribute teachers to assist disadvantaged students (Clotfelter et al., 2008a; Goldhaber & Startz, 2017). Isenberg et al. (2013) found that if quality teachers were equitably distributed across schools, student achievement gaps would also be greatly reduced. To reduce teacher quality gaps, however, these gaps must first be identified. They suggested schools and school districts facing teacher quality gaps can seek a better means of attracting and retaining quality teachers.

Many factors affect why some schools attract and retain teachers better than others. Mansfield (2015), in an analysis of teacher transfers in North Carolina schools, argued working conditions and salaries were the greatest influences on teachers deciding to change schools. Other researchers found student characteristics greatly influence a teacher's preference for one school over another (Glazerman & Max, 2011). Glazerman

and Max found the percentage of low-income students in schools was associated with lower teacher quality.

Economists use the phrase, compensating differentials, to describe the wages required to attract a person to a job with perceived negative characteristics (Smith, 1979). In the state of Georgia, the majority of a teacher's salary is determined at the state level. Teachers may sort into some schools over others based on reasons other than salary because compensating differentials may not exist in Georgia.

Geographic location may be a particularly important factor for teachers determining where to teach, but has not been fully studied (Boyd et al., 2013). Engel and Cannata (2015) and Boyd, Lankford, Loeb, and Wyckoff (2005) asserted because teachers prefer to teach close to where they lived as a child, more teachers from their samples grew up in suburban areas. This has led to school leaders in urban and rural areas finding it more difficult to attract and retain effective teachers. Thus, the researcher investigated if, and to what extent, teacher quality gaps exist in Georgia schools across geographic locales.

Additional research could help in gaining an understanding about how school locale type affects school outcomes. Goff and Bruecker (2017) argued that affluence played a bigger part in student achievement among Wisconsin school districts than geographic locale type. This study analyzed district data, which may obscure nuances within individual schools. Rural communities have been understudied in previous educational research (Nolan, Waldfogel, & Wimer, 2017). By controlling for school locale type, this study determined certain locale types face teacher quality gaps compared to others. Additionally, the present study continues the ongoing debate on the effects of

poverty and the ability of schools to improve outcomes for students in poverty (Payne & Ortiz, 2017).

To summarize, the theoretical framework for this study relies on literature which supports two ideas: students benefit from being taught by quality teachers, and teachers tend to sort into schools they perceive to be better places in which to work. Due to teacher perceptions of various geographic locales, teachers may tend to sort into some locales over others. The literature on teacher quality gaps offers few studies that have analyzed the role of geographic locale on teacher quality and none would be suitable for generalizing to Georgia schools. The literature clearly supports further investigation into reasons for teacher sorting in Georgia elementary schools.

Research Questions

The following questions guided this study:

Quantitative questions.

1) To what degree do teacher quality gaps in teacher characteristics (e.g., experience, education, and salary) exist based on school characteristics (e.g., geographic locale type, percentage of economically disadvantaged students, and CCRPI score) in Georgia elementary schools?

2) Do relationships exist between teacher characteristics and school characteristics in Georgia elementary schools?

Qualitative question.

3) What challenges have directors of human resources faced in recruiting and retaining teachers?

Summary of Methodology

An explanatory sequential mixed methods design was used to first determine if teacher quality gaps, based on teacher characteristics, existed in Georgia elementary schools based on school characteristics. The teacher characteristics used in this study were teacher experience, teacher education, and teacher salary. The school characteristics used in this study were geographic locale type, percentage of economically disadvantaged students, and school CCRPI score. The study investigated problems faced by human resources directors in attracting and retaining quality teachers. Archival data from state and federal sources were used to provide an overview of teacher characteristics and sorting in Georgia elementary schools. Previous researchers have not analyzed or determined if differences in teacher characteristics exist across Georgia elementary schools. This may be due to the fact school level data on Georgia schools do not include geographic locale. I combined data from federal sources, which identify locale type, with state level data on teacher characteristics. This analysis was conducted to determine if differences in teacher characteristics (teacher salary, teacher experience, teacher education levels) vary based on school characteristics (geographic locale type, percentage economically disadvantaged students, and CCRPI score).

A multivariate analysis of covariance (MANCOVA) was used to determine if statistically significant differences existed by geographic locale type (city, suburban, town, rural) while controlling for selected teacher characteristics based on the percentage of economically disadvantaged students and CCRPI scores. However, because student economic disadvantage and school CCRPI scores affected geographic locales to greater and lesser extents, the MANCOVA could not be interpreted. A multivariate analysis of

variance (MANOVA) determined statistically significant differences across locale types. The researcher followed up the MANOVA with hierarchical regressions for each geographic main locale type. The results of the quantitative phase informed and framed the discussions and selection of participants in the second, qualitative phase.

The quantitative analysis was followed by qualitative interviews with directors of human resources who were identified in the quantitative phase. The researcher chose participants based on the finding that student economic disadvantage affected suburban and rural schools but not city and town schools. Thus, human resources directors from suburban and rural schools served as interview participants. The researcher transcribed and analyzed interviews to determine factors affecting teacher sorting. A general inductive approach for qualitative analysis was used to identify themes. The themes further explained how teacher decisions and district policy decisions contributed to sorting in Georgia schools.

Significance of the Study

In early 2018, teachers went on strike in Arizona, Colorado, Kentucky, Oklahoma, and West Virginia, arguing for higher wages. According to an AP-NORC poll conducted in April of 2018, a majority of Americans believe teachers deserve higher salaries (Associated Press & NORC, 2018). Many teachers in West Virginia stated low wages in their state caused teachers to work in other nearby states (Turner, 2018, March 16). While the anecdotes above clarify the issue of national variation in teacher working conditions and pay, variations within schools at the regional, state, and district level are frequently ignored.

In order to provide quality instruction, schools must hire and retain effective teachers (Chetty et al., 2010). This may be especially true for increasing student achievement at low-performing schools (Isenberg et al., 2013). A comparison of Georgia's elementary schools was conducted to determine if certain types of schools have advantages in terms of teacher characteristics. This analysis revealed the existence of teacher quality gaps in Georgia elementary schools. Additionally, this study provides insights into the challenges faced by human resources directors when attempting to attract and retain quality teachers. Human resources directors have a high degree of influence over personnel decisions in school systems but their influence has rarely been studied (Tran, 2015).

This study determined that differences in teacher characteristics existed within Georgia elementary schools based on select school characteristics. A policy maker in Georgia attempting to reduce inequalities in the teacher quality gap could use this information to address specific needs in Georgia elementary schools. Further, information in this study could help inform policies to assist specific geographic locales with teacher quality gaps.

This research could provide guidance for schools with leaders who want to attract and retain teachers. This study revealed schools in certain geographic areas pay teachers less than schools in other geographic areas. The researcher determined schools with certain characteristics should focus their resources on improving student learning through attracting and retaining quality teachers. Additionally, compensating wage differentials were not present in Georgia school districts. School districts in Georgia could use the

findings from this study to make more informed policy decisions when attempting to reduce educational inequalities.

The description of school level characteristics and teacher sorting contributed to educational research. District-level data may distort the effects of teacher salaries and teacher sorting. Researchers have documented inequalities among schools within the same district (Brunner, Cho, & Reback, 2012; Glazerman & Max, 2011; Lankford, Loeb, & Wyckoff, 2002). The choice of limiting the data to elementary schools provided consistency across select school characteristics. Elementary school teachers receive lower salaries, on average, than middle and high school teachers. Further, many middle and high school teachers receive salary supplements for extracurricular and coaching positions, positions that do not, generally, exist at the elementary school level. Because different districts pay higher or lower supplements to their coaches, limiting the data to elementary schools constrained inferences drawn from salary differences from coaching supplements. The differences in pay between elementary, middle, and high school teachers warranted investigation but were beyond the parameters of this study.

Scholars disagree about how much of an impact teachers can have on disadvantaged students (Chetty et al., 2016; Payne & Ortiz, 2017). This study contributes to the literature by determining if students suffering a disadvantage were taught by less experienced, educated, and compensated teachers due to teacher sorting. By further separating school data, the researcher analyzed the ways in which teacher sorting occurs across schools based on average teacher salary and student poverty rates. This revealed implications for policy reforms to aid low performing schools with specific characteristics.

Policy makers could use the findings of this study to develop policies which attract high-quality teachers to specific schools with the greatest need of quality teachers. For instance, rural schools have more experienced, but lower paid, teachers than city elementary schools. State policies could offer financial incentives to attract teachers to remain in city schools. In 2009, a similar policy was implemented in Georgia which increased starting pay for high school math and science teachers as well as offering a bonus for elementary teachers who received math or science endorsements (Tagami, 2018). Simply raising teacher salaries for *all teachers* may not reduce teacher quality gaps. Instead, this study revealed where teacher quality gaps exist in order to inform where policymakers should focus efforts to reduce teacher quality gaps in Georgia.

Definition of Terms

The following terms are defined as they are used in the context of this study.

Teacher characteristics. Teacher characteristics refers to the background qualifications of a teacher, which usually include years' experience and education level (Skourdoumbis, 2017). This study included salary as a teacher characteristic, as well as experience and education level.

School characteristics. School characteristics refers to the demographic information or performance measures for individual schools. The school characteristics used in this study included geographic locale, percentage of economically disadvantaged students, and CCRPI score.

Teacher sorting. Teacher sorting refers to the locations in which groups of teachers work (Mason-Williams & Gagnon, 2017). Whereas teacher supply describes the

number and quality of qualified educators in a labor market, teacher sorting describes the distribution of teachers to specific teaching locations (Jones & Hartney, 2017).

College and Career Readiness Performance Index. This is a score given to every school within the current study's target population. For elementary schools, the score is based largely upon student achievement data on End of Grade assessments in grades three, four, and five (Georgia Department of Education, 2018).

Compensating differential. Compensating differential refers to the amount of additional money required to attract an employee to a position is considered less favorable than other available options (Chambers, 2010; Smith & Sutherland, 2008; Smith, 1979).

Teacher education. Teacher education is the highest degree earned. Georgia data reports the number of teachers with bachelors, masters, specialist, doctoral, and other. For this study, only masters, specialist, doctoral, and other were used (The Governor's Office of Student Achievement, 2018).

Teacher experience. Teacher experience is reported by the state of Georgia as the total number of years completed in the teaching field (The Governor's Office of Student Achievement, 2018).

Economic disadvantage. A student is identified as economically disadvantaged if the person qualifies for free or reduced lunch (National Center for Education Statistics, 2018).

Teacher quality gap. Teacher quality gap refers to an unequitable distribution of teachers or teacher quality across student subgroups (Goldhaber et al., 2015).

Limitations

This study was limited to describing sorting patterns among Georgia elementary teachers. Inferences could not be made about the sorting patterns of other than elementary schools. The quantitative phase did not explain why teachers have sorted into particular patterns. Many variables outside the scope of this study may help answer that question; geographic locale type, percentage of economically disadvantaged students, and CCRPI score may explain major school level factors that influence teacher quality gaps. Factors not identified through school data, like crime rates, may also influence teacher quality gaps but are not included in this study.

The sorting patterns in Georgia are not generalizable to all U.S. states. While prominent scholars in the field have used teacher experience as a means of identifying teacher quality gaps, there are other means of doing so. For instance, many experienced teachers may not be as effective as lesser experienced teachers. The themes drawn from directors of human resources may not explain the influence of teacher sorting on decisions made by other school administrators. For instance, superintendents and principals also influence school personnel. Principals may have a different perspective on what attracts teachers to a particular school and may make decisions to increase teacher quality at the building level. Last, the researcher only conducted interviews with human resources directors in districts with high numbers of rural and suburban schools. Human resources directors in city and town schools may face unique challenges not identified through this study.

Organization of the Study

The goal of this study was to determine the degree to which teacher characteristics vary in Georgia elementary schools by geographic locale type. Further analysis was done to ascertain the influence of student economic disadvantage and CCRPI scores across the state and within specific geographic locale types. Teacher characteristics measured included experience, salary, and education. Interviews with human resources directors provided an explanation as to the quantitative findings about teacher characteristics in Georgia elementary schools.

Chapter two includes a review of the literature on economic theory, the role of geography on teacher labor markets, teacher sorting, teacher quality gaps, teacher salaries, student poverty, and the impact of teachers on student achievement. Chapter three describes the mixed methods research design and research methodologies used for this study. Chapter four consists of a description of the quantitative and qualitative data analyses. Chapter five provides an explanation of the conclusions drawn from the research.

Chapter II

LITERATURE REVIEW

The literature review provides an overview of the major research on teacher sorting and teacher quality gaps. The literature review contains a discussion of each of the variables used in the study. The review begins with an explanation from the field of economics of how workers choose where to work and why people decide to seek employment as teachers. The literature then addresses how and why teachers choose one specific school over others with an emphasis on the role of geography and salaries. Next, literature on teacher quality gaps is discussed. Following the discussion on why people enter the teaching profession and work in particular schools, there is a summary of research on teacher characteristics. The effects of poverty on student achievement are then addressed. Last, the limited research about school system directors of human resources is described.

Economic Theory

The conceptual framework for this study bridges economic theory and research in education. In economics, the terms wage differential, or compensating wage differential, explain differences in pay as a result of differences in the desirability of jobs (Kaufman & Hotchkiss, 2006). For instance, if two jobs are identical in every way except one job is perceived as less desirable, one should expect, based on economic theory, the less desirable job offers higher pay in order to attract a qualified employee. Empirical studies

have demonstrated less desirable jobs require increased wages in order to attract employees (Eberth, Elliott, & Skåtun, 2016; Scheffel, 2011).

Martin (2010a) specifically investigated teacher wage differentials and found higher wage differentials were associated with higher percentages of Black and Latino students. She did not analyze the effects of wages on student achievement. Ingle and Rutledge (2010) determined that higher paying school districts were able to be more selective in teacher hiring. Additionally, Ingle and Rutledge (2010) revealed that individual schools within districts perceived as more desirable received more applications, allowing the principals at those locations to be more selective in staffing. Wage differences may have implications for teacher sorting because of the effects of compensation differentials.

Economic theory posits jobs with perceived negative characteristics require additional pay in order to attract workers when compared to jobs with perceived positive characteristics (Smith, 1979). As a result of these *compensating differentials*, or lack thereof, teachers with higher qualifications sort into schools that pay more or are perceived as having more favorable conditions (Jones & Hartney, 2017). Researchers determined teacher quality gaps lead to inequalities in a number of settings. For instance, Steele et al. (2015) found intra-district teacher quality gaps resulted in decreased student learning outcomes in an urban school district. Cowen, Butler, Fowles, Streams, and Toma (2012) found remote areas in Kentucky faced greater teacher attrition rates, which led to teacher quality gaps. In order to reduce inequalities in education, students need equitable access to quality teaching (Darling-Hammond, 2003).

One type of wage differential occurs due to location (Kaufman & Hotchkiss, 2006). Goodman and Smith (2018), in an analysis of 347 Metropolitan areas in the United States, found regional differences explained higher wages and concentration of medical professionals in urban areas. In a study of inter-provincial wages in Canada, Cahill and Gager (2014) noted that human capital increases as wages increase. The above elements suggest that as teacher wages increase within urban areas, teacher characteristics rise as well.

In addition to urban areas being able to increase productivity by offering higher wages, agglomeration economies also help to explain differences between urban workforces and non-urban workforces. Agglomeration economies refer to benefits to productivity associated with urban areas due to factors such as logistics, population, and specialization of knowledge and skills (Rosenthal & Strange, 2004). Because of agglomeration economies, many researchers in the field of economics argue urban areas result in higher skilled labor spillover which increases overall productivity (Hafner, 2013). The implication for education is that one should expect different teacher markets, skill sets, and spillover in urban areas.

Teacher Supply

Many studies found national average teacher salaries positively correlate with higher student achievement (Akiba, Chiu, Shimizu, & Liang, 2012; Dolton & Marcenaro-Gutierrez, 2011; Han, Borgonovi, & Guerriero, 2018; Ripley, 2013). Citing data from the Organisation for Economic Co-operation and Development (OECD), Akiba et al. (2012) argued that no association existed between average new teacher salaries and student achievement. However, the higher salaries paid to experienced teachers clearly and

consistently correlated with higher Program for International Student Assessment (PISA) scores. These findings may have particular relevance in the United States, where teachers receive higher initial compensation than in many other countries, while experienced teachers receive less than most OECD nations (Akiba et al., 2012). Both Akiba et al. (2012) and Ripley (2013) speculated that, in countries with higher expected salaries, more qualified candidates were enticed into the teaching profession, compared to countries where candidates expected less compensation. These authors suggested higher salaries lead to higher student achievement. One implication from these studies is that, in countries where teachers receive greater prestige and salary, more qualified candidates enter the teaching profession.

While Akiba et al. (2012) found teaching salaries correlated with student achievement, other researchers insisted salaries have a limited influence on the teaching field. Han et al. (2018) analyzed a PISA survey from 2006 comparing opinions of teaching in various countries and concluded higher salaries and the high societal value placed on teaching resulted in more high-aptitude 15-year-olds considering teaching as a career possibility. In particular, the authors revealed high-aptitude math and science students were more likely to consider teaching as a profession when they expected higher salaries. The authors concluded for countries like the United States, where students lag behind in the quantitative section of the PISA score, increasing both financial incentives and the status of teaching may be one way to raise student achievement. The study conducted by Han et al. (2018) indicated the potential rewards of the teaching profession influenced who became a teacher. This fact may impact US public education. Higher

aptitude teachers in the United States may be influenced by financial incentives more so than lower aptitude teachers.

Changes in teaching salaries affect who enters the teaching profession in individual countries within given years. Figlio (2002) examined nationwide district-wide data on newly hired teachers for the school years 1987-1988 and 1993-1994. In his analysis, he found school districts hired higher-quality teachers during the 1993-1994 school year. Figlio (2002) attributes the higher quality of teachers to increased real teacher wages between 1987 and 1993. Figlio also found a statistically significant difference in the quality of teachers, based on SAT scores, hired between public school districts where teachers are paid more than those where teachers are paid less. One limitation of this study (Figlio, 2002) is the definition of teacher quality by SAT score, which may or may not make a significant impact on students.

Nagler, Piopiunik, and West (2015) analyzed the effects of the Great Recession on teacher labor supply. The authors found Florida teachers who entered the profession during a recession were more qualified than those hired before the recession. According to the authors, the higher-qualified teachers raised student achievement in Florida. Nagler et al. (2015) argued during the Great Recession, people with higher than normal qualifications entered the teaching profession because of the lack of jobs in other, more lucrative, private-sector industries. Taken together, Nagler et al. (2015) and Figlio (2002) demonstrated the teacher labor supply within the United States changes as teaching salaries, relative to other job opportunities, increase or decrease.

Teachers choose to work in particular schools for a variety of factors (Feng, 2009). One factor which affects a teacher's decision to work in a school is salary (Martin,

2010a). Whether or not school districts can improve student achievement through financial incentives for teachers is not an established fact (Figlio, 2002). However, understanding variation in teacher salaries across geographic locales may aid in understanding potential reasons for teacher quality gaps. For instance, Tuck, Berman, and Hill (2009) analyzed economic conditions throughout the state of Alaska and found schools in rural Alaska were not offering sufficient compensation differentials to attract and retain effective teachers. Miller (2012) analyzed data from the state of New York and determined rural schools faced significant teacher quality gaps based on teacher experience. Additionally, Miller (2012) discovered many first year teachers were initially hired by rural schools, but transferred to suburban schools after gaining experience. The author attributed a large degree of the teacher quality gap to lower teacher pay in rural areas, a conclusion supported by Bailey (2014) when examining teacher quality gaps in rural elementary schools.

The Role of Geography on Teacher Sorting

Positive correlations between teacher salaries and student achievement may come as little surprise to many in the field of education (Goldhaber, Quince, & Theobald, 2017). However, factors other than salary influence teacher sorting patterns. Steele et al. (2015) found student composition influenced teacher sorting patterns within the district they investigated. Loeb, Darling-Hammond, and Luczak (2005) found teachers were more likely to leave schools with high concentrations of economically disadvantaged students. This includes the State of Georgia, where, according to Clotfelter et al. (2005, teacher sorting may also occur based on the percentage of disadvantaged students in schools. There may be multiple factors that caused these correlations. Students in poor

neighborhoods may be less successful than their wealthier peers due to systemic inequality, poorly funded schools, lower quality teachers, and/or many other factors (Adamson & Darling-Hammond, 2012). Descriptions of teacher sorting patterns related to economically disadvantaged students are important for complete understandings of teacher quality gaps.

Teacher sorting is affected by many factors. One factor not yet fully explored in the literature is sorting by geographic locale (Goff & Bruecker, 2017). David Monk (2007), in an analysis of teacher retention and recruitment in rural areas, described the characteristics of rural areas as having "small size, sparse settlement, narrowness of choice (with regard, for example, to shopping, schools, and medical services), distance from population concentrations, and an economic reliance on agricultural industries" (p. 156). The drastic differences among geographic areas affect teacher labor markets (Monk, 2007). Multiple researchers have indicated geography affects teacher labor markets, student achievement, and school resource allocation (Boyd et al., 2005; Papay et al. 2017**)**. An analysis of the effects of teacher salaries should take into consideration that schools located in different regions may be impacted by salary differentials in different ways because of the differences associated with school locale type.

The United States Department of Agriculture (2017) found achievement gaps between rural and non-rural schools decreased between the years 2000-2015. However, differences between educational characteristics by geographic locale remain. Educational attainment and wages at all education levels were lower in rural areas compared to urban areas (United States Department of Agriculture, 2017). Many studies have analyzed factors that contribute to lower graduation rates in rural areas compared to other

geographic locales (Zaff et al., 2017). However, simply analyzing graduation rates may not allow for a full picture of student achievement within rural schools. Based on the findings of the United States Department of Agriculture (2017) higher educational attainment in rural areas does not lead to as many economic benefits as educational attainment in urban areas. The economic opportunities found, or not found, in a location have been found to impact its teacher labor market (Clotfelter et al., 2008b; Papay et al., 2017)

In an analysis of New York teachers' preference for where to work, Boyd et al. (2005) found teachers do not look for jobs very far from their hometown. The authors concluded that, because teachers only look for jobs within a short proximity from their graduating school, teacher labor markets tend to be "geographically very small" (Boyd et al., 2005). Specifically, the authors found 61 percent of new teachers from their sample obtained their first teaching job within 15 miles of their hometown. The authors noted that, because most prospective teachers grew up in suburban neighborhoods, urban areas tend to have to *import* teachers who grew up in different areas. This process placed urban and rural schools in New York at a disadvantage for hiring and retaining quality teachers. In order to compensate for this, urban school districts had to offer higher compensation in order to draw teachers to a less desirable geographic region (Boyd et al., 2005).

Whereas Boyd et al., (2005) argued rural schools in New York were at a teacher supply disadvantage compared to other locale types, Goff and Bruecker (2017) found rural school in Wisconsin did not have a teacher shortage. However, Goff and Bruecker (2017) found Wisconsin teachers preferred to teach in non-rural settings. Also, like Boyd

et al., (2005) the authors found teachers obtained jobs close to where they graduated from high school or college (Goff & Bruecker, 2017).

Miller (2012) also examined teacher sorting decisions and labor markets in the state of New York. In his study, Miller attempted to determine how labor markets affected where teachers chose to teach in New York. Miller argued that, in addition to other industries, schools compete for labor with other schools. Miller found rural schools tended to have fewer industries competing for labor than urban schools. Urban schools in New York also attracted more teachers, as evidenced by the high rate of teachers who transferred out of working in rural schools to work in urban schools (Miller, 2012). Because of the differences in rural and urban labor markets, one should consider school locale type as a factor when studying teacher sorting.

Despite the differences Miller (2012) found between rural and urban schools, he maintained rural communities had attributes which should have attracted workers. For instance, student poverty rates were lower in New York's rural schools and, in some rural areas, teachers were paid higher amounts after cost of living adjustments were made (Miller, 2012). Despite this, however, teachers throughout the state did not prefer teaching in rural areas. Miller described rural schools as having "an experienced teacher trade deficit" (p. 23). Even though rural schools paid higher wages when adjusted for cost of living and student poverty rates were lower, urban labor markets attracted more teachers with more experience (Miller, 2012). Monk (2007) documented rural schools as tending to have teachers with less experience than other geographic areas. Thus, one drawback of rural schools has been the inability to retain teachers with high levels of experience.

Similar to the work of Boyd et al. (2005) and Miller (2012), Papay et al. (2017), in an analysis of sixteen urban school districts in seven states, argued urban schools faced specific problems of teacher retention. Of particular note is their finding that teacher labor markets and patterns of retention varied widely on a national, state, and local level (Papay et al., 2017). The authors made a clear point that urban schools have more difficulty attracting and retaining teachers than other school local types. Because teacher turnover has been tied to lower student achievement, teacher retention is a significant problem for urban schools (Imazeki, 2005). Papay et al. (2017) argued teacher retention was as significant of a problem as teacher recruitment.

Teachers may choose to work in a particular geographic locale for a multitude of reasons (Boyd et al., 2005; Tuck et al., 2009; Winters, 2009). In their analysis of Alaskan schools, Tuck et al. (2009) found a lack of local amenities may repel teachers from working in remote areas of the state. While Alaska was a unique state due to the extreme isolation of some schools, the case illustrates the role geography can have on schools. Other researchers confirmed this through studies of continental states in which they observed that teachers were less likely to work in rural areas or likely to transfer out of rural schools (Boyd et al., 2005; Miller, 2012; Papay et al., 2017).

Boyd et al. (2005) argued teachers' desire to work close to their hometown placed urban schools at a hiring disadvantage; in their analysis of teacher preferences and job search patterns, they stated teacher labor markets should not be seen as "covering large regions" (p. 128). Instead, teacher labor markets may be fairly small. Papay et al. (2017) corroborated these claims when they found teachers did not leave urban schools in high volume in favor of suburban schools. Instead, teachers in urban areas were far more

likely to transfer to a different school within the district in which they were already employed (Papay et al., 2017). Thus, simply studying districts as a whole may obscure nuances of teacher sorting across individual schools. Teachers are more likely to transfer after gaining experience; thus, analyzing teacher sorting at the school level would serve as a better control for the current study (Clotfelter et al., 2008a; Papay et al., 2017).

Teacher quality, on average, disadvantages urban schools (Goff & Bruecker, 2017; Papay et al., 2017). Boyd et al. (2005) found teachers preferred to work in suburban schools, which is a particular disadvantage for urban students. Lankford et al. (2002) conducted a descriptive analysis of New York state schools and found urban schools had fewer quality teachers. Like the work of Miller (2012) on rural schools, Lankford et al. (2002) argued that teacher compensation differentials were not large enough to draw teachers to urban schools. If Georgia schools are similar to other states mentioned above, teachers would show a preference for suburban schools as opposed to urban and rural schools. However, an analysis of teacher quality gaps by geographic locales has not been conducted in Georgia schools.

In the United States, schools are classified using an *urban-centric* measure. In other words, school locale types are defined and measured with regard to distance away from urban centers (National Center for Education Statistics, 2018). The National Center for Education Statistics (2018) created four main locale types (city, suburban, town, rural) and three sizes within each of these main categories, for a total of twelve total school locale types. Goff and Bruecker (2017) argued when defining school locales based on proximity to population concentrations, individual school differences may become obscured. For instance economic diversity and opportunity may differ greatly within

communities of the same locale type (Goff and Bruecker, 2017). Nevertheless, the most common labels used for geographic locale type in schools were created by urban-centric means by the federal government. The following are the twelve school locale types defined by The National Center for Education Statistics, 2018):

- City—Large
- City—Midsize
- City—Small
- Suburban—Large
- Suburban—Midsize
- Suburban—Small
- Town—Fringe
- Town—Distant
- Town—Remote
- Rural—Fringe
- Rural—Distant
- Rural—Remote

One aspect of teacher sorting that is understudied is the degree to which teacher quality gaps exist across geographic areas. Rural schools may be at a particular disadvantage in attracting and retaining effective teachers. For one, Engel and Cannata (2015) found teacher labor markets in rural areas are extremely small. These researchers found the small-scale nature of rural teacher labor markets leads to greater inequalities in student achievement because of the lack of access to teachers. Knight (2017) found that, nationally, teacher quality gaps based on teacher experience existed at the school level

when comparing schools by the percentage of minority and economically disadvantaged students. Because rural students are more likely to be low income, understanding how teacher quality gaps exist based on geographic locale may inform policymakers interested in decreasing teacher quality gaps (Lavalley, 2018).

The role of salary on teacher sorting.

Teacher sorting has resulted in an unequitable distribution of quality teachers (Adamson & Darling-Hamond, 2012). Many researchers have argued the unequitable distribution of quality teachers is in large part due to teacher salaries (Adamson & Darling-Hammond, 2012; Clotfelter et al., 2008a; Clotfelter, et al., 2005; Clotfelter et al., 2011; Darling-Hammond, 2003, 2006; Feng, 2009; Lin, 2010; Lin & Couch, 2014; Tuck et al., 2009) and that higher concentrations of effective teachers have led to student achievement gaps (Darling-Hammond, 2006). Investigations of teacher quality gaps are significant because of the importance of policy makers understanding the causes of and remedies for student achievement gaps. Before specific policies can be made in the state of Georgia, a full description of teacher sorting is needed.

Researchers have demonstrated positive correlations exist between teacher salaries and school characteristics which increase student achievement (Cebula, Mixon, & Montez, 2013; Gilpin & Kagonovich, 2012; Hanushek, Kain, & Rivkin 1999; Hendricks, 2014; Imazeki, 2005; Jackson, 2012; James et al., 2011; Leigh, 2012; Lin, 2010; Martin, 2010a, 2010b; Rice, Betty, Cara, & Hoyer, 2015). However, these studies do not provide clear guidelines for school policy. While researchers have indicated schools with higher salaries attract and retain teachers at high rates, it is less clear if this directly impacts student achievement and whether salary differences impact all types of

schools equally (Clotfelter et al., 2011; Feng, 2009). One reason for the lack of clear policy implications is a dearth of specificity in the literature. For instance, most researchers on teacher salaries and student achievement have analyzed district-level data (Hendricks, 2014). While this is important, it does not answer questions about the impact of teacher salaries on elementary schools. Different school levels may be affected differently by salaries.

Clotfelter et al. (2011) and Feng (2009) suggested increasing salaries is one solution to the unequitable distribution of teachers. Clotfelter et al. (2011) posited that, by increasing teacher salaries, schools with high percentages of disadvantaged students could attract and retain those that are highly qualified. While they stated teachers respond to financial incentives like laborers in any other field, they suggested salary is not the only factor motivating teachers to work in a specific location. In other words, salary has been demonstrated to attract and retain teachers but the magnitude and effects of salary differences are not fully understood (Clotfelter et al., 2011).

The study conducted by Clotfelter et al. (2011) was significant to the field of teacher labor markets. The researchers analyzed data from North Carolina, the pay structure of which is similar to the one in Georgia. The majority of teacher salaries are determined at the state level, but individual school districts offer salary supplements. The authors predicted the wage differences between school districts would be sufficient to determine the effects of wage differences. One finding of note was that a 10 percent increase in salary within a school was associated with a 14 percent higher probability of teachers remaining within the school. The authors concluded salary differentials in North Carolina were “relatively powerful motivator” for keeping teachers with less experience

in their initial placements but less effective at keeping highly qualified teachers in those locations (Clotfelter et al., 2011, p. 425). One limitation to this study was the authors did not directly measure the impact of teacher salaries on student achievement. Instead, Clotfelter et al. (2011) used teacher qualifications as a proxy for student achievement.

Feng (2009) analyzed survival rates for inter-district teacher transfers among Florida teachers, including specific data about teachers and the locations in which they taught. She found both school characteristics and salary differences affected teachers' likelihood of staying within a specific district (inter-district mobility) and within a specific school (intra-district mobility). Feng also found strong associations between the likelihood of leaving the teaching profession and the non-teaching job market. Teachers who work in geographic locations with higher non-teaching job opportunities were more likely to exit the teaching profession. This study is unique in the literature on the effects of salary on schools because it addressed the ways in which geography may affect the teacher labor market. However, what is still less clear is whether or not these differences in geography influence the teacher labor market in ways that affect student achievement.

Public school systems across the United States have different means of determining teacher salaries. In some states, teacher salaries are determined almost entirely at the local board of education level (The Governor's Office of Student Achievement, 2018). Within the state of Georgia, however, the majority of teacher salary is determined at the state level. However, local districts offer *salary supplements* as a means to attract teachers to work within their district (Winters, 2009). Winters (2009) found the variation in teacher salaries, by district, was significant. Winters (2009), in an analysis of the variation of teacher salaries in Georgia, found the main determinants of a

school system's local supplement to be the average supplement in neighboring school districts, the property tax base of the county, the percentage of teachers with advanced degrees, and average years of experience among teachers. Of these factors, only average supplement in neighboring districts was significant, at the .01 level.

Tuck et al. (2009) offered key insights into the gaps in knowledge about the effects of teacher salaries on student achievement. The researchers were attempting to study the impact of wage differentials on student outcomes by geographic region in Alaskan schools. The authors used teacher quality as a proxy for predicted student outcomes because data on student achievement is difficult to link to salaries. Specifically, the authors assumed teacher experience to serve as an indicator of teacher quality which would have a positive impact on student educational outcomes. The authors acknowledged the difficulty of understanding the direct impact of teacher salaries on student achievement. Tuck et al. (2009) noted that studies on teacher salaries had not adequately taken "into account differences among districts" (p. 59). One of the ways in which researchers have not done so has to do with geographic characteristics. Because the labor markets of rural areas are different from the markets of urban areas, salary differences may impact teacher sorting differently (Loeb & Page, 2000; Tuck et al., 2009).

Winters (2009) argued schools compete for teachers by increasing local supplements. When a school system is unable to offer competitive salary supplements, the result is an unequitable distribution of teachers. Winters (2009) further stated that local economic opportunity (defined by the residential, commercial, and industrial tax base) determined if schools paid higher supplements.

Cebula, Mixon, and Montez (2013) analyzed data from Los Angeles public high schools and found teacher pay and teacher quality are correlates of student achievement. The authors acknowledged the literature on teacher pay and student achievement does not suggest increasing teacher pay always, or across a state, results in increased performance. Instead, they argue high pay within some schools attracts more qualified teachers than other, lower paying, schools. Lin (2010) conducted a regression analysis of data on 500 school districts in Pennsylvania between 1999 and 2002 and found teacher salaries positively correlated with student achievement. His analysis controlled for other independent variables, like median household income and average years of teaching experience of the school districts. In their study, Cebula et al. (2013) found similar results: teacher salaries are correlates of higher student performance. However, neither analysis offers evidence on the effects of geography on teacher salary.

The work by James et al. (2011) examined school district expenditures in Georgia. Among the researchers' findings was a school district's expenditures on teacher salaries and benefits were correlates of student achievement. One limitation of James et al.'s (2011) research is the authors analyzed district-level data, which may obscure differences unique to elementary, middle, or high schools. One difference being that middle and high school teachers often receive supplemental pay for coaching sports, sponsoring extra-curricular activities, or teaching on an extended contract.

The works of Cebula et al. (2013), James et al. (2011), and Lin (2010) are similar to the findings of Martin (2010a). They found higher salaries in a school attract more qualified teachers. Martin (2010a) only analyzed teacher sorting decisions and did not directly demonstrate higher teacher salaries led to higher student achievement. Both

Cebula et al. (2013) and Martin (2010a) conducted multiple regressions to determine if teacher salaries affect schools. Their work did not analyze schools with similar characteristics (i.e., poverty rates) within the sample. Thus, one cannot conclude all schools or teachers respond to salaries in the same way.

Effects of Salary on Teacher Attraction and Retention

Researchers have demonstrated higher salaries in a school correlate with higher teacher aptitude (Gilpin & Kaganovich, 2012; Leigh, 2012). Gilpin and Kaganovich (2012) analyzed nationwide, district-level salary schedules and found higher salaries correlated with higher teacher SAT scores. The analysis revealed the effects of teacher salary on teacher aptitude were not consistent among all schools. School districts with high poverty and crime rates did not attract high-SAT teachers at the same rate as those that paid the same but had lower poverty and crime rates. In other words, salaries attract higher aptitude teachers, but salary is not the only, or even most significant, consideration for teachers working in a school (Horng, 2009). Gilpin and Kaganovich (2012) indicated a need to better understand the effects of teacher salaries on schools serving low-income students.

Schools with high rates of low-income students struggle to retain effective teachers. Higher teacher salaries may help not only to attract, but also retain, effective teachers (Clotfelter, et al., 2008a; Martin, 2010a). Clotfelter et al. (2008a) investigated the effects of a salary bonus to teachers in North Carolina who worked in high schools with high student poverty rates. They found a bonus of $1,800 resulted in a 12% increased retention rate, especially among experienced teachers. These findings are particularly important because experienced teachers have been found to be more effective

than novice teachers (Goldhaber et al., 2015). Clotfelter et al. (2008a) concluded a wage differential of $1800 would be sufficient to increase student outcomes among poor schools.

Martin (2010a), in an analysis of American school districts, found correlations between teacher salaries and school district racial and ethnic characteristics. She described, on average, districts with higher concentrations of minority students paid higher wages than districts with lower salaries. She speculated these districts would have to offer higher wages as a compensating differential. However, Martin (2010a) also found that, as an individual school's concentration of African American students increases, ceteris paribus, teacher salaries decrease. In other words, *districts* had high mean wages concentrated its lower-paid teachers within *schools* with more African American children. Martin's (2010a) analysis has dramatic policy implications, revealing pay discrepancies between teachers in schools with high percentages of African American students. What is not known, however, is if the decreased salary caused decreased student achievement.

Similar to the research of Clotfelter et al. (2008a), other researchers have indicated salary differentials may be one way to retain effective teachers in low-income schools (Hendricks, 2014; Imazeki, 2005; Martin, 2010a). Labor markets and job options also affect teacher attrition (Imazeki, 2005; Jackson, 2012; Martin, 2010a). The research on teacher attrition is important to the larger body of research because, as Imazeki (2005) concluded, targeted spending on specific districts, schools, or teachers would be more effective at reducing teacher turnover for schools with high attrition than across-state

salary increases. Higher salaries enable principals to be more selective in hiring teachers (Ingle & Rutledge, 2010).

Labor markets and job options affect teacher attrition (Imazeki, 2005; Jackson, 2012; Martin, 2010a). Imazeki (2005), in an analysis of Wisconsin school districts between the academic years 1992-1993 and 1997-1998, found uniform, state-wide, salary increases lead to fewer teachers exiting the profession, but had no statistically significant effect on where district teachers choose to work. Imazeki (2005) concluded targeted spending in specific districts, schools, or teachers would be more effective at reducing teacher turnover for schools with high attrition than across-state salary increases.

Jackson (2012) analyzed how changing demand affected public schools. Jackson researched the effects of charter school openings on nearby public schools in North Carolina from 1997-2005. He found the competition for teacher labor caused hard to staff schools to increase wages to retain effective teachers. Jackson (2012) concluded policymakers should shift funding from other areas to teacher salaries to increase teacher retention. Similarly, Martin (2010a) demonstrated schools with high poverty and minority populations do not pay enough to attract and retain effective teachers. Because of lower teacher wages, schools with traditionally disadvantaged students are more likely to have high teacher turnover—thereby decreasing teacher experience—which has been demonstrated to decrease student achievement (Ronfeldt, Loeb, & Wyckoff, 2013).

Imazeki (2005) and Jackson (2012) argued wages offered in particular schools or districts affect teacher employment decisions. Both analyzed the effects of teacher salaries on staffing decisions and found increasing teacher compensation leads to a

reduction in teacher turnover rates. Martin (2010a) found because teachers view schools with high poverty and minority populations negatively, these schools must pay higher wages than other schools to retain effective teachers. However, it has not been empirically demonstrated if lower salaries, and the teacher supply results from those salaries, directly lower student achievement.

Much of the research has focused on the effects of teacher salaries at the school-district level (Gilpin & Kaganovich, 2012; Hendricks, 2014; Imazeki, 2005; James et al., 2011; Martin, 2010a, 2010b). While each of the school levels (elementary, middle, high) make up the overall district, research does not exist which exclusively focuses on elementary or middle schools. All inferential research used regression analysis to analyze the effects of teacher salaries on student achievement (Cebula, 2013; Clotfelter et al., 2008a; Gilpin & Kaganovich, 2012; Hendricks, 2014; Imazeki, 2005; James et al., 2011; Lin, 2010; Martin, 2010a, 2010b).

Teacher Quality Gaps

Researchers have demonstrated students from traditionally disadvantaged backgrounds tend to be taught by less qualified teachers than traditionally advantaged students (Clotfelter, 2005; Goldhaber et al., 2015; Goldhaber et al., 2017; Isenberg et al., 2013; Kraft & Gilmour, 2017; Steele et al., 2015). Within the literature, debate continues regarding the definitions of teacher quality. Among characteristics commonly associated with identifiable traits of quality teachers, disadvantaged students are more likely to be taught by lower quality teachers (Adamson & Darling-Hammond, 2012).

Researchers have indicated novice teachers have less impact on student learning than more experienced teachers (Clotfelter et al., 2005; Nye, Konstantopoulous, &

Hedges, 2004). Nye et al. (2004) analyzed teacher characteristics of randomly assigned elementary students to teachers in 79 elementary schools in Tennessee, finding that teacher experience had the greatest predictive power of student achievement among the teacher characteristics they analyzed. Clotfelter et al. (2005) analyzed district and school data from North Carolina and found 30 percent of the distribution of novice teachers in a school can be explained by the percentage of minority students in the school. Novice teachers were more likely to work in schools with more minority students. They found within schools, minority students were more likely to be taught by novice teachers. The findings from Clotfelter et al. (2005) may mean teacher quality gaps explain persistent student achievement gaps.

Clotfelter et al. (2005) used teacher experience as a predictor of teacher quality while other studies attempted to define teacher quality more precisely. Using a value-added measure, Steele et al. (2015) analyzed the distribution of teachers within an urban school district in the Southern US. The researchers found the differences in teacher value added between schools in the top quartile of schools by minority enrollment and teachers in the bottom quartile of percentage minority enrollment was .11 standard deviations higher within low-minority schools. The findings posited minority students in this school district were more likely to be taught by less effective teachers. However, the authors did not find evidence that high value-added teachers left high-minority schools once hired. Instead, the unequal distribution of novice and low value-added teachers in high-minority schools was a result of recruitment differences (Steele et al., 2015). Recruitment, not retention, was found to be the reason for unequal distribution of more effective teachers.

The interpretations of research on the teacher quality gap is mixed. Steele et al.'s (2015) findings on why higher-quality teachers were located in lower minority schools contradicts other research findings. Sass, Hannaway, Xu, Figlio, and Feng (2012) and Steele, Baird, Engberg, and Hunter (2014) found teacher sorting occurred in ways that provided schools with lower income students greater access to highly effective teachers. Because the two studies analyzed different data, the distribution of effective teachers to higher or lower-income schools may not be uniform across the United States. Some states or districts may demonstrate different types of teacher sorting which results in different student outcomes.

Not all researchers agree initial hiring explains the teacher quality gaps faced by many students. Goldhaber et al. (2015) analyzed data from school districts in Washington and found across all school levels, an uneven distribution of teacher quality, as measured by experience, licensure exam scores, and value added, existed for schools based on student makeup as defined by free/reduced lunch, minority, and low academic percentages. Goldhaber et al. (2015) found an unequal distribution of high-quality teachers in favor of traditionally advantaged students. Unlike Steel et al. (2015), Goldhaber et al. (2015) concluded within-district and within-school transfers accounted for additional layers of unequal teacher distribution, finding that teachers with higher qualifications were more likely to "leave disadvantaged schools for another school in the district" (p. 305).

Isenberg et al. (2013), in a study funded by the U.S. Department of Education, found clear evidence disadvantaged students were less likely to be taught by highly effective teachers. Their study included 29 school districts across the United States.

Similar to Goldhaber et al. (2015), Adamson and Darling-Hammond (2012), and Steele et al. (2015), Isenberg et al. (2013) found students from disadvantaged backgrounds had a higher likelihood of being taught by teachers with lower qualifications. Isenberg et al. (2013) only analyzed the likelihood of students being taught by teachers with certain characteristics. They do not, however, prove these discrepancies cause lower student achievement.

Disagreements about the extent of the impact of the teacher quality gap remain contested. Following their analysis of 26 districts throughout the US, researchers working for the U.S. Department of Education argued the differences in teacher quality they found were slight and did not necessarily affect student achievement (Isenberg et al., 2013). Goldhaber et al. (2017), however, in an analysis of historical data from Washington and North Carolina, found teacher quality gaps have a long history and significantly contribute to persistent inequalities. Obviously, there is no clear consensus among major researchers in the field of teacher quality gaps. Without clear evidence that teacher quality gaps result in exacerbating student achievement gaps, an agreed-upon conclusion may be impossible.

One means of identifying teacher quality gaps is through teacher experience. Many researchers have documented the association between teacher experience and teacher effectiveness. In one of the most significant studies on teacher quality gaps, Goldhaber et al. (2015) used teacher experience as one means of determining if teacher quality gaps exist. Researchers at Cornell University included teacher experience in a list of risk factors associated with underperforming schools (Whipple, Evans, Barry, & Maxwell, 2010). The researchers found low teacher experience contributed to poor

educational outcomes in underperforming schools in New York City elementary schools (Whipple et al., 2010). Nye et al. (2004) found more experienced teachers have a greater impact on elementary student achievement, especially for economically disadvantaged children. Other researchers have found teacher experience associated with greater student outcomes at the high school level (Subedi, Reese, & Powell, 2015; Subedi, Swan, & Hynes, 2011).

The Role of Teachers in Student Achievement

Teacher quality influences student achievement more than any other school-level factor (Blazar, 2015; Chetty et al., 2010; Gordon, Kane, & Staiger, 2006; Green, 2014; Hanushek, 2010; Mangiante (2011); Tyler, Taylor, Kane, & Wooten, 2010). Higher quality teachers can dramatically improve educational outcomes for children (Gordon et al., 2006). Chetty et al. (2010) argued children taught by an above average Kindergarten teacher will, on average, earn around $320,000 more money than children taught by a below-average teachers. Access to quality teachers also contributes to racial and economic disparities (Gordon et al., 2006). Thomas J. Kane, professor of education and economics at Harvard University, suggested the achievement gap between black and white children could be closed in eight years if black children had access to the best teachers (Teaching the Teachers, 2016). Research determining how teachers choose to enter, stay, and locate within the profession is extremely important because of the important role teachers play in the opportunities and success of students.

The Role of Poverty in Student Achievement

The multitude of negative effects poverty has on student achievement have been widely documented (Chetty et al., 2016; Den Bosch & Duch, 2017; Duncan, Magnuson,

& Murnane, 2016; Ferguson, Bovaird, & Mueller, 2007; Jensen, 2013; Sharkins, Leger, & Ernest, 2017). Children from impoverished backgrounds are less likely to receive cognitive stimulation at young ages (Den Bosch & Duch, 2017). Children from impoverished backgrounds are more likely to attend lower performing schools than their more affluent peers (Chetty et al., 2016; Duncan et al., 2016; Fryer & Levitt, 2004). Jensen (2013) found children from low-income households are less likely to engage with multiple aspects of schooling. The research is clear: students identified as poor are at a distinct disadvantage compared to their affluent peers.

In a literature review on the effects of poverty on student achievement, Olszewski-Kubilius and Corwith (2018) reported students from impoverished households begin school with achievement gaps in reading, math, and science compared to their peers from higher income households. More striking, the achievement gaps not only continued, but grew, through elementary school (Olszewiski-Kubilius & Corwith, 2018). Studies have found many students labeled as *high achievers* in kindergarten do not maintain this status by fifth grade (Olszewiski-Kubilis & Corwith, 2018). Researchers have documented students from impoverished backgrounds have less money spent on educational resources by their parents, home environments are less stimulating, health outcomes are lower, and students live under higher stress (Olszewiski-Kubilius & Corwith, 2018). Each of these factors was demonstrated to lead to lower student achievement among students living in poverty (Olszewiski-Kubilius & Corwith, 2018).

Poverty in schools is often tied to the percentage of students receiving free or reduced lunch prices (Olszewski-Kubilius & Corwith, 2018). The USDA, which makes an annual determination as to which students receive subsidized lunch rates, has one

formula for determining need. States such as Georgia use the federal guidelines in order to define *economically disadvantaged* (Georgia Department of Education, 2017). One problem with the USDA model of economic disadvantage is it has not factored in cost of living. According to Nolan et al. (2017), this means students in urban areas, where cost of living is higher than in rural or suburban areas, may suffer from heightened poverty. In other words, urban households in poverty may be able to buy fewer goods and services than rural households of the same income level. Due to this, poverty rates may affect urban and rural areas differently (Nolan et al., 2017).

Directors of Human Resources Departments

Very little is known about the difficulties faced by directors of human resources in attracting and retaining effective teachers to their district (Mania-Singer, 2017). People in these positions play an important role in teacher recruitment, but little is known about why and how they make decisions to attract teachers (Tran, 2015). Interviews with these professionals may reveal further details about how and why teachers sort into some schools over others because they are heavily involved in salary and benefits decisions at the district level. Thus, directors of human resources may prove to be a valuable source of information about how schools can attract and retain effective teachers, one, however, that has rarely been used by researchers. Their insights may reveal key information about teacher quality gaps in Georgia schools.

Conclusion

This literature review highlights several agreements and disagreements in the literature on teacher quality gaps and sorting. However, most of the disagreements about teacher sorting are only by degree. Several ideas are firmly grounded in the literature

review. First, teachers choose to work in schools for a variety of factors. Second, teacher quality gaps give advantages to some students and disadvantages to others. Third, researchers have found geography affects educational opportunities but the literature on teacher quality gaps by geographic locale is limited.

Research does not exist on teacher sorting patterns in Georgia elementary schools. Additionally, within the literature on teacher sorting, relatively little is known about how geographic locale affects teacher sorting. While some studies have analyzed student achievement across geographic locale types in Georgia, none have analyzed teacher sorting patterns (Angioloni & Ames, 2015). Previous studies have analyzed teacher sorting have not analyzed the ways in which teachers sort by geographic locale type.

Chapter III

METHODOLOGY

Reducing the unequal distribution of quality teachers is important for equity in American schools (Goldhaber et al., 2017). This explanatory sequential mixed methods study examined teacher characteristics in Georgia elementary schools according to school characteristics and explained reasons for teacher sorting in that state. Mixed methods research allows for a problem to be examined using the strengths of both qualitative and quantitative methodologies (Creswell, 2014). Specifically, explanatory sequential mixed methods begin with a quantitative observation which leads to seeking answers through qualitative research (Creswell, 2014).

The quantitative phase consisted of an analysis of teacher and school characteristics in all of Georgia's elementary schools containing grades pre-Kindergarten through fifth grade or Kindergarten through fifth grade. The independent variables in the study were school geographic locale type, percentage of economically disadvantaged students, and school CCRPI score. The dependent variables for the study were average teacher experience, teacher education, and teacher salary. The aforementioned variables determined how teacher characteristics differed across different types of schools in the state of Georgia. Additionally, relationships between teacher and student characteristics were analyzed. This study revealed correlations among the selected teacher and school characteristics. Analyses of data determined statistical significance among geographic

locale types through multivariate analysis of covariance (MANCOVA) and multivariate analysis of variance (MANOVA). Hierarchical regressions determined teacher sorting occurred within locales based on school characteristics.

The qualitative phase consisted of conducting and interviewing human resources directors. Interview participants were identified through the quantitative analysis. In the quantitative phase, teacher sorting based on student economic disadvantage appeared to occur more frequently in suburban and rural districts. Thus, human resources directors from districts with high numbers of suburban and rural schools were purposefully sampled in order to understand particular challenges faced by these district leaders. The qualitative phase was based on grounded theory research methodology. Semi-structured interview questions were used in order to investigate challenges faced by human resources directors regarding teacher recruitment and attainment. The interviews were analyzed and compared to determine common themes that emerged from the data. Understanding the perspectives of these individuals contributed to the body of knowledge on how schools can create policies to aid in the equitable distribution of quality teachers.

Purpose of the Study

One gap in the literature on teacher sorting is a consensus on whether or not teacher sorting patterns grant advantages to some types of schools over others. For example, schools with high percentages of economically disadvantaged students may also have teachers with low average experience. This study added to the discussion on teacher sorting through a description of teacher characteristics and teacher sorting in Georgia elementary schools. One of the main ways in which researchers have identified teacher quality gaps is through measures of teacher experience (Goldhaber et al., 2015). Because

salaries and student characteristics have been demonstrated to affect teacher sorting decisions, this study was designed to describe differences among teachers by school locale type. In the state of Georgia, teachers with graduate degrees are paid more than teachers with only Bachelor's degrees. Thus, to make any meaning from data about salary differences, an explanation of differences in educational attainment was determined as well.

This study was also designed to improve understanding about how personnel decisions at the district level affect teacher sorting decisions. In order to better understand causes and motivations for differences in teacher sorting, the researcher interviewed directors of human resources. These individuals have significant influence over hiring decisions but have rarely been studied (Tran, 2015). Through an explanatory sequential, mixed methods research design, this study contributes to the literature on teacher sorting by describing major characteristics of teacher sorting in Georgia, followed by an analysis of interview data with human resources directors.

Research Questions

The following questions guided this study:

Quantitative questions.

1) To what degree do teacher quality gaps in teacher characteristics (e.g., experience, education, and salary) exist based on school characteristics (e.g., geographic locale type, percentage of economically disadvantaged students, and CCRPI score) in Georgia elementary schools?

2) Do relationships exist between teacher characteristics and school characteristics in Georgia elementary schools?

Qualitative question.

3) What challenges have directors of human resources faced in recruiting and retaining teachers?

Methodology

An explanatory sequential mixed methods design was used to answer the research questions for this study. According to Creswell (2014), explanatory sequential designs are used by researchers in order to first provide evidence of a phenomenon through quantitative research and then to allow qualitative data collection and analysis to explain quantitative findings. The first two research questions are quantitative in nature. Each of the research questions was answered through an analysis of descriptive statistics using government data. The last research question is a qualitative question. Qualitative questions allow researchers to ask "nondirectional" questions when the researcher is exploring a topic, phenomenon, or concept cannot be answered through quantitative means (Creswell, 2014, p. 141). Qualitative questions are also open-ended in order to create a design "explores the complex and diverse nature" of a topic (Patton, 2015, p. 253). Thus, a qualitative research question is appropriate for investigating challenges faced by school policy-makers. The qualitative research question for this study was answered through an analysis of interview transcripts with human resources directors. The themes that emerged from these interviews increase understanding about the quantitative data.

Descriptive statistics, as the name implies, allow researchers to "describe and summarize observations" (Ary, Jacobs, Sorensen, & Walker, 2014). Because of the lack of research analyzing teacher characteristics by geographic location, percentage of

economically disadvantaged students, and school achievement scores within elementary schools in Georgia, using descriptive analysis makes a meaningful contribution to the literature on teacher sorting. An overall description on the state of teacher sorting in Georgia was established in this study.

Qualitative data for this study was collected from interviews with human resources directors in Georgia. Directors were employed in districts with large numbers of suburban or rural schools. Because the participants were selected for their characteristics, it is considered *purposeful sampling*. Purposeful sampling is useful for qualitative research because it offers "useful manifestations" of what the researcher is seeking to understand (Patton, 2015, p. 46). The participants for the present study were selected because schools in their districts were more likely to be affected by teacher sorting based on student economic disadvantage, as identified in the quantitative phase. By selecting directors of human resources, the researcher sought to provide insights on teacher characteristics and sorting in Georgia that have not been previously researched or reported.

Population

The population for the quantitative phase of this study was elementary schools in the state of Georgia. For the purposes of this study, only elementary schools that included grades pre-kindergarten (PK) through 5 or kindergarten (K) through 5 were examined. The GDOE classifies a school as *elementary* if it includes at least one grade PK–5. For example, a school housing grades 5–8 is classified as an *elementary* school. Pursuant to the goals of this study, it would not make sense to include such schools because their range of grades may cause teacher characteristics to be different.

The target population for the qualitative phase were directors of human resources at school districts in Georgia. Interview participants were identified in the quantitative phase. Identification of teacher quality gaps served as the basis for participant selection. Human resources directors are heavily involved in personnel decisions made in public schools (Tran, 2015). As such, this population offered particularly useful insights in this investigation of teacher sorting and teacher characteristics.

Selection of Participants

Elementary teacher sorting worked best for this study. To begin, elementary schools are more numerous than high and middle schools, geographic diversity was better represented. Second, elementary teachers are less likely to earn supplemental pay for coaching and/or extra-curricular activities compared to middle and high school teachers. It is quite possible a county with low teacher salaries may have a distorted average high school teacher salary due to higher-than-average coaching supplements. By only looking at average pay within elementary schools, this study better isolated teaching salaries by locale type. By measuring teacher and student characteristics at a school, this study analyzed teacher characteristics across school locale types rather than county locale types. Around 10% of all schools categorized by the GDOE as elementary were not included in this analysis because of the definition of *elementary school* used in this study. The accessibility of the data (described below) allowed this study to include 99.7% of the target population. For the 2017-2018 school year, 1060 schools were included in this study. Three schools were not assigned a school locale type and were not included in analyses by geographic locals.

Human resources directors were purposefully selected based on identified teacher quality gaps from the quantitative section. By selecting participants on the basis of teacher sorting, the researcher hoped to explain factors affecting teacher sorting not addressed in the quantitative phase. Because little research has been conducted on human resources departments within schools, let alone their involvement in attracting quality teachers to schools, the selection of directors based on teacher sorting served as a starting point for research. The specific district names and names of the directors were not included in this document for the sake of privacy.

Instrumentation

The instrumentation used for the quantitative phase consisted of documents from various government offices based on required reporting from each school system. All of the information necessary to complete the quantitative portion of this exam was publicly available on the Georgia Department of Education's or the National Center for Education Statistics' websites. The data used for the quantitative phase were found in Excel files. However, all of the information used in this study was not originally located within a single excel file. The data for average teacher experience, average teacher salary, and teacher education were found in an Excel file on The Governor's Office of Student Achievement website under the section, *Certified Personnel* (The Governor's Office of Student Achievement, 2019). The data regarding percentage of students who are economically disadvantaged can be found on the same website under *Enrollment by Subgroup Programs*. School-level CCRPI scores can be found The Governor's Office of Student Achievement Office website in a file titled *CCRPI Scoring by Component* (Georgia Department of Education, 2019).

School locale type is defined and compiled by the federal government and can be found on the National Center for Education Statistics website using the *Search for Public Schools* feature (National Center for Education Statistics, 2019). After each of the raw Excel data files was collected, a master file was created that combined the relevant dependent and independent variables into one Excel file. This Excel file contained the three dependent and three independent variables for all 1060 of the elementary schools that fit the criteria for this study. Once the data had been combined, the file was imported into SPSS for analysis purposes.

During the qualitative phase, according to grounded theory, the researcher is the main instrument used for data collection and analysis (Patton, 2015). The researcher employed voice recording software, field notes, and memo writing to aid in data collection and analysis. Additionally, a semi-structured interview protocol was used for each interview (See Appendix A). The interview questions were field tested to maximize clarity and precision. Once the interviews were conducted, I analyzed the data using a thematic analysis guide created by Nowell, Norris, White, & Moules (2017) by compiling common methodologies from grounded theory research to elucidate a clear process for analyzing qualitative data.

Validity

Validity describes the degree to which an instrument measures what it is meant to measure (Creswell, 2014). The content validity of the current student is very high because the quantitative phase measures teacher characteristics across geographic locales, as reported by official government documents. However, conclusions about the predictive validity of this study should be drawn with caution. Many factors affect why teachers

choose to teach where they do. Thus, this study did not seek to generalize teacher characteristics across all states or explain why teacher characteristics vary across schools based on select characteristics.

While some qualitative researchers use phrases like *trustworthiness, authenticity,* and *quality* instead of *validity,* throughout this paper, the term *validity* is used when discussing steps taken by the researcher to ensure data have been correctly measured, analyzed, and interpreted (Ary, et al., 2014). Because this is a mixed methods study, using the term *validity* decreased confusion when transitioning from the quantitative phase to the qualitative phase. To ensure interview questions are clear, a field test was conducted in order to improve research questions (Seidman, 2013). In addition to internal validity, steps were taken to ensure the conclusions drawn from the interviews have a high degree of validity.

Researchers use different methods to increase validity in qualitative research compared to the methods used in quantitative research (Patton, 2015). Maxwell (2013) identified 8 ways in which qualitative researchers can increase validity. Three of the methods described by Maxwell (2013) were used in this study: the accumulation of rich data, respondent validation, and multicase comparisons. Gathering rich data has been recognized as increasing validity because it provides the appropriate context, detail, and description to justify a researcher's conclusion (Maxwell, 2013). Merriam (2002) described respondent validation as providing interview participants with interview transcripts or the researcher's conclusions in order to allow the participants to correct incorrect researcher interpretations.

Maxwell (2013) described respondent validation, or *member checks*, as the single best way to prevent researchers from drawing inaccurate conclusions about the meaning of interview data. Seidman (2013) stated respondent validation can also prevent the researcher from publishing information which may be damaging to the participant. Multiple interviews also increased the validity of this research by ensuring the statements and perceptions of a single individual are experienced by others (Maxwell, 2013).

Reliability

Reliability is not an issue for the quantitative phase based on the parameters of the study because the current study does not rely on a sampling of the population but on a census. However, different years may produce different results. As school districts change policies, similar studies conducted in different years may yield different results.

The reliability of the qualitative phase was increased primarily through respondent validation. Participants were given the conclusion section of the current study. Characterizations with which participants disagree did not exist. Patton (2015) argued providing participants the opportunity to check a researcher's conclusions ensures the integrity of qualitative research. Another means of increasing reliability was be the use of memos. Memos, or field notes, were written during and after the interviews to keep a record of the researcher's thoughts about the interview (Glaser & Strauss, 1967). Field notes were referenced and cited during the data analysis phase.

Independent Variables

School characteristics served as the independent variables in the quantitative section. Three independent variables were used for the quantitative phase of the study. The independent variables for the first phase consisted of school locale type, percentage

of economically disadvantaged students, and school CCRPI score. The National Center for Educational Statistics (NCES) categorized schools into four *basic* school locale types (National Center for Education Statistics, n.d.). All American schools are designated as either city, suburban, town, and rural. Within each category, there are three subcategories for each school locale type; thus, in total, twelve categories exist into which elementary schools can be divided by school locale type. Below are the twelve categories listed in ascending order based on proximity to population centers: City—Large, City—Midsize, City—Small, Suburban—Large, Suburban—Midsize, Suburban—Small, Town—Fringe, Town—Distant, Town—Remote, Rural—Fringe, Rural—Distant, and Rural—Remote (National Center for Education Statistics, n.d.). For a complete definition of each type, see Appendix B.

The Georgia Department of Education defines the percentage of economically disadvantaged students as the percentage of students in a school who qualify for free or reduced-priced meals (Georgia Department of Education, n.d.). Georgia law requires that these data are sent every October to the Georgia Department of Education. Every year, schools in Georgia receive a College and Career Readiness Performance Index (CCRPI) score. This score was designed to be a comprehensive evaluation of schools (Georgia Department of Education, 2018). At the elementary level, scores are determined using four criteria weighted differently, as shown in parenthesis: content mastery (30%), progress (35%), closing gaps (15%), and readiness (20%) (Georgia Department of Education, 2018). Score calculations are overwhelming based on End of Grade (EOG) assessments administered in grades three, four, and five. Progress and closing gaps scores are given based on how student subgroups perform compared to previous years and other

students from the same subgroup from around the state (Georgia Department of Education, 2018). Student attendance and percentage of students taking fine arts or world languages affect a portion of a school's readiness score. CCRPI was an appropriate variable for comparing school characteristics and students achievement across Georgia because CCRPI is based heavily upon student academic achievement data.

School locale type was chosen for the independent variable in this study because it may affect teacher mobility (Boyd et al., 2005). Teachers working in suburban areas may have greater opportunity to work in a school with higher salaries if they drive into a nearby urban area than their peers in rural areas. Additionally, rural areas typically pay teachers less than urban areas (Goff & Bruecker, 2017). By controlling for school locale type, this study improves our understanding of the ways in which teachers are distributed across and throughout the state of Georgia.

The third independent variable in the quantitative phase is percentage of students who qualify for free/reduced lunch. Understanding differences in Georgia schools based on poverty rates may be useful for policymakers. Specific school locale types may need different types of policy interventions because poverty rates are associated with lower student achievement. The National Center for Educational Statistics (NCES) reports the number of students who qualify for free/reduced lunch rates.

Dependent Variables

Teacher characteristics served as the dependent variables in the quantitative section. Three dependent variables were used for the quantitative phase of this study. A number determine teacher salaries in Georgia. The Georgia Department of Education provides and determines the majority of a teacher's salary. At the state level, a civil-

service salary schedule exists based on certificate level (Bachelor's, Master's, Educational Specialist, and Doctorate), and the number of years credible work experience. However, diversity in teacher pay exists within the state of Georgia due to local school salary supplements. For example, a first-year teacher with a Bachelor's degree would earn $36,428 in Madison County, Georgia during the 2018-2019 school year (Madison County School District, 2018). In contrast, a teacher with the same credentials would earn $43,283 in Forsyth County, Georgia (Forsyth County Schools, 2018). What is not known, however, is if, and to what extent, salary differences exist among schools based on locale type. Salary information is collected by The Governor's Office of Student Achievement for all schools in Georgia and were used in this study.

Teaching experience was the second dependent variable in the quantitative phase of this study. Teaching experience is important for this study because of the correlation between teacher experience and teacher salaries. Teacher salary schedules in the state of Georgia result in teachers earning more money as their years of service increase. However, teacher experience has been demonstrated to positively impact student teaching (Clotfelter et al., 2005). Thus, simply looking at teaching salaries across elementary schools in Georgia would not have fully explained teacher sorting. By investigating average experience by school locale type, this study intended to determine if a teacher quality gap exists based on school locale types in Georgia elementary schools. The Governor's Office of Student Achievement reports the average years of experience among teachers for all schools in Georgia and was be used in this study.

Teacher education is the third dependent variable in the quantitative phase. The Georgia Department of Education (2019) collects data on the number of teachers at each

school who have a bachelor's, master's, specialist, or doctoral degree. Degrees that do not fit in one of these categories are labeled *other.* Georgia reports the data as the number of teachers in each school who have each of the above degrees. For the purpose of comparing average teacher education across Georgia elementary schools, dummy coding was used to determine the average degree in each school. Bachelor's degrees were coded as the number one, master's degrees, two, specialist degrees, three, and doctoral degrees were assigned four. Average teacher education was then calculated in a new Excel column.

Data Collection

Once the Institutional Review Board (IRB) granted permission (Appendix C), information was compiled from various government agencies. The list of all elementary schools teaching Kindergarten through fifth grade and pre-Kindergarten was derived from CCRPI reports from the 2017-2018 academic school year because this data set included a description of grades taught for each school. Average teacher experience, teacher education data, average teacher salary, and percentage of economically disadvantaged students were collected from a different location on the Georgia Department of Education's website (The Governor's Office of Student Achievement, 2018). The National Center for Educational Statistics determines school locale type classifications and publishes the data on its website (National Center for Education Statistics, 2018). Each of the above data sets are easily accessible or accessible through a data request through the Georgia Governor's Office of Student Achievement.

The above data were compiled by the researcher into a single file for analysis purposes. One of the contributions to the literature offered through this study was the

combination of disparate information into one place for analysis. After the data were collected, the researcher performed statistical analysis using Statistical Package for the Social Sciences (SPSS), version 25. The *Data Analysis* section further describes how the data were analyzed.

Using archival data for this study presented several advantages over conducting survey research in answering questions about teacher salaries. Researchers have demonstrated response bias in salary reporting (Kim & Tamborini, 2012; Marquis et al., 1986). Socially desirable responses to surveys have led to misunderstandings of phenomenon (Fang, Prybutok, & Wen, 2016; Kim & Tamborini, 2012; Steenkamp, de Jong, & Baumgartner, 2010). Because many people consider salaries sensitive and a personal matter, response bias on surveys occurs more frequently compared with other, more banal, topics (Kim & Tamborini, 2012; Marquis et al., 1986). Previous research has established that, among some teachers, salary is not a main consideration in where they work (Bacolod, 2007). However, due to social desirability bias, surveys may distort research on the reasons teachers work at particular schools. Thus, by using archival data for studying the impact of salaries, the researcher can formulate suppositions about the impact of salaries, but not teacher perceptions about salaries.

After IRB approval, data collection for the qualitative phase of this study was conducted through interviews. The researcher purposefully sampled five directors of human resources from school districts with high numbers of suburban and rural elementary schools; as identified in the quantitative phase. Purposeful sampling allows researchers to select participants who are "particularly relevant to your questions and goals" (Maxwell, 2013, p. 97). Human Resources directors provide particularly relevant

perspectives on teacher sorting because they influence policies to attract and retain teachers in their districts (Tran, 2015).

In August 2019, the researcher sent emails (Appendix D) to human resources directors in the sixteen school districts with the highest number of suburban and rural elementary schools in the state of Georgia. Follow-up phone calls were made when selected participants did not respond. Five human resources directors agreed to interviews with the researcher, representing a response rate of 31 percent. After human resources directors agreed to participate, the researcher provided participants with a copy of the research statement (Appendix E). After participants understood their rights, the researcher scheduled interviews. Before each interview, the research statement was read aloud to the participants in accordance with Valdosta State University IRB guidelines.

Individual, semi-structured interviews were conducted with each of the four directors of human resources. Semi-structured interviews allow researchers to create questions before an interview but gives researchers and participants flexibility based on the answers and reflections of the participant (DiCicco-Bloom & Crabtree, 2006). Single, semi-structured interviews which lasted between 30 minutes and 105 minutes provided useful and sufficient data for generating data for thematic analysis (DiCicco-Bloom & Crabtree, 2006; Schmidt, 2004). Data gathered in this manner provided information to answer the qualitative research question regarding challenges faced by human resources directors. The interview protocol for the interviews is located on Appendix A. Follow-up questions were asked during the interview. This process is utilized in Grounded Theory research, which allows the interviewer to add, subtract, or modify research questions as data are collected and themes emerge (Birks & Mills, 2011).

Each interview was recorded using the cell phone application, *Easy Voice Recorder*. After the interviews were conducted, the researcher transcribed the audio recordings within one week and deleted all original recordings**.** Transcripts were kept by the researcher for at least three years after the publication of this paper. All field notes and personal reflections written on paper were also be stored in the locked cabinet for three years. Interview transcripts were electronically stored on password protected files. Backups were made on an external hard drive that was also be password protected. All interview participants and district names were given aliases for the write up for this dissertation.

Data Analysis

This study reports descriptive statistics about the elementary schools in Georgia not readily accessible. Data used in this study were located in disparate locations which resulted in a lack of accessibility. Below are some of the descriptive statistics this study reported about elementary schools in Georgia. The *mean*, *standard deviation*, and *range* of school and teacher characteristics by geographic locale type included:

- Teacher salaries
- Teacher experience
- Teacher education

Additionally, tables, were generated in order to clearly present the data. Research questions one through three were answered upon the analysis of the descriptive data.

The first step in the data analysis for the quantitative phase consisted of importing information on all of Georgia elementary schools from the state Department of Education into a Statistical Package for the Social Sciences (SPSS) file. This process yielded a file

that included all target elementary schools and the average teacher salary, average teacher experience, level of education for all teachers, student poverty rate, and CCRPI score at each school. The geographic locale types for each school were added to the file from the National Center for Education Statistics database. Gathering NCES data involved searching for each school name and entering the school's main geographic category (city, suburban, town, or rural) in one column and its subcategory in another file. This allowed the researcher to provide descriptive statistics about the main categories as well as for descriptive reports about each of the twelve total locale types. For instance, this process allowed the researcher to report average teacher salary, average teacher experience, average teacher education, and average percentage student poverty rate at all city schools as well as schools classified as a city—large, city—midsize, and city—small. By providing an analysis of the main categories as well as the subcategories, this study provided a detailed analysis of teacher sorting in Georgia elementary schools.

After the descriptive analysis of data, inferential statistics were used in order to determine if significant differences and correlations existed among teacher and school characteristics. Multivariate analysis of covariance (MANCOVA) was used to determine if statistically significant differences existed for selected teacher characteristics based on geographic locale types while controlling for percentage of economically disadvantaged students and CCRPI scores. Multivariate analyses of covariance are used when researchers want to determine if statistically significant differences exist for two or more categorical dependent variables within a categorical dependent variable while using two or more dependent variables as covariates. MANCOVAs provide greater statistical

significance than multiple MANOVAs by accounting for multiple dependent variables (Field, 2013).

Through a MANOVA, it was possible to determine relationships within the selected dependent variables as well as the effects of the dependent variables on the independent variables. Thus, for this study, the researcher was able to use a multivariate F-statistic to determine if statistically significant differences existed in teacher characteristics across geographic locales. Additionally, relationships between variables were provided through the MANOVA.

The MANOVA was conducted through SPSS, version 25. The researcher checked for missing data and outliers before continuing with further analysis. Once all the assumptions for a MANOVA were examined, the results of the MANOVA output were analyzed. Between-subjects effects were analyzed and reported. The researcher determined where significant differences existed based on each dependent variable and the effect size based on the *partial eta squared* results. Where statistically significant differences were found, post hoc tests allowed the researcher to determine if statistically significant differences existed between each of the 12 school locale types. The pairwise comparison analysis determined which school types have the greatest differences for each of the teacher characteristics.

Due to the assumption of homogeneity of regression slopes being violated in the initial MANCOVA analysis, a hierarchical multiple regressions analyses was conducted for each main geographic locale type. This was done with the goal of analyzing the different ways in which CCRPI scores and percentage of economically disadvantaged students affected teacher characteristics in each geographic locale differently.

Hierarchical multiple regression was chosen over standard multiple regression because that method would determine how much additional predictive power is added through the inclusion of each independent variable added to the model (Laerd Statistics, 2017). These analyses allowed the researcher to determine the effects of student economic disadvantage and CCRPI scores within each geographic locale.

The descriptive and inferential statistics identified above constituted significant contributions to knowledge of Georgia schools. Understanding the distribution of teacher pay within the state serves as a starting point for policy-makers interested in reforming Georgia schools. Additionally, providing clear information on expected salary could better inform people interested in entering the profession about how much money they can expect to make in particular locations. According to expectancy theory, individuals make decisions based on what they expect to occur in the future (Tolman, 1955). Some individuals considering the teaching profession may realize teaching pays more in some areas than they thought and choose to enter the profession. Thus, by providing a more thorough breakdown of Georgia teacher salaries, persons considering entering the profession in Georgia may be able to make better decisions.

The qualitative phase of this study was based in grounded theory research. Grounded theory, created by Glaser and Strauss (1967), allows researchers to create a theory which explains a phenomenon through themes that emerge from data collection (Merriam, 2002). Grounded theory posits the researcher is not seeking to test an *a priori* assumption, but instead is seeking to discover an answer through qualitative research (Ary et al., 2014). The researcher, who did not presume to know the perceptions or attitudes of human resources directors about teacher characteristics and sorting, chose

grounded theory which was an appropriate form of qualitative research when seeking to explain common themes among the interviews.

Data analysis occurred using a general inductive approach. General inductive analysis of qualitative data was used to condense interviews into summaries, relate the interviews to the research questions, and create a theory which helps explain teacher sorting in Georgia elementary schools (Thomas, 2006). The specific strategy used for inductive analysis was the creation of themes after close readings and coding of interview data (Thomas, 2006). To aid in the identification of themes, a method of thematic analysis developed by Nowell et al. (2017) was used (See Appendix F). This method created by Nowell et al. (2017) divided thematic analysis into six phases as follows:

Phase 1: Familiarizing yourself with your data.

Phase 2: Generating initial codes.

Phase 3: Searching for themes.

Phase 4: Reviewing themes.

Phase 5: Defining and naming themes.

Phase 6: Producing the report. (p. 4)

Each of these phases were followed as prescribed by the authors to generate relevant meaning from the interview data.

Following the recommendations for thematic analysis proposed by Nowell et al. (2017) the researcher became familiar with the collected data. This phase began by compiling data into formats that could easily be used, organizing data, transcribing audio recordings, and securely storing that data (Nowell et al., 2017). All transcripts were uploaded to *QDA Miner,* which is qualitative coding software. Following the

organization of data, all interview data, field notes, and reflective writing were read three times. Braun and Clarke (2006) recommended researchers read through all data before generating initial coding so researchers are aware and familiar with the entirety of the data in order to generate more meaningful codes.

Following the advice of Nowell et al. (2017), the second phase for thematic analysis consisted of generating codes. Coding is a means of organizing qualitative data and the main one used by most qualitative researchers (Maxwell, 2013). Coding provides researchers with a general framework and focus for their analysis (Patton, 2015). Transcripts and field notes were read a fourth time in order to label codes within the interview transcripts. According to Maxwell (2013), the purpose of coding is to identify "units or segments of data that seem important" to the researcher (p. 107). By coding all of the interview data, common ideas among the various participants became evident. A coding manual was created and attached as Appendix G in order to aid readers in understanding how transcripts were coded (Creswell, 2014). After coding all of the interview data, the *code retrieval* function was used within QDA miner which allowed the researcher to see each code across all interview transcripts.

After coding transcripts, the next phase in this thematic analysis was the search for themes. Coding breaks qualitative data into fragments which are used to draw conclusions, or themes. Themes are used by researchers to describe a description of the overall meaning from the identified codes (Nowell et al., 2017). As stated by Braun and Clarke (2006), "A theme captures something important about the data in relation to the research question, and represents some level of *patterned* response or meaning" (p. 82). Because this study was conducted through a grounded theory framework, themes were

created deductively, meaning the researcher looked for information pertaining to the specific area of inquiry identified through the research questions (Braun & Clarke, 2006). From the data, themes were identified and analyzed in order to answer the qualitative research question. Within QDA miner, codes were categorized within one of five overarching themes (Appendix G).

Nowell et al. (2017) recommended that, after themes have been identified and briefly summarized, researchers need to then review those themes. Reviewing themes is important because, oftentimes, researchers identify themes early on in the analysis process that are not well established by data (Braun & Clarke, 2006). Themes were reviewed by rereading the original data with the identified themes in mind. Through this process, researchers can determine if identified themes are established in the source material (Nowell et al, 2017). The themes identified in this dissertation were reviewed in order to limit the subjectivity of the researcher's biases and further ensure the grounding of themes in the interview data.

Nowell et al. (2017) advocated for one last phase before writing the report. The purpose of this fifth phase is to define and name themes (Nowell et al., 2017). Defining and naming themes involved taking the codes and themes drawn from the literature and relating them to the interviews. In earlier phases, the researcher considered and identified the themes. In the fifth phase, the researcher began explaining the meaning of the themes drawn from the interview data. This was the phase at which the researcher began to formally answer the qualitative research question. One important component of this phase was peer checking. The researcher asked a fellow doctoral student to read and analyze the coded transcripts to make sure the themes identified were actually present.

The last phase in Nowell et al.'s guide for thematic analysis was producing the report. Nowell et al. (2017) argued the report should be a rich descriptive summary of the process and results of qualitative data analysis. The report explained, in narrative form, to the major themes found and the means by which the themes were established through the data. Creswell (2014) argued the final write-up of qualitative research can take many forms, but always explains what lessons were learned from the analysis. For this dissertation, and within this phase, the data from the qualitative interviews were articulated with an overall argument relevant to the qualitative research question. Quotes from participants were included as a means of establishing the basis for themes. The report produced was a culmination of the data analysis and consisted of the researchers' explanation for how the participants informed the discussion about teacher sorting in Georgia elementary schools.

Protection of Human Subjects

This study was approved by Valdosta State Universities Institutional Review Board (IRB). A copy of the approval can be found on Appendix C. Because the data used for the quantitative phase were publicly available and the researcher was not in contact with school districts, no potential harm was possible from the quantitative phase of this study. The protection of interview participants was ensured in a few ways. First, every participant was given a copy of the research statement (Appendix E). Second, names of interview participants and their school district names were eliminated for the study. Third, interview participants were able to review quotes and conclusions the researcher identified in this dissertation to inform the researcher if there was any information that they would like to be excluded from the final version.

Summary

The purpose of this explanatory sequential mixed methods study was to describe teacher characteristics and sorting in Georgia elementary schools by selected school characteristics. Quantitative data about teacher and student characteristics at the individual elementary school level were gathered from disparate governmental sources and combined. Descriptive statistics were used to describe the overall picture of teacher salaries and teacher sorting in Georgia elementary schools. Inferential statistics (MANCOVA, MANOVA, and hierarchical regressions) determined statistically significant differences among variables and thee relationships among variables. Interviews with directors of human resources from select school districts revealed themes among school administrators about teacher sorting in Georgia schools. Through the use of disparate data sources and interviews with human resources directors, the researcher has provided researchers and policy makers with a detailed description of teacher characteristics and sorting in the state of Georgia. This research may aid the creation of more effective policy and/or serve as the basis for future research endeavors.

Chapter IV

RESULTS

This explanatory sequential mixed methods study investigated the distribution of teachers, based on select characteristics, across Georgia elementary schools by geographic locale type. The teacher characteristics used in the study included teacher experience, salary, and education. In addition to geographic locale type, school characteristics also included the percentage of economically disadvantaged students and CCRPI scores. The primary purpose of the study was to determine if, and to what extent, teacher quality gaps existed in Georgia elementary schools.

This chapter contains the results of the explanatory sequential study conducted to answer the following research questions:

1) To what degree do teacher quality gaps in teacher characteristics (e.g., experience, education, and salary) exist based on school characteristics (e.g., geographic locale type, percentage of economically disadvantaged students, and CCRPI score) in Georgia elementary schools?

2) Do relationships exist between teacher characteristics and school characteristics in Georgia elementary schools?

3) What challenges have directors of human resources faced in recruiting and retaining teachers?

Research questions one and two were answered using quantitative methodologies. The results for research question one and two are presented in the descriptive statistics and inferential statistics sections of this chapter. Teacher quality gaps were examined by an analysis of teacher and school characteristics in Georgia. Descriptive analysis provided comparisons of schools, while three inferential statistical procedures (MANCOVA, MANOVA, and hierarchical regressions) were used to determine if statistically significant differences existed based on school characteristics. Research question three was answered using qualitative methodologies. The results for research question three are presented in the qualitative section. Through interviews with human resources directors, the study provides insights into challenges faced by school systems to recruit and retain effective teachers.

Explanatory sequential mixed methods designs allow researchers to investigate topics through quantitative methods and provide explanations to findings through qualitative methods. Teacher and school characteristics were analyzed using the Statistical Package for the Social Sciences, version 25, with the goal of describing teacher distribution in Georgia. The researcher gathered archival data about school and teacher characteristics from the Georgia Department of Education and the National Center for Educational Statistics for the quantitative phase.

The researcher used a form of thematic analysis developed by Nowell et al. (2017) to analyze semi-structured interviews with human resources directors. Thematic analysis increased the validity by providing the researcher with a systematic means of analyzing the data (Nowell et al., 2017). The findings begin with an explanation of the data, procedures, and results of the quantitative phase. Next, the chapter contains an

explanation of the participants, procedures, and themes identified within the qualitative phase. The chapter concludes with a summary of key findings from the quantitative and qualitative phases.

Quantitative Phase

Demographics. A total of 1,060 Georgia elementary schools were used in this study. The researcher used schools that taught grades pre-Kindergarten through fifth grade or Kindergarten through fifth grade. The limitation increased consistency across schools. For instance, some schools in Georgia taught Kindergarten through second grades or fifth through eighth grade. The state of Georgia labels such schools as elementary. However, CCRPI calculations change based on the grades being taught. The researcher hoped that limiting the target schools by grade increased consistency in teacher characteristics.

The National Center for Education Statistics (2019) labels all schools as one of four areas types (City, Suburb, Town, and Rural) based on U.S. census data. The NCES further divides schools by subtypes. To determine subtypes, the NCES uses population size to determine city and suburban assignments and an urban-centric (or proximity to an urban area) measure for town and rural assignments. Because of the differences used to create subtypes, city and suburb subtypes are labeled as large, midsize, and small whereas town and rural are distant, fringe, and remote. Large, midsize, and small refer to the population size of the schools' territory, determined by the NCES. Distant, fringe, and remote refer to the schools distance from an urban area.

Data for every elementary school's average teacher experience, salary, education, and percentage of economically disadvantaged students were downloaded from the

Georgia Department of Education (2019). Data for every elementary school's CCRPI score were downloaded from the Governor's Office of Student Achievement (2019). Data from the National Center for Education Statistics (2019), Georgia Department of Education (2019), and the Governor's Office of Student Achievement (2019) were combined into a single SPSS file for analysis. All tables used below were adapted from National Center for Education Statistics (2019) and Georgia Department of Education (2019) data.

From the target population, the NCES did not assign locale types to three schools. This occurred because the schools changed location or opened in the academic year 2017-2018 (National Center for Education Statistics, 2019). These schools were not included in analyses of locale types, leading to 99.7% of the population being used to compare teacher characteristics across locale types. Georgia elementary schools are represented in each of the four types of area and geographic subtypes (Tables 1 and 2). More of Georgia's elementary schools are labeled as suburb (43.5%) than any other geographic locale type. Rural schools were the next highest frequency (28.8%), followed by city (20.6 %) and town (6.6 %).

Table 1

Frequency Chart for Geographic Locale Type

	Frequency	Percent
City	218	20.60%
Suburb	461	43.50%
Town	73	6.60%
Rural	305	28.80%
Total	1057	99.70%

Note. Three schools were omitted because locale types were not assigned.

Georgia schools were concentrated within a few geographic locale subtypes (see Table 2). Suburb: Large contained 40.8% of all schools followed by Rural: Fringe (21%) and City: Midsize (10.2%). The remaining nine locale subtypes each contained fewer than 10% of all elementary schools. Rural: Remote schools were the least represented (.8%) with only nine schools classified in this subtype.

Table 2

Frequency Chart Geographic Locale Subtypes

Geographic Locale	Frequency	Percent
City: Large	46	4.30%
City: Midsize	108	10.20%
City: Small	64	6.00%
Rural: Distant	73	6.90%
Rural: Fringe	223	21.00%
Rural: Remote	9	.80%
Suburb: Large	433	40.80%
Suburb: Midsize	13	1.20%
Suburb: Small	15	1.40%
Town: Distant	44	4.20%
Town: Fringe	18	1.70%
Town: Remote	11	1.00%
Total	1057	99.70%[a]

[a]Three schools were omitted because locale types were not assigned.

Descriptive statistics. The descriptive statistics section details the school (CCRPI scores and student economic disadvantage) and teacher characteristics (teacher experience, salary, and education) for geographic locale types and subtypes. The descriptive statistics provide an overview of differences in teacher and school characteristics across geographic locale types. Several differences in teacher characteristics were apparent across locale types. These differences suggest that teacher characteristics were impacted by geographic locale type.

Elementary school characteristics included CCRPI scores, average teacher salary, average teacher experience, average teacher education, and percentage of economically disadvantaged students (Tables 3). CCRPI scores range from 0 to 100. Higher scores

represent higher school achievement. The mean CCRPI score for all schools was 73.04 (*SD* = 11.57, *range* = 58.5). For main locale types, suburb schools had the highest mean score (*m* = 75.36, *SD* = 11.75, *range* = 57.6), followed by rural (*m* = 73.04, *SD* = 10.39, *range* = 55.40), town (*m* = 71.09, *SD* = 10.75, *range* = 47.00), and city schools had the lowest mean CCRPI score (*m* = 68.80, *SD* = 11.83, *range* = 54.8). Suburban schools had a much higher school achievement as represented by CCRPI scores than rural, town, and city schools.

The average teacher salary for all elementary schools was $55992.45 (*SD* = $4,605.09, *range* = $30,617.24) For main locale types, suburban schools had the highest average teacher salary (*m* = $57683.48*, SD* = $3,550.74, *range* = $26,840.65), followed by rural schools (*m* = $55262.*41 , SD* = $4336.29, *range* = $28,186.87), city schools (*m* = $54399.88*, SD* = $5,896.38, *range* = $26,762.10), and town schools had the lowest average salary (*m* = $53413.34*, SD* = $3,138.37, *range* = $12,815.31). For all schools, the average teacher experience was 13.30 years (*SD* = 2.52, *range* = 17.71). For main locale types, rural schools had the highest average teacher experience (*m* = 14.52*, SD* = 2.42, *range* = 17.47) followed by town schools (*m* = 14.20*, SD* = 1.78, *range* = 8.13), suburban (*m* = 12.94*, SD* = 2.40, *range* = 15.48), and city schools had the lowest average teacher experience (*m* = 12.11*, SD* = 2.29, *range* = 14.53). The average suburban teacher earned more than $2,000 more than the average rural teacher, $3,000 more than the average city teacher, and $4,000 more than the average town teacher.

For all elementary schools, the average percentage of economically disadvantaged students was 67.07 (*SD* = 28.98*, range* = 100*).* For main locale types, city schools had the highest average percentage of economically disadvantaged students (*m* = 79.66*, SD* =

48.18, *range* = 88.00) followed by town schools (*m* = 74.56, *SD* = 20.22, *range* = 78.00), rural schools (*m* = 65.22, *SD* = 24.75, *range* = 94.00), and suburban schools (*m* = 61.24, *SD* = 31.05, *range* = 99.00). City schools, on average, had more economically disadvantaged students any other local type whereas suburban schools had fewer economically disadvantaged students.

As described in Chapter 3, average teacher education was determined by creating dummy variables 1-4 for bachelor's (1), master's (2), specialist (3), and doctoral degrees (4). For statistical analysis, bachelor's degrees served as a reference variable set at 1 because this is the entry level degree required for teachers, followed by a master's degree, specialist, and doctoral degree. Thus, teacher education was converted into a continuous variable for analysis. The mean average educational attainment for all schools was 1.84 (*SD* = .18, *range* = 1.25). For main locale types, rural schools had the highest average teacher education (*m* = 1.89, *SD* = .19, *range* = 1.25) followed by town (*m* = 1.86, *SD* = .18, *range* = .86), suburb (*m* = 1.82, *SD* = .16, *range* = 1.06), and city schools (*m* = 1.81, *SD* = .19, *range* = 1.25). Based on the descriptive statistics, the differences in teacher education across main locale types were minimal.

Table 3

School and Teacher Characteristics Means for Main Locale Type

Main Locale Type	CCRPI Score	Average Teacher Salary	Average Teacher Experience	Average Teacher Education	% Students ED
City	68.80	$54,399.88	12.11	1.81	79.66%
Rural	73.04	$55,262.41	14.52	1.89	65.22%
Suburb	75.36	$57,683.48	12.94	1.82	61.24%
Town	71.09	$53,413.34	14.20	1.86	74.56%
Total	73.04	$55,992.45	13.30	1.84	67.07%

Note. Average Teacher Ed. 1-Bachelors, 2-Masters, 3-Specialist, 4-Doctoral

For geographic sub-types, Suburb: Large schools had the highest average CCRPI scores (m = 75.52, SD = 12.01, *range* = 57.60) followed by Suburb: Small (m = 73.99, SD = 4.85, *range* = 14.20), Town: Fringe (m = 73.46 , SD = 10.56, *range* = 39.50), Rural: Fringe (m = 73.38 , SD = 10.34, *range* = 55.40), Rural: Distant (m = 72.64, SD = 10.06, *range* = 44.60), City: Small(m = 72.46, SD = 11.83, *range* = 50.90), Suburb: Midsize (m = 71.99, SD = 7.75, *range* = 20.60), Town: Remote (m = 70.42 , SD = 10.72, *range* = 39.1), Town: Distant(m = 70.28, SD = 10.93, *range* = 39.50), City: Large (m = 69.14, SD = 13.72, *range* = 54.8), Rural: Remote (m = 67.96, SD = 13.96, *range* = 35.10), and City: Midsize had the lowest average CCRPI scores (m = 66.48, SD = 10.43, *range* = 50.70). The difference between the mean CCRPI score in the highest and lowest locale sub-type was 9.04 points (Table 4)

Table 4

Mean School CCRPI Score by Geographic Local Sub-type

Geographic Locale	Mean	N	Std. Deviation
City: Large	69.13	46	13.72
City: Midsize	66.48	108	10.43
City: Small	72.46	64	11.83
Rural: Distant	72.64	73	10.06
Rural: Fringe	73.38	223	10.34
Rural: Remote	67.96	9	13.96
Suburb: Large	75.52	433	12.01
Suburb: Midsize	71.98	13	7.75
Suburb: Small	73.69	15	4.85
Town: Distant	70.28	44	10.93
Town: Fringe	73.46	18	10.56
Town: Remote	70.42	11	10.72
Total	73.04	1,057	11.59

For geographic sub-types, average teacher salaries were highest in City: Large schools (*m* = *$*62487*, SD* = $33.29, *range* = $17231) followed by Suburb: Large (*m* = $57824*, SD* = $3515, *range* = $26841), Suburb: Midsize (*m* = *$*56403*, SD* = $3538, *range* = $11295), Rural: Fringe (*m* = $55775*, SD* = $4403, *range* = $28187), City: Small (*m* = $54960*, SD* = 3976, *range* = $19065), Town: Fringe (*m* = $54935*, SD* = $3322, *range* = $11086), Suburb: Small (*m* = $54734*, SD* = $3305, *range* = $15385), Rural: Distant (*m* = $53945*, SD* = $3704, *range* = $16710), Town: Distant (*m* = $53327*, SD* = $2988, *range* = $12550.77), Rural: Remote (*m* = $53251*, SD* = $5029, *range* = $14327), Town: Remote (*m* = $51270*, SD* = $2122, *range* = $6330), and City: Midsize schools had lowest average teacher salaries (*m* = $506023*, SD* = $3720, *range* = $18057). The

difference between the mean salary in the highest and lowest locale sub-type was $11,217.54 (Table 5).

Table 5

Mean Teacher Salary by Geographic Local Sub-type

Geographic Locale	Mean	N	Std. Deviation
City: Large	$62,487.10	46	3,328.53
City: Midsize	$50,623.16	108	3,719.96
City: Small	$54,960.39	64	3,976.39
Rural: Distant	$53,944.67	73	3,704.25
Rural: Fringe	$55,774.97	223	4,403.23
Rural: Remote	$53,250.82	9	5,028.52
Suburb: Large	$57,824.10	433	3,514.54
Suburb: Midsize	$56,402.57	13	3,538.29
Suburb: Small	$54,734.31	15	3,305.16
Town: Distant	$53,326.70	44	2,988.30
Town: Fringe	$54,935.22	18	3,321.69
Town: Remote	$51,269.56	11	2,121.81
Total	$56,012.74	1,057	4,594.17

For geographic sub-types, average teacher experience was highest in Rural: Remote schools (m = 13.39, SD = 1.87, $range$ = 6.48) followed by Rural: Distant (m = 14.94, SD = 2.49, $range$ = 14.36), Town: Fringe (m = 14.73, SD = 1.58, $range$ = 6.36), Rural: Fringe (m = 14.32, SD = 2.36, $range$ = 15.46), Town: Distant (m = 14.18, SD = 1.80, $range$ = 7.77), Suburb: Small (m = 14.10, SD = 2.35, $range$ = 10.12), Suburb: Midsize (m = 13.96, SD = 2.05, $range$ = 7.00), Town: Remote (m = 13.39, SD = 1.87, $range$ = 6.48), Suburb: Large (m = 12.87, SD = 2.40, $range$ = 15.26), City: Large (m = 12.51, SD = 2.11, $range$ = 11.93), City: Small (m = 12.15, SD = 2.03, $range$ = 9.58), and

City: Midsize schools had the lowest average teacher experience (*m* = 11.92*, SD* = 2.50, *range* = 12.64). The difference between the mean experience in the highest and lowest locale sub-type was 4.13 years (Table 6).

Table 6

Mean Teacher Experience by Geographic Local Sub-type

Geographic Locale	Mean Years	N	Std. Deviation
City: Large	12.51	46	2.11
City: Midsize	11.92	108	2.50
City: Small	12.15	64	2.03
Rural: Distant	14.94	73	2.49
Rural: Fringe	14.32	223	2.36
Rural: Remote	16.05	9	2.57
Suburb: Large	12.87	433	2.40
Suburb: Midsize	13.96	13	2.05
Suburb: Small	14.10	15	2.35
Town: Distant	14.18	44	1.80
Town: Fringe	14.73	18	1.58
Town: Remote	13.39	11	1.87
Total	13.31	1057	2.51

For geographic sub-types, average teacher education was highest in Rural: Remote schools (*m* = 2.00*, SD* = .20, *range* = .70) followed by City: Large (*m* = 1.94*, SD* = .19, *range* = .97), Suburb: Midsize (*m* = 1.92*, SD* = .16, *range* = .58), Suburb: Small (*m* = 1.92*, SD* = .16, *range* = .75), Rural: Distant (*m* = 1.90*, SD* = .21, *range* = 1.04), Rural: Fringe (*m* = 1.88*, SD* = .18, *range* = 1.25), Town: Distant (*m* = 1.88*, SD* = .19, *range* = .84), Town: Fringe (*m* = 1.86*, SD* = .18, *range* = .66), Suburb: Large (*m* = 1.81*, SD* = .56, *range* = .95), Town: Remote (*m* = 1.80*, SD* = .15, *range* = .49), and City: Midsize (*m*

= 1.78, *SD* = .15, *range* = .78) and City Small (*m* = 1.78, *SD* = .20, *range* = .89) had the lowest average teacher education. The difference between the mean teacher education in the highest and lowest locale sub-type was .22 degree (Table 7).

Table 7

Mean Teacher Education by Geographic Local Sub-type

Geographic Locale	Mean	N	Std. Deviation
City: Large	1.94	46	.19
City: Midsize	1.78	108	.15
City: Small	1.78	64	.20
Rural: Distant	1.89	73	.21
Rural: Fringe	1.88	223	.18
Rural: Remote	2.00	9	.20
Suburb: Large	1.81	433	.16
Suburb: Midsize	1.92	13	.17
Suburb: Small	1.92	15	.17
Town: Distant	1.88	44	.19
Town: Fringe	1.86	18	.18
Town: Remote	1.80	11	.15
Total	1.84	1057	.18

Note. Average Teacher Ed. 1-Bachelors, 2-Masters, 3-Specialist, 4-Doctoral

For geographic sub-types, Town: Remote schools had the highest average percentage of economically disadvantaged students (*m* = 91.55, *SD* = 5.68, *range* = 20.00) followed by Rural: Remote (*m* = 88.67, *SD* = 16.05, *range* = 46.00), City: Midsize (*m* = 88.09, *SD* = 18.71, *range* = 95.00), City: Large (*m* = 81.72, *SD* = 34.57, *range* = 95.00), Suburb: Midsize (*m* = 77.54, *SD* = 25.23, *range* = 77.00), Town: Distant (*m* = 77.43, *SD* = 20.19, *range* = 69.00), Rural: Distant (*m* = 76.29, *SD* = 19.02, *range* = 64.00), Suburb: Small (*m* = 69.93, *SD* = 18.42, *range* = 61.00), City: Small (*m* = 63.94, *SD* = 29.50, *range* = 95.00), Rural: Fringe (*m* = 60.65, *SD* = 25.08, *range* = 94.00),

Suburb: Large (*m* = 60.45*, SD* = 31.41, *range* = 99.00), and Town: Fringe schools had the lowest average percentage of economically disadvantaged students (*m* = 57.17*, SD* = 12.36, *range* = 64.00). The percentage difference between the mean percentage of economically disadvantaged students in the highest and lowest locale sub-type was 46.23% (Table 8). This means that clear differences in economic disadvantage existed across locale sub-types.

Table 8

Mean Percentage of Economically Disadvantaged Students Education by Geographic Local Sub-type

Geographic Locale	Mean	N	Std. Deviation
City: Large	81.72%	46	34.57%
City: Midsize	88.09%	108	18.71%
City: Small	63.94%	64	29.50%
Rural: Distant	76.29%	73	19.02%
Rural: Fringe	60.65%	223	25.08%
Rural: Remote	88.67%	9	16.05%
Suburb: Large	60.45%	433	31.41%
Suburb: Midsize	77.54%	13	25.23%
Suburb: Small	69.93%	15	18.42%
Town: Distant	77.43%	44	20.19%
Town: Fringe	57.17%	18	12.36%
Town: Remote	91.55%	11	5.68%
Total	67.11%	1057	28.94%

Across the state of Georgia, many correlations existed between individual teacher characteristics and school characteristics. Results of a Pearson correlation demonstrated a statistically significant negative association between teacher experience and percentage

of economically disadvantaged students, r(1054) = -.251, $p < .01$; and a significant positive relationship between teacher experience and CCRPI scores, r(1054) = .258, $p < .01$. Data confirmed that across the state, schools with higher percentages of economically disadvantaged students and lower CCRPI scores tended to have less experienced teachers than schools with a lower economic disadvantage and higher CCRPI scores.

Results of a Pearson correlation demonstrated a statistically significant negative association between teacher salaries and percentage of economically disadvantaged students, r(1054) = -.412, $p < .01$; and a statistically significant positive association between average teacher salary and CCRPI score, r(1054) = .370, $p < .01$. Data confirmed that across the state, schools with higher percentages of economically disadvantaged students and lower CCRPI scores tended to have lower paid teachers than schools with a lower economic disadvantage and higher CCRPI scores.

Results of a Pearson Correlation demonstrated an insignificant association between average teacher education and percentage of economically disadvantaged students. ($r(1054) = -.025$, $p > .01$. However, the association between teacher education and CCRPI scores was statistically significant ($r(1054) = .106$, $p < .01$. Data confirmed that across the state, schools with lower CCRPI scores tended to have lower teacher education but that economic disadvantage was not associated with higher or lower teacher education.

Summary results for descriptive statistics. The analysis of descriptive statistics revealed several differences in teacher characteristics across geographic locale types. Suburban elementary schools had, on average, higher CCRPI scores, higher teacher

salaries, and fewer economically disadvantaged students than the other geographic locale types. City schools, in contrast, had the lowest CCRPI scores, lower teacher experience, and more economically disadvantaged students than the other geographic locale types.

Differences across geographic locale sub-types were even greater and more complex than across geographic locale main-types. For instance, within city schools, City: Large teachers were paid, on average, over $11,000 more than City: Midsize teachers, despite an experience gap of less than one year. Teacher experience gaps across geographic sub-types were stark. For instance, City: Midsize teachers had more than four fewer years of experience, on average, than Rural: Remote teachers and over three years less experience than Rural: Distant teachers. Economically disadvantaged students were also unequally distributed across Georgia elementary schools. On average, 60.45% of Suburb: Large students were economically disadvantaged whereas 88.09% of City: Midsize students were economically disadvantaged. The descriptive statistics revealed that locations across the state had varying teacher experience gaps as well as differences in the other teacher and school characteristics examined.

Several significant correlations existed between variables. Across the state, a -.251 correlation existed between teacher experience and the percentage of economically disadvantaged students. This means that economically disadvantaged students were more likely to be taught by less experienced teachers than their more affluent peers. Similarly, a -.412 correlation existed between student economic disadvantage and teacher salaries. This suggests that teachers of economically disadvantaged students are also, on average, paid less than teachers of more economically affluent students.

Differences teacher and school characteristics existed across geographic locale types. Descriptive findings suggested that differences exist across locale types and sub-types. Additionally, statistically significant correlations existed between teacher and school characteristics. These findings suggest that teacher experience gaps exist across certain school locale types and for economically disadvantaged students. In the next section, an inferential statistical analysis provides further meaning about the differences across Georgia elementary schools.

Inferential statistics. Inferential statistics allow researcher to interpret the statistical significance of observed data (Ary et al., 2014). Whereas descriptive data showed differences in teacher characteristics by locale, inferential methods were used to determine the likelihood that such differences occurred by chance. The first inferential procedure used was a multivariate analysis of covariance (MANCOVA) to determine if differences in teacher characteristics existed across locale types while controlling for student economic disadvantage and CCRPI scores. After statistical assumptions were violated, a multivariate analysis of variance (MANOVA) was conducted to determine if differences in teacher characteristics existed across locale types. Last, hierarchical regressions were performed to determine the effects of student economic disadvantage and CCRPI scores within, not across, locales.

MANCOVA. Multivariate Analyses of Covariance (MANCOVA) was used to determine if statistically significant differences in teacher characteristics (salary, education, and experience) existed based on geographic locale type while controlling for the percentage of economically disadvantaged students and CCRPI scores. Eleven assumptions exist for MANCOVA procedures (Laerd Statistics, 2017). The first four

assumptions relate to the types of data required to perform the procedure. One-way MANCOVAs require one categorical independent variable with two or more groups, one or more continuous covariates, two or more continuous dependent variables, and independence of observations. Geographic locale served as the categorical independent variable; percentage of economically disadvantaged students and CCRPI score served as continuous covariates; and teacher salary, education, and experience served as continuous dependent variables. The assumption for independence of observations was met because each observation was only used once.

According to Laerd Statistics (2017), the other seven assumptions for MANCOVAs are as follows:

Assumption 5: There should be a linear relationship between each pair of dependent variables within each group of the independent variable.

Assumption 6: There should be a linear relationship between the covariate and each dependent variable within each group of the independent variable.

Assumption 7: You should have homogeneity of regression slopes.

Assumption 8: There should be homogeneity of variances and covariance.

Assumptions 9: There should be no significant univariate outliers in the groups of your independent variable in terms of each dependent variable.

Assumption 10: There should be no significant multivariate outliers in the groups of your independent variable in terms of each dependent variable.

Assumption 11: The residuals should be approximately normally distributed for each group of the independent variable.

Linearity (assumptions 5 and 6) were tested using scatterplot matrices using SPSS. Scatterplots were created (Appendix H) to test linearity among all dependent variables and between dependent variables and covariates. Loess lines (90% fit) were placed into each scatterplot to better determine linearity. The researcher determined that the assumptions of linearity were met based on the scatterplot matrices. It should be noted that in some individual scatterplots, linearity between the dependent variables and covariates was not very clear. For instance, within the Rural: Remote scatterplot (Appendix H), the relationship between CCRPI score and average teacher salary does not form a straight line. Due to the small number of cases in the Rural: Remote group, the loess line is strongly affected by two observations. In cases such as this (with a low number of observations within a group), normality is not violated (Laerd Statistics, 2017). Overall, because none of the scatterplots suggested a non-monotonic relationship, assumptions five and six were not violated and the MANCOVA could continue (Laerd Statistics, 2017). All scatterplots suggested linearity among dependent variables.

Assumption seven, homogeneity of regression slopes, was tested in SPSS by running a one-way MANCOVA with interactive terms for each covariate and geographic locale type. This test determines if the regression slopes for the covariates and dependent variables are equal across all geographic locale types. There was heterogeneity of regression slopes, as assessed by the interaction term between geographic locale and percentage of economically disadvantaged students, $F(33, 3002.87) = 4.08$, $p < .001$. In other words, the covariates affect the dependent variables differently depending on geographic locale type. However, there was homogeneity of regression slopes, as assessed by the interaction term between geographic locale and CCRPI scores, $F(33,$

3002.87) = 1.15, $p = .25$. Based on the results of the above, percentage of economically disadvantaged students was removed as a covariate. When a model was created with only geographic locale and CCRPI as an interaction term, there was heterogeneity of regression slopes $F(33, 3038.22) = 2.79$, $p < .001$. Thus, a MANCOVA was not conducted because the assumption of homogeneity of regression slopes was violated when using student economic disadvantage or CCRPI scores as a covariates independently or together.

MANOVA. Because the homogeneity of regression slopes assumption of a MANCOVA was violated, a multivariate analysis of variance was conducted. The MANOVA procedure was used to determine if statistical differences in teacher characteristics (salary, experience, and education) existed by geographic locale type. One-way MANOVAs have ten assumptions. The first three pertain to using the correct data types. For this study, one categorical variable (geographic locale type) served as the independent variable and three continuous variables served as dependent multivariate variables. All observations were independent. According to Laerd Statistics (2017), one-way MANOVAs have seven additional assumptions:

Assumption 4: There should be no univariate or multivariate outliers.

Assumption 5: There needs to be multivariate normality.

Assumption 6: There should be no multicollinearity.

Assumption 7: There should be a linear relationship between the dependent variables for each group of the independent variable.

Assumption 8: You should have an adequate sample size.

Assumptions 9: There should be homogeneity of variance-covariance matrices.

Assumption 10: There should be homogeneity of variances (n.d.).

Boxplots were analyzed to detect the presence of outliers. No more than one outlier was found for each of the twelve geographic locales. To increase the validity of the MANOVA findings, the outliers were not removed. The *Explore: Plots* function of SPSS was used to test normality through the Shapiro-Wilk test for normality. For all dependent variables, most locales were normally distributed ($p > .05$). Average teacher experience was not normally distributed in the Rural: Fringe group ($p <. 05$). Average teacher education was not normally distributed in the Rural: Distant group ($p < .05$). Average teacher salary was not normally distributed in Rural: Distant ($p < .05$). Because one-way MANOVAs are not greatly affected by violations of normality, and only 3 violations out of 36 existed, the researcher continued with the procedure (Laerd Statistics, 2017).

The assumption of no multicollinearity was tested by generating correlation coefficients among dependent variables in SPSS (see Table 5). There was no multicollinearity, as assessed by Pearson correlation between any dependent variables. There was a moderate correlation between all dependent variables, which is desirable for a MANOVA (Laerd Statistics, 2017). The Pearson correlation between teacher education and experience was .576 ($p < .01$), teacher education and salary .494 ($p < .01$), teacher experience and salary was .460 ($p < .01$).

Table 9

Correlations Between Dependent Variables

		Average Teacher Education	Average Teacher Experience	Average Teacher Salary
Average Teacher Education	Pearson Correlation	1	.576**	.494**
	Sig. (2-tailed)		.000	.000
	N	1057	1057	1057
Average Teacher Experience	Pearson Correlation	.576**	1	.460**
	Sig. (2-tailed)	.000		.000
	N	1057	1057	1057
Average Teacher Salary	Pearson Correlation	.494**	.460**	1
	Sig. (2-tailed)	.000	.000	
	N	1057	1057	1057

**Correlation is significant at the 0.01 level (2-tailed).

Scatterplot matrices were created using SPSS in order to test for linear relationships among all dependent variables. Scatterplot results demonstrated clear linearity among all variable combinations in each geographic locale type. Thus, assumption 7 was met.

The assumption for multivariate outliers was assessed through *Mahalanobis distance* calculations using SPSS. The *Mahalanobis distance* values were sorted to identify outliers based on a chi-square chart. The *critical value* for this study was 16.27 because it had three dependent variables; thus, three outliers were identified with *Mahalanobis values* of 20.42, 18.15, and 16.58 ($p > .001$). The researcher conducted the MANOVA with the outliers because only three existed. MANOVAs are less affected by outliers than other statistical tests and it is acceptable to proceed with outliers (Laerd Statistics, 2017).

A MANOVA was conducted using the *multivariate* analysis function of SPSS. Assumption number eight was met because each group had more observations than dependent variables. *Box's Test of Equality of Covariance Matrices* was used to test homogeneity of variance-covariance matrices. *Pillai's Trace* was used to determine statistical significance when interpreting the main one-way MANOVA results because the results were significant ($p < .001$) (Laerd Statistics, 2017). For the assumption of homogeneity of variances, there was homogeneity of variances, as assessed by *Levene's Test of Homogeneity of Variance* for average teacher experience and average teacher education ($p > .05$). For average teacher salary, there was heterogeneity of variance ($p < .05$). The researcher proceeded with the MANOVA, which is acceptable if one also lowers their level of statistical significance.

The main MANOVA was tested using the *multivariate output* table from SPSS (see Table 6). There was a statistically significant difference between the geographic locale types on the combined dependent variables, $F(33, 3135) = 29.01$, $p < .0005$; *Pillai's Trace* = .70; partial $\eta^2 = .234$. Tests of between-subjects was analyzed in order to determine how each dependent variable contributed to the statistical significance of the MANOVA because a statistically significant difference was found (See Appendix I).

Table 10

MANOVA Tests Output[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.986	24448.315[b]	3.000	1043.000	.000	.986
	Wilks' Lambda	.014	24448.315[b]	3.000	1043.000	.000	.986
Geographic Locale	Pillai's Trace	.702	29.009	33.000	3135.000	.000	.234
	Wilks' Lambda	.388	35.247	33.000	3073.574	.000	.270

[a]Design: Intercept + GeographicLocale
[b]Exact statistic
[c]The statistic is an upper bound on F that yields a lower bound on the significance level

From the tests of between-subjects effects, a statistically significant difference was found for all dependent variables ($p < .001$). There was a statistically significant difference in average teacher salary between the school locale types, $F(11, 1045) = 48.79$, $p < .001$; partial $\eta^2 = .339$. There was a statistically significant difference in average teacher experience between the school locale types, $F(11, 1045) = 16.36$, $p < .001$; partial $\eta^2 = .147$. There was a statistically significant difference in average teacher education between the school locale types, $F(11, 1045) = 7.54$, $p < .001$; partial $\eta^2 = .074$.

A *Tukey-Kramer post hoc test* was conducted in SPSS to determine which locale types had statistically significant differences for each dependent variable. *Tukey-Kramer* was used as the *post hoc* comparison because *N* differed for each group. Statistically significant differences were most common for average teacher salary. Salary differences between City: Large and all other locales were statistically significant. Mean teacher salaries were 11,863 higher in the City: Large group than in the City: Midsize group (99% CI, 9,383 to 14,344), which was statistically significant ($p < .001$). However, mean

teacher salaries were only $4,663 higher in the City: Large group than in the Suburb: Large group (99% CI, 2,478 to 6,847), which was statistically significant ($p < .001$). So while all groups were statistically different from City: Large, not all differences were as large.

With the exception of City groups, no statistically significant differences existed within main geographic locale groups. For instance, no statistically significant differences existed among average teacher salaries for Suburb: Large, Suburb: Midsize, and Suburb: Small. The Town: Remote group had the lowest average teacher salary, but this was only statistically significant compared with City: Large (μ difference = -11,217, 99% CI, -15,946 to -6,489), Rural: Fringe (μ difference = -4,505, 99% CI, -8857 to 154), and Suburb: Large (μ difference = -6554, 99% CI, 10,856 to 2,253) all significant at the $p <$ .01 level.

Several statistically significant differences existed in average teacher experience. Rural: Remote was the group with the highest average teacher experience. Statistically significant differences existed between the City: Large (μ difference = 3.54, 99% CI, .35 to 6.73), City: Midsize (μ difference = 4.13, 99% CI, 1.01 to 7.12), City: Small (μ difference = 3.90, 99% CI, .78 to 7.02), and Suburb: Large (μ difference = 3.18, 99% CI, .23 to 6.13). No statistically significant differences occurred between subgroups that were also categorized within the same main group. For instance, no statistically significant differences existed among City: Large, City: Midsize, or City: Small.

Fewer statistically significant differences existed among groups based on average teacher education compared with experience and salary. The group City: Midsize had the lowest average education (μ = 1.78), but statistically significant differences only existed

compared with City: Large (μ difference .16, 99% CI, -.27 to -.04), Rural: Distant (μ difference = -.109, 99% CI, -.21 to -.01), and Rural: Fringe (μ difference = -.10, 99% CI, -.17 to -.02). Rural: Remote was the group with the highest average education but no statistically significant differences existed between it and other groups. This may have been, in part due to the small sample size of Rural: Remote ($N = 11$) and the high *alpha level* of the post hoc test ($\alpha = .01$). However, statistically significant differences existed within the Rural: Remote comparisons for both teacher salary and teacher experience.

Hierarchical multiple regressions. Because the assumption of homogeneity of regression slopes were violated in the initial MANCOVA analysis, a hierarchical multiple regressions analyses was conducted for each main geographic locale type with the goal of analyzing the different ways in which CCRPI scores and percentage of economically disadvantaged students affected teacher characteristics in each geographic locale differently. Hierarchical multiple regression was chosen over standard multiple regression because that method would determine how much additional predictive power was added through the inclusion of each independent variable added to the model (Laerd Statistics, 2017). Hierarchical multiple regressions were not completed for geographic sub-types due to the small sample size of many groups.

By conducting a *hierarchical multiple regressions* for each main geographic locale, more accurate assumptions about the moderator effect that geographic locale has on CCRPI and percentage of economically disadvantaged students can be made. Teacher experience was included as the dependent variable in the regression model because teacher salaries in Georgia increase with increased teacher experience. Thus, this model

accounted for the potential confounding effects of teacher experience on teacher salaries (Laerd Statistics, 2017).

According to Laerd Statistics (2017), hierarchical multiple regressions have eight assumptions:

Assumption 1: you have a continuous dependent variable.

Assumption 2: you have two or more independent variables which can be continuous or, in some instances, categorical.

Assumption 3: you should have independence of observations.

Assumption 4: there needs to be a linear relationship between the dependent variable and each independent variable as well as the independent variables collectively.

Assumption 5: there needs to be homoscedasticity of residuals (equal error variances).

Assumption 6: data must not show multicollinearity.

Assumption 7: no significant outliers.

Assumption 8: the residuals should be approximately normally distributed (n.d.).

City hierarchical regression. A hierarchical regression was performed using SPSS for all city schools. There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.03. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There was one standardized residual ±3 standard deviations

(Standard Residual = -3.194). There was one studentized deleted residuals greater than ±3 standard deviations (standard deleted residual = -3.28) but the case was kept in the data. There were no leverage values greater than 0.2, or values for Cook's distance above 1. There assumption of normality was met, as assessed by Q-Q Plot.

The full model of average teacher salary, percentage of economically disadvantaged students, and CCRPI scores to predict teacher experience (see Table 11, Model 3) was statistically significant, $R^2 = .207$, $F(1, 214) = 54.26$, $p < .01$; adjusted $R^2 = .196$. The addition of percentage of economically disadvantaged students to the prediction of teacher experience (Model 2) did not lead to a statistically significant increase in R^2 of .005, $F(1, 215) = 1.34$, $p > .01$. The addition of CCRPI to the prediction of teacher experience (Model 3) led to a statistically significant increase in R^2 of .035, $F(1, 214) = 9.41$, $p < .01$. In summary, teacher salary and CCRPI scores had statistically significant influence on teacher experience in city elementary schools.

Table 11

City Hierarchical Regression Model Summary[d]

				Std. Error	Change Statistics				
Model	R	R Square	Adjusted R Square	of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.409[a]	.167	.164	2.095	.167	43.445	1	216	.000
2	.415[b]	.173	.165	2.094	.005	1.346	1	215	.247
3	.456[c]	.207	.196	2.053	.035	9.412	1	214	.002

[a]Predictors: (Constant); AverageTeacherSalary
[b]Predictors: (Constant); AverageTeacherSalary, StudentsED
[c]Predictors: (Constant); AverageTeacherSalary, StudentsED, CCRPIScore
[d]Dependent Variable; AverageTeacherExperience

Rural hierarchical regression. A hierarchical regression was performed using SPSS for all rural schools. There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.82. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There were two standardized residual values ±3 standard deviations (Standard Residual = -6.80 and +7.43) but both values were kept in the data analysis. There were two studentized deleted residuals greater than ±3 standard deviations (standard deleted residual = -3.66 and +4.08) but the cases were kept in the data. There were no leverage values greater than 0.2, or values for Cook's distance above 1.There assumption of normality was met, as assessed by Q-Q Plot.

The full model of average teacher salary, percentage of economically disadvantaged students, and CCRPI scores to predict teacher experience at rural schools (see Table 12, Model 3) was statistically significant, $R^2 = .397$, $F(1, 301) = 181.95$, $p < .01$; adjusted $R^2 = .391$. The addition of percentage of economically disadvantaged students to the prediction of teacher experience (Model 2) led to a statistically significant increase in R^2 of .063, $F(1, 302) = 31.45$, $p < .001$. The addition of CCRPI to the prediction of teacher experience (Model 3) did not lead to a statistically significant increase in R^2 of .005, $F(1, 301) = 2.683$, $p > .01$. In summary, teacher salary and student economic disadvantage had statistically significant influence on teacher experience in rural elementary schools.

Table 12

Rural Hierarchical Regression Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.573[a]	.328	.326	1.988	.328	147.825	1	303	.000
2	.626[b]	.391	.387	1.895	.063	31.448	1	302	.000
3	.630[c]	.397	.391	1.890	.005	2.683	1	301	.102

[a]Predictors: (Constant); AverageTeacherSalary
[b]Predictors: (Constant); AverageTeacherSalary, StudentsED
[c]Predictors: (Constant); AverageTeacherSalary, StudentsED, CCRPIScore
[d]Dependent Variable: AverageTeacherExperience

Suburb hierarchical regression. A hierarchical regression was performed using SPSS for all suburb schools. There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.01. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1. There was one standardized residual ±3 standard deviations (Standard Residual = -5.67). There was one studentized deleted residuals greater than ±3 standard deviations (standard deleted residual = 3.33), but the case was kept in the data. There were no leverage values greater than 0.2, or values for Cook's distance above 1. There assumption of normality was met, as assessed by Q-Q Plot.

The full model of average teacher salary, percentage of economically disadvantaged students, and CCRPI scores to predict teacher experience at suburban

schools (see Table 13, Model 3) was statistically significant, $R^2 = .487$, $F(1, 457) = 417.17$, $p < .01$; adjusted $R^2 = .483$. The addition of percentage of economically disadvantaged students to the prediction of teacher experience (Model 2) led to a statistically significant increase in R^2 of .023, $F(1, 458) = 20.73$, $p < .01$. The addition of CCRPI to the prediction of teacher experience (Model 3) did not lead to a statistically significant increase in R^2 of < .001, $F(1, 457) = .04$, $p > .01$. In summary, teacher salary and student economic disadvantage had statistically significant influence on teacher experience in suburban elementary schools.

Table 13

Suburb Hierarchical Regression Model Summary[d]

				Std. Error	Change Statistics				
Model	R	R Square	Adjusted R Square	of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.681[a]	.463	.462	1.758	.463	396.407	1	459	.000
2	.698[b]	.487	.484	1.722	.023	20.728	1	458	.000
3	.698[c]	.487	.483	1.724	.000	.041	1	457	.840

[a]Predictors: (Constant); AverageTeacherSalary
[b]Predictors: (Constant); AverageTeacherSalary, StudentsED
[c]Predictors: (Constant); AverageTeacherSalary, StudentsED, CCRPIScore
[d]Dependent Variable: AverageTeacherExperience

Town hierarchical regression. A hierarchical regression was performed using SPSS for all town schools. There was linearity as assessed by partial regression plots and a plot of standardized residuals against the predicted values. There was independence of residuals, as assessed by a Durbin-Watson statistic of 2.30. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. There was no evidence of multicollinearity, as assessed by tolerance

values greater than 0.1. There were no standardized residuals ±3 standard deviations. There were no studentized deleted residuals greater than ±3 standard deviations. There were no leverage values greater than 0.2, or values for Cook's distance above 1. The assumption of normality was met, as assessed by Q-Q Plot.

The full model of average teacher salary, percentage of economically disadvantaged students, and CCRPI scores to predict teacher experience at all town schools (see Table 14, Model 3) was statistically significant, $R^2 = .342$, $F(1, 69) = 35.48$, $p < .01$; adjusted $R^2 = .313$. The addition of percentage of economically disadvantaged students to the prediction of teacher experience (Model 2) did not lead to a statistically significant increase in R^2 of .021, $F(1, 70) = 2.2$, $p > .01$. The addition of CCRPI to the prediction of teacher experience (Model 3) did not lead to a statistically significant increase in R^2 of .005, $F(1, 69) = .49$, $p > .01$. In summary, teacher salary was the the only variable that had a statistically significant influence on teacher experience in town elementary schools.

Table 14

Town Hierarchical Regression Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.562[a]	.316	.306	1.486	.316	32.790	1	71	.000
2	.580[b]	.337	.318	1.474	.021	2.206	1	70	.142
3	.584[c]	.342	.313	1.479	.005	.490	1	69	.486

[a]Predictors: (Constant); AverageTeacherSalary
[b]Predictors: (Constant); AverageTeacherSalary, Students
[c]Predictors: (Constant); AverageTeacherSalary
[d]Dependent Variable: AverageTeacherExperience

Summary results for inferential statistics. Due to a violation of a statistical assumption, a MANCOVA could not be used to determine if statistically significant differences in teacher characteristics existed by geographic locale type while controlling for the influence of student economic disadvantage and CCRPI scores. However, this is a significant finding because student economic disadvantage and CCRPI scores affected teacher characteristics in some locales more than others.

The results of a MANOVA indicated that geographic locale type had a statistically significant impact on teacher characteristics, $F(33, 3135) = 29.01$, $p < .001$; *Pillai's Trace* = .70; partial $\mu = .234$. This meant that geographic locale accounted for 23% of the variation in all teacher characteristics examined. More specifically, geographic locale type accounted for 14.7% of the variation in teacher experience across schools. The MANOVA results indicated that teacher relationships existed between geographic locale type and teacher characteristics.

Hierarchical regressions were conducted to determine the effects of student economic disadvantage and CCRPI scores on teacher experience within each geographic locale type (Table 15). For city schools, teacher experience was influenced by CCRPI scores, but not student economic disadvantage. For suburban schools, teacher experience was influenced by student economic disadvantage but not CCRPI scores. For rural schools, teacher experience was influenced by student economic disadvantage but not CCRPI scores. Teacher experience was not influenced by student economic disadvantage or CCRPI scores in town schools. The results of the hierarchical regressions indicated teacher quality gaps, based on experience, existed within and across schools based on school characteristics.

Table 15

Influence on Teacher Experience Determined Through Hierarchical Regressions

Locale Type	Student Economic Disadvantage (Yes/No)	CCRPI Score (Yes/No)
City	No	Yes
Suburb	Yes	No
Rural	Yes	No
Town	No	No

Qualitative Phase

Participants. The researcher purposefully sampled participants based on the findings in the quantitative phase. Explanatory sequential research designs allow researchers to sample populations based on findings (Creswell, 2014). In the quantitative phase, the researcher found that teacher sorting occurred more frequently in suburban and

rural schools than in city or town schools. Thus, I chose to gather participants from school districts with high numbers of suburban and rural schools in order to better understand the unique position and challenges of human resources directors in districts with high rates of teacher sorting. Interview questions were developed to focus discussions on teacher characteristics and teacher sorting. Pilot tests were conducted with two teachers, one principal, and one human resources director to ensure the questions were cogent and clear.

In August 2019, the researcher sent emails (Appendix D) to human resources directors in the sixteen school districts with the highest number of suburban and rural elementary schools in the state of Georgia. Five human resources directors agreed to conduct interviews with the researcher, representing a response rate of 31 percent. After human resources directors agreed to participate, the researcher provided those participants with a copy of the research statement (Appendix E). After participants understood their rights, the researcher scheduled interviews. Before each interview, the research statement was read aloud to the participants in accordance with Valdosta State University IRB guidelines.

The researcher conducted and recorded semi-structured interviews with all interview participants. He then transcribed the interviews, removed all identifying information, and destroyed the audio recordings. Participants' names have been removed and are referred to as participant A, B, C, D, and E. The researcher used thematic analysis, as developed by Nowell et al. (2017), to identify themes from the interviews. Phase 1: Familiarizing yourself with your data (Appendix F) was completed by transcribing the interviews and writing memos about each interview throughout the

transcription process. Phase 2: Generating initial codes (Appendix F) was completed by reading each interview three times and writing initial codes on printed copies. Phase 3: searching for themes (Appendix F) was conducted by using QDA Miner software in order to assign codes throughout each interview once the initial codes had been analyzed. The researcher then began to notice common occurrences, sentiments, and issues across codes. These common occurrences turned into initial themes.

Phase 4: Reviewing themes (Appendix F) was completed by rereading all transcripts and ensuring that the themes identified occurred within the larger context of each interview. Phase 5: Defining and naming themes (Appendix F) occurred through member checking. Participants were sent copies of the interview write-ups for their review and were encouraged to read and analyze the themes and relate to the researcher any disagreements. Participants did not express disagreements with the themes identified by the researcher. Last, Phase 6: Producing the report (Appendix F) was completed by writing about each theme within this chapter. The researcher used the *code retrieval* function of QDA Miner to assist with reporting the results. Codes found across multiple interviews were analyzed in order to identify common themes regarding challenges faced by human resources directors in Georgia school districts (Appendix G). Five themes were identified by the researcher:

1. Human Resources directors competed with neighboring school districts for teachers through teacher compensation packages.
2. Geography impacted human resources directors' ability to attract and retain teachers.

3. Human resources directors worked to address challenges regarding district level recruitment.

4. Human resources directors faced two main challenges that caused intra-district sorting: building leadership and student demographics.

5. Human resources directors created retention policies focused on supporting and retaining new teachers.

Qualitative question and findings. Research question three stated: What challenges have directors of human resources faced in recruiting and retaining teachers? The researcher conducted interviews with five human resources directors in school districts identified in the quantitative phase. Directors from districts with a high number of suburban and rural schools were chosen for interviews because teacher sorting by student demographics occurred in suburban and rural schools.

Theme 1. Human Resources competed with neighboring school districts for teachers through teacher compensation packages. All participants expressed that teacher salaries impacted their ability to attract and retain teachers. Participant E stated, "A lot of people are driven by the money, so we have a hard time competing with [neighboring] counties because they pay more." When asked how his school district attracts teachers, Participant B mentioned that was done via local salary supplements. He had noticed that many people from South Carolina choose to work in his district because "we pay 6,000 dollars more." Participant D stated that she thought that salary was very important because, "people can go right next door to a [neighboring] county and make more money." Participant A recalled having teachers "leave and go to some of our surrounding districts for more money."

Despite the consensus that salaries impact teacher sorting decisions, none of the participants thought that salary differences had negatively impacted their districts in a meaningful way. Participant B said, because neighboring "salary ranges are relatively close to one another," he had seen "very few teachers change school districts based solely on salary differences." Similarly, Participant E said that, despite having a neighboring district where teachers are paid more, teachers have not left en masse because "there's always usually a trade off with what comes with that." Participant C did not worry about neighboring districts that pay higher because teachers would "take the 2,000 dollar pay cut" to work in an "easier school." Participant D said that her district often gets "people from [a large metro district]. And they can make a lot more money in [that neighboring district]. However, teachers chose to work in the district for reasons other than salary." Participant A said that as long as her district "stays competitive with the metro Atlanta districts that surround us, I don't think teachers are going to leave over a few thousand dollars." Participants felt that if their district salaries were relatively similar to neighboring districts, salaries would not cause many teachers to leave their districts because of other advantages. In other words, participants did not notice differences in salary supplements serving as a wage differential that would entice teachers to work in less ideal situations.

Participants expressed that the total benefits package offered by the school district was a significant financial means to attract people to work as teachers in their district. Participant E said that he tells prospective employees that his county pays into Social Security whereas many surrounding counties do not. Regarding TRS, Participant D said, "how amazing that is and how there is no other pension like that in any other industry I

know of." Participant A's district offered an "employee assistance program" which provides 8 free counseling sessions with a mental health professional.

Last, participants identified school choice for their children as a benefit that has attracted and retained teachers from neighboring school districts. The participants described schools in their districts as being desirable compared to neighboring districts. Participant A said that teachers who use this program would have to "think twice" because they would have to "uproot" their children. Participant D said that her county had a "reputation for being a great school system" and that some people have accepted jobs in the county after discussing which school they would like their children to attend. Participant C noted that some teachers will "migrate" from one school to another within the district so that they will work in the same school where their children attend. Regardless of the degree of the effect these policies had on teacher retention and recruitment, human resources directors felt the need to remain competitive with neighboring districts through a variety of compensation programs from salary supplements to retirement plans.

Theme 2. Geography impacted human resources directors' ability to attract and retain teachers. All participants expressed that geographic factors affected teacher attraction and retention in their districts. The local economy and attractions near and within the districts in which they work impacted the overall applicant pool. Participant D thought that her location near, but not within, Atlanta served as an advantage in terms of teacher recruitment. Participant D stated that "we just have a deeper pool" of qualified teachers because "we are very blessed" to be in "an area where people want to live and want to work." She continued, "I mean, because we are just outside of Metro Atlanta, this

is a desirable place for families to move and their families to come here." She went on to say that at the elementary level, "our pool will sometimes be so deep that it's difficult for a principal to even be able to sort through all those applications to be able to decide who they want to interview." She said that the characteristics of the local area were important because surrounding counties are usually "competing for the same applicants" and that the "characteristics of our area" are what "draws people here so it's not difficult for us to sell the idea of coming to be a teacher. She acknowledged that in talking with other HR directors in other parts of Georgia, not all counties had such a high number of people applying for open jobs. For instance, some districts have had to start "really thinking outside the box" to fill open positions. The participant provided an example of a district that went an entire academic year without filling a position for a fourth grade teacher.

Similarly, Participant C stated that his district's position near three large cities means that quality candidates from Georgia and South Carolina compete strenuously for jobs in his district. He stated that his county consistently has a "100% hire rate for job openings," which is not the case for many school districts "that really struggle" to fill vacancies. He stated as a badge of honor that, in his county, "99% of our teachers are fully certified at the elementary school level." Much like Participant D, Participant C said many school districts with a limited teacher pool have to do "some outside the box thinking" about how to get candidates certified. Some examples of this included canvasing daycare facilities. Participant C also noted that, because of the affluence in his county, he does not have some of the same problems as other counties where some parts of the county have "huge pockets" of "economically disadvantaged" students.

Participant E explained that his county provides many opportunities for "things to do" that other, "very rural communities" did not. Additionally, the county was outside the busiest parts of Atlanta, which he deemed to be an advantage. For instance, if you "want a big church to go to" or "a golf course" or "whatever" it is you like, his county offers many attractions. Participant B described how "our school district is in a thriving metro area of Atlanta. The community has a thriving economy." As a result of this, he deduced that his county did not suffer some of the same struggles as other counties.

Participants also viewed their proximity to, and relationships with, local universities as an advantage to their school districts. Participant E said that the local regional university served as a pipeline for teachers into his district. About the university, he said, "we have a relationship with them and they have a lot of their interns that are in our school." This relationship meant that "when they do a good job," the principal often offers them a job right there" because they have "seen her or his work" and they are "great." He went on to say that some universities had a reputation for sending good teachers, which results in the county being more likely to hire people from those education programs. Participant C said that having "four great teaching programs within a two-hour radius" meant that he could easily recruit teachers at college job fairs. Participant D echoed the comments of participants E and C. Because of Participant D's close proximity to universities, she primarily looks at local colleges "that have sent us effective teachers and we target those colleges and continue to recruit there," whereas schools that struggle to recruit teachers "may go to some out-of-state colleges" and have to cast a larger net to recruit teachers.

The common theme found with participants was that the local area in which they worked provided a "natural recruitment base" (Participant C) and a "deeper pool of candidates" (Participant D). The experiences of the participants selected for this research were probably not the experiences of all HR directors. Participants were selected because sorting occurs more frequently in schools in their counties, competition within those counties was probably greater. Nevertheless, local universities, local job opportunities, and local amenities were perceived to influence the availability of teachers.

Theme 3. Human resources directors worked to address challenges regarding district level recruitment. Human resources directors understood processes occurring throughout their school district regarding teacher sorting. However, many of their responses to interview questions focused on district-level challenges. Thus, a theme emerged that HR directors were in a unique position to understand and explain teacher supply at the district level. Two common elements arose from discussions regarding district level recruitment. Human resources directors understood the impact of teacher perceptions of the school district on teacher supply and they worked hard to fill niche positions with qualified teachers.

Participant A believed that his district had developed a positive perception in the community so that "people come to my county because they want to work for [the participant's] county schools." She acknowledged that sorting often occurs after an initial hire, but because the district maintained a consistent set of "core beliefs and values," her district did not "struggle" to attract teachers. Participant E said that some school districts struggle to fill positions because "sometimes just the perception of you" is negative. He continued that "if there's a bad environment" it does not matter how much the district

pays, that district will have a difficult time recruiting teachers. For this reason, he worked diligently to "create an environment where people want to stay. And I'm more on the soft skills, the family piece" of maintaining a positive perception of the school district.

Participants B, C, D, and E believed that CCRPI influenced perceptions of their districts. Participant B thought CCRPI scores have "a mental impact. Teachers want to be successful and want to be seen as successful in the eyes of parents and the community." He continued that because of CCRPI scores, "quality teachers have the ability to seek out work environments that are successful and environments that are seen in the community as a place to send your kids." Participant D said that "teachers are being more informed. And they are looking not only at CCRPI" but also "doing Google searches about schools and seeing how their rated on different sites." She concluded that teachers have started "really doing their research to decide where they want to teach. And because CCRPI is academic performance, as well as other things like school climate and discipline, I think that's very important to teachers."

Similar to Participant B, Participants C and E felt that CCRPI not only impacted school recruiting but the community as a whole. "The price of real estate will drop" in areas with lower CCRPI scores, said Participant E. As a result of this, "we've had some who've gotten quite angry because of the school" CCRPI score lowered "their market area." He continued that as people are moving to the area, they will look at CCRPI scores when buying a house. "If you're a parent, you are moving in from Oklahoma, you want to go to a place" where there is a "good school." Participant C had noticed the impact of CCRPI scores at college recruiting fairs. "I always go to the recruiting fairs and wonder like, who's the belle of the ball, you know." His district had benefited from CCRPI scores

because, at recruiting fairs, “everybody wants to come to us.” He said that “they know” CCRPI scores which results in a particular school district becoming “their first choice.” In conversations with recent graduates, Participant C said, “a lot of them are looking at, you know, CCRPI scores” and because of this, districts with “lower CCRPI scores may also have trouble, you know, finding qualified applicants.” He compared CCRPI scores of online review platforms. “CCRPI is basically our Google reviews” and that “graduates are going to look at it and they’re gonna, they’re going to navigate towards those places that have the quote, unquote, best Google reviews.”

In addition to the challenge of district-wide perceptions, human resources directors were also concerned with their ability to find niche, or difficult to fill, teaching positions. Participant E described challenges in recruiting teachers for specialty technical courses. For instance, he said that positions for “healthcare science,” “diesel mechanics,” and “technology” were incredibly difficult positions to fill. Regarding healthcare science teachers, he said, “they can go to the hospital” and “on the weekend, make what they would” as a teacher. Diesel mechanic and technology positions could similarly “go in the private sector, and make, you know, 30,000 more dollars.” He believed that the only way people with these skill sets would teach would be for lower “stress” or to “live and spend time with my family.”

Participant D said his “biggest challenge is those kind of niche, hard-to-fill positions.” She further explained that teaching positions were in German, career and technical education, automotive, and digital animation. Similarly to the sentiments of Participant E, “it’s difficult sometimes to compete with the private sector.” She/he had also noticed that nonteaching positions like “sign language interpreter” were difficult to

fill because people with those skills could make much more "contracting through an agency." Participant C said he sometimes even had difficulty filling math positions. So much so that for recruiting purposes, he said HR directors would "go to North Dakota if we can."

Human resources directors seemed to defer to principals to make most school-level hiring decisions. However, participants were cognizant of, and worked to meet, district-wide challenges in teacher sorting and teacher supply. Through the interviews, the researcher identified two main challenges for human resources directors. First, HR directors understood the need for creating a positive perception of their school district in order to attract teachers. Second, participants faced the challenge of hiring for specialized positions throughout their school districts.

Theme 4. Human resources directors faced two main challenges that caused intra-district sorting: building leadership and student demographics. Participants acknowledged that some schools in their districts were more desirable than others. Although most noted that teachers choose to work in a particular school for a variety of reasons, all participants stated that building leadership was one of the biggest factors that caused intra-district sorting within their counties. Additionally, all but one participant recognized that student demographics can impact teachers' willingness to work in one school. Additionally, three participants stated that teachers seek to get hired within their counties and then sort into specific schools after doing so. Intra-district sorting within these counties, which was identified in the quantitative phase, appeared to be on the minds of human resources directors.

All participants believed that the building leaders (principals and assistant principals) dramatically impacted intra-district sorting. Participant B stated his thoughts very bluntly: “High-quality teachers typically migrate toward high-quality leaders. High-quality leaders typically rid themselves of low-quality teachers.” He continues to on to say that teacher quality gaps can “typically be traced back to leadership and the culture the administration allows to manifest as being acceptable” within individual schools.

Participants A, E, and C credited building leadership with developing positive school cultures that made people want to stay at particular schools. Participant A’s district implemented a focus on “connectedness and straying connected with your community, your faculty and staff” in order to “foster that (connectedness) in people so they stay connected to their principal and stay in that building.” The participant believed that this district-level “intentional focus” would increase retention rates across schools by building positive relationships between teachers and principals. Participant E believed, “the principal makes all the difference in the world” to a school’s culture which carries on “down the line to your people. And it’s a family. And so when people feel a part of that family, it makes them feel special.”

Participant C explained that building leaders “really bear huge onus on retaining our teachers and hiring good teachers.” This was especially true, he said, because when teachers consider leaving a school or school district, an effective leader may be able to “bridge that gap” and keep an effective teacher at their school. He said that principals building positive relationships with teachers was extremely important. Participant C stated that principals need to know their teachers and not talk to them just to “check off a box” but “really listen” to teachers about their lives and work. He said that this has

caused such loyalty among some teachers that "if an assistant principal leaves a school to become a principal at another school, then some of the teachers will go with that assistant principal."

Participants C and D both expressed good hiring practices by building leaders lead to more effective teachers in some locations than others. When asked about characteristics of schools that have been more attractive to teachers, Participant D said, "Leadership. You know, there are schools that consistently every year they have so little turnover, it's just amazing. It'll basically just be their retirees." Not only can leadership cause people to stay in a school, she said, "there are other schools where we have a higher turnover. And so a lot of times I attribute that to leadership in a school." Regarding some of the schools within her district that have struggled to attract teachers, Participant D said:

> Current principals at those schools have been very intentional about selecting people who want to be at their school. And they will be very vocal about that. They'll say, I want someone who wants to be here. And so they have changed their recruiting practices a little bit, and changing the places they recruit from.

Similarly, Participant C said that schools with more effective teachers have principals "that do a great job of interviewing." He likened this to a "Google review" where a school gets a positive reputation from interviewees even when they do not take a job within the school. These principals, "understand the impression that you're making on an applicant when they walk into your building" and that positive leaders make sure there is "somebody there to greet them (applicants), you know, provide them water, if it's necessary." He believed that effective leaders "interview how I (they) treat people" in

order to send the message that people "want to work for the school, they treat you right, they treat you fairly, and they treat you well."

In addition to building leadership, four of the participants said student demographics at a school could affect intra-district sorting. Participant A reluctantly said that teacher recruitment could "be tougher in a Title 1 school that in a non-Title 1 school." Participant E noted that when prospective teachers consider schools within his district, they "unfortunately, look at the demographic population within that school. And they don't feel comfortable in the school where people don't look like them. And that drives some of it [teacher sorting] as well."

Participant D directly stated that two main regions existed within her county. She said, "the demographics of the schools on the northern end" of the county "are different from the demographics on the southern." She continued, "that doesn't mean the schools are not as good quality. They're just different." Despite her perceptions of equal quality, she acknowledged:

> We are right on the edge of metro Atlanta. So our county is changing, our clientele is changing, sometimes people came to work at a school because it has certain clientele, and then that clientele starts changing, they might have a hard time adjusting. And so maybe they will seek employment at another school in our system.

This was a particular problem for Participant D because the district began, "redistricting a few years ago" which resulted in their school changing "significantly in their demographics. And so if teachers had a hard time adjusting with that, they may seek a

position at another school." For certain schools, attracting teachers was such a problem that Participant D's school district began limiting teacher transfers within their district.

Every participant experienced teacher sorting within their districts because of a number of factors. Additionally, three participants noticed teachers getting hired into their school districts in order to eventually work in a specific school within the district. Participant A said, "People come to (my) county because they want to work for [participant's] county schools and then they find the right fit within the schools." Teacher sorting was not necessarily a negative thing for Participant A. "I always tell first year teachers if you walk into a setting and say, I don't know if this is the right fit, we do have other schools." Participant C said that some teachers say, "I'm going to take the first job I can to get into [the] county." After the initial placement, he said there were a variety of factors that may cause teachers to sort into various schools. Participant D similarly said, "teachers get hired into that school to get their foot in the door in (my) county, so to speak. And then when they have the opportunity, they will transfer internally to another school." Human resources directors noticed that teachers will sometimes be attracted to a county and then sort within. This may be a bigger issue for school districts selected from the quantitative phase and may not be as big of a factor for districts with city and town schools.

Theme 5. Human resources directors created retention policies focused on supporting and retaining new teachers. When the researcher asked participants about retention policies in place in their districts, the theme emerged that retaining new teachers was the focus of retention policies across all participants' districts. This may be explained by participants' views about the effects of teacher experience on teacher effectiveness, all

of whom believed it to be important. However, participants also believed that the effects of experience level off after a period of time and that additional experience would not change an ineffective teacher into an effective teacher. The common theme was that most of the benefits of experience occur early in the profession. Thus, human resources directors focused their attention on keeping new teachers who would improve on their skills and become more effective.

All participants described policies in place to retain new teachers. Participant A said her district attempted to "get the first year teachers that support and have them shadow a more experienced teacher" that is an "assigned mentor." "We put a lot of focus on our first year teachers," she added. Participant A also believed that "if you ask any teacher what's the hardest part, they'll tell you the hardest part of the job is, if you have one or twenty years [experience], is managing classrooms." Because of this, her county offered "opportunities for teachers to present to first-year teachers to go and attend conferences to help them build their craft" regarding classroom management. For new teachers, Participant D's district also placed "the emphasis on professional development for teachers."

Participant C's district also implemented a new teacher mentor program to ensure that new teachers were paired with other teachers in their field. He stated that "I think a lot of school districts, and probably just a lot of companies in general fail with a mentor is they don't get mentors or guides who want to do it, it's just some people see it as a, it's just another side duty." Instead, this school district tries "to get people that have a passion for helping younger teachers or less experienced teachers" who also teach the same

subjects. Participants clearly believed in the need to support and encourage new teachers to remain in their school districts.

Three participants noted teacher leader programs as a means of retaining more experienced teachers. Participant A emphasized the need to "build capacity" within teachers in her district by providing "assignments outside the classroom" where they can be "instructional leaders or a personalized learning specialist." Participants A, D, and E all offered programs for teachers aspiring to become administrators. However, none of the participants spoke as much or as enthusiastically about these programs as they did their new teacher/mentor programs.

All participants believed that teachers become better with experience. Additionally, all teachers qualified their belief by stating the limits of experience. Participant A said, "we get better with our craft every year" and "we learn the more we grow." Regarding experience, Participant D felt "it does have an effect." However, "there's a point where the effect levels off, you know." As she recalled her own experience, she said, "I learned a lot in those first years as a teacher." She concluded, "After a certain number of years, it's like you get to that point. And then I don't know that it continues at that same rate." Participant E said that good teachers "maintain" their "effectiveness" after a certain point.

Participant C heartily believed that teachers improved with experience, noting that "just because somebody is not good at something their first year, doesn't mean they're not good their second year." He clearly believed that many first-year teachers were effective. "I always look at talent. Are you talented? But you know, if you're looking at two people, both talented, both the same credentials . . . 99% of people take the one

who's more experienced." In a comparison with football, he said, "Look at quarterbacks in the NFL; they're not great the first year" but improve with additional seasons. He concluded that experienced teachers "are generally not gonna make some of the mistakes you see younger people make, just because they've been through the wars and the battle."

Human resources directors felt experience mattered, but to a limited degree. For most, the benefits of experience leveled off after an unspecified amount of time. However, their belief in betterment through intentional experience was made evident by the mentor programs provided by HR directors.

Summary of Findings

Through the quantitative phase, the researcher compiled data from state and national agencies in order to analyze the effects of school characteristics on teacher characteristics. Descriptive data revealed that associations exist between school characteristics (geographic locale type, CCRPI score, and percentage of economically disadvantaged students) and teacher characteristics (average experience, average education, and average salary). Negative correlations existed between teacher experience and percentage of economically disadvantaged students, $r(1057) = -.251$, $p < .01$ as well as between teacher salaries and percentage of economically disadvantaged students, $r(1054) = -.412$, $p < .01$. Positive correlations existed between teacher experience and CCRPI scores, $r(1054) = .258$, $p < .01$ and between average teacher salary and CCRPI scores, $r (1054) = .370$, $p < .01$. The descriptive findings indicated that teacher quality gaps, based on teacher experience existed across locale types and for economically disadvantaged students.

The researcher originally intended to conduct a MANCOVA in order to determine the effects of geographic locale type on teacher characteristics while controlling for student economic disadvantage and CCRPI scores. However, because one of the essential assumptions of a MANCOVA was violated, a meaningful analysis of the output could not proceed. However, the assumption violation was an important finding, indicating that the influence of student economic disadvantage and school CCRPI scores affect geographic locales differently. In other words, teacher characteristics were not influenced to the same degree across locale types.

A MANOVA revealed that geographic locale had a statistically significant impact on all three teacher characteristics. Seventeen statistically significant differences were found across locale sub-types. Clearly, relationships existed between teacher characteristics and school characteristics. Hierarchical regressions were conducted to determine how economic disadvantage affected teacher characteristics in the four main geographic locale types. Hierarchical regressions indicated that economic disadvantage had the biggest impact on teacher experience within rural schools, followed by suburban schools, and no impact on city or town schools. Hierarchical regressions indicated that CCRPI had an impact within city schools but not rural, suburb, or town schools. Hierarchical regressions indicated that teacher quality gaps, based on experience existed within geographic locale types.

Through the qualitative phase, the researcher conducted interviews with five human resources directors in Georgia schools containing a high number of suburban and rural elementary schools. Interview analysis resulted in five themes:

1. Human Resources directors competed with neighboring school districts for teachers through teacher compensation packages.

2. Geography impacted human resources directors' ability to attract and retain teachers.

3. Human resources directors worked to address challenges regarding district level recruitment.

4. Human resources directors faced two main challenges that caused intra-district sorting: building leadership and student demographics.

5. Human resources directors created retention policies focused on supporting and retaining new teachers.

Chapter V

DISCUSSION

This chapter begins with a summary of the purpose, related literature, and methodology of the current study. The chapter then offers a discussion of the key findings, implications of the findings, and recommendations for future research. The study followed an explanatory mixed methods design. The researcher gathered data on all elementary schools in Georgia and analyzed teacher characteristics by school characteristics. The researcher followed up quantitative findings by interviewing with human resources directors to better understand the challenges faced by school districts regarding teacher recruitment and retention.

Purpose of the Study

Teacher quality gaps have led to educational inequalities (Darling-Hammond, 2006). Ensuring equitable access to quality teachers could reduce achievement gaps (Goldhaber et al., 2017). The purpose of this explanatory sequential mixed methods study was to determine if teacher quality gaps exist in Georgia elementary schools and, if so, offer an explanation for the differences found. School characteristics and teacher characteristics were analyzed to determine if schools with particular characteristics were more likely to have teachers with specific characteristics. Of particular focus for the researcher were differences in teacher characteristics across geographic locales.

Interviews with human resources directors were conducted to explain reasons for differences across elementary schools in Georgia.

Quantitative questions.

1) To what degree do teacher quality gaps in teacher characteristics (e.g., experience, education, and salary) exist based on school characteristics (e.g., geographic locale type, percentage of economically disadvantaged students, and CCRPI score) in Georgia elementary schools?

2) Do relationships exist between teacher characteristics and school characteristics in Georgia elementary schools?

Qualitative question.

3) What challenges have directors of human resources faced in recruiting and retaining teachers?

Related Literature

Teacher quality gaps occur when some students have access to higher quality teachers than other students. Teacher quality gaps have been widely documented in American schools (Clotfelter, 2005; Goldhaber et al., 2015; Goldhaber et al., 2017; Isenberg et al., 2013; Kraft & Gilmour, 2017; Steele et al., 2015). Teacher quality gaps have resulted in traditionally disadvantaged students being taught by lower quality teachers than their advantaged peers (Adamson & Darling-Hammond, 2012). Whipple et al. (2010) pointed out that low teacher experience is a risk factor associated with underperforming schools. Dan Goldhaber, a preeminent scholar of teacher quality gaps, and his associates (2015) have determined that teacher experience serves as an effective metric for measuring teacher quality gaps.

Using a data set of elementary schools in Tennessee, Nye et al. (2004) found that teacher experience had significant predictive power of student achievement. In an analysis of Washington schools, Goldhaber et al. (2015), found that students from lower income households, as determined by eligibility for free/reduced lunch rates, were more likely to be taught by lower quality teachers as measured by experience, licensure exam scores, and a value added measure. Whipple et al. (2010) analyzed New York City elementary school data and found low teacher experience significantly contributed to poor educational outcomes. Based on experimental data from Tennessee, Nye et al. (2004) argued that more experienced teachers improved student learning to a larger degree than did less experienced teachers. The effects of experience on student achievement were even greater for students from economically disadvantaged backgrounds.

Clotfelter et al. (2005), in an analysis of North Carolina schools, concluded that 30 percent of the distribution of novice teachers could be explained by the percentage of minority students. In other words, novice teachers tended to be concentrated in schools with more disadvantaged students. Many factors affect why some schools have higher rates of novice teachers. Steele et al. (2015) argued that initial hiring explained the majority of the unequal distribution of teachers in an urban school district. However, Goldhaber et al. (2015) concluded that teacher transfers, not initial hiring, within Washington schools explained how teacher quality gaps arose. Researchers have consistently found that traditionally disadvantaged students were more likely to be taught by less experienced teachers than students from privileged backgrounds.

Another easily measured teacher characteristic is education level. Previous research on the relationship between teacher educational attainment and student performance has been limited and inconclusive. Horn and Jang (2017) completed a meta-analysis on the impact of graduate degrees on teacher effectiveness. They argued that advanced degrees have not been demonstrated to increase student achievement. However, the authors were clear that research in this area is complicated and "poorly understood" (Horn & Jang, 2017, p. 1). In particular, there is a decided dearth of literature about teacher education and teacher quality gaps.

Researchers have demonstrated that poverty negatively affects student learning outcomes (Olszewski-Kubilius & Corwith, 2018). These results are due to a multitude of factors. For instance, Den Bosch and Duch (2017) found children from impoverished backgrounds received, on average, less cognitive stimulation at young ages than children from middle- to upper-income families. However, schools have not adequately addressed achievement gaps. Duncan et al. (2016) and Fryer and Levitt (2004) established that children from low-income households were more likely to attend low performing schools than more affluent students. A commonly used metric for determining poverty rates in schools has been the percentage of students receiving free or reduced lunch prices. In a literature review on the effects of poverty on student achievement, Olszewski-Kubilius and Corwith (2018) explained researchers consistently report that students from impoverished households begin school with achievement gaps in all learning areas and that these gaps continue to increase with age. Chetty et al. (2010) argued highly qualified teachers significantly decreased early achievement gaps. However, due to teacher quality gaps, achievement gaps have persisted (Adamson & Darling-Hamond, 2012).

One possible explanation for the unequal distribution of teachers may be salary differences. Economists Kaufman and Hotchkiss (2006) described the importance of compensating wage differentials, which, in most job markets, means that jobs perceived as less desirable will offer higher wages in order to attract employees. However, teacher labor markets may differ from most other labor markets. For instance, Clotfelter et al. (2011) argued that schools with high percentages of disadvantaged students did not pay enough to attract higher quality teachers. The authors maintained that, by increasing salaries in specific schools, teacher quality gaps could be reduced. Similarly, Feng (2009) found that salaries and school characteristics were predictive of teacher retention in Florida schools.

The above studies may indicate that public schools are unable to offer adequate compensating wage differentials in order to attract teachers to schools where they are most needed. Martin (2010a), in a nationwide analysis of teacher salaries and student achievement, argued that schools with high populations of economically disadvantaged students and racial minorities did not pay high enough salaries to attract and retain effective teachers. This lack of compensating wage differentials resulted in lower student achievement (Martin, 2010a). Clotfelter et al. (2008a) analyzed the effects of a retention bonus for teachers in high poverty areas. The researchers found that increasing salaries by $1,800 in specific schools would significantly increase student outcomes among poor students in North Carolina. The literature clearly establishes that salaries affect teacher distribution.

Geography may affect educational outcomes (Boyd et al., 2005; Goff & Bruecker, 2017; Miller, 2012; Monk, 2007; United States Department of Agriculture, 2017; Zaff et

al., 2017). Boyd et al. (2005) found that teachers searched for jobs close to their hometowns. This resulted in a disadvantage for urban schools. However, Miller (2012) found that rural schools had fewer surrounding industries, which meant fewer prospective teachers moved to rural areas. Following their nationwide analysis, Papay et al. (2017) argued that urban schools faced greater teacher recruitment and retention difficulties than any other geographic locale type. Tuck et al. (2009) found that teachers' desire for local amenities put rural schools at a disadvantage in Alaskan schools. While the above studies demonstrated that geography affects teacher labor markets, the effects of geography on teacher sorting and educational outcomes has not been extensively researched (Goff & Bruecker, 2017).

Methods

The current mixed methods explanatory sequential study examined differences in teacher characteristics based on school characteristics across Georgia elementary schools and investigated reasons for the differences. Explanatory sequential studies require researchers to investigate a problem in an initial quantitative phase and proceed with a qualitative phase to better understand quantitative findings (Creswell, 2014). The independent variables were geographic locale type, average percentage of economically disadvantaged students, and College and Career Readiness Performance Index (CCRPI) scores of elementary schools in Georgia. The dependent variables were average teacher experience, teacher salary, and teacher education. The qualitative phase consisted of interviews with human resources directors selected based on the quantitative findings.

Population. The population for the quantitative phase of this study included elementary schools in the state of Georgia. Only elementary schools comprised of grades pre-kindergarten (PK) through 5 or kindergarten (K) through 5 were included. Teacher and school characteristics were analyzed from 1,057 schools. Three schools were not included in the inferential analysis because they had not been designated as a geographic locale by the federal government at the time of data collection.

Participants. The researcher purposefully sampled participants in the qualitative phase based on the findings in the quantitative phase. Explanatory sequential research designs allow researchers to sample populations based on findings (Creswell, 2014). In the quantitative phase, the researcher found that teacher sorting occurred more frequently in suburban and rural schools than in city or town schools. Thus, he chose to gather participants from school districts with high numbers of suburban and rural schools in order to better understand the unique position and challenges of human resources directors in districts with high rates of teacher sorting. The researcher interviewed five human resources directors in counties identified through the quantitative phase.

Procedures and data analysis. The quantitative phase used data from the Georgia Department of Education (2019) and National Center for Education Statistics (2019) to analyze teacher and school characteristics. Both descriptive and inferential statistical procedures were used to analyze quantitative data. A one-way MANCOVA was first attempted but because statistical assumptions were not met, a MANOVA was performed. *Post hoc* comparisons were then reviewed to determine significant differences in teacher characteristics across geographic locales. Last, four hierarchical multiple

regressions were performed to determine how schools in each geographic locale were differently affected by the independent variables.

The qualitative phase of this study was conducted through a grounded theory approach. Grounded theory, created by Glaser and Strauss (1967) allows researchers to create a theory which explains a phenomenon through themes that emerge from data collection (Merriam, 2002). Grounded theory posits the researcher is not seeking to test an *a priori* assumption, but instead is attempting to discover an answer through qualitative research (Ary et al., 2014). Grounded theory was an appropriate form of qualitative research because the researcher did not assume to know the perceptions or attitudes of human resources directors about teacher characteristics and sorting, but sought to explain common themes among the interviews.

Data analysis occurred using a general inductive approach. General inductive analysis of qualitative data was used to identify themes across interviews, condense interviews into summaries, relate the interviews to the research questions, and to create a theory which helps explain teacher sorting in Georgia elementary schools (Thomas, 2006). The specific strategy used for inductive analysis was the creation of themes after close readings and coding of interview data (Thomas, 2006). The researcher used QDA Miner software to code interview transcripts. The researcher also used a method of thematic analysis developed by Nowell et al. (2017) (Appendix F) to aid in the identification of themes and develop a theory.

Limitations

Several limitations existed for this research study design. Teacher experience, though highly correlated with teacher quality, is not the same thing as teacher quality

(Goldhaber et al., 2015)., the researcher had to use hierarchical multiple regressions within each geographic locale type to determine how CCRPI and student economic disadvantage affected teacher experience because CCRPI and student economic disadvantage affected locales differently. Thus, generalizations about the effects of school performance measures and student economic disadvantage while controlling for geographic locale type were limited. In the quantitative phase, the researcher only analyzed teacher distribution across Georgia. Full causality for the distribution of teachers could not be explained by the data used in this study. Only human resources directors from districts with high rural/suburban schools were interviewed. The perspectives of human resources directors in districts with many city and/or town schools were not included in the present study. Perhaps because of this, most participants expressed not having great difficulty in recruiting teachers. A more representative sample of Georgia's human resources directors could reveal different challenges within different school districts.

Summary of Findings

Three research questions were used in the current study to determine the degree to which teacher characteristics differ in Georgia elementary schools based on school characteristics. Differences in teacher characteristics were determined through quantitative means. Teacher characteristics used in this study included average teacher experience, teacher salary, and teacher education. School characteristics used in this study included geographic locale type, percentage of economically disadvantaged students, and CCRPI score. Data were gathered from the Georgia Department of Education and NCES. After the quantitative phase, interviews with human resources

directors were analyzed to determine challenges faced in Georgia to recruiting and retaining teachers.

Quantitative phase. Research Question 1 asked if relationships exist between school characteristics and teacher characteristics. An analysis of descriptive statistics revealed differences across geographic locale types. The difference in average teacher experience between the locale with the highest and lowest average years of experience was 4.13 years (Table 15). The difference in average teacher salary between the lowest paid locale and the highest paid locale was $11,863.94 (Table 16). The difference in average teacher education between the lowest teacher education locale to the highest teacher education was .22 degree (Table 17). The difference in average percent economically disadvantaged students between the lowest locale and highest locale was 34.38% (Table 18).

Table 16

Average Teacher Experience, Ascending

Geographic Locale	Mean	N	Std. Deviation
City: Midsize	11.92	108	2.50
City: Small	12.15	64	2.03
City: Large	12.51	46	2.11
Suburb: Large	12.87	433	2.40
Town: Remote	13.387	11	1.87
Suburb: Midsize	13.96	13	2.05
Suburb: Small	14.10	15	2.35
Town: Distant	14.18	44	1.80
Rural: Fringe	14.32	223	2.36
Town: Fringe	14.73	18	1.58
Rural: Distant	14.94	73	2.49
Rural: Remote	16.05	9	2.57
Total	13.31	1057	2.51

Table 17

Average Teacher Salary, Ascending

Geographic Locale	Mean	N	Std. Deviation
City: Midsize	50623.16	108.00	3719.96
Town: Remote	51269.56	11.00	2121.81
Rural: Remote	53250.82	9.00	5028.52
Town: Distant	53326.70	44.00	2988.30
Rural: Distant	53944.67	73.00	3704.25
Suburb: Small	54734.31	15.00	3305.16
Town: Fringe	54935.22	18.00	3321.69
City: Small	54960.39	64.00	3976.39
Rural: Fringe	55774.97	223.00	4403.23
Suburb: Midsize	56402.57	13.00	3538.29
Suburb: Large	57824.10	433.00	3514.54
City: Large	62487.10	46.00	3328.53
Total	56012.74	1057.00	4594.17

Table 18

Average Teacher Education, Ascending

Geographic Locale	Mean	N	Std. Deviation
City: Small	1.78	64.00	.20
City: Midsize	1.78	108.00	.15
Town: Remote	1.80	11.00	.15
Suburb: Large	1.81	433.00	.16
Town: Fringe	1.86	18.00	.18
Rural: Fringe	1.88	223.00	.18
Town: Distant	1.88	44.00	.19
Rural: Distant	1.89	73.00	.21
Suburb: Midsize	1.92	13.00	.17
Suburb: Small	1.92	15.00	.17
City: Large	1.94	46.00	.19
Rural: Remote	2.00	9.00	.20
Total	1.84	1057.00	.18

Table 19

Average Percentage of Economically Disadvantaged Students, Ascending

Geographic Locale	Mean	N	Std. Deviation
Town: Fringe	57.17%	18	12.36
Suburb: Large	60.45%	433	31.41
Rural: Fringe	60.65%	223	25.08
City: Small	63.94%	64	29.50
Suburb: Small	69.93%	15	18.42
Rural: Distant	76.29%	73	19.02
Town: Distant	77.43%	44	20.19
Suburb: Midsize	77.54%	13	25.23
City: Large	81.72%	46	34.57
City: Midsize	88.09%	108	18.71
Rural: Remote	88.67%	9	16.05
Town: Remote	91.55%	11	5.68
Total	67.11%	1057	28.94

Across the state of Georgia, many correlations existed between individual teacher characteristics and school characteristics. Results of a Pearson correlation demonstrated a statistically significant negative association between teacher experience and percentage of economically disadvantaged students, $r(1057) = -.251$, $p < .01$; and a significant positive relationship between teacher experience and CCRPI scores, $r(1054) = .258$, $p < .01$. Data confirmed that across the state, schools with higher percentages of economically disadvantaged students and lower CCRPI scores tended to have less experienced teachers than schools with lower economic disadvantage and higher CCRPI scores.

Results of a Pearson correlation demonstrated a statistically significant negative association between teacher salaries and percentage of economically disadvantaged students, $r(1054) = -.412$, $p < .01$; and a statistically significant positive association

between average teacher salary and CCRPI score, r(1054) = .370, $p < .01$. Data confirmed that across the state, schools with higher percentages of economically disadvantaged students and lower CCRPI scores tended to have lower paid teachers than schools with a lower economic disadvantage and higher CCRPI scores.

Results of a Pearson Correlation demonstrated an insignificant association between average teacher education and percentage of economically disadvantaged students. ($r(1054) = -.025$, $p > .01$. However, the association between teacher education and CCRPI scores was statistically significant ($r(1054) = .106$, $p < .01$. Data confirmed that, across the state, schools with lower CCRPI scores tend to have lower teacher education but that economic disadvantage is not associated with higher or lower teacher education.

Although the descriptive statistics confirmed that differences existed across locale types, and that certain school characteristics were associated with teacher characteristics, the meaning that can be drawn from descriptive data is limited. A MANCOVA was conducted in SPSS to determine if statistically significant differences in teacher characteristics existed by geographic locale while controlling for the influence of student economic disadvantage and CCRPI scores. Previous researchers found that teacher sorting is heavily influenced by the percentage of economically disadvantaged students in a school and the school's performance metrics (Goff & Bruecker, 2017). Thus, the researcher conducted a one-way MANCOVA in order to determine the degree to which teacher sorting was affected by geographic locale while controlling for these two covariates.

One-way MANCOVAs require that eleven statistical assumptions be met in the data to have accurate statistical power. When the MANCOVA procedure was conducted in SPSS, most statistical assumptions were met; however, the assumption of homogeneity of regression slopes was not. The purpose of the homogeneity of regression slopes is to ensure that the covariates (economic disadvantage and school performance) have the same effect on each of the categorical groups (geographic locales). When this assumption is violated, the categorical variable is referred to as a moderator variable. Moderator variables affect the relationship between dependent and independent variables.

The violation of this assumption indicated that geographic locale type had a moderator effect on CCRPI and the percentage of economically disadvantaged students. In other words, the effects of school performance measures and economically disadvantaged students may have a different effect on teacher characteristics, depending on geographic locale type. Had the MANCOVA been analyzed regardless of this assumption violation, the results would have shown a greater effect of geographic locale on teacher characteristics than was actually present. If one locale was affected by student disadvantage more than another, the MANCOVA results would have attributed those differences solely to geographic locale. Based on the assumption violation in the MANCOVA, a conclusion cannot be made regarding the effects of geographic locale type while controlling for percentage of economically disadvantaged students and CCRPI score. The significance of this finding is that explanations about teacher sorting decisions may not be uniform throughout the state. For instance, certain factors may impact rural teacher sorting decisions to a greater extent than suburban teacher sorting decisions. Previous researchers have determined that many teacher labor markets are small (Engel

& Cannata, 2015). Based on significant differences in its elementary schools by locale type, this seems to hold true in the state of Georgia.

A MANOVA was conducted using the data because economic disadvantage and school performance could not serve as covariates in a MANCOVA analysis. This was appropriate because MANOVA analysis does not reports differences between groups without controlling for covariates. Thus, the relationship demonstrated in a MANOVA was more accurate even though it indicated a weaker relationship between geographic locale and teacher characteristics. In the MANOVA analysis, geographic locale type served as the independent variable and teacher experience, education, and salary served as the dependent variables.

The MANOVA procedure revealed that geographic locale type has a statistically significant impact on teacher characteristics, $F(33, 3135) = 29.01$, $p < .001$; *Pillai's Trace* = .70; partial $\mu = .234$. The *partial eta squared* of .234 denotes a large effect size (Cohen, 1988; Miles & Shevlin, 2001). In other words, geographic locale accounts for 23% of the variation in teacher characteristics. Tests of between-subjects effects was used to determine the impact of geographic locale on each of the dependent variables. Geographic locale had the largest impact on teacher salaries, $F(11, 1045) = 48.79$, $p < .001$; partial $\mu = .339$. This signified a large effect (Cohen, 1988; Miles & Shevlin, 2001). Next was teacher experience, $F(11, 1045) = 16.36$, $p < .001$; partial $\mu = .147$. This signified a medium effect (Cohen, 1988; Miles & Shevlin, 2001). Geographic locale had the least impact on teacher education, $F(11, 1045) = 7.54$, $p < .001$; partial $\mu = .074$. This signified a medium effect (Cohen, 1988; Miles & Shevlin, 2001). In sum, the MANOVA revealed that geographic locale accounts for approximately 33.9% of the variation in

average teacher salaries, 14.7% of the variation in average teacher experience, and 7.4% of the variation in average education across Georgia elementary schools.

A *Tukey-Kramer post hoc test* was conducted and analyzed in order to determine if statistically significant differences existed between specific locale types for each variable. *Post hoc* tests allow researchers to see differences between specific groups within a categorical variable. Twenty-five comparisons revealed statistically significant differences in salaries between specific locales. Seventeen comparisons were statistically significant between locales for teacher experience. Eight comparisons were statistically significant between locales for teacher education. The MANOVA statistics and the follow up *post hoc* comparisons corroborated that geographic locale had the largest impact on average teacher salary, followed by experience, and the lowest impact on education.

A hierarchical multiple regression was conducted for each main locale type because the initial MANCOVA revealed economic disadvantage and school performance measures affected geographic locales differently. Hierarchical multiple regression was chosen because it allowed the researcher to determine the added predictive power of additional independent variables on regression model. This is especially useful when covariates are known (Laerd Statistics, 2017). Teacher salary was included in the regression model because Georgia teachers receive salary increases with additional experience. Thus, the model allowed the researcher to determine the additional influence of student economic disadvantage and CCRPI score in each main locale while controlling for the predictive power of teacher salaries. Main locales were chosen because of the

small sample sizes in some locales. Small sample sizes have a greater impact on the regression models than group comparison methods.

Each hierarchical regression model used teacher salary, percentage of economically disadvantaged students, and CCRPI score as independent variables and teacher experience as the dependent variable. Hierarchical regression models generate an initial model (Model 1) to which other models that include additional independent variables will be compared. The initial model for each of the regressions (city, suburb, rural, and town) used teacher experience. Thus, the hierarchical regression model demonstrated the additional association that each independent variable had on teacher salary. The full model for each locale was statistically significant, $p < .01$.

Results from the city hierarchical regression model indicated that the addition of economic disadvantage to the model did not lead to a statistically significant increase in R^2, as shown in Table 7. However, the addition of CCRPI to the model led to a statistically significant increase in R^2 of .035, $F(1, 214) = 9.41$, $p < .01$. Results indicated that within city schools, average teacher experience was influenced by CCRPI scores but not student economic disadvantage.

Results from the rural hierarchical model indicated the addition of economic disadvantage to the model led to a statistically significant increase in R^2 of .063, $F(1, 302) = 31.45$, $p < .001$. However, the addition of CCRPI to the prediction of teacher experience did not lead to a statistically significant increase in R^2. These results indicated that within rural schools, average teacher experience was influenced by student economic disadvantage, but not CCRPI scores.

Results from the suburb hierarchical model indicated that the addition of economic disadvantage to the model led to a statistically significant increase in R^2 of .023, $F(1, 458) = 20.72$, $p < .01$. The addition of CCRPI to the model did not lead to a statistically significant increase in R^2. These results indicated that within suburban schools, average teacher experience was influenced by student economic disadvantage, but not CCRPI scores.

Results from the town hierarchical model indicated that the addition of economic disadvantage to the model did not lead to a statistically significant increase in R^2. The addition of CCRPI also did not lead to a statistically significant increase in R^2. These results indicated that within town schools, average teacher experience was influenced by neither student economic disadvantage nor CCRPI scores.

Results from the quantitative phase answered the research questions in many ways. Descriptive analysis answered Research Question 2. Teacher characteristics were associated with school characteristics though some of the associations were stronger depending on the characteristic. Specific geographic locale types tended to have higher teacher salary, experience, and education. However, the effects of geography on education appeared minimal. Schools with more economically disadvantaged students and lower CCRPI scores tended to have teachers with less experience and lower salaries.

Inferential statistics were better suited to answer Research Question 1. Due to adherence to statistical assumptions, Research Question 1 could not be directly answered through a MANCOVA analysis. Instead of determining whether geographic locale affected teacher characteristics while accounting for economic disadvantage and school performance scores, the analysis revealed that one cannot control for the two covariates

because they affect geographic locales differently. In other words, economic disadvantage and school performance measures do not uniformly affect elementary schools in Georgia.

A one-way MANOVA analysis revealed that, across the state, geographic locale had a large effect on teacher salaries and a medium effect on teacher experience and education. *Post hoc* tests showed where the largest gaps in experience, salary, and education occurred by locale types. Hierarchical regressions demonstrated that the percentage of economic disadvantage in a school had the largest impact on teacher experience within rural schools, followed by suburban schools. Economic disadvantage did not have an impact on teacher experience within city or town schools. CCRPI score only had an impact within city schools.

Qualitative phase. In asking Research Question 3, the researcher sought to understand challenges faced by human resources directors in recruiting and retaining teachers to their school districts. The researcher conducted semi-structured interviews with five human resources directors in order to better understand teacher recruitment, retention, and sorting within their districts. Participants answered prepared questions (Appendix A), but the researcher asked additional questions based on responses to the prepared questions. The researcher identified five common themes regarding Research Question 3 after coding and analyzing interview transcripts. Names of participants and school districts have been removed. The researcher changed participant names to participant A, B, C, D, and E for this paper.

The first theme identified by the researcher was that human resources directors competed with neighboring school districts for teachers through teacher compensation

packages, an issue that was acknowledged by all of the participants. However, participants saw their job as staying competitive with bordering school districts, rather than on a state-wide level. Participant B said that because other school districts had "salary ranges" that were "relatively close to one another" that "very few teachers change school districts based solely on salary differences." However, when asked how the district attracts and retains teachers, the same participant responded, "local salary supplements." This participant indicated that salaries were important to teachers, but as long as a school district offered salaries relatively close to those of neighboring districts, teachers changing district due to salary would not be a problem. Participant C similarly said that teachers would "take the 2,000 dollar pay cut" in exchange for working in an "easier school." He stated that some people drive from South Carolina to work in his district because "we pay 6,000 dollars more." Again, the participant implied that salaries mattered, but only to a degree.

Human resources directors competed with neighboring districts through incentives other than salary. Participants identified benefits packages as a means by which they attracted and retained teachers. Participant E explained that their district pays into social security (something many school districts do not do) in order to attract teachers. Participant A stated that a recently introduced "employee assistance program" that provided counseling services to employees was introduced to help teachers and improve retention.

Three participants identified teacher school choice as a reason some teachers work in their districts. Teacher school choice allows teachers to send their children to any school in the district, even if they live outside that district. Participant D said their district

had a “reputation for being a great school system” where teachers want to bring their children. Participant A said that teachers have to “think twice” when they leave the school district because they would have to “uproot” their children because they would no longer qualify for teacher school choice.

The second theme identified by the researcher was that geography impacted human resources directors’ ability to attract and retain teachers. Participants expressed how local economic opportunities affected teacher supply in their districts. Participant D described her district as having a “deeper pool” of qualified teachers because the area was a place where “people want to live and want to work.” She said the district was “just outside of Metro Atlanta” and was a “desirable place for families to move” into because of local economic opportunities and amenities. She said it was “not difficult for us to sell the idea of coming to be a teacher” here. Participant C attributed his school districts proximity to three large cities for having a “100% hire rate for all job openings.” This was in comparison to other districts, he said, that have to do “some outside the box thinking” to get teachers. Participant E said because his community offered “things to do” that “very rural” areas did not, he did not struggle to attract teachers.

Participants also explained that proximity to and relationships with local universities eased potential teacher recruitment challenges. Local universities served as both pipelines and filters for quality teacher candidates. Regarding a local university, Participant E stated, “we have a relationship with them and they have a lot of their interns that are in our schools.” In turn, “when they do a good job, often the principal offers them a job right there.” Participant C explained that having “four great teaching programs within a two-hour radius” meant that recruitment was not a challenge and contributed to a

"100% hire rate." Participant D was aware of the colleges "that have sent us effective teachers and we target those colleges and continue to recruit there." Participant C summarized the effects of geography as creating a "natural recruitment base" for his district.

The third theme identified by the researcher was that human resources directors worked to address challenges regarding district level recruitment. While participants understood that different schools faced different challenges throughout their districts, their challenges and concerns were focused mainly on district-level challenges. Two common challenges were identified across participants. First, participants wanted to foster a positive image of the district because they thought that perceptions of the district could help or hinder recruitment. Second, participants focused on recruiting and maintaining hard-to-fill specialty positions throughout the district.

Participant E noted that "sometimes just the perception of you" can impact a district's ability to attract and retain teachers. As a result of this belief, he worked tirelessly to "create an environment where people want to stay." The participant continued by stating, "if there's a bad environment," a higher salary is not enough to attract teachers. One aspect affecting perceptions about school districts that was identified by participants was CCRPI scores. Participant B thought that CCRPI scores have a "mental impact" and that "teachers want to be successful and want to be seen as successful in the eyes of parents and the community." He believed CCRPI scores have that effect because "quality teachers have the ability to seek out work environments that are successful and environments that are seen in the community as a place to send your kids." Participant D said that prospective teachers to her district have begun to conduct

"Google searches about schools and seeing how they're rated on different sites. And because CCRPI is academic performance, as well as other things like school climate and discipline, I think that's very important to teachers." Participant C said CCRPI scores determine the "first choice" for college graduates. He explained schools with "lower CCRPI scores may also have trouble, you know, finding qualified applicants." He continued by stating that, because he worked in a district with high CCRPI schools, prospective teachers have eagerly applied to his district.

The fourth theme identified by the researcher was that human resources directors faced two main challenges that caused intra-district sorting: building-level leadership and student demographics. Participants believed that the principals and assistant principals in a school affected intra-district sorting. Participant B argued that "high-quality teachers typically migrate toward high-quality leaders. High-quality leaders typically rid themselves of low-quality teachers." Participant A's district focused on fostering "connectedness in people so they stay connected to their principal and stay in that building." Participant E believed that, "the principal makes all the difference in the world" to a school culture which carries on "down the line to your people. And it's a family. And so when people feel a part of that family, it makes them feel special." Participant C expressed building leaders "bear huge onus on retaining our teachers and hiring good teachers."

Participants also cited varying student demographics among schools as a reason for intra-district teacher sorting. Participant A indicated within her district, recruitment "could be tougher in a Title 1 school than in a non-Title 1 school." Participant E was more direct in arguing that prospective employees, "unfortunately, look at the

demographic population within" schools "and they don't feel comfortable in the school where people don't look like them. And that drives some of teacher sorting "as well." Participant D said that his "county is changing, our clientele is changing, sometimes people came to work at a school because it has certain clientele, and then that clientele starts changing." He credited this process to why many "seek employment at another school in our system."

The fifth theme identified by the researcher was that human resources directors created retention policies focused on supporting and retaining new teachers. All participants described policies in place to retain new teachers. Participant A and C explained in detail the importance of their new teacher mentoring programs. Participant A stated, "we put a lot of focus on our first year teachers" by ensuring they "attend conferences to help them build their craft" and have an effective "assigned mentor." Participant C worked to "get people that have a passion for helping younger teachers or less experienced teachers" to serve as mentors for first year teachers. This may have been vital to human resources directors because all participants indicated that teacher effectiveness improves with experience. However, most thought, like participant D, that "there's a point where the effects (of experience) level off." Participants may have been more likely to focus retention efforts on new teachers because participants believed that initial experience was the most crucial.

Discussion

The researcher found that differences in teacher characteristics existed across Georgia elementary schools. Statewide, student demographics were associated with teacher characteristics. A moderate statistically significant correlation existed between

average teacher experience and percentage of economically disadvantaged students, $r(1057) = -.251$, $p < .01$. Economic disadvantage affected some locale types more than others; hierarchical regressions revealed that student economic disadvantage had the largest effect on rural schools, $F(1, 302) = 31.45$, $p < .001$. However, economic disadvantage only explained 6.3% of the variation in teacher characteristics across rural schools, $R^2 = .063$. Interviews with human resources directors also indicated that student demographics affected teacher sorting. Participants believed that schools with higher minority and economically disadvantaged populations were more difficult to staff than other schools. This sorting, participants noted, often occurred after staff gained experience within their district. This same phenomenon was found by Clotfelter et al. (2008) and Papay et al. (2017) in other states.

Findings in the present study align with previous research on teacher quality gaps. Adamson and Darling-Hammond (2012) argued that teacher quality gaps exacerbate unequitable educational outcomes when lower quality teachers are more likely to teach economically disadvantaged students. Researchers such as Clotfleter et al. (2005) and Nye, et al. (2004) have found that students from impoverished backgrounds were more likely to be taught by teachers with less experience, which led to lower academic outcomes. In agreement with the human resources directors participating in this study, Goldhaber et al. (2015) found that student demographics led to intra-district teacher sorting. Data analysis in the present study supported previous findings.

The quantitative phase revealed differences in teacher characteristics across geographic locale types. A MANOVA procedure determined that geographic locale accounted for 23% of the variation in teacher characteristics examined in this study.

Additionally, teachers in Rural: Remote schools had, on average, 4.13 years more experience than teachers in City: Midsize schools. One might expect these locales to have a similar difference in salary because teacher salary is heavily influenced by experience. However, in terms of geographic locale, salary differences between these two were not found to be the greatest. Rural: Remote teachers' average salary was $53,250.82 and City: Midsize teachers' average salary was $50,623.16. The greatest difference in salary existed between City: Midsize ($50,623.16) and City: Large ($62,487.10) teachers, with a mean difference of $11,863.94. Additionally, a moderate to strong negative correlation existed between average teacher salaries and average student economic disadvantage, $r(1054) = -.412$, $p < .01$.

In other words, schools with fewer economically disadvantaged students also pay teachers higher wages. Other researchers concluded the same when looking at different parts of the United States (Cebula et al., 2013; Gilpin & Kaganovich, 2012; Hanushek et al., 1999; Imazeki, 2005; Lin, 2010; and Martin, 2010a). Clotfelter et al. (2011) and Feng (2009) argued that one way to reduce teacher quality gaps would be to offer wage differentials in schools with lower quality teachers. However, Georgia does not provide additional wages for teachers to work in schools with lower CCRPI scores or those with high rates of economically disadvantaged students.

Research on teacher sorting among geographic regions is limited (Goff & Bruecker, 2017). Boyd et al. (2005) determined that rural schools in New York faced teacher recruitment and retention challenges that urban areas did not. Miller (2012) argued that because urban areas competed for workers in other sectors, the pool of teacher applicants was larger in urban areas compared to rural areas. He also discovered

that many teachers left rural schools for urban schools. Monk (2007) found that teachers in rural areas had less experience than teachers in urban areas. Findings from the present study suggested that in Georgia, some urban areas suffer from a teacher experience gap compared with some rural areas. Thus, Georgia may be unique in its distribution of experienced teachers across locale types.

Participant interviews indicated that human resources directors believed that salary mattered for teacher recruitment. However, most felt a need to compete with nearby districts, rather than across the state. Boyd et al. (2005) observed that teacher labor markets tend to be relatively small compared to other industries. Similarly, Papay et al. (2017) found that most teacher sorting occurred within school districts, not over long distances. Participants also stated community characteristics impacted their ability to attract and retain teachers; their observation was supported by Tuck et al. (2009), who noted that local amenities strongly affected Alaskan school districts' ability to attract teachers. Boyd et al. (2005) found that teachers tended to seek employment close to home, which created larger labor pools for some areas over others.

All participants expressed that salaries were important to teachers, but in a limited manner. Human resources directors felt that as long as they kept salaries relatively similar to neighboring districts, other characteristics of their county (amenities and student demographics) would attract teachers. Participants time and again expressed that a few thousand dollars was not enough to make a teacher change schools. In other words, salary differences did not seem large enough to attract teachers to locations they perceived as less desirable. Miller (2012) and Lankford et al. (2002) also contended that schools in their studies did not offer adequate compensating differentials to more equitably

distribute teachers across schools with different characteristics. Researchers such as Imazeki (2005) and Jackson (2012) pointed out that salaries can affect teacher sorting decisions; however, differences in Georgia teacher wages were not large enough to reduce teacher quality gaps.

Georgia's school performance metric, the CCRPI, also had associations across schools. For all schools, a moderate but statistically significant correlation existed between teacher experience and CCRPI scores, $r(1054) = .258$, $p < .01$. Additionally, a weak but statistically significant correlation existed between teacher education and CCRPI scores, $r(1054) = .106$, $p < .01$. CCRPI scores had the largest effects on city schools, $F(1,214) = 9.41$, $p < .01$. However CCRPI only accounted for 3.5% of variation in teacher experience within city schools.

Human resources directors said that CCRPI scores affected teacher sorting. However, teachers may sort earlier in their careers, based on participant interviews, whereas the data used in the quantitative phase analyzed all Georgia elementary teachers. CCRPI scores may affect early teacher sorting to a greater extent. Because student economic disadvantage and CCRPI scores affected teacher characteristics in geographic locales differently, only limited conclusions about the effects of geographic locale on teacher characteristics could be drawn.

Implications of the Results

Ensuring equity of access to quality teachers should be a high priority for all educational policy-makers (Long, 2011). When certain groups of students have greater access to quality and experienced teachers, a teacher quality gap is present (Goldhaber et al., 2015). In order for the problem of teacher quality gaps to be resolved, such gaps must

first be identified. Previous researchers have identified teacher quality gaps based on student economic and racial background; however, until now, that issue had never been researched in Georgia. Similarly, limited research has been conducted on the role of geography in access to experienced teachers in the United States.

The present study corroborated the established literature on teacher quality gaps. Namely, some students in Georgia had access to teachers with higher qualifications. Across Georgia, schools with higher percentages of economically disadvantaged students and lower CCRPI scores employed teachers with lower experience. Whipple et al. (2010) found schools with less experienced teachers led to lower student achievement. In the present study, human resources directors also believed that teachers with more experience tended to be more effective teachers. Goldhaber et al. (2015) documented how unequitable access to teachers with lower experience placed poor students at a further disadvantage, compared to their more affluent peers. Further research is needed to determine extent to which low experience teachers cause schools to underperform. Nevertheless, the unequitable distribution of teachers found in the present study constitutes a social justice problem in Georgia.

Perhaps most importantly, this research has highlighted that in Georgia, teachers have few incentives to work in schools with lower performance measures or in those with higher populations of economically disadvantaged students. In other words, wage differentials, i.e., the amount of money required for someone to take a less desirable job, (Kaufman & Hotchkiss, 2006) do not exist within Georgia teacher labor markets. Human resources directors also indicated that small salary differences would not be enough to attract teachers to teach in situations they perceive as less ideal.

Because salaries have not been shown to motivate teachers to change locations, HR directors in Georgia noted that student characteristics often shape teacher decisions to change schools. Additionally, the quantitative research found a negative association between economic disadvantage and teacher salary. Teachers who work with high economically disadvantaged populations were, on average, paid less than teachers working with more affluent students. Martin (2010a) found that to attract teachers, schools with higher disadvantaged student populations had to pay higher salaries. Similarly, Ingle and Rutledge (2010) found that schools offering high salaries received a greater number of job applications. Despite the potential influence of salaries, Georgia schools do not offer the financial incentives necessary for equitably distributed teachers.

This study analyzed the distribution of teachers based on select characteristics across Georgia elementary schools, with an emphasis on the role of geographic locale on teacher characteristics. Analysis of the data revealed that factors affecting teacher sorting affected geographic locales differently. Thus, future policies to promote equitable teacher distribution must account for regional differences.

Recommendations for Future Research

This study was the first conducted on teacher sorting in Georgia schools and the first to explore challenges faced among human resources directors in those schools. However, during the course of this research, many questions were raised that were outside the parameters of the study. Gaps in the literature on teacher sorting persist despite the knowledge gained through this study. Based on the unanswered questions that were raised, the researcher developed suggestions for future research conducted on

teacher sorting. Suggested recommendations for future research based upon the findings from this study include:

1. Conduct a longitudinal study that tracks newly hired Georgia teachers. Because participants described how teachers are initially hired in a school district and, after gaining experience, transfer schools, teacher sorting may occur at greater rates in the early stages of a teacher's career. A longitudinal study would also allow researchers to determine if the effects of school characteristics are more pronounced among early career teachers.
2. Conduct interviews with teachers regarding why they continue to work in a particular school or reasons they may have left schools in the past. The first-hand experiences of teachers who have recently transferred schools could shed light on the reasons teachers choose some schools over others.
3. Conduct further investigations into factors affecting leader sorting. Human resources directors stressed the importance of quality building-level leaders on attracting and retaining effective teachers. Quantitative analysis, in addition to further qualitative investigations, could increase understanding of ways in which schools with high rates of economically disadvantaged students could better attract quality building-level leaders.
4. Conduct a quantitative analysis of teacher sorting among schools within a close proximity. Both the data analysis and interviews from the present study identified that teacher labor markets were relatively small in Georgia. Factors affecting teacher sorting may be more pronounced at the regional level or among neighboring school districts.

5. Conduct qualitative investigations as to why rural school districts have higher average teacher experience than other geographic locales. Teachers in these districts may have to stay in the profession longer in order to make up for lost wages or benefits.
6. Conduct an investigation of or experiment with programs designed to retain teachers with 10-20 years of experience. Human resources directors believed that, after early career experience, additional years of teaching did not lead to teachers becoming more productive. Thus, retention initiatives were focused on new teachers. Strategic policy decisions could be made if more was known about retaining middle and late career teachers.
7. Conduct an investigation into why CCRPI affects city schools more than other locale types. Based on the data analyzed, city schools were not significantly affected by student demographics. This may indicate that the motives of teachers in city schools differ from those in other locale types. City schools may have students who are demographically similar, which may indicate that and teachers sort for reasons other than student characteristics.
8. Conduct further quantitative studies exploring what school characteristics affect teacher sorting decisions. While geographic locale type, student economic disadvantage, and school performance affected some schools, other factors may have larger effects on teacher decision making. Learning about other factors may better inform policy makers seeking to make access to teachers equitable across schools.

9. Conduct a pilot study within a school district offering wage differentials to schools experiencing teacher quality gaps. Currently, little research exists demonstrating what effective wage differential would look like for teachers. In other words, one cannot claim to know how much additional money a district or school would have to offer to attract teachers due to insufficient data on the topic. A pilot study in a district with teacher quality gaps could help policymakers understand how teachers respond to financial incentives.

Summary

A growing body of research has demonstrated that students from disadvantaged backgrounds tend to be taught by less qualified teachers than are more advantaged students (Clotfelter et al., 2005; Goldhaber et al., 2015; Goldhaber et al., 2017; Isenberg et al., 2013; Kraft & Gilmour, 2017; Steele et al., 2015). These teacher quality gaps have resulted in exacerbating achievement gaps (Adamson & Darling-Hammond, 2012). The researcher used an explanatory sequential mixed methods design to understand teacher sorting patterns in Georgia schools. This study was designed to determine how school characteristics affected teacher characteristics in Georgia elementary schools to better understand if, and to what extent, teacher quality gaps occurred in Georgia. Additionally, interviews with human resources directors informed understanding about challenges and issues faced by school districts to recruit and retain teachers.

Results from this study demonstrated that teacher quality gaps existed in Georgia elementary schools. Across the state, economically disadvantaged students were more likely to be taught by less experienced and lower paid teachers. Particular geographic locales also employed more experienced and higher paid teachers than others. Human

resources directors recounted how many teachers get initially hired in one district, then soon after, sort into schools with fewer economically disadvantaged students. Because salary differentials do not exist in the state, minimal economic incentives existed to attract teachers to schools they may perceive as less favorable. Instead, teachers with greater experience tended to sort into schools based on local amenities and school characteristics.

Questions continue to abound regarding the influence of school characteristics on teacher characteristics. Nevertheless, the findings of the present study add to the body of literature suggesting that an unequal distribution of teachers persists across schools. Additionally, very little research has been conducted to determine how wage differentials could reduce teacher quality gaps. However, the current study contributed to the literature by explaining the challenges human resources directors faced in recruiting and retaining teachers. Future research should focus on investigating ways to reduce teacher quality gaps.

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Appendix A

Interview Protocol

Introduction:

Good morning/afternoon _____. Thank you again for agreeing to this interview. I will be asking questions regarding your experiences as a director of human resources.

Your participation is vital to increase understanding about teacher sorting in Georgia schools. All the information you share with me today will remain confidential. Your name and the name of your school district will remain confidential unless you request otherwise. The interview will be recorded and transcribed for analysis purposes. Once transcribed, the original audio will be deleted. The transcription will remain in a locked cabinet for security purposes. After three years, the transcriptions will be destroyed. Do you have any questions before we begin?

Interview Questions:

1. Briefly describe your role as director of human resources.
2. I am investigating teacher quality gaps. Teacher quality gaps occur when higher quality teachers sort into certain schools over others. Through your career, in what ways have you noticed teacher quality gaps?
3. Has your school district experienced teacher quality gaps across its various schools?
4. In my quantitative phase, I found differences in teacher sorting patterns for rural/suburban schools compared to urban/town schools. What challenges exist for your school district compared to other locales in Georgia regarding?
5. Have you noticed any trends regarding teachers leaving or entering your district from neighboring school districts?

6. To what degree do you believe salary influences teacher sorting?
7. To what degree do you believe a school's CCRPI score impacts teacher sorting across schools?
8. How would you describe an effective teacher?
9. What policies has your department taken to attract effective teachers?
10. What policies has your department taken to retain effective teachers?
11. In your experience, what are the main reasons that teachers choose to work in one school district over others?
12. What are some steps you believe the State of Georgia could take in order to reduce teacher quality gaps?

Closing:

Thank you for your time and responses to this interview. Once I write up my analysis of the findings, I will provide you with a draft for your review. This process is referred to as respondent validation. This allows you to disagree with any characterizations of the conversation we just had. Once the final study is complete and defended, I will provide you with a copy. Thank you again.

Appendix B

NCES School Locale Full Definitions

- *City – Large (11)*: Territory inside an Urbanized Area and inside a Principal City with population of 250,000 or more.
- *City – Midsize (12)*: Territory inside an Urbanized Area and inside a Principal City with population less than 250,000 and greater than or equal to 100,000.
- *City – Small (13):* Territory inside an Urbanized Area and inside a Principal City with population less than 100,000.
- *Suburban – Large (21)*: Territory outside a Principal City and inside an Urbanized Area with population of 250,000 or more.
- *Suburban – Midsize (22)*: Territory outside a Principal City and inside an Urbanized Area with population less than 250,000 and greater than or equal to 100,000.
- *Suburban – Small (23)*: Territory outside a Principal City and inside an Urbanized Area with population less than 100,000.
- *Town – Fringe (31)*: Territory inside an Urban Cluster that is less than or equal to 10 miles from an Urbanized Area.
- *Town – Distant (32)*: Territory inside an Urban Cluster that is more than 10 miles and less than or equal to 35 miles from an Urbanized Area.
- *Town – Remote (33)*: Territory inside an Urban Cluster that is more than 35 miles from an Urbanized Area.
- *Rural – Fringe (41)*: Census-defined rural territory that is less than or equal to 5 miles from an Urbanized Area, as well as rural territory that is less than or equal to 2.5 miles from an Urban Cluster.

- *Rural – Distant (42)*: Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an Urbanized Area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an Urban Cluster.
- *Rural – Remote (43)*: Census-defined rural territory that is more than 25 miles from an Urbanized Area and also more than 10 miles from an Urban Cluster.

Appendix C

Institutional Review Board Approval

Institutional Review Board (IRB)
For the Protection of Human Research Participants

PROTOCOL EXEMPTION REPORT

Protocol Number: 03864-2019 **Responsible Researcher:** Britton Grier

Supervising Faculty: Dr. Leon Pate

Project Title: *An Examination of Teacher Characteristics by School Locales in Georgia Elementary Schools.*

INSTITUTIONAL REVIEW BOARD DETERMINATION:

This research protocol is **Exempt** from Institutional Review Board (IRB) oversight under Exemption **Category 2**. Your research study may begin immediately. If the nature of the research project changes such that exemption criteria may no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research.

ADDITIONAL COMMENTS:

- *Upon completion of this research study all data (data list, email correspondence, etc.) must be securely maintained (locked file cabinet, password protected computer, etc.) and accessible only by the researcher for a minimum of 3 years and then destroyed.*
- *In order to ensure participant anonymity, the participant name lists and associated pseudonym lists must be kept in secure & separate files.*
- *At the start of the recorded interview session the researcher must read the research statement to the participant; the reading of the statement and verification that the participant voluntary agrees to participate is to be included in the recording and documented in the transcript.*

☒ ***If this box is checked, please submit any documents you revise to the IRB Administrator at irb@valdosta.edu to ensure an updated record of your exemption.***

Elizabeth Ann Olphie *07.08.2019*
Elizabeth Ann Olphie, IRB Administrator

Thank you for submitting an IRB application.
Please direct questions to irb@valdosta.edu or 229-253-2947.

Revised: 06.02.16

Appendix D

Email to Directors of Human Resources Template

Subject Line: Interview Request

Greetings Mrs./Ms./Mr./Dr. (Name of Director),

My name is Britton Grier. I am a doctoral student at Valdosta State University conducting research on teacher sorting patterns across Georgia elementary schools. Part of my investigation includes seeking to understand the role of directors of human resources on attracting and retaining teachers. Human resources departments are a vital part of school districts but very little research exists about them.

As a participant in this study, I am seeking to conduct a 30 minute interview with you. You have been purposefully selected because your school district is the highest paying (City/Suburban/Town/Rural) school district in Georgia. Your responses will remain confidential unless you would prefer otherwise. Interviews may take place in your office, over the phone, or through Skype based on your preferences.

Thank you for your time and consideration,

Britton Grier
Doctoral Student
Curriculum, Leadership, & Technology
Valdosta State University
blgrier@valdosta.edu

Appendix E

Research Statement

You are being asked to participate in an interview as part of a research study entitled *An Examination of Teacher Characteristics by School Locales in Georgia Elementary Schools,* which is being conducted by Britton Grier*,* a student at Valdosta State University. The purpose of the study is to better understand the effects of school characteristics on teacher characteristics. You will receive no direct benefits from participating in this research study. However, your responses may help us learn more about teacher sorting patterns in Georgia schools. There are no foreseeable risks involved in participating in this study other than those encountered in day-to-day life. Participation should take approximately thirty minutes. The interviews will be audio taped in order to accurately capture your concerns, opinions, and ideas. Once the recordings have been transcribed, the tapes will be destroyed. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may choose not to participate, to stop responding at any time, or to skip any questions that you do not want to answer. You must be at least 18 years of age to participate in this study. Your participation in the interview will serve as your voluntary agreement to participate in this research project and your certification that you are 18 years of age or older.

Questions regarding the purpose or procedures of the research should be directed to Britton Grier at blgrier@valdosta.edu. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-253-2947 or irb@valdosta.edu.

Appendix F

Thematic Analysis (Nowell et al., 2017)

Establishing Trustworthiness During Each Phase of the Thematic Analysis

Phases of Thematic Analysis	Means of Establishing Trustworthiness
Phase 1: Familiarizing yourself with your data	Prolong engagement with data Triangulate different data collection modes Document theoretical and reflective thoughts Document thoughts about potential codes/themes Store raw data in well-organized archives Keep records of all data field notes, transcripts, and reflexive journals
Phase 2: Generating initial codes	Peer debriefing Researcher triangulation Reflexive journaling Use of a coding framework Audit trail of code generation Documentation of all team meeting and peer debriefings
Phase 3: Searching for themes	Researcher triangulation Diagramming to make sense of theme connections Keep detailed notes about development and hierarchies of concepts and themes
Phase 4: Reviewing themes	Researcher triangulation Peer debriefing Team consensus on themes Documentation of team meetings regarding themes Documentation of themes naming
Phase 5: Defining and naming themes	Member checking Peer debriefing Describing process of coding and analysis in sufficient details Thick descriptions of context Description of the audit trail Report on reasons for theoretical, methodological, and analytical choices throughout the entire study
Phase 6: Producing the report	

Appendix G

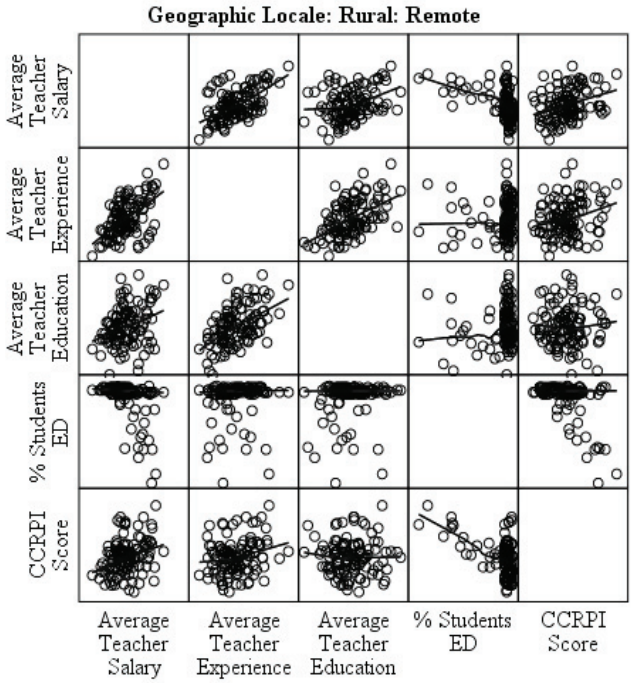
Coding Manual

Theme	Code	Description
Human Resources Challenges	HR Challenges	Difficulties or problems identified by the participant
	Lack of Challenges	Participants stated problems they have seen, but do not experience within their district.
	Niche Hires	Difficult to fill positions within the district.
	Perceptions of the District	The impact of community or prospective teacher beliefs about the school district.
Teacher Salaries	Wage Differentials	Discussions about the impact of salary differences between districts.
	Neighboring Districts	Competition for teachers or comparisons with surrounding districts.
	Benefits Package	Non-monetary financial benefits used by the district to attract and retain teachers
Influence of Geography	Local Economy	The role of local businesses or amenities in attracting and retaining teachers.
	Teaching Pool	Descriptions of the number, quality, or source of teacher job applicants.
	Local Universities	The impact of local universities on attracting and retaining teachers within the district.

Intra-district Sorting	Building Leadership	The role of principals and assistant principals on attracting and retaining teachers.
	Foot in the Door	The tendency of teachers to get hired at any school in the district to then transfer to a more desirable school.
	Student Demographic	Discussions about the role of student characteristics on attracting or retaining teachers as well as intra-district sorting.
Retention Policies	Teacher Experience	Beliefs about the role of teacher experience on teacher effectiveness.
	New Teachers	Policies designed to retain new teachers.
	Teacher Leaders	Policies designed to retain experienced teachers through leadership opportunities.

APPENDIX H

SPSS Scatterplot Matrices for Determining Linearity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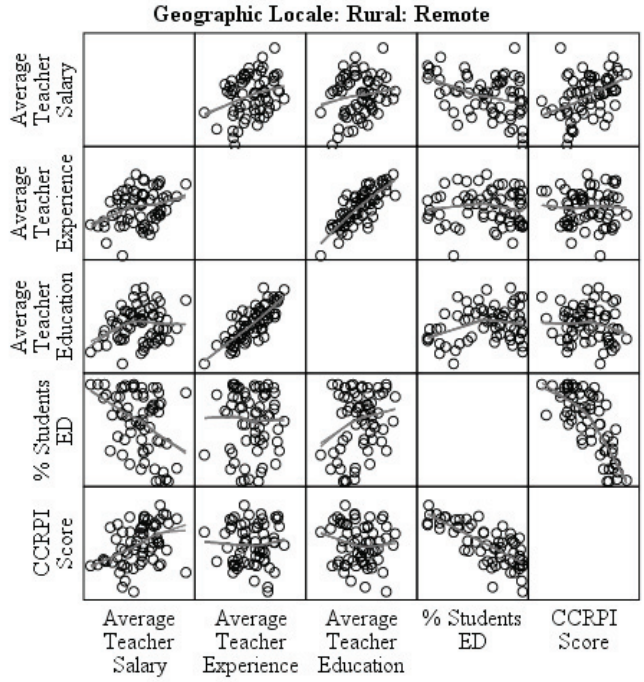
Average Teacher Experience
Average Teacher Education
% Students ED
CCRPI Score
Average Teacher Salary
Average Teacher Experience
Average Teacher Education
% Students ED
CCRPI Score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Average Teacher Salary
Average Teacher Experience
Average Teacher Education
% Students ED
CCRPI Score
Average Teacher Salary
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Average Teacher Education
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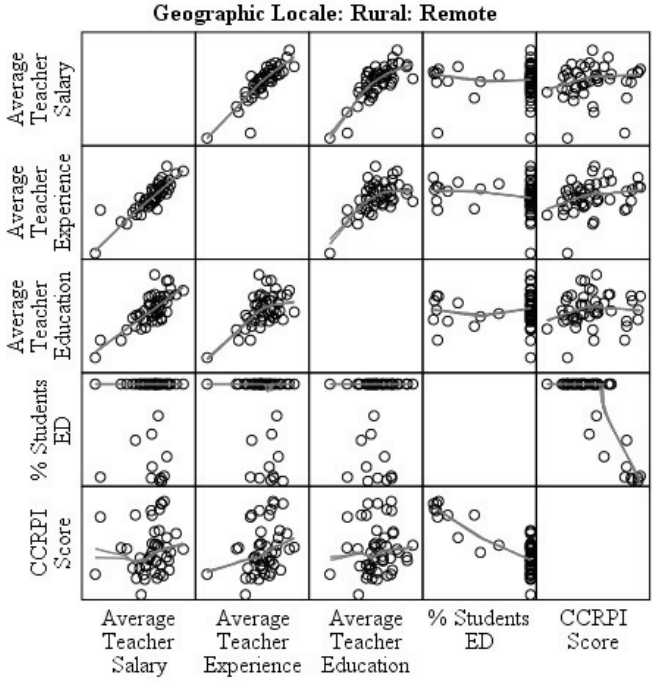
CCRPI Score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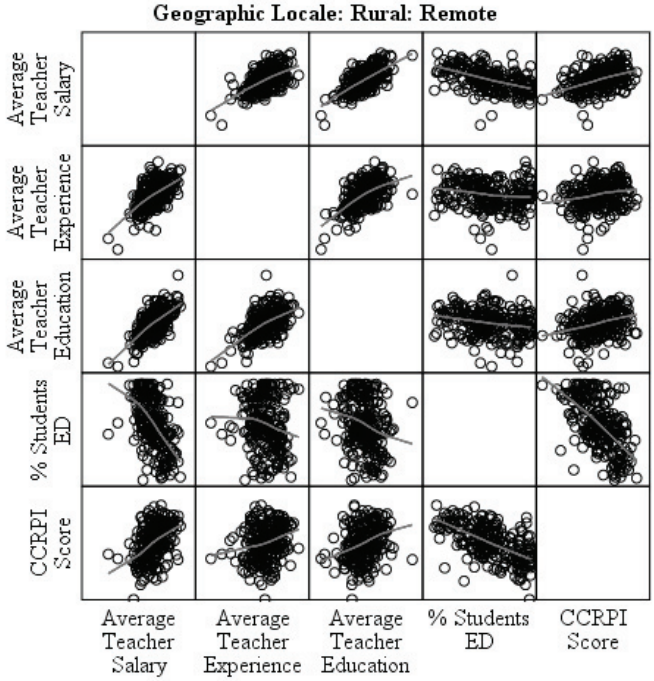
Average Teacher Experience
Average Teacher Education
% Students ED
CCRPI Score
Average Teacher Salary
Average Teacher Experience
Average Teacher Education
% Students ED
CCRPI Score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Average Teacher Education
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Average Teacher Education
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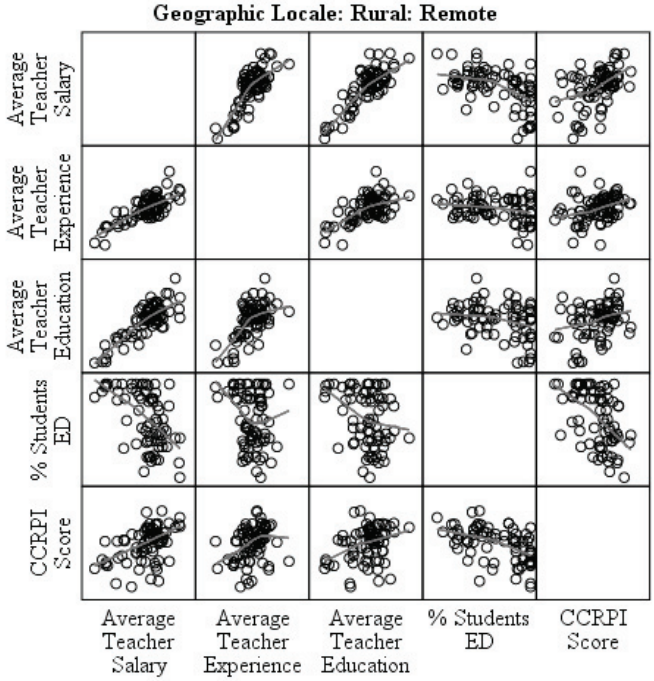
CCRPI Score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Average Teacher Experience
Average Teacher Education
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CCRPI Score
Average Teacher Salary
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Average Teacher Education
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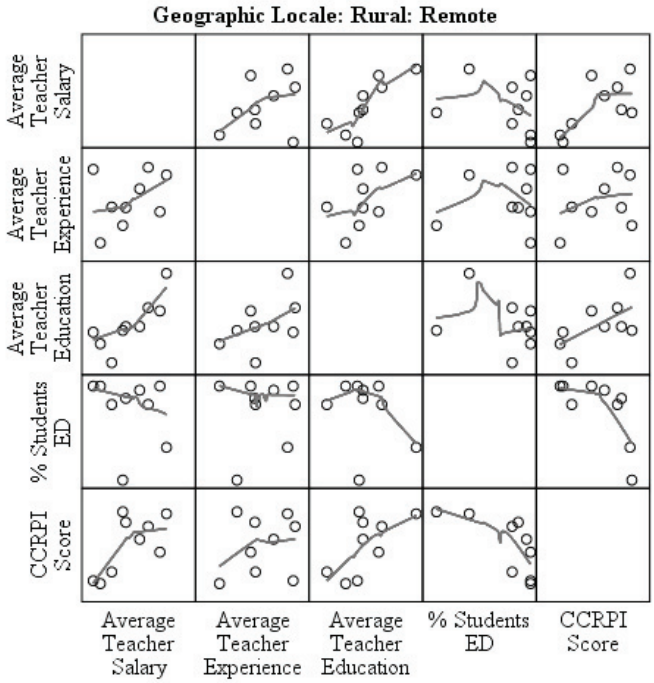
CCRPI Score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Average Teacher Experience
Average Teacher Education
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CCRPI Score
Average Teacher Salary
Average Teacher Experience
Average Teacher Education
% Students ED
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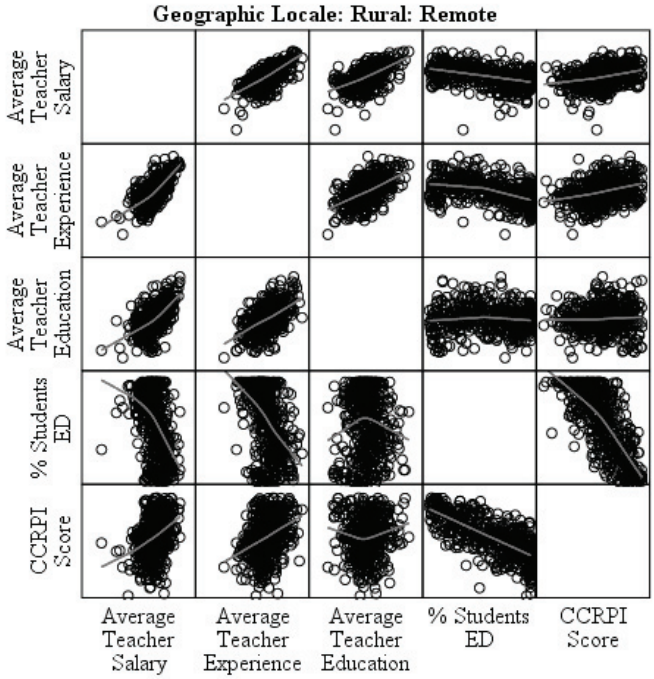
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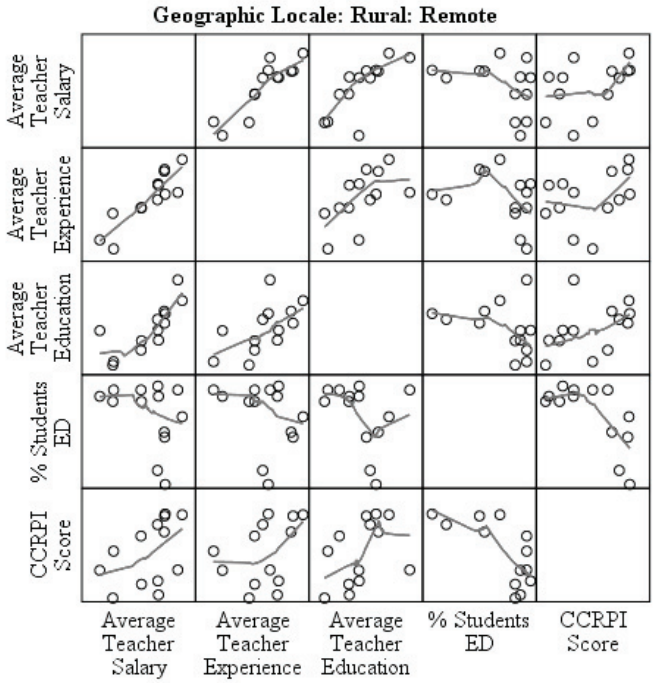
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Average Teacher Education
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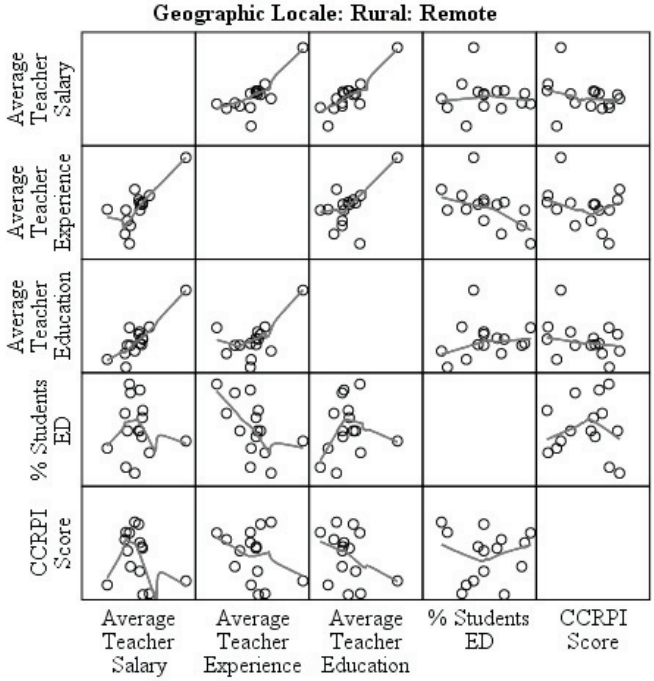
CCRPI Score
Average Teacher Salary
Average Teacher Experience
Average Teacher Education
% Students ED
CCRPI Score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Average Teacher Education
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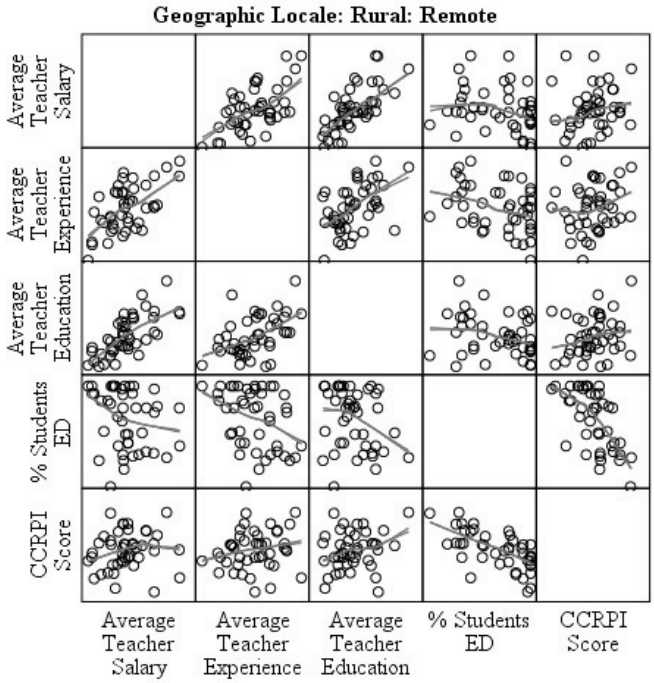
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CCRPI Score
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Average Teacher Education
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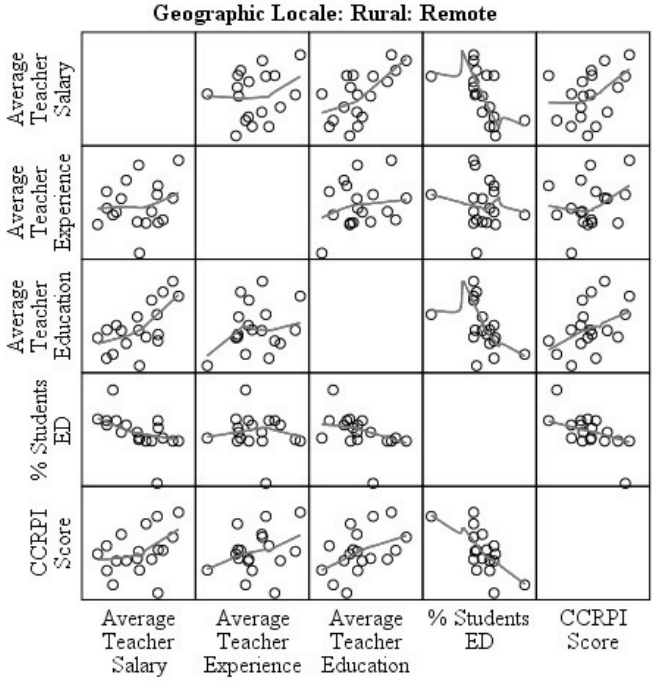
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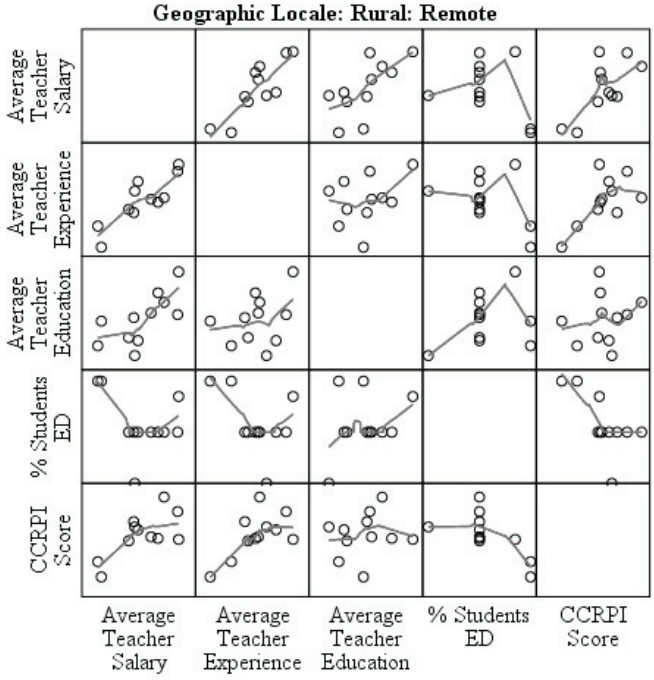
Geographic Locale: Rural: Remote
Average Teacher Salary
Average Teacher Experience
Average Teacher Education
% Students ED
CCRPI Score
Average Teacher Salary
Average Teacher Experience
Average Teacher Education
% Students ED
CCRPI Score

Appendix I

MANOVA Between-subjects Effects SPSS Output

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Average Teacher Salary	7562689052.843[a]	11	687517186.622	48.789	.000	.339
	Average Teacher Experience	980.672[b]	11	89.152	16.364	.000	.147
	Average Teacher Education	2.497[c]	11	.227	7.544	.000	.074
Intercept	Average Teacher Salary	885900077327.002	1	885900077327.002	62867.529	.000	.984
	Average Teacher Experience	55526.535	1	55526.535	10191.871	.000	.907
	Average Teacher Education	1026.680	1	1026.680	34120.953	.000	.970
Geographic Locale	Average Teacher Salary	7562689052.843	11	687517186.622	48.789	.000	.339
	Average Teacher Experience	980.672	11	89.152	16.364	.000	.147
	Average Teacher Education	2.497	11	.227	7.544	.000	.074
Error	Average Teacher Salary	14725655633.325	1045	14091536.491			
	Average Teacher Experience	5693.285	1045	5.448			
	Average Teacher Education	31.443	1045	.030			
Total	Average Teacher Salary	3338548582772.181	1057				
	Average Teacher Experience	193993.712	1057				
	Average Teacher Education	3608.041	1057				
Corrected Total	Average Teacher Salary	22288344686.169	1056				

	Average Teacher Experience	6673.957	1056
	Average Teacher Education	33.940	1056

a. R Squared = .339 (Adjusted R Squared = .332)

b. R Squared = .147 (Adjusted R Squared = .138)

c. R Squared = .074 (Adjusted R Squared = .064)