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THE  
CENTER  
FOR  
STATE  
AND  
LOCAL  
FINANCE

# The Effect of Start-Up Charter Schools on Nearby Property Values

Peter Bluestone  
David Sjoquist  
Nick Warner



ANDREW YOUNG SCHOOL  
CENTER FOR STATE & LOCAL FINANCE

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## About the Report

This is the second in a three-part series of studies commissioned by the State Charter Schools Commission and performed by the Center for State and Local Finance that analyze the economic impact of start-up charter schools on the communities they serve and on the state of Georgia as a whole. The first report summarized the academic literature on the impact of charter schools on academic development and achievement. This second report examines the economic impact of start-up charter schools on the communities surrounding them by analyzing the effects on real property values. The third report will use administrative data from Georgia's schools and government agencies to show the effect of start-up charter schools on academic achievement, the labor market, and the economic impact thereof on their communities. Examining the economic impact of charter schools on their communities has been previously undertaken in only a few other states. This series of reports, focusing on the Georgia experience with start-up charter schools, aims to make a meaningful contribution to this literature.

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## Introduction

While an extensive literature examines charter schools' effects on achievement outcomes, less is known about the economic impact that these schools have on the communities in which they are located. The effect of charter schools on local property values can help reveal this economic impact. If homebuyers value access to charter schools, then demand for homes in locations that provide access to these schools will rise. Increased demand subsequently will raise the prices of the homes in the area. This report quantifies the economic impact of Georgia's start-up charter schools on the property values in the communities in which they are located.

To assess the economic impact that charter schools have on local property values in Georgia, we compiled a rich data set that includes home sales from 2004 to 2013, covering 15 school districts that include 52 start-up charter schools. We analyzed the variation in sales prices of houses across school attendance zones, as well as the variation in house values based on the distance from the charter schools. In our analyses, we control for neighborhood and house characteristics. In certain instances, when appropriate, we also analyze the differences in house prices before and after the opening of start-up charter schools.

Some charter schools utilize priority attendance zones within a larger attendance zone, which give enrollment priority to students who live within these zones. We find that for start-up charter schools with priority attendance zones, households are willing to pay an additional 3-5 percent to be within one half-mile of the school. This effect increases to roughly 8 percent in the city of Atlanta. For start-up charter schools without priority zones, the positive economic effect is mostly isolated to charter schools in the Atlanta suburbs. For this subsample, households appear to be willing to pay roughly 2-6 percent more depending on the relative distance from the school. For suburban Atlanta schools, the results also suggest that the presence of a start-up charter school can diminish the positive economic relationship between the quality of the zoned traditional public school and higher home values by offering an alternative to the zoned traditional public school.

This study includes a separate analysis of the Pataula Charter Academy, which is in southwest Georgia and has an attendance zone of its five surrounding counties. Due to the very large attendance zone and the rural nature of the counties served, we use a different model to calculate the Pataula start-up charter school's effect on property values in the five counties. Our analysis of the effect of the opening of the Pataula Charter Academy on property values in the area is inconclusive. While evidence suggests that the school's opening has had some positive effect on property values, the difficulty in obtaining needed data on home sales coupled with a smaller number of transactions limited the statistical power of the model.

The next section of this report discusses the salient features and structure of charter schools in Georgia. In the third section, we describe the economic theory of how start-up charter schools can affect home prices. The fourth section reviews the results from the recent literature. Section Five describes our research strategy, and Section Six summarizes the data used in the analysis. Section Seven describes the

model and its theoretical underpinnings. Section Eight gives the results. Section Nine presents the analysis of the Pataula charter school. The final section concludes and summarizes the results.

## Charter Schools in Georgia

While charter schools are public schools, two important factors differentiate them from traditional public schools. First, rather than children being assigned to a specific public school, parents can choose whether to send their children to a charter school. Second, charter schools have increased flexibility in how they educate students in exchange for increased accountability. This flexibility pertains to both state and district regulations that govern operations as well as the nature of the educational programs provided. Thus, charter schools can differ from traditional public schools in various ways, such as the length of the school day, mandatory summer school, the instructional methods offered and so forth. Charter school students are required to take the same standardized tests and cover the same basic subject matter as traditional public school students. The charter school's governing board oversees daily operations of the school and the authorizing body annually reviews the school's performance to ensure compliance with the charter contract. If the charter school does not meet the standards set by the authorizing agency, the school's charter (contract) can be revoked.<sup>1</sup>

Per the 2013-14 and 2014-15 Georgia Charter Schools and Charter Systems Annual Report, 382 charter schools were operating in Georgia at the start of the 2014-15 school year.<sup>2</sup> These schools may be divided into three broad types (Georgia Department of Education 2014; Types of Charters):

- **Conversion Charter School:** A charter school that existed as a local public school prior to becoming a charter school. The application process for conversion requires that a majority of the faculty and staff members and a majority of parents of students enrolled in the school vote to apply for a charter. Conversion charter schools are overseen by an independent governing board that is accountable to the local school district and the State Board of Education as the authorizers. Entrance into conversion charter schools is usually guaranteed for students residing within the school attendance boundaries as determined by the local school board. If additional capacity remains at the school, the area from which students can enroll is determined by an attendance zone specified in the charter agreement.
- **Start-Up Charter School:** A new school created by a petition made by a nonprofit governing board. The school administration is accountable to the governing board that is accountable to the authorizing agency, which could be the local school district and State Board of Education or the State Charter Schools Commission. Start-up charter schools may determine their own attendance zones, including priority attendance zones. In Georgia, start-up charters can be further divided into two types based upon the authorizing agency.

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<sup>1</sup> Conversion charters and charter systems have a different element of choice from start-up charters in which all attendees choose enrollment over their traditional public school option. Conversion charters and charter systems replace the local

<sup>2</sup> The Georgia Department of Education has released a more recent report, but we use the 2014-15 numbers because they include the relevant year of data used in this study.

- Locally Approved Start-Up: A charter school operating under the terms of a charter among the governing board, the local school district and the State Board of Education.
- State Charter School: A charter school created as an independent school that operates under terms of a charter between the governing board and the State Charter Schools Commission. Petitioners apply to become a state charter school if their petition was denied by a local board of education or if they will draw students from a statewide attendance zone.
- **Charter System School:** A charter school system is a local school district that operates under a charter between the school district as the charter petitioner and the State Board of Education. Schools in a charter system are different from conversion and start-up charter schools. The school district, not the school and school governing board, has the contract with the state. The locally elected school district board retains oversight and management responsibilities, including hiring school staff and maintaining facilities.

Across the United States, 5.1 percent of all public school students in the 2013-14 school year (the most recent available national data) attended charter schools (Georgia Department of Education 2015). Similarly, at the start of the 2015-16 school year, charter school students (with charter systems excluded for national comparability) represented 5.9 percent of all K-12 public school students in Georgia. If we include charter system school students in this calculation, this amount increases to 18.4 percent of the public school population in Georgia for the 2014-15 school year (Georgia Department of Education 2015).

A substantial portion of the recent growth in charter school attendance is due to schools in charter system schools. As noted above, schools in charter systems are quite different from conversion and start-up charter schools. Charter systems are unique to the Georgia charter school landscape; no other state in the nation provides a mechanism for converting a local school system into a charter system (Georgia Department of Education 2014). In this report, we restrict our analysis to start-up charter schools.

## Economic Theory of House Price Effects

Traditionally in Georgia, public school attendance is determined by where the student lives. This link between school attendance and residential location allows the quality of the public schools to be capitalized into the price of the home.<sup>3</sup> For instance, a home buyer with a greater preference for higher quality public school education for their children will be willing to pay more for a home in the attendance zone of a higher quality public school, all else equal.<sup>4</sup> This capitalization of school quality into housing prices has been well studied (for instance, see Black 1999).

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<sup>3</sup> Capitalization in terms of homes and educational quality is a process of adjustment in which the value of a house increases to incorporate the dollar value of the benefits of higher quality education from one attendance zone to another.

<sup>4</sup> Attendance zones can vary in size across and within school districts. Large, populous school districts such as Atlanta Public Schools can have many attendance zones that correspond to different elementary, middle and high schools. Other less populous school districts may have only one elementary, middle and high school, so the attendance zone for each school corresponds with the school district boundaries. In Georgia, a single county is often the boundary for a school district and thus may also correspond to the attendance boundary in rural, less populous areas.

The idea that school choice can affect school quality has a long history, starting with Milton Friedman (1955). Friedman argued that one way to improve education outcomes is to create public school choice within school districts. The theory holds that competition among schools will improve outcomes for students. To the extent that such school choice improves education quality, it is then capitalized into the value of the housing in the relevant attendance zone.

However, the capitalization link between home values and school quality may be broken or weakened by allowing parents to choose among high-quality schools that are not tied to a specific residential location. If parents no longer must live in a specific attendance zone for their children to attend a high-quality school, rather than pay the premium to live in an attendance zone of a high-quality traditional public school in their school system, families might simply choose to transport their children to a charter school. Thus, the addition of a high-quality charter school could limit the capitalization of education quality into house prices. However, some charter schools' attendance areas are defined to some degree by where the students live: The neighborhood where a charter school locates and the nature of its attendance zones can affect its theoretical link to home prices.

It is also possible that residents view additional charter schools as a disamenity, which would lead to declines in property values. For example, if choice schools can be attended by students from outside of the neighborhood, these outside students could prove unpopular with neighborhood residents, particularly if it is perceived that these students largely come from other "undesirable" neighborhoods. Thus, the net effect of charter schools on property values is an empirical question.

## Results from the Recent Literature

Recent empirical studies analyzing the effect of charter schools on property values have yielded mixed results. Some studies have found an effect while others have not. The nature of the attendance boundaries and the availability of housing within these boundaries seem to play a role in the findings. Two studies that did find an effect used data from areas where either the attendance zone or the nature of the urban area itself increased demand for quality educational opportunities. One study examined the city of Atlanta, which has the unusual feature of priority attendance zones for charter schools. The second study analyzed New York City, one of the most expensive and supply constrained urban housing markets in the country. Other studies that used data from areas without limited attendance zones and urban areas with greater housing availability did not find an effect.

Note that these studies do not include the performance of the charter schools or choice schools in their primary models. There are several reasons for this. First, home prices could be affected by the presence of a charter school before there are measures, usually test scores, available to assess performance. These effects could occur when the plans to open a charter school are announced, or in the early years, when the charter school is open but test scores might not be readily available to the public. Second, to control for unobserved neighborhood characteristics, these studies rely on a fixed effects modeling specification. Such fixed effects models use test score changes over time that occur in an individual school rather than

comparing them across different schools. In other words, fixed effects models rely on marginal changes in performance within schools to measure effects but do not take into account the average performance of the school. However, it is the average performance of schools that home buyers tend to use to make an initial assessment of school quality (see Kane et al. 2003). Thus, the inclusion of charter or choice schools' test scores would rely on researcher judgment to deal with missing data and may make the interpretation of the results difficult.

A recent report by Patrick (2015) used the priority admission zones within a larger designated attendance zone to test the effects of charter schools on property values. The priority attendance zones in the metro-Atlanta area are unusual and may factor into the result. Most charter school attendance zones in the United States and Georgia are fairly diffuse. However, 13 metro-Atlanta charter schools have priority admission zones within their designated attendance zones. Patrick used this unusual feature of metro-Atlanta charter schools to identify the change in single-family residential home sales from 2004 to 2013 associated with conversion and start-up charter schools. The results suggest that households are willing to pay a premium for the increased probability of admission to charter schools in priority one attendance zones.<sup>5</sup> Estimates of the increase in the sales price of single-family houses due to charter schools range from 7 to 13 percent, with an average increase in sales prices of approximately 10 percent.

Estimates from a previous CSLF report show the increase in the sales price of single-family houses due to charter schools range from 7 to 13 percent, with an average increase in sales prices of approximately 10 percent.

Schwartz et al. (2014) used 1988-2003 New York City housing unit sales data to study the effects of choice schools on property values in New York City (NYC). According to the researchers, because NYC is a single tax district, school quality differences are less a reflection of differences in revenue than of performance.<sup>6</sup> In addition, NYC has an abundance of school choice, many attendance zones and a constrained housing supply. The researchers were careful to separate out general neighborhood preferential effects from the specific effects of local school performance. They examined the link between the quality of locally zoned schools and surrounding housing values. They found evidence that the addition of a choice school nearby weakens the capitalization link between housing values and the zoned traditional elementary school, likely because the choice schools can be attended by students who live outside the traditional elementary

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<sup>5</sup> In Georgia, start-up charter schools may designate priority attendance zones. These different priority zones confer different probabilities of gaining admittance to a charter school to the various geographic areas within the schools' attendance area. A priority one zone is usually the zone with the highest probability of attendance.

<sup>6</sup> A choice school is defined as one in which attendance is not based on the student's home address. Based on this definition, the study used data from 123 NYC choice elementary schools, of which only two were identified as charter schools. There is some evidence that charter schools can receive less funding than traditional public schools from the district. Thus, while it is possible that these two charter schools may have received less funding than the other schools in the study, it is unlikely that such a disparity would greatly influence the study's findings.



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school boundary. They also found that the choice school itself is associated with higher property values for nearby housing, suggesting that the close-in community views these schools as amenities.

In a study using data from Toledo, Ohio, researchers examined the effect of charter schools on property values (Horowitz et al. 2009). They found little evidence that the existence of a charter school affects property values. The researchers studied residential values before and after charter school openings in Toledo from 1987 until the first quarter of 2006. The charter schools studied were similar to those found in most parts of Georgia as they did not have local service areas distinct from the zoned elementary schools.

The researchers focused on houses with repeat sales that occurred before and after the opening of a charter school. They found that the post-charter school sales prices had no relationship with distance from the nearest charter school, controlling for other factors. Second, they compared post-charter school actual housing sales prices to forecasted values based on housing price trends in each census tract. They found nothing relating the difference in the observed sale price from the predicted price and the variable that measured the distance from the local charter school.

Imberman et al. (2017) examined the effect of charter schools on property values in Los Angeles County. They used 2008-11 house sale price data from Los Angeles County to estimate the impact on housing prices of having charter schools nearby. Again, the charter schools studied did not have special attendance zones that differed from those of the zoned traditional public schools. Following previous studies, the authors related housing prices to school characteristics and carefully controlled for the correlation between neighborhood characteristics and housing prices using census block fixed effects. Using the full data set, they found little evidence that the availability or distance from charter schools affected housing prices.

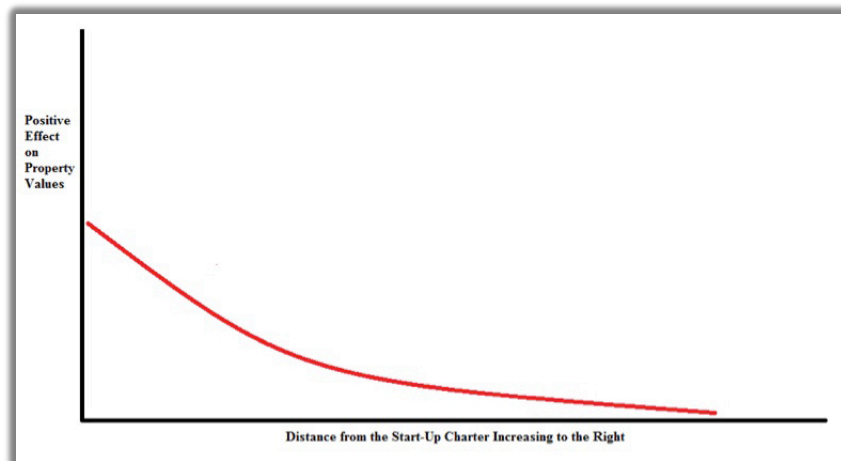
However, when the sample was restricted to include only properties located in the same school district as the charter school, they find that nearby charter schools lower housing prices. The authors suggest that this effect might be related to the California policy that requires oversubscribed charter schools to give priority to those students in the local school district in which the charter school is located. Due to the nature of the model specification, the authors were reticent to conclude that this result reflected the weakening of the traditional relationship between public school quality and home prices.

## Proximity to the Start-Up Charter School and the Effect on Home Values

The opening of a start-up charter school could affect home values through multiple channels. To test this effect, we formulate a model in which home value is a function of how close the home is to a start-up charter school, while controlling for other relevant variables that could also affect home prices. This proximity model isolates any difference in sales prices of homes stemming from differences in homes' proximity to a start-up charter school. If the opening of a start-up charter school positively or negatively affected local home values, we would expect that effect to be greater for homes that are closer to the school.

The distance to a charter school can affect home values in at least two ways. First, according to traditional urban economics theory, people value being closer to an amenity — in this case, a charter school. The effect on a home's price is due to reduced travel time and travel costs to the amenity; this benefit is capitalized into the price of the home. Figure 1 shows that the travel time benefit decreases as the distance from the home to the school increases, again which follows from the standard urban economics theory (see Kane et al. 2003).

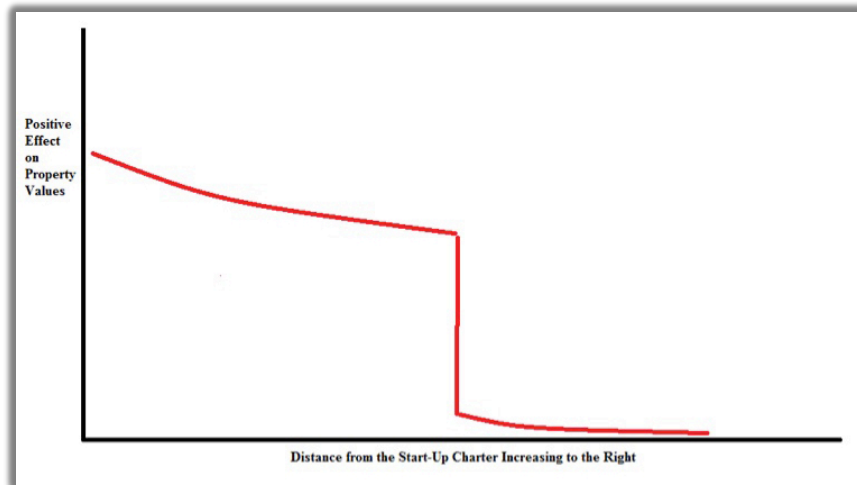
**Figure 1. Theoretical Distance to Charter School Benefit Curve for Non-Priority Zone**



Source: Authors' illustration of economic theory

Second, living closer to a start-up charter school could add value to a home through the priority zone effect. Children living in a charter's priority zone have an increased chance of attending the charter school, a benefit if there is heavy demand for the school. In this case, the relationship that distance may have on home values is a function of whether the home is inside the border of the priority attendance zone; once the border is reached, home values drop. This priority zone effect, combined with the travel time benefits described above, produces a value function shown in Figure 2. Note the steep drop, which occurs at the border of the priority zone.

**Figure 2. Theoretical Distance to Charter School Benefit Curve for Priority Zone**



Source: Authors' illustration of economic theory

Our proximity model seeks to measure both effects. We expect that the positive effect on home prices of distance will diminish as one gets farther from the start-up charter school. We also expect that these effects will be larger for houses located near a start-up charter school with a priority zone.

We use concentric rings in our proximity model to try to identify the downward sloping curve that shows the diminishing value of travel time benefits for houses located farther away from the start-up charter school. Each model specification has two concentric rings and compares the sale prices of the homes within the closest ring to sales price of the homes within the next closest ring. In the first specification, the radii of the rings are the smallest, with the inside ring being 0.3 miles and the outside ring being 0.6 miles from the charter school. In the second model, the radii of the rings are a half-mile and one mile from the charter school, and the radii of the rings in the third model are 0.7 and 1.4 miles from the charter school.<sup>7</sup> As discussed earlier, the effect of a charter school on property values is expected to diminish as the distance from the property increases due to higher transportation costs. Based on Black (1999), we expect this effect to be concentrated within two miles of the school.

In estimating effects that charter schools have on property values, we must control for the neighborhood characteristics of the property. Such neighborhood characteristics include among others: distance to the central business district and shopping, green space and parks, and public safety. The perceived quality of the locally zoned traditional public school is also assumed to be included. All these neighborhood factors could influence property values and could differ across neighborhoods. However, quality data on many these characteristics are difficult to obtain. The panel nature of the data, sales transactions over time, allows us to control for the influence of unobserved neighborhood characteristic on home prices using

<sup>7</sup> We use a fourth model in later specifications to account for distances in suburbs and rural areas.

the fixed effects estimator. The fixed effects estimator allows for neighborhood characteristics that do not vary overtime to be controlled for, without having to include data on them.

The concentric ring approach has several advantages over the use of a continuous distance variable. First, it provides a clear border to test the average effects of distance from a charter school on property values. Second, it also allows us to more easily incorporate and interpret the results of the model using census block fixed effects necessary to control for unobserved neighborhood characteristics.<sup>8</sup> Using the concentric ring model and census block fixed effects, our identification comes from houses sold in the same census block at different times and on different sides of the concentric ring border.

The sales price of a single-family residential property also depends on home characteristics, such as the finished square footage, lot size, the number of bedrooms and bathrooms, the size of the basement, the year the home was built, the condition of the home, the existence of a fireplace, the existence of a garage or carport, and whether the home has been recently renovated. These characteristics must be accounted for in any model attempting to measure home sales prices. For ease of exposition, we simply refer to home sales prices throughout our analyses, with the understanding that they include all the above elements.

We do not limit our analysis to repeated sales on the same property as previous researchers have for several reasons. Such a restriction discards valuable sales observations in the area and may prevent any analysis of areas with only a few transactions. In addition, repeat sales may introduce bias, as a disproportionate number of those properties may be distressed, be in fast-changing neighborhoods or be houses that are often “flipped.”

The nonrandom location of charter schools and changes in the geographic distribution of home sales, are controlled for using elements of our model structure such as the census block fixed effects and the housing characteristics described above. In addition, a measure of the zoned traditional public school (TPS) quality, based on statewide standardized test scores is included, which is discussed in greater detail in a later section. Given the inclusion of census block fixed effects, our research strategy assumes that factors that may induce both an increase in charter supply and an increase in house value do not vary within census blocks over time. Of course, housing prices in Georgia were influenced by larger economic trends, such as the Great Recession, during the study period. To account for these general changes in house prices related to overall market conditions, we include year-by-month fixed effects in all regression models.<sup>9</sup>

We use a different methodology to capture the effect of one charter school, Pataula Charter Academy, which has a multi-county attendance zone. Our approach for this school is similar to a research strategy often referred to as a difference-in-differences analysis. The basic idea of this method is to compare the rates of change of the variable of interest for two groups: a treatment group and the control group. The treatment group is the five counties in the Pataula Charter Academy’s attendance zone. We selected five

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<sup>8</sup> If a linear continuous distance measure is used, the results could be difficult to interpret due to the incorporation of the census block group fixed effects and how they might distort relative distance from the charter school.

<sup>9</sup> Year-by-month fixed effects is statistical technique that is used to take changes in national market conditions and seasonal trends out of the data, using monthly average values.

counties similar to the Pataula Charter Academy's counties in terms of relevant socioeconomic characteristics such as population size, demographics characteristics, and personal income, but without a start-up charter school, to use as a control group. We compared changes in house prices across the counties in the Pataula Charter Academy's attendance zone to price changes in the control group counties.

To determine these five control counties, we first identified the relevant geographic regions. The Pataula five-county charter school attendance zone is in two Georgia Department of Community Affairs (DCA) regions, Southwest Georgia and River Valley. We added the Southern Georgia region to those DCA regions to broaden the potential counties eligible for matching. Next, we matched the median values of the following variables for the five counties (i.e., county school systems) in the attendance zone to the counties in the three DCA regions:

- the number of owner occupied houses,
- the average dollar value of owner-occupied housing, and
- the geographic density of housing stock.

This initial step produced 10 potential matching counties: Atkinson, Charlton, Clinch, Irwin, Marion, Miller, Talbot, Taylor, Terrell and Turner.

The second step was to select the five counties that were similar in residential property values prior to the opening of the charter school in 2010. A per capita residential assessed value (from the property tax digest) was used for this step. Each of the five Pataula attendance zone counties was matched with a similar county from the 10 counties listed above based on the absolute value of the average difference in per capita home values from 2005 to 2010. Some counties had several matches that were relatively close and that also overlapped with other counties in the Pataula attendance zone. The matching criteria, as well as researcher judgment, were used to pick counties that were the most similar to the counties in the Pataula attendance zone. The five matching counties selected were Atkinson, Clinch, Miller, Terrell and Turner. (For greater detail on this process, see Appendix A.) The next section shows the summary statistics for our data set and highlights various geographic characteristics of the charter schools in the study relative to TPS.

## Data Summary Statistics and Overview

Table 1 shows summary statistics for the data set. We include the average values for property and home characteristics for the full sample of 444,420 home sales that occurred in Georgia from 2004 to 2013 as well as for the sample of 63,511 sales that occurred within a 1.8-mile radius of the selected start-up charter schools.<sup>10</sup> Most of our observations in the selected start-up charter school sample come from the metro-Atlanta area. Thus, we might expect to see some differences between the average values from the full sample and the selected start-up charter school sample. But generally, the average values for most of

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<sup>10</sup> We use data on home sales in selected Georgia counties that were geocoded and matched with performance data for charter schools and traditional public schools from 2004 to 2014. See Appendix B for a complete list of schools and counties.

the housing characteristics are similar. The average house size in square feet is 17 percent smaller in the selected start-up charter school sample than in the full sample. Fewer houses also have garages or carports in the selected sample than in the full sample. The averages did differ in two areas: lot size and house age. First, the lot sizes in the full sample are 0.7 acres compared to 0.2 acres in the start-up charter school sample.<sup>11</sup> Second, the homes in the full sample are newer, with 1972 being the average year of construction compared to an average year of construction of 1964 for those homes that were within 1.8 miles of a start-up charter school in the selected sample.

**Table 1. Summary Statistics All Geocoded Arm's Length Transactions**

	OBSERVATIONS	MEAN	STD. DEV.	MIN	MAX
Square Feet	444,420	2,096	1,110	0	149,713
Lot Size in Square Feet	444,420	29,011	817,003	0	194,000,000
Number of Bathrooms	444,420	2.56	1.15	0	38
Number of Bedrooms	444,420	3.16	1.17	0	74
Unfinished Basement Square feet	444,420	427	642	0	10,050
Year Built	441,094	1972	146	0	2014
Below Average Indicator	444,420	0.04	0.20	0	1
Above Average Indicator	444,420	0.35	0.48	0	1
Fireplace Indicator	444,420	0.59	0.49	0	1
Garage/Carport Indicator	444,420	0.60	0.49	0	1
Recently Renovated Indicator	444,420	0.70	0.46	0	1
SUMMARY STATISTICS WITHIN 1.8 MILES AND WITH A TEST SCORE					
	OBSERVATIONS	MEAN	STD. DEV.	MIN	MAX
Percent Exceed CRCT	63,511	24.15	16.22	0.091463	83.45766
Square Feet	63,511	1,729	908	0	73,102
Lot Size in Square Feet	63,511	8,921	144,185	0	34,900,000
Number of Bathrooms	63,511	2.13	1.02	0	12
Number of Bedrooms	63,511	2.97	0.98	0	14
Unfinished Basement Square feet	63,511	518	621	0	10,050
Year Built	63,263	1964	90	0	2013
Below Average Indicator	63,511	0.05	0.21	0	1
Above Average Indicator	63,511	0.25	0.43	0	1
Fireplace Indicator	63,511	0.52	0.50	0	1
Garage/Carport Indicator	63,511	0.38	0.49	0	1
Recently Renovated Indicator	63,511	0.64	0.48	0	1

Source: CoreLogic home sales 2004-13

<sup>11</sup> A standard size lot in the city of Atlanta is 50 feet by 100 feet, which is roughly 0.1 of an acre. If those lot dimensions are doubled to 100 feet by 200 feet, that yields a lot size of roughly half an acre, which is a little smaller than the average lot size of the full sample.

This rich data set allows us to analyze the effect of the selected start-up charter schools on real property values in the communities they serve. It includes sales data and property characteristics for home sales in the 28 metro-Atlanta counties as well as the other selected counties from 2004 through the first quarter of 2013. (See Appendix B for a complete list of schools and counties.) This study examines house prices within a certain distance of 52 of Georgia's more than 300 charters.<sup>12</sup> To gain a more complete picture of the schools in question, the CSLF team collected key information about each charter in the sample, including its distance to surrounding schools, grade levels served, teaching styles, date opened and demand for admission as determined by whether an admissions lottery was held for the 2016-17 school year.

**Table 2. Distance in Miles from Surrounding Schools (By Level of Urbanization)**

	COUNT OF SCHOOLS	AVERAGE OF DISTANCE FROM CLOSEST START-UP	AVERAGE OF DISTANCE FROM CLOSEST SCHOOL
Cities Large and Mid-size	19	2.3	0.6
Large Suburbs	24	4.3	0.7
Towns and Rural Areas	9	28.2	4
Total	52	7.7	1.2

Source: Authors' calculations

Table 2 presents the count of charters according to level of urbanization and average distance from neighboring schools. The majority of the 52 charters included in this study are located in large suburbs and cities, and a few are located in rural areas and remote towns. (Note that only four schools are in the mid-size city of Savannah, and 15 are in the large city of Atlanta.) The schools in the large suburbs are all in Atlanta.<sup>13</sup> Small towns and rural areas include all areas outside the 28 metro-Atlanta counties and other parts of the state.<sup>14</sup>

On average, selected charters in the large cities of Atlanta and Savannah are the closest to surrounding schools — both charter and traditional public schools — implying that more school choice exists in these areas. Charters in rural and remote areas are, on average, a farther distance away from neighboring public schools and a much larger distance away from other charters. The two charters located in remote

<sup>12</sup> According to a Georgia Department of Education Annual Charter School report, there were 87 charter schools in 2014-15. Schools were dropped that did not have defined attendance zones or were not start-up charter schools. This excluded career academies, nontraditional high schools, district-operated schools and state charter schools with a statewide attendance zone. Schools that opened in 2014 or later were also not included due to lack of usable data. This process resulted in the full list of 52 start-up charter schools compiled by the Center for State and Local Finance and the State Charter School Commission for additional research on the economic impacts of charter schools. Note that two of the schools on that list have recently closed, the Latin Academy Charter School and Ivy Preparatory Young Men's Leadership Academy but are still included in this historical analysis.

<sup>13</sup> In this research, an Atlanta suburb is defined as any area in metro-Atlanta not included in the city of Atlanta school district. Large Atlanta suburban areas include Avondale Estates, Canton, Douglasville, Forest Park, Hapeville, Kennesaw, Lawrenceville, Lithonia, Morrow, Norcross, Riverdale, Roswell, Smyrna and Stone Mountain.

<sup>14</sup> The following are small towns and rural areas: Edison, Statesboro, East Point, Greensboro, Newnan, Senoia, Thomasville, Baconton and Norcross. The five county Pataula region is also included here.

towns, Charter Conservatory for Liberal Arts & Technology<sup>15</sup> and Pataula Charter Academy, are located 42.7 and 38.3 miles away from the nearest start-up charter, respectively.

Some charter schools configure grade levels like traditional public schools, serving either elementary, middle or high school grades. Others aggregate the teaching of the various grade levels. Of the 52 charter schools, 25 have the traditional grade level groupings: 11 serving elementary school students, 10 serving middle school students, and four serving high school students. The remaining 27 charter schools serve some nontraditional combination of grade levels. Of these 27 charter schools, 18 schools serve some combination of traditional elementary and middle school grades, kindergarten through either sixth, seventh or eighth grade.

Most of the charter schools included in this study opened between 2000 and 2015. The majority, 27 out of 52, opened during the five-year period between 2010 and 2015, while 12 opened between 2005 and 2009. Another 13 schools opened between 2000 and 2004. The year with the most school openings is 2011, when 10 of the charter schools opened.

**Table 3. Oversubscribed Schools (2016-17)**

LOTTERY	SCHOOL COUNT	PERCENTAGE
No	7	13%
Yes	27	52%
Unknown	18	35%
Total	52	

Source: School websites

Demand for services is the final school characteristic included in the analyses. Oversubscription is one way to gauge the level of demand to attend a given school. According to the Georgia Department of Education, if the number of applicants to a charter school exceeds the number of available slots, a random lottery must be held to determine entry.<sup>16</sup> Table 3 shows that the majority of the charters examined in this study held a random lottery or had a waiting list for the 2016-17 school year, suggesting a high demand for charter school attendance. A survey of charter school websites confirmed that 27 of them held a lottery for the 2016 school year and seven did not.<sup>17</sup> The next section describes the results of the proximity-based analysis of the potential effect of start-up charter schools on home sales prices.

<sup>15</sup> Charter Conservatory for Liberal Arts & Technology is now named Statesboro STEAM College, Careers, Arts and Technology Academy

<sup>16</sup> Priority may be given to certain students based on criteria such as attendance zone, their level of economic disadvantage, whether a parent or guardian is employed by the charter school and whether a student has siblings that also attend the charter. Charter schools, however, are not permitted to take details such as race, test scores or languages spoken at home into consideration (Georgia Department of Education 2015).

<sup>17</sup> The remaining 18 charter schools did not have relevant information available on their websites.



## Proximity Model

Equation 1 shows our base model, which is designed to test for the potential effects of proximity to a start-up charter school. It is estimated using various sets of charter schools and is not used for individual charter schools.

$$\begin{aligned} \text{Equation 1: } \log(\text{Sales Price})_{hmy} &= \beta_0 + \beta_1 W + \beta_2 \text{PSP}_{hy} + \beta_3 \text{SUA}_{hy} + \beta_4 \text{SF}_h + \beta_5 \text{LS}_h + \beta_6 \text{LS}_h + \beta_7 \text{Bed}_h \\ &+ \beta_8 \text{Bath}_h + \beta_9 \text{Base}_h + \beta_{10} \text{HA}_h + \beta_{11} \text{BAC}_h + \beta_{12} \text{AAC}_h + \beta_{13} \text{FP}_h + \beta_{14} \text{Gar}_h \\ &+ \beta_{15} \text{RR}_h + \gamma \text{MonthYear} + \delta \text{CBG} \end{aligned}$$

The dependent variable,  $\log(\text{Sales Price})_{hmy}$ , is the logged price of a single-family residence sold during a particular year and month.<sup>18</sup>  $\beta_0$  represents the constant term in the model and what a single-family residence would have sold for if all other variables took a value of zero.  $W$  equals one if the home is within a specified distance from a start-up charter school included in the study, and equals zero if it is within the two boundaries of the outer concentric circle, a concentric circle just around the school outside the closer threshold. For example, using the inner ring of 0.7 miles, only sales included in the analysis would be within 1.4 miles of a start-up charter school. In this case,  $\beta_1$  would be the percentage difference in the sales price of homes that sold within the 0.7-mile threshold distance from a start-up charter school compared to the sales price of homes that occurred between 0.7 and 1.4 miles away from the school.

$\text{PSP}_{hy}$  is a measure of local public school performance; it is the percentage of tests on which students exceeded expectations on the Criterion-Referenced Competency Tests (CRCT) from the zoned traditional public elementary school.<sup>19</sup> The CRCT was the only standardized test administered at all elementary schools in Georgia over the entire study period. Students were tested on their competency in language arts, reading and math. Third, fourth and fifth graders also were tested on their competency in social studies and science. The variable represents the percentage of tests that exceeded the standard in the zoned elementary school in the year preceding the year of the home sale. This is a different measure from the percentage of students that exceeded the standard, as one student takes several tests and could exceed the standard on one test and not on another.<sup>20</sup> Elementary schools were chosen because their attendance zones are significantly smaller than middle and high school zones and are a narrower indicator of local school quality.

<sup>18</sup> We limit the sample to non-distressed arm's length transactions or transactions in which the buyer and seller are unrelated, and neither is acting under duress. These limitations ensure that the data reflects the fair market value of the property.

<sup>19</sup> We obtained the historical attendance maps for as many school districts as possible to ensure that test scores were accurately matched to transactions historically. Districts for which we were able to obtain historical attendance zones include the city of Atlanta, Fulton County, Cobb County, Gwinnett County and DeKalb County.

<sup>20</sup> Using the percentage of tests that exceeded the standard is a simpler measure to work with for measuring school performance than the percentage of students that exceeded the standard, as different numbers of students in each school take different tests. Thus, computing a student average per school for all subjects would require additional computational steps and potentially researcher judgment on the number of students to use.

$SUA_{hy}$  is the age of the closest start-up charter school to the home sold. This variable captures the effect of the age of the school on the home sale price. Prior research has shown that charter schools are more likely to improve student achievement the longer they are open, likely because they have more time to improve their methods (e.g., Sass 2006). Generally, the start-up charter schools in this study showed higher percentages of exceeding expectations on CRCT tests the longer they had been in operation. Although not researched directly, the age of the charter could affect property values as well. Information on the school's performance as well as other signals of the school's quality might not be available in the early years.

$SF_h$  is the square footage of the home,  $LS_h$  is the lot size in square feet,  $Bed_h$  is the number of bedrooms,  $Bath_h$  is the fractional number of bathrooms,  $Base_h$  is the square footage of unfinished basement, and  $HA_h$  is the year the property was built.  $BAC_h$  is an indicator variable that equals one if the assessor indicated that the property was in below-average condition, and zero otherwise.  $AAC_h$  is an indicator variable that equals one if the assessor indicated that the property was in above-average condition, and zero otherwise.  $FP_h$  is an indicator variable that equals one if the property has a fireplace, and zero otherwise.  $Gar_h$  is an indicator variable that equals one if the property has a garage or carport, and zero otherwise.  $RR_h$  is an indicator variable that equals one if the property had a major renovation within 10 years of the sales date, and zero otherwise. **MonthYear** is a set of indicator variables for the month and year in which the sale occurred, and **CBG** is a set of census block group indicator variables.

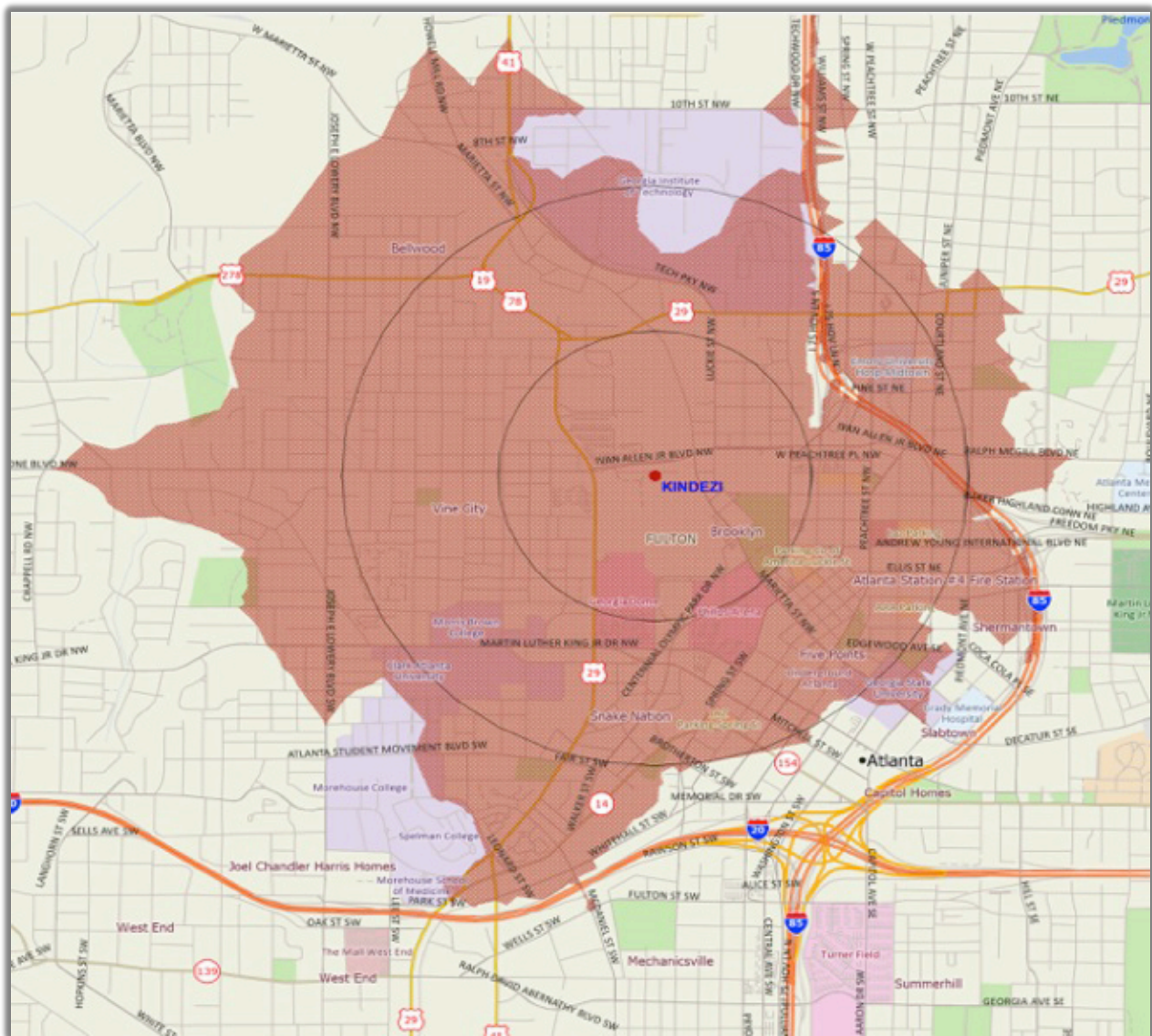
## RESULTS

Two different effects are potentially present. The first effect is driven by the benefits of being closer to an amenity, the start-up charter school, such as reduced travel time. The second is the potential benefit of being within the priority enrollment zone of the start-up charter school. The priority zone effect has been documented in previous research and may confound our estimation if used with a sample that includes start-up charter schools without priority zones (Patrick 2015). The concentric ring model is able to test for both effects. If both effects are present, we would expect the magnitudes of the coefficients on priority zone concentric ring distance variables to be larger than those for non-priority zoned start-up charter schools. Thus, we estimate Equation 1 separately for charter schools with and without priority zones.

We also split the samples by different geographic locations, as prior studies have found that effects may differ in urban versus suburban and rural areas (Tuttle et al. 2012). Some of the schools in our sample are located in urban Atlanta or suburban Atlanta, some are in small cities and towns in other areas of the state, and some are in rural areas. It is possible that the relationship between distance to the start-up charter school and property values is different depending on the type of geographic setting of the start-up charter school and homes.

The geography of the region can affect the relationship between distance to the start-up charter school and home values in the following manner. The price effect on property values of distance to a start-up charter school is a function of changes in travel cost due to shorter commute times. The distance traveled in a given amount of time may differ in urban versus suburban and rural settings. For instance, it may only be possible to go an average of 1.5 miles in five minutes in an urban area (average speed 18 mph) versus three miles in five minutes in a suburban or rural area (average speed 36 mph). Walking to school is also common in urban environments but much less likely in the suburbs. The relationship between distance and travel time is further illustrated in figures 3-5.

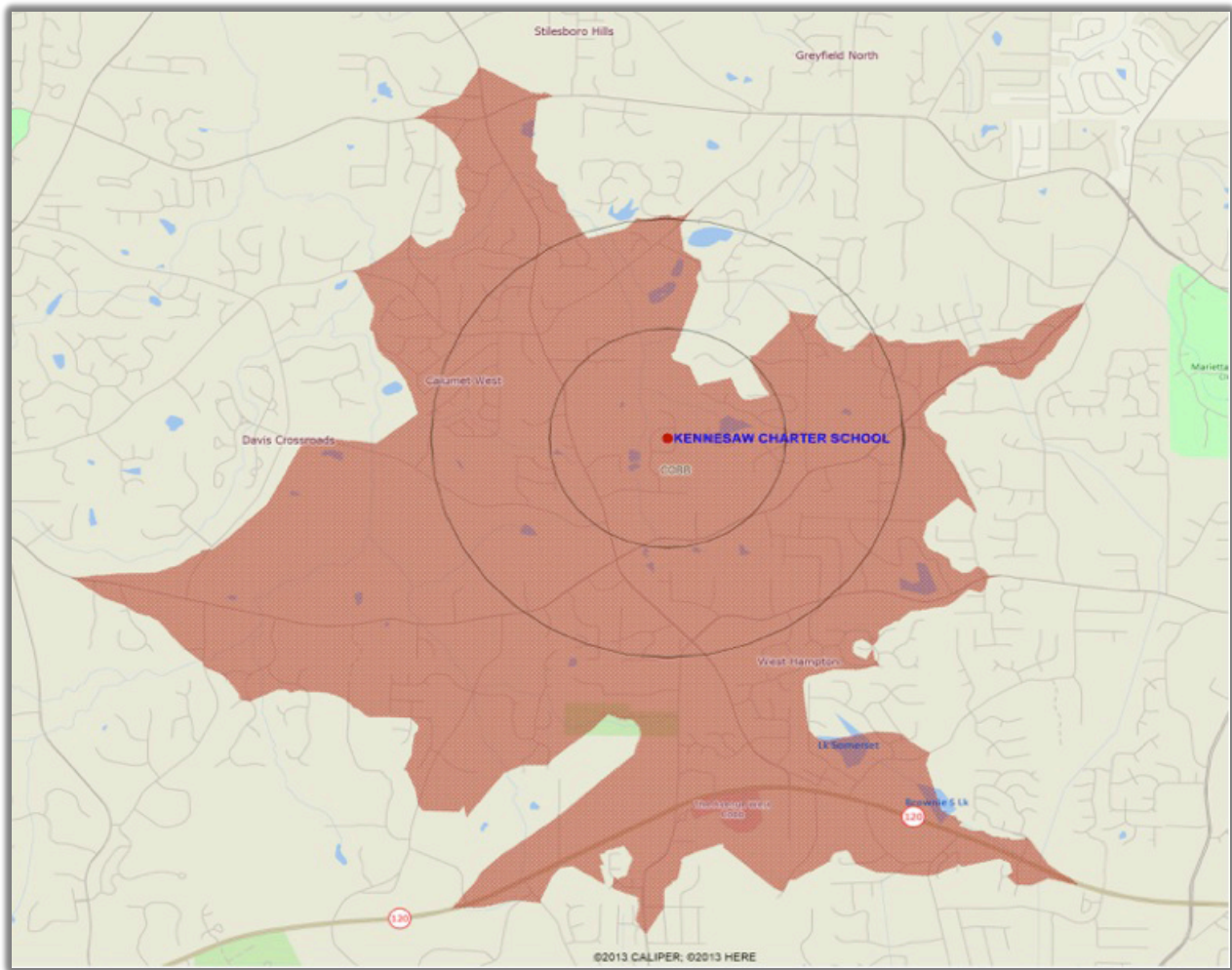
**Figure 3. Five-Minute Drive Time Distance in an Atlanta Urban Area**



Source: Authors' calculations using Maptitude software

Note: The two concentric circles are the half-mile ring and the one-mile rings.

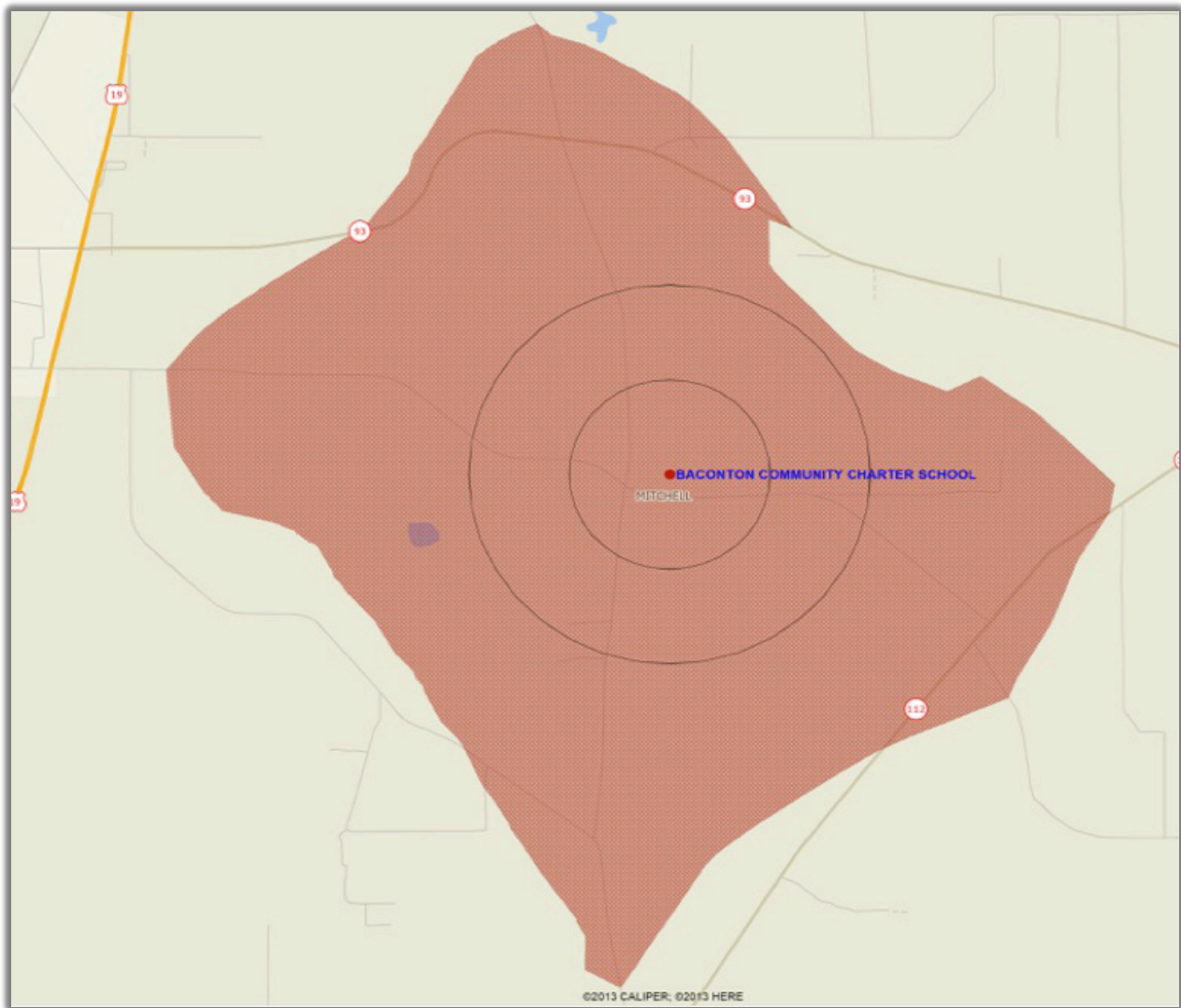
**Figure 4. Five-Minute Drive Time Distance in an Atlanta Suburban Area**



Source: Authors' calculations using Maptitude software

Note: The two concentric circles are the half-mile ring and the one-mile rings.

**Figure 5. Five-Minute Drive Time Distance in a Georgia Rural Area**



Source: Authors' calculations using Maptitude software

Note: The two concentric circles are the half-mile ring and the one-mile rings.

The relationship between the concentric circles we use to test the effects of distance and estimated travel times in a car are shown in figures 3-5. In each figure, the two concentric circles are the half-mile ring and the one-mile ring. The shaded area is the distance one can drive in five minutes in optimal travel conditions centered on the various charter schools. Figure 3 illustrates the more limited distance that can be covered in five minutes in a highly urban area, using the Kindezi Charter School in downtown Atlanta as an example. Here, the 1.0-mile ring is a rough approximation of this distance. Figure 4 shows a typical suburban Atlanta five-minute travel distance centered on the Kennesaw Charter School in Cobb County. Note here that the five-minute travel time in some areas is considerably larger than the 1.0-mile ring. Travel time depends on access to major road networks in the area. Finally, Figure 5 illustrates a typical rural county five-minute travel distance, with the Baconton Community Charter School located in Mitchell County as an example. The five-minute travel time is considerably larger than the 1.0-mile ring in almost

every direction. (In many places, it appears that a concentric ring of 2.0 miles centered on Baconton would fit into the five-minute drive time.) Thus, it is possible that the concentric rings used to test the effect of distance to the start-up charter school on home values should be larger for suburban and rural areas. We test the finer geographical classifications using the larger concentric rings in suburban and rural areas only in the model.

Second, it is possible that when a charter school enters a region, it can decouple the traditional link between home prices and TPS elementary school quality. If the start-up charter school offered educational opportunities that families believed were better than or comparable to the TPS, these families would no longer be constrained by purchasing a home in the smaller, higher quality elementary school zone. This could result in lower home prices in that area. It is also possible that families who chose to attend the start-up charter school might locate in areas with low-performing TPS and relatively inexpensive housing. Over time, this behavior could bid up the prices of these homes despite the poor performance of the TPS. This type of decoupling of TPS school quality and home prices may affect the results of our model, which is designed to capture the traditional relationship that distance has on perceived amenities. We may also be able to identify decoupling in the absence of a priority attendance zone, which functions in a similar fashion to the smaller elementary school attendance zones. We run our model on different geographies with and without priority attendance zones to help identify whether and where decoupling is occurring.

### ***Summary of Results for Priority and Non-Priority Zoned Schools***

We first examine home sales that took place near start-up charter schools that have tiered priority zones. As discussed earlier, being in a priority one attendance zone in Atlanta has been found to increase property values (Patrick 2015). The existence of priority attendance zones may affect the premium on distance: Typically, the closer the property is to the school, the more likely it is that the home will fall within a priority one zone, the zone most likely to attend the start-up charter school.

**Table 4. Summary of Home Sale Price Results by Attendance Zone Type**

	PRIORITY ZONED SCHOOLS ONLY	ATLANTA CITY START- UP PRIORITY ZONE ONLY	NON- PRIORITY ZONED SCHOOLS	ATLANTA CITY START-UP NON-PRIORITY ZONE ONLY	ATLANTA SUBURB START-UP NON-PRIORITY ZONE ONLY
VARIABLES	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
<b>CONCENTRIC RING DISTANCE</b>					
Within 0.3mi v 0.3mi-0.6mi	0.0535**	0.0816**	-0.00386	0.0193	NA
Within 0.5mi v 0.5mi-1mi	0.0353*	0.0802***	0.00985	-0.0909*	0.0423***
Within 0.7mi v 0.7mi-1.4mi	-0.0234	0.0112	0.0206*	-0.0692*	0.0601***
Within 0.9mi v 0.9mi-1.8mi	NA	NA	NA	NA	0.0263**
<b>PERCENT EXCEED CRCT</b>					
Within 0.3mi v 0.3mi-0.6mi	0.00896***	0.0102***	-0.00305***	-0.00265	NA
Within 0.5mi v 0.5mi-1mi	0.00537***	0.00446***	-0.0011	0.0038	-0.00314***
Within 0.7mi v 0.7mi-1.4mi	0.00728***	0.00656***	0.000641	0.000402	-0.000731
Within 0.9mi v 0.9mi-1.8mi	NA	NA	NA	NA	-0.000355
<b>START-UP AGE IN YEARS</b>					
Within 0.3mi v 0.3mi-0.6mi	0.0149	0.0111	-0.0922***	0.0185	NA
Within 0.5mi v 0.5mi-1mi	0.0315***	0.0341***	-0.0582***	-0.0919	-0.0438**
Within 0.7mi v 0.7mi-1.4mi	0.0283***	0.0310***	-0.0182***	-0.0564	-0.0457***
Within 0.9mi v 0.9mi-1.8mi	NA	NA	NA	NA	-0.0233***

Estimated with robust standard errors, see Appendix tables C1-C6 for details.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculations

### Priority Zone

Table 4 summarizes the relevant regression results for our key variables of interest. (See Appendix C for tables showing the full regression results as well as a brief discussion of other variables.) The results for all geographies with priority zones in column 1 and for the city of Atlanta in column 2 are very similar. Thus, we focus our discussion on the results for the city of Atlanta. The literature has shown that students in urban areas can benefit academically from start-up charter schools (Tuttle et al. 2012). Atlanta has some of the longest running start-up charter schools in the state, including eight with priority attendance zones. These eight also make up most of the sample and thus drive the results. Note the results presented throughout this report represent the effects that the explanatory variables have on home prices on average. Thus, caution must be used in applying these results to individual start-up charter schools existing or proposed.

#### ATLANTA CITY START-UP PRIORITY ZONE

In Table 4, the results for the concentric ring distance variables, specifications 1 and 2, have statistically significant coefficients. Specification 1 shows results for properties within 0.3 miles of a start-up charter school compared to those between 0.3 and 0.6 miles of a charter. Being within 0.3 miles of a charter is

In the city of Atlanta, being within 0.3 miles of a charter school with a priority attendance zone is estimated to increase the sales price of a home by 8.2 percent, compared to homes in the concentric ring of 0.3 to 0.6 miles. For these charter schools an additional year of operation also increases the value of a nearby home by roughly 3 percent, on average.

estimated to increase the sales price of a home by 8.2 percent, compared to homes in the concentric ring of 0.3 to 0.6 miles.

Specification 2 indicates that properties within a half-mile of a start-up charter school sell for more than those between a half-mile and a mile from a start-up. The value of the coefficient is 0.0802; thus, the effect of being within this distance is estimated to increase the sales price of a home by 8.0 percent.<sup>21</sup> The third specification compares properties within 0.7 miles of a start-up charter school to those between 0.7 and 1.4 miles from a charter. The value of the coefficient is positive but not statistically significant.

These results suggest that the effect of a start-up charter school on home values is greatest near the inner ring of the school — between 0.3 (1,578 feet) and 0.6 miles (3,168 feet) from the school — due to the benefits of decreased travel time. As expected, this effect decreases slightly but is still positive and statistically significant at the second concentric ring, as travel time increases in the larger concentric ring. At greater distances, beyond 0.7 miles and less than 1.4 miles from the school, the effect of the start-up charter school on property values may be too tenuous to be measured in the city of Atlanta.

The two education-related variables studied in the literature — the age of the start-up charter school and the achievement level of the zoned TPS as measured by the CRCT exceeds expectations variable — also have the expected signs and are statistically significant. The CRCT exceeds expectations variable is statistically significant and positively related to sales prices of homes, with a value of 0.0102 for specification 1 and 0.0045 and 0.0066 for specifications 2 and 3, respectively. This means that an increase of 1 percent in CRCT exceeds expectations test scores, at the TPS, would increase estimated property values by 0.4 percent to 1.0 percent. The coefficient for the age of the charter school is also positive in all three specifications and is statistically significant in specifications 2 and 3, with the values of 0.0341 and 0.0310, respectively. Thus, an additional year of operation for a start-up charter school on average would increase the value of a nearby home by roughly 3 percent in both specifications.

#### ATLANTA SUBURBS PRIORITY ATTENDANCE ZONE

The other potential geographical subsample in this section, Atlanta suburban charter schools with priority attendance zones, is not well suited for the proximity model. As our task is to test whether charter schools affect property values in the aggregate, our model is designed to test the effects of many schools

<sup>21</sup> In specifications 2 and 3, the effect size for the concentric ring distance variables is similar to that found by Patrick (2015) for the premium of being in a priority one zone.



at once, using the two concentric areas around the start-up charter school. As such, it relies on a large number of observations to mitigate the effects of a relatively small number of outlying transactions that may be associated with a small number of schools. As we have shown, the model is well specified to do that, producing reasonable estimates of housing characteristics that determine home prices (see Appendix C). It is possible that when a subsample contains only a few schools, the locations or geographical features that surround these particular schools may be unusual and produce unexpected results.

Our sample contains only three Atlanta suburban priority zoned charter schools: DeKalb Path Academy, which includes 5,289 transactions; KIPP South Fulton Academy, which includes 3,380 transactions; and the Museum School of Avondale Estates, with 857 transactions. DeKalb Path Academy and KIPP South Fulton Academy both have priority zones with unusual geographical features. The DeKalb Path Academy priority one zone is bounded to the southeast by Interstate 85 and to the northwest by a line to the north of and parallel to Peachtree Road/Peachtree Industrial Boulevard. The priority one zone also includes a portion of Interstate 85 and the Peachtree Industrial Boulevard commercial corridor, one of the busiest in the city of Atlanta. The school is located on the boundary of Oglethorpe University campus and not far from Peachtree DeKalb Airport. The priority one zone for KIPP South Fulton Academy includes eight elementary schools and another seven elementary schools in its priority two zone. Such large priority zones may also include major thoroughfares, railroad tracks and large commercial properties. These various land uses can interact in unusual ways and distort how distance from residential property to the charter school affects home prices.

These two charter schools account for 91 percent of the observations in this subsample, skewing the results. Thus, we do not report the results for the subsample for suburban Atlanta priority zoned schools, as the results would not offer us any generalizable effects beyond these two schools. (Note that these schools are included in the larger samples.)

### **Non-Priority Zoned Schools**

Columns 3-5 of Table 4 show the results of the same regression model as in columns 1 and 2, but the sample of home sales is restricted to only areas with start-up charter schools that do not have priority zones. The model's results vary across the three subsamples. Column 3 shows the results for all non-priority zoned schools.

#### **ATLANTA CITY START-UP NON-PRIORITY ZONE**

Column 4 examines the effect that city of Atlanta charter schools without priority attendance zones have on property values in the city of Atlanta. For this subset of the data, the model's results are inconclusive. The concentric ring distance variables for specification 2 (within 0.3 miles of a charter vs. 0.3 to 0.6 miles from the charter) and specification 3 (within 0.5 miles of a charter vs. 0.5 to one mile from the charter) are negative and marginally statistically significant. In addition, neither the CRCT exceeds expectations variable nor the age of the start-up charter is statistically significant, and neither has a consistent sign, with some coefficients having positive signs and some negative signs.

Several potential reasons exist for these inconsistent results. First, this subset of the data has limited observations, from 823 for specification 1 to 3,145 for specification 3. These transactions occurred near nine start-up charter schools. It is possible that, due to this limited number of observations, our results are strongly influenced by a handful of schools with anomalous characteristics. Second, the larger concentric rings that we use to measure the effect of distance can include multiple neighborhoods in the city of Atlanta. It is possible, given the limited number of observations, that the model might be picking up unrelated neighborhood effects, with greater distance from a start-up charter school putting a house in a better neighborhood or section of the city. It is also possible that travel costs are too small to be reflected in the data or that parents place a small premium on travel distance. These results suggest that in the city of Atlanta, start-up charter schools without priority zones are not likely to increase the value of nearby homes.

#### ATLANTA SUBURBS NON-PRIORITY ATTENDANCE ZONE

We next examine the Atlanta suburbs that have start-up charter schools without a priority attendance zone.<sup>22</sup> Here we use the larger distance ring to better match reasonable travel time in the Atlanta suburbs and drop the first ring with the outer boundary of 0.6 miles. Several factors of suburban living make the first inner ring distance unsuitable in the suburbs. First, it is unlikely that students or families are walking to school in the suburbs. Thus, the travel time in a car or on a bus in the inner ring between 0.3 and 0.6 miles may not be a meaningful travel time difference. Second, suburban zoning may make living very near a school less appealing. It is likely schools in the suburbs are sited in or near commercial districts with busy roads. There may be limited single-family residential houses near these schools, and such homes may be unappealing to families with children due to concerns about safety, noise and other disamenities associated with living near busy commercial corridors.

Column 5 shows the results for nonpriority suburbs in the metro-Atlanta area. Examining just the Atlanta suburbs, all the concentric ring distance variable coefficients are positive and statistically significant. Specification 2 shows the results for properties that are within a half-mile of a start-up charter school compared to those between one-half and one mile of a charter. The value of the coefficient is 0.0423. Thus, the effect of being within this distance is estimated to increase the sales price of a home by 4.2 percent.

In specification 3, properties that are within 0.7 miles of a start-up charter school sell for higher prices than those located between 0.7 and 1.4 miles from a charter. The value of the coefficient is 0.0601; thus, the effect of being within this distance is estimated to increase the sales price of a home by 6.0 percent. For the specification for properties that are within 0.9 miles of a start-up charter school compared to those between 0.9 and 1.8 miles from a charter, the value of the coefficient is 0.0263 and statistically significant, adding 2.6 percent to the values of homes within this distance.

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<sup>22</sup> The counties included are Fulton, Cobb, DeKalb, Gwinnett, Cherokee, Clayton and Douglas. Again, an Atlanta suburb are those metro-Atlanta areas outside the city of Atlanta school district.

The coefficient on the CRCT exceeds expectations variable for specification 2 is negative and statistically significant, and the signs for specifications 3 and 4 are also negative but not statistically significant. These results suggest that the relationship traditionally seen between TPS CRCT exceeds expectations scores and property values may have been changed by the presence of start-up charter schools. The negative and statistically significant values on start-up charter school age coefficients in all three specifications suggests that as the start-up charter school ages, the values of homes within a 1.8-mile radius of the school declines.

The results in column 5 provide additional evidence that some decoupling may be occurring. Properties in the Atlanta suburbs near start-up charter schools are more valuable, and the CRCT exceeds expectations variable is negative. Together, these results suggest that families now are less willing to pay to be in better TPS elementary school zones as they now have a start-up charter school option. We believe that it is this result from the Atlanta suburban start-up charter schools that is likely generating the similar result found in column 3, for nonpriority zones in the full sample.

### **Summary**

Our results suggest several broad patterns. First, the positive effects resulting from residing closer to a charter school seems to be associated with the presence of a priority attendance zone. Thus, in addition to the benefit of decreased travel time that proximity brings, some of the effect is also likely driven by properties closer to the charter school being more likely to be in the priority one enrollment zone, increasing the chance of admission into the school. However, the traditional link between TPS quality and home prices remains: Families are still willing to pay more to live in higher performing TPS elementary school zones. These effects are particularly strong in the city of Atlanta subsample.

Second, we find some evidence in the subsample of non-priority start-up charter schools in the Atlanta suburbs that start-up charter schools can add value to homes and also decouple the traditional relationship between home value and TPS quality. In this subsample, we again find a positive effect on home values for those closer to the charter school, revealing the benefits to travel time that proximity brings. However, families do not receive the additional benefit from an increased chance of gaining admission due to location, as is the case with priority zones. Instead, in the suburbs, the lack of priority zones seems to weaken the traditional link between TPS elementary school quality and home prices.

In the metro-Atlanta area, we generally find a positive effect on home values for those closer to the charter school, revealing the benefits to travel time that proximity brings.

## ROBUSTNESS

It is possible that our results are capturing some preexisting relationship between the future location of the start-up charter school and home values, potentially due to some other amenities located close by. Thus, the relationship between home prices and distance from the start-up charter school may not be fully attributable to the new start-up charter schools. For instance, a new shopping center opens at roughly the same time and near the start-up charter school. As mentioned previously, we attempt to control for this by using census block fixed effects in combination with the concentric ring approach. In addition, we have many start-up charter schools in our sample, which greatly diminishes the likelihood that some preexisting relationship or concurrent event that improved property values within similar distances of start-up charters occurred across a significant portion of these areas to affect our results. Also, the month and year fixed effects should control for any broad state or national time trend, such as the Great Recession.

As a robustness check, we test for the remote possibility that there was a preexisting relationship between distance from the start-up charter school in each of the areas and home values that could also partially contribute to our findings of improved property values in some subsamples of the data. We use the sales data from transactions that occurred before a charter school opened and construct a difference-in-differences model. This method compares the rates of change of the variable of interest for two groups, a treatment group and a control group. The treatment group consists of home sales that occurred after the start-up charter school opened within the relevant concentric rings. The control group comprises the home sales that occurred in the same relevant concentric rings but before the start-up charter school opened. When this type of model is run on the subsample of charter schools without priority zones, the results do not support a finding that some preexisting home price trend existed prior to the opening of the start-up charter schools. This provides additional evidence that our charter school property value result was not due to a preexisting relationship between distance from the start-up charter school and home prices in the data.<sup>23</sup>

For several reasons, we are unable to adequately use the difference-in-differences method on the subsample of start-up charter schools with priority zones. First, many of the start-up charter schools with priority zones were open prior to 2004. Thus, we have no data for sales that occurred prior to their opening. Second, due to the closeness of the charter schools in the city of Atlanta with priority zones, the designation of sales as occurring before or after the opening of a start-up charter school is problematic. Many of the transactions are potentially in the before group for one charter school but in the after group for another charter school. Such transactions would be in the control group for one charter school and in the treatment group for another, producing unreliable regression results. These two situations occur predominately in the city of Atlanta for start-up charter schools with priority zones, greatly limiting our potential pool of observations. With so few observations, our regressions run on this subsample produce inconsistent and inconclusive results.

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<sup>23</sup> We do not report the results of these regressions here, but they are available upon request.

However, other empirical evidence from Patrick (2015) has shown that charter schools with priority zones do affect property values. Recall that her research design was a border discontinuity approach that avoided the concerns of an existing trend in property values by not relying on a distance measure from the relevant start-up charter school.

An additional concern is that the census block groups we use as our fixed effects area are not reasonable proxies for neighborhoods and thus do not adequately control for unobserved neighborhood effects. Here again we rely on evidence generated from the city of Atlanta. Atlanta has implemented the Neighborhood Planning Unit (NPU) to allow for citizen input into planning and zoning decisions. These NPUs were created from existing city neighborhoods. Because NPUs are made up of groups of similar neighborhoods, we can use NPUs to test the validity of our assumption that census block groups also generally conform to neighborhood boundaries. We examine the block group map and the NPU map for the city of Atlanta and find that the two are generally consistent. We also run the model using NPU designations rather than block groups for the fixed effects, and the results are very similar to the block group specification. A benefit of using census block groups is that they are smaller than city of Atlanta-defined NPUs and may control for variation that might exist within an NPU. In addition, census block groups are the only designated area available for the full data set. In the next section, we examine the special case of the Pataula Charter Academy.

## Pataula Charter Academy

To capture the effect of one charter school, Pataula Charter Academy, which has a five-county attendance zone, we use a different methodology, the difference-in-differences approach. Again, this method compares the rates of change of the variable of interest for a treatment group and a control group. The treatment group is the five counties in the Pataula Charter Academy's attendance zone. For the control group, we selected five similar counties in terms of relevant socioeconomic characteristics such as population size, demographics characteristics and personal income that do not have a start-up charter school (as discussed in the research strategy section).

This type of analysis is appropriate and necessary to estimate any potential property value effect from the existence of Pataula Charter Academy. This region of Georgia is rural, and single-family residences do not sell as frequently as in more urbanized areas. Consequently, we have only a small number of observations upon which to measure a statistically significant effect. Our previous analysis based on proximity relied heavily on multiple sales within small neighborhoods that only differed in their distance from the charter school. This type of analysis would not be possible for the study of the Pataula Charter Academy due to the limited sales transactions. It is also likely that the transportation cost of small distances is very different in a rural area without urban congestion (see figures 3 and 5). Also, Pataula Charter Academy opened in 2010, and we can observe home sales in our data both before and after its opening, making a difference-in-differences analysis possible.

The rural nature of this area limited the home sales data that we could observe. Rural addresses pose problems when geocoding for homes' latitude and longitude coordinates, which are required for calculating distances and identifying census block groups. Also, some counties' sales transaction files do not cover all the years in our sample, creating nonrandom holes in our data that cause concern in establishing trends between our treatment and control groups both before and after 2010. To account for these issues, we combine two data sets of sales transactions for these 10 counties, resulting in a dataset of 1,932 geocoded home sales that were evenly distributed across all 10 counties and the years 2004-14.<sup>24</sup> Approximately 850 additional homes sales occurred in the area during the study period, but they were not available for the analysis because we could not identify their home characteristics or reasonably geocode their location.

After controlling for census block group fixed effects and home characteristics, regressions of the home sales before 2010 show that homes were appreciating slightly faster in our comparison group of counties than were homes in the Pataula attendance zone, but the difference is not statistically significant. Month and year fixed effects are included in the final analysis to control for steady property appreciation over time that is similar across all the areas included.

## RESULTS

The difference-in-differences model relies on specifying three dichotomous variables (referred to in the literature as dummy variables) to measure the effects of interest. In our analysis, the first variable measures the effect if the sale occurred in the Pataula attendance zone in any year. This isolates the effect of being a home within the Pataula attendance zone at any time between 2004 and 2014. The second variable indicates that the sale took place after July 2010 in any of the counties in the Pataula attendance zone or the control group.<sup>25</sup> This isolates the effect of the sale occurring after the opening of the school regardless of whether it sold in the Pataula attendance zone or in the comparison group of counties. The third variable is the product of the first two and isolates the effect of being in the Pataula attendance zone after 2010 on the home sale price, compared to the control group of counties. We use this third variable to measure the effect of the school opening on property values in the Pataula zone. Note that our analysis assumes that no other event occurred in 2010 that could also have raised property values in the Pataula attendance zone, such as the opening of a large, new firm or other amenity.<sup>26</sup>

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<sup>24</sup> One came from qpublic.net, a site that organizes and distributes parcel-level data for many tax assessors in Georgia. The other was obtained from CoreLogic, an aggregator of parcel-level data files that include sales transaction and home characteristics data. The Qpublic data set allowed us to add an additional year of sales to the analysis.

<sup>25</sup> Recall, sales slightly before the opening of the charter school are included in the analysis as the home prices could be affected by the announced opening.

<sup>26</sup> The analysis also assumes that no such event occurred in the comparison counties. We examined data from the One Georgia Authority, an agency tasked with bolstering business development in Georgia, to check this assumption. Both five county regions experienced modest economic development activity around 2010. However, this modest level of activity is similar in both regions and does not appear to be substantial enough to have a material effect on the regions' housing prices.

**Table 5. Pataula Difference-In-Differences**

VARIABLES	LOG HOME SALES PRICE
Pataula Zone All Years	-0.0569 (-0.313)
After July 2010 All Counties	2.418*** (-0.815)
Pataula Zone and After July 2010	0.122 (-0.0764)
Percent Exceed CRCT	0.684 (-0.786)
Acres	0.0243*** (-0.00891)
Square Feet	0.000274*** (-0.0000452)
Number of Bathrooms	0.146*** (-0.0357)
Number of Bedrooms	-0.0214 (-0.0187)
Basement Square Feet	0.000434*** (-0.000134)
Below Average Condition	-0.515*** (-0.075)
Home Age in Years	0.000169* (-0.0000987)
Fireplace	0.210*** (-0.044)
Garage	0.298*** (-0.0413)
Recent Renovation	0.256*** (-0.0943)
Neighborhood	0.102** (-0.0462)
Month Year Fixed Effects	Y
Block Group Fixed Effects	Y
Constant	8.314*** -0.315
Observations	1,932
R-squared	0.498

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculations, Qpublic, CoreLogic, and School district attendance area maps and test scores

The direction and statistical significance of our explanatory variables matches our previous model with a few exceptions (see Table 5). The CRCT exceeds expectations variable is positive but not statistically significant. Many of the counties in this analysis have only one elementary school; residents, thus, likely have no meaningful choice of elementary school based on place of residence within the county. This regression includes acres of land rather than square feet and is positive and statistically significant. This suggests that in these rural areas, larger lots increase home prices. This model also includes an indicator variable for “neighborhood,” which indicates that the home was described as having a subdivision or neighborhood in the data. Due to the sparse populations in these rural counties, census block groups are geographically larger than in urban areas and thus could contain considerable variation in housing stock quality and style. It is likely though that houses that were built at roughly the same time as part of a new subdivision or neighborhood are of similar quality and style. This neighborhood variable is included to try to better control for neighborhood like variation within census block groups. This variable is statistically significant and positive, suggesting that being part of a subdivision or neighborhood does increase home value.

The results from the analysis of the Pataula Charter Academy suggest that the charter school has had some positive effect on local property values.

The R-squared for this model is 0.498, indicating that the model is explaining about half of the variance in home prices. This is in contrast to the R-squared from column 1 of Table 4 for priority zoned schools of 0.67 and column 3 of Table 4 for non-priority zoned schools of 0.76 (see Appendix Tables TC2 and TC3). This indicates that these model specifications are explaining about three-quarters of the variance in home prices. This lower level of explanatory power for the Pataula model is likely due to factors outside of our set of variables that influence home prices in this area. Census block group fixed effects, for example, could be much less representative of fixed neighborhood characteristics in rural areas. Due to their larger size, one census block group in these areas could include lakefront vacation homes as well as homes closer to a town, which could be driving the lower R-squared statistic.

The result for the variable of interest, Pataula attendance zone after 2010, is positive but not within the normal range of statistical significance. The coefficient is 0.122 with a relatively small standard error, suggesting that the Pataula Charter Academy has likely had some positive effect on local property values.<sup>27</sup> However, because of the lack of traditional statistical significance, we cannot be certain of the size of this effect. This low level of statistical significance is most likely due to the data limitations in the Pataula analysis.

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<sup>27</sup> More technically, the coefficient is 0.122 with a standard error of 0.0764, which indicates that we can reject the hypothesis that Pataula Charter Academy is having no positive effect on property values in the region with 85 percent confidence.



## Conclusion

Start-up charter schools affect property values through two different channels. First, property values could benefit from being closer to an amenity, the start-up charter school. Second, property values could benefit from being within the priority zone of a start-up charter school. If both effects are present, we would expect magnitudes of the coefficients on priority zone charter school concentric ring distance variables to be larger than those for non-priority zoned start-up charter schools. Our results generally support the two effects listed above.<sup>28</sup>

Most of this support comes from results obtained from analyzing subsamples of data from the metro-Atlanta area. We find that charter schools with priority enrollment zones in the city of Atlanta have a stronger effect on property values than charter schools without priority zones in the Atlanta suburbs. For instance, in the city of Atlanta, priority-zoned charter schools increased property values by 8.2 percent in the smallest concentric ring specification of 0.3 miles compared to 4.2 percent for non-priority charter schools in the smallest concentric ring specification of one-half mile in the Atlanta suburbs.

These results are consistent with the limited literature that has found that charter schools affect property values. Patrick (2015) found evidence that households value the increased probability of admission to charter schools in priority one admissions zones, with premiums on home prices in the priority one zone ranging from 7-13 percent. Others have found that being near a school has a positive effect on property values. For example, Kane et al. (2003) found that being one mile further away from an elementary school was associated with a 1 to 5 percentage point decline in home values.

Additionally, it is possible that the entrance of a charter school to the region lessens the traditional link between home prices and TPS elementary school quality, referred to as decoupling. Our results also offer some evidence that decoupling may be occurring in the Atlanta suburbs near charter schools without priority attendance zones. First, our results show that properties in the Atlanta suburbs near start-up charter schools without priority zones are more valuable than those in the outer concentric ring of one-half to one mile from the school. Second, the CRCT exceeds expectations variable is negative for these schools. These two results suggest that families value their start-up charter school option and now are less willing to pay to be in higher achieving TPS elementary school zones.

To further estimate the economic impact on the communities served by these charter schools, we estimated the effect on the average house in the area. In the city of Atlanta, the average house in a priority attendance zone within 1.8 miles of a start-up charter school sold for \$145,170 from 2004 to 2013. The house was roughly 1,500 square feet, with three bedrooms and two bathrooms. If this average house were in the 0.3-mile concentric ring of a priority-zoned school, we would expect it to sell for \$11,846 more than the same house located in the second concentric ring of 0.3-0.6 miles. In the Atlanta suburbs, the average house sold for \$139,206 from 2004 to 2013. The house was also roughly 1,500

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<sup>28</sup> Again, caution must be used in applying these results to individual start-up charter schools existing or proposed, as the results presented here are average effects.

square feet, with three bedrooms and two bathrooms. If this average house were in the half-mile concentric ring of a priority-zoned school, we would expect it to sell for \$5,888 more than the same house located in the second concentric ring of one-half to one mile from the charter school. Table 6 shows the economic impact of these positive effects for both the city of Atlanta and the Atlanta suburbs on the average home for the three specifications.

**Table 6: Economic Impact of Start-Up Charter Schools  
City of Atlanta and Atlanta Suburbs**

AVERAGE HOME SALE PRICE IMPACT		
	ATLANTA CITY START-UP PRIORITY ZONE ONLY	ATLANTA SUBURB START-UP NON-PRIORITY ZONE ONLY
<b>CONCENTRIC RING DISTANCE</b>		
Within 0.3mi v 0.3mi-0.6mi	+ \$11,846	NA
Within 0.5mi v 0.5mi-1mi	+ \$11,643	+ \$5,888
Within 0.7mi v 0.7mi-1.4mi	+ \$1,626	+ \$8,366
Within 0.9mi v 0.9mi-1.8mi	NA	+ \$3,661

Source: Authors' calculations

The results from the analysis of the Pataula Charter Academy suggest that the charter school has had some positive effect on local property values. However, because of the lack of traditional statistical significance, we cannot be certain of the size of this effect. Even if the true size of the effect were similar in magnitude to that found in the city of Atlanta or the Atlanta suburbs, the economic benefit to the community served would likely be smaller. First, houses in Pataula's five-county attendance zone are less expensive, with the average three-bedroom, two-bathroom house selling for \$75,210 from 2004 to 2013. Note that the average house was slightly larger than in the city of Atlanta at 1,700 square feet. Second, the Pataula region has considerably fewer housing units and home sales than in the metro-Atlanta area. The Pataula Charter Academy may have other less tangible effects on the five-county region, but our analysis of home sales cannot identify them.

Our results suggest that households value access to charter schools, conditional on geographic location and the existence of a priority attendance zone. While individual homeowners may benefit from the increase in a home's value, there is also a benefit to the communities served by these start-up charter schools. Local public services, including traditional public schools and public safety, rely on property tax revenue for funding. The increased home values near a start-up charter school increase the local tax base. Thus, while successful start-up charter schools benefit the students attending them and their families, there appears to be benefits to the broader community served as well.

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## Appendix A: Detailed Criteria for Matching Counties

Data on the number of owner-occupied units and the median value of owner-occupied units came from the Georgia statistics system and are the average 2008-12 values. Housing density data are also from the Georgia statistics system for the year 2013.

### 1) SIMILAR GEOGRAPHIC REGION

The five Pataula charter school attendance zone counties are in two Department of Community Affairs regions: Southwest Georgia and River Valley. We also include the Southern Georgia region to broaden the potential counties eligible for matching.

### 2) SIMILAR NUMBER OF OWNER-OCCUPIED HOUSING

The median number of owner-occupied houses in the Pataula charter school attendance zone is 1,320, with a mean of 1,542. Note that two counties in the Pataula attendance zone have less than 1,000 owner-occupied units each: Baker with 953 and Clay with 873. Early County has the largest number of owner-occupied housing with 2,708 units. To best match the Pataula attendance zone, we exclude all counties that have more than 3,000 or fewer than 800 owner-occupied housing units.

### 3) SIMILAR VALUE OF OWNER-OCCUPIED HOUSING

The Pataula attendance zone median owner-occupied housing unit value was \$74,200, with mean of \$71,450. To find counties with similar median values, counties that had values within 15 percent of the median are selected. This range is \$63,070 to \$85,330.

### 4) SIMILAR VALUE OF HOUSING DENSITY

We use housing density to try to match counties with similar styles of development. The Pataula attendance zone has a median density of 10 housing units per square mile, with a maximum of 10.6 and a minimum of 4.7. Thus, we exclude any counties that have densities 50 percent above the maximum or 50 percent below the minimum. This leaves 10 counties: Atkinson, Charlton, Clinch, Irwin, Marion, Miller, Talbot, Taylor, Terrell and Turner.

The goal of the first four criteria is to find counties that are similar to the Pataula attendance zone counties. Once those counties are identified, we want to match up the counties that are similar in residential values prior to the opening of the charter school in 2010. The final step is to pull the residential assessed values (40 percent valuations) and population and calculate a per capita digest value.

Each of the five Pataula attendance zone counties is matched with a similar county from the 10 above based on the absolute value of the average difference in per capita values from 2005 to 2010. Some counties have several matches that are relatively close and that also overlap with other counties in the Pataula attendance zone. Researcher judgment is used to pick counties that are the most similar across the prior criteria as well as the matching criteria to select from these similar counties. The five matching counties selected were Atkinson, Clinch, Miller, Terrell and Turner.

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## Appendix B: Charter School List

Amana Academy  
Atlanta Heights Charter School  
Atlanta Neighborhood Charter School (ES)  
Atlanta Neighborhood Charter School (MS)  
Baconton Community Charter School  
Bishop Hall Charter School  
Brighten Academy  
Charles R. Drew Charter School  
Charter Conservatory for Liberal Arts & Technology (CCAT)  
Cherokee Charter Academy  
Coastal Empire Montessori  
Coweta Charter Academy  
DeKalb Academy of Technology & the Environment (D.A.T.E.)  
DeKalb PATH Academy  
DeKalb Preparatory Academy  
Elite Scholars Academy  
Fulton Leadership Academy  
Fulton Science Academy High School  
Fulton Sunshine Academy  
Gwinnett Charter School of Advanced Mathematics, Science & Technology  
Hapeville Charter Middle School  
International Academy of Smyrna  
International Community School  
Ivy Preparatory Academy  
Ivy Preparatory Academy at Kirkwood for Girls  
Ivy Preparatory Young Men's Leadership Academy  
Kennesaw Charter Science and Math Academy  
KIPP Atlanta Collegiate  
KIPP South Fulton Academy  
KIPP STRIVE - Primary  
KIPP STRIVE Academy  
KIPP Vision  
KIPP Vision - Primary  
KIPP West Atlanta Young Scholars Academy (KIPP WAYS)  
Lake Oconee Academy  
Latin Academy Charter School  
Leadership Preparatory Academy  
New Life Academy of Excellence (two sites)

Odyssey School  
Oglethorpe Charter School  
Pataula Charter Academy  
Savannah Classical Academy  
The GLOBE Academy  
The Intown Academy  
The Kindezi School  
The Main Street Academy (two sites)  
The Museum School of Avondale Estates  
Tybee Island Maritime Academy  
Unidos Dual Language Charter School  
Utopian Academy for the Arts  
Wesley International Academy  
Westside Atlanta Charter School

## Appendix C: Results Full Tables

Tables C1- C5 show the results from the model specified in Equation 1, which controls for property characteristics, neighborhood effects, locally zoned school performance, the age of the start-up charter school and when the home sale occurred. The model performs as expected on the control variables for housing characteristics, illustrating the relationship between such factors as home square footage and sale price.

We discuss Table C1, showing results for priority zoned schools, below as the results are similar in the other tables. The square footage is positively related to sales price with an expected coefficient size. In general, 100 finished square feet is expected to increase the price of a home by about 2 percent. The effect of lot size on sales prices is extremely small and generally statistically insignificant, likely due to the inclusion of square footage and other housing characteristics. The number of bathrooms is statistically significantly related to higher sales prices. This is a relatively large coefficient, with an additional bathroom adding 10-13 percent to the price of a house. The number of bedrooms is positive and but not statistically significant. Unfinished basement square feet is slightly negatively related to sales price, most likely because for a given square footage of home, a purchaser would prefer finished square feet of basement. Fireplaces, garages and recent renovations are all statistically significant and positively related to sales prices. The year the home was built has a small positive relation to sales price, suggesting a preference for newer homes after controlling for the condition of the home.

The two education-related variables included here and that have been studied in the literature, the age of the start-up charter school and the achievement level of the zoned traditional public school as measured by the CRCT exceeds expectations variable, also have the expected signs and are generally statistically significant. The CRCT exceeds expectations variable is statistically significant and positively related to sales prices of homes, which is an expected finding. The age of the start-up charter is also positive but only statistically significant in specification 3, suggesting a weak positive relationship to the price of the home. The values for the R-squared, a measure used to explain how much of the variation in the dependent variable is explained by the model, are about 65-68 percent for all three specifications. These levels of R-squared provides evidence that the model is appropriately specified. The results for the other subsamples follow.

**Table C1. Priority Zoned Schools Only**

VARIABLES	LOG SALES PRICE	LOG SALES PRICE	LOG SALES PRICE
Within .3mi v .3mi-.6mi	0.0535** -0.0262		
Within .5mi v .5mi-1mi		0.0353* -0.0191	
Within .7mi v .7mi-1.4mi			-0.0234 -0.0192
Percent Exceed CRCT	0.00896*** -0.00151	0.00537*** -0.000954	0.00728*** -0.000788
Start-Up Age in Years	0.0149 -0.0287	0.0315*** -0.011	0.0283*** -0.00523
Square Feet	0.000243*** -1.87E-05	0.000239*** -1.56E-05	0.000247*** -1.31E-05
Lot Size	-3.58e-08* -2.13E-08	-3.32e-08* -1.90E-08	9.69E-09 -2.87E-08
Number of Bathrooms	0.0972*** -0.0156	0.132*** -0.0118	0.133*** -0.00964
Number of Bedrooms	0.0235 -0.0156	0.00264 -0.0101	0.00247 -0.00812
Basement Square Feet (unf.)	-8.75e-05*** -2.58E-05	-9.80e-05*** -1.69E-05	-0.000106*** -1.38E-05
Below Average Condition	0.0598 -0.0542	0.0487 -0.0389	0.0343 -0.0299
Above Average Condition	0.0256 -0.0298	0.0065 -0.0184	0.0286** -0.0144
Year Built	0.000526 -0.000384	0.000623*** -0.000177	0.000145 -0.000184
Fireplace	0.118*** -0.0208	0.108*** -0.0141	0.0851*** -0.0113
Garage	0.129*** -0.0253	0.0703*** -0.0169	0.0668*** -0.0133
Recent Renovation	0.0472* -0.0258	0.0409** -0.0175	0.0294** -0.0142
Month Year Fixed Effects	Y	Y	Y
Block Group Fixed Effects	Y	Y	Y
Constant	10.80*** -0.8	10.95*** -0.395	11.69*** -0.3
Observations	6,751	14,846	23,380
R-squared	0.688	0.668	0.651

Robust standard errors below coefficient

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculations, CoreLogic home sales 2004-13, and School district attendance area maps and test scores



**Table C2. Excluding Priority Zoned Schools**

VARIABLES	LOG SALES PRICE	LOG SALES PRICE	LOG SALES PRICE
Within .5mi v .5mi-1mi	-0.00386 -0.0143		
Within .7mi v .7mi-1.4mi		0.00985 -0.0131	
Within .9mi v .7mi-1.8mi			0.0206* -0.0109
Percent Exceed CRCT	-0.00305*** -0.000821	-0.0011 -0.000679	0.000641 -0.000579
Start-Up Age in Years	-0.0922*** -0.0251	-0.0582*** -0.012	-0.0182*** -0.00454
Square Feet	0.000305*** -1.46E-05	0.000152*** -5.24E-05	0.000162*** -4.30E-05
Lot Size	-8.88e-09*** -3.29E-09	-2.17E-09 -6.96E-09	3.41E-09 -1.22E-08
Number of Bathrooms	0.138*** -0.0113	0.183*** -0.0209	0.169*** -0.0186
Number of Bedrooms	0.0225** -0.011	0.0695*** -0.0147	0.0519*** -0.0107
Basement Square Feet (unf.)	2.71e-05** -1.09E-05	3.70e-05*** -8.29E-06	3.59e-05*** -6.16E-06
Below Average Condition	-0.0078 -0.0332	-0.104*** -0.0266	-0.148*** -0.0224
Above Average Condition	0.0821*** -0.0177	0.0561*** -0.0126	0.0628*** -0.0102
Year Built	-0.000579*** -8.95E-05	-0.000525*** -7.68E-05	-0.000503*** -6.09E-05
Fireplace	0.0383** -0.0155	0.0156 -0.0113	0.011 -0.00892
Garage	0.122*** -0.0133	0.127*** -0.0108	0.120*** -0.00835
Recent Renovation	0.0231 -0.0245	0.0509*** -0.0191	0.0869*** -0.0162
Month Year Fixed Effects	Y	Y	Y
Block Group Fixed Effects	Y	Y	Y
Constant	12.07*** -0.278	11.70*** -0.196	11.86*** -0.204
Observations	11,479	20,645	31,393
R-squared	0.757	0.763	0.76

Robust standard errors below coefficient

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculations, CoreLogic home sales 2004-13, and School district attendance area maps and test scores

**Table C3. Atlanta City Start-Up Priority Zone Only**

VARIABLES	LOG SALES PRICE	LOG SALES PRICE	LOG SALES PRICE
Within .3mi v .3mi-.6mi	0.0816** -0.0334		
Within .5mi v .5mi-1mi		0.0802*** -0.0228	
Within .7mi v .7mi-1.4mi			0.0112 -0.0243
Percent Exceed CRCT	0.0102*** -0.00188	0.00446*** -0.00115	0.00656*** -0.000971
Start-Up Age in Years	0.0111 -0.029	0.0341*** -0.0111	0.0310*** -0.00526
Square Feet	0.000308*** -2.49E-05	0.000249*** -2.34E-05	0.000264*** -2.12E-05
Lot Size	3.59E-06 -2.42E-06	4.61E-07 -1.84E-06	2.87E-07 -8.38E-07
Number of Bathrooms	0.0806*** -0.0204	0.112*** -0.0155	0.111*** -0.013
Number of Bedrooms	0.0382** -0.0183	0.0159 -0.0119	0.00802 -0.01
Basement Square Feet (unf.)	-7.41e-05** -3.03E-05	-6.01e-05*** -2.18E-05	-7.89e-05*** -1.81E-05
Below Average Condition	-0.0362 -0.0643	0.00385 -0.0454	-0.0275 -0.0338
Above Average Condition	0.00486 -0.0336	-0.0143 -0.0213	0.00955 -0.017
Year Built	0.00211*** -0.000519	0.00319*** -0.000362	0.00263*** -0.000295
Fireplace	0.122*** -0.0234	0.107*** -0.0164	0.0913*** -0.0132
Garage	0.100*** -0.0302	0.0535*** -0.0206	0.0669*** -0.0168
Recent Renovation	-0.0125 -0.0299	-0.0306 -0.0212	-0.0330* -0.0179
Month Year Fixed Effects	Y	Y	Y
Block Group Fixed Effects	Y	Y	Y
Constant	6.973*** -1.026	4.685*** -0.713	6.460*** -0.578
Observations	5,049	11,046	16,612
R-squared	0.631	0.614	0.594

Robust standard errors below coefficient

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculations, CoreLogic home sales 2004-13, and School district attendance area maps and test scores

**Table C4. Atlanta City Start-Up Non-Priority Zone Only**

VARIABLES	LOG SALES PRICE	LOG SALES PRICE	LOG SALES PRICE
Within .3mi v .3mi-.6mi	0.0193 -0.0672		
Within .5mi v .5mi-1mi		-0.0909* -0.0495	
Within .7mi v .7mi-1.4mi			-0.0692* -0.0416
Percent Exceed CRCT	-0.00265 -0.00485	0.0038 -0.00292	0.000402 -0.00252
Start-Up Age in Years	0.0185 -0.113	-0.0919 -0.0601	-0.0564 -0.041
Square Feet	0.000260*** -7.05E-05	0.000254*** -3.81E-05	7.04e-05*** -1.74E-05
Lot Size	8.04E-07 -3.73E-06	2.76E-06 -1.83E-06	-3.27E-07 -2.29E-07
Number of Bathrooms	0.165*** -0.0474	0.132*** -0.0264	0.132*** -0.0211
Number of Bedrooms	-0.000738 -0.0383	0.00272 -0.0244	0.0679*** -0.018
Basement Square Feet (unf.)	1.32E-05 -7.25E-05	-5.31E-05 -4.25E-05	-1.50E-05 -3.18E-05
Below Average Condition	0.203* -0.114	0.0703 -0.0822	-0.0847 -0.0632
Above Average Condition	0.155* -0.0878	0.0905* -0.0504	0.107*** -0.0391
Year Built	0.00151 -0.00144	0.00336*** -0.000795	0.00459*** -0.000606
Fireplace	0.0168 -0.0571	0.0212 -0.0369	0.0103 -0.0283
Garage	-0.00435 -0.0644	0.0255 -0.0421	0.0518* -0.0314
Recent Renovation	-0.0763 -0.0688	-0.124*** -0.0413	-0.112*** -0.033
Month Year Fixed Effects	Y	Y	Y
Block Group Fixed Effects	Y	Y	Y
Constant	8.023*** -2.871	4.430*** -1.579	3.421*** -1.178
Observations	823	1,924	3,145
R-squared	0.799	0.784	0.79

Robust standard errors below coefficient

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculations, CoreLogic home sales 2004-13, and School district attendance area maps and test scores

**Table C5. Atlanta Suburb Start-Up Non-Priority Zone Only**

VARIABLES	LOG SALES PRICE	LOG SALES PRICE	LOG SALES PRICE
Within .5mi v .5mi-1mi	0.0423*** -0.0148		
Within .7mi v .7mi-1.4mi		0.0601*** -0.0127	
Within .9mi v .9mi-1.8mi			0.0263** -0.0112
Percent Exceed CRCT	-0.00314*** -0.000837	-0.000731 -0.000631	-0.000355 -0.000543
Start-Up Age in Years	-0.0438** -0.0171	-0.0457*** -0.0104	-0.0233*** -0.0042
Square Feet	0.000272*** -1.48E-05	0.000246*** -1.76E-05	0.000269*** -1.42E-05
Lot Size	-4.85E-09 -3.01E-09	-2.86E-09 -3.16E-09	-6.51E-11 -6.72E-09
Number of Bathrooms	0.0701*** -0.0119	0.0639*** -0.00972	0.0420*** -0.00843
Number of Bedrooms	0.0629*** -0.0116	0.0770*** -0.0086	0.0486*** -0.00679
Basement Square Feet (unf.)	8.50e-05*** -1.07E-05	7.95e-05*** -7.46E-06	7.51e-05*** -5.82E-06
Below Average Condition	-0.0454 -0.032	-0.0947*** -0.0249	-0.126*** -0.0219
Above Average Condition	0.0896*** -0.0168	0.0684*** -0.0117	0.0946*** -0.00963
Year Built	0.00485*** -0.000587	0.00574*** -0.000458	0.00607*** -0.000368
Fireplace	0.0420** -0.0181	0.0111 -0.0127	0.0066 -0.00992
Garage	0.124*** -0.0149	0.101*** -0.0107	0.0849*** -0.00848
Recent Renovation	0.0523 -0.0359	0.0737*** -0.0265	0.122*** -0.0213
Month Year Fixed Effects	Y	Y	Y
Block Group Fixed Effects	Y	Y	Y
Constant	1.386 -1.159	-0.585 -0.907	-0.836 -0.731
Observations	8,394	15,330	23,533
R-squared	0.758	0.775	0.775

Robust standard errors below coefficient

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculations, CoreLogic home sales 2004-13, and School district attendance area maps and test scores

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## About the Authors

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**Peter Bluestone** is a senior research associate with the Center for State and Local Finance. His research includes urban economics, static and dynamic economic impact modeling, and state and local fiscal policy. His work includes modeling state and local impacts of policy changes and economic development using various economic models, including IMPLAN and Regional Economics Models Incorporated (REMI). Bluestone currently serves on the technical advisory committee for the Atlanta Regional Commission. He received his doctorate in economics from Georgia State University.

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**David Sjoquist** is a faculty member in the Andrew Young School of Policy Studies at Georgia State University. A specialist in the field of public finance, Sjoquist has an extensive interest in urban economics, especially local economic development, central city poverty, and education policy. He has published extensively on topics, such as analysis of public policies, tax allocation districts, teenage employment, local government fiscal conditions, and the urban underclass. His current research interests include property taxation, school financing, local sales taxes and income taxes. His work has been published in such journals as *American Economic Review*, *Journal of Public Economics*, *National Tax Journal*, and *Review of Economics and Statistics*. He holds a doctorate from the University of Minnesota.

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**Nicholas Warner**, a research associate at the Center for State and Local Finance at Georgia State University, specializes in education finance. His recent research has focused on school district expenditure and revenue portfolio analysis, tax expenditure estimation, examination of Georgia's special option sales tax for school facility funding, and school districts' responses to the Great Recession. His work has been published in the *Journal of Education Finance* as well as by the Georgia Department of Early Care and Learning. Warner received his master's degree in economics from the Andrew Young School of Policy Studies.

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The Center for State and Local Finance's (CSLF) mission is to develop the people and ideas for next generation public finance by bringing together the Andrew Young School's nationally-ranked faculty and the broader public finance community. CSLF conducts innovative, nonpartisan research on tax policy and reform, budget and financial management, education finance, and economic development and urban policy. Additionally, it provides premier executive education in public finance for state and local finance officials and works with local and state partners on technical assistance projects on fiscal and economic policy.

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## About the State Charter Schools Commission of Georgia

The State Charter Schools Commission of Georgia is a state-level, independent charter school authorizing entity. The commission has the power to approve or deny petitions for commission charter schools and renew, nonrenew, or terminate commission charter school petitions in accordance with Georgia law.

While the Commission's duties are set forth in law and extend beyond simply authorizing schools, the Commission's principal obligations include:

- Reviewing charter school petitions for commission charter schools and assisting in the establishment of commission charter schools throughout Georgia;
- Developing and promoting best practices for charter schools and charter school cosponsors to ensure that high-quality charter schools are developed and encouraged;
- Promoting high standards of accountability for commission charter schools; and
- Monitoring and annually reviewing the academic and financial performance, including revenues and expenditures, of commission charter schools and holding the schools accountable for their performance pursuant to the charter.