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Circles of Influence: An Analysis of Charter School Location and Racial Patterns at Varying Geographic Scales

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Abstract: This paper uses Geographic Information Systems (GIS) and dynamic mapping to examine student enrollments in New Jersey charter schools. Consistent with previous research, we find evidence of increased racial segregation. Greater percentages of African-Americans attend charter schools than reside in surrounding areas. We add to the existing charter school literature by more fully considering the importance of charter school supply and examining student enrollments across three geographic scales: school districts, census tracts and block groups. We demonstrate that racial segregation is most severe within charter schools' immediate neighborhoods (i.e. block groups), suggesting that analyses comparing charter schools to larger school districts or nearby public schools may misrepresent student sorting. This finding appears to result from the tendency of charter

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schools in New Jersey to cluster just outside predominately African-American neighborhoods, encircling the residential locations of the students they are most likely to enroll.
Keywords: GIS; mapping; charter schools; segregation; school enrollments; school choice.

Círculos de influencia: Un análisis de la ubicación y de los patrones raciales de las escuelas charter a diferentes escalas geográficas

Resumen: Este trabajo utiliza los Sistemas de Información Geográfica (SIG), cartografía y análisis de dinámicas de matriculación de estudiantes en las escuelas "charter" en Nueva Jersey. Como en investigaciones anteriores, encontramos evidencia de que la segregación racial se ha incrementado. Mayores porcentajes de estudiantes Afro-americanos asisten a las escuelas charter que residentes en áreas cercanas a esas escuelas. Añadimos a la literatura existente sobre las escuelas charter considerando principalmente la importancia de la oferta de las escuelas charter y examinando los estudiantes inscritos en tres escalas geográficas: los distritos escolares, censales y grupos de barrios. Hemos demostrado que la segregación racial es más grave en los barrios cercanos a las escuelas charter (es decir, grupos de barrios), lo que sugiere que las pruebas de comparación de las escuelas a los distritos escolares más grandes escuelas "charter" o pública de vecinos puede alterar la clasificación de estudiante. Este hallazgo parece ser el resultado de la tendencia de escuelas charter en Nueva Jersey, justo fuera del clúster de los barrios predominantemente afroamericana, con la participación la zona residencial de los estudiantes más probable más la DEA para inscribirse en una escuela charter.
Palabras clave: SIG; cartografía; escuelas charter; segregación; matrícula escolar; elección de escuelas.

Círculos de influência: Uma análise da localização e do padrão racial da escola charter em diferentes escalas geográficas

Resumo: Este trabalho utiliza Sistemas de Informação Geográfica (SIG) e mapeamento dinâmico para analisar matrículas de alunos em escolas charter de Nova Jersey. Como em pesquisas anteriores, encontramos evidências de que a segregação racial aumentou. Maiores percentagens de Afro-Americanos frequentam as escolas charter do que os residentes em áreas próximas. Nós adicionamos a literatura existente sobre escolas charter considerando principalmente a importância do abastecimento das escolas charter e o exame de alunos matriculados em três escalas geográficas : os distritos escolares, setores censitários e grupos de quarteirões. Nós demonstramos que a segregação racial é mais grave em bairros próximos às escolas charter (ou seja, bloco grupos), sugerindo que análises comparando as escolas charter aos maiores distritos escolares a ou às escolas públicas vizinhas podem adulterar a classificação do estudante. Este achado parece resultado da tendência de escolas charter em New Jersey de agrupar apenas de fora dos bairros predominantemente Afro-Americanos, envolvendo as áreas residenciais dos alunos que mais provavelmente mais se matriculariam em uma escola charter.
Palavras-chave: SIG e cartografia; escolas charter; segregação; matrículas escolares; a escolha da escola.

Introduction

Charter school reform has been described as an effective solution for providing low-income and minority children with improved learning opportunities. This motivation has led policymakers in several states to include racial classification provisions in charter school laws that promote integration and confront the possibility that increased school choice may lead to greater student

sorting by race and ethnicity (Oluwole & Green, 2008; Renzulli, 2006). The intuitive appeal of promoting increased diversity in schools is that common schooling experiences lead to peer interactions that positively influence academic achievement and socialization practices (Levin, 1999, 2001). However, while carefully structuring charter school admission policies may encourage student enrollments that better reflect district or neighborhood norms, it does little to address the distribution and accessibility of new schooling options for families across racial/ethnic sub-groups, especially those already living in heavily segregated communities. Thus, how charter schools choose to operate within educational marketplaces remains an important point of inquiry, and researchers have begun to investigate whether competition creates incentives for charters to actively pursue more selective (and potentially more segregated) student bodies.

Questions about how charter schools respond to market-based competition and position themselves within educational marketplaces are essential spatial concerns that require descriptive analyses of the arrangement of schooling options. Previous research has tended to examine charter school practices and enrollments acontextually—that is, studied student demographics, school resources, student outcomes, etc. divorced from the larger environments in which charter schools operate. But, where a school chooses to locate has a direct bearing on its level of competition, access to resources and institutional legitimacy. Studies that ignore the larger context in which schools operate may obscure two points critical to understanding charter school reform. First, contexts vary. Statutory regulations, such as those regarding for-profit participation, charter authorization or racial balancing provisions, as well as local economic and demographic factors influence market entry and the availability of new educational opportunities. Second, families' access to new educational opportunities is, perhaps, best described by examining the full range of schooling options in a given area, rather than their choice of a particular school (Lubienski, Gulosino & Weitzel, 2009). With this in mind, determining where charter schools are physically located can help us gauge the degree to which market-style locational strategies promote equitable access to schools across communities, especially in areas with intense segregation and racial isolation. Such knowledge can provide important information to policymakers concerned about the possible detrimental effects of choice and interested in designing policies that provide appropriate incentives for charter schools to serve all students.

In this paper, we add to the existing literature on charter schools by examining more fully the potential relationship between neighborhood context and charter schools' locational decisions. More specifically, we use Geographic Information Systems (GIS) and dynamic mapping to compare New Jersey charter schools to the school districts, census tracts, and block groups in which they reside. The results of this study make several contributions to debates on the segregative effect of charter schools. First, acknowledging research that shows 'white flight' to be a concern in some places (Crowder & South, 2008; Saporito, 2003; Fairlie & Resch, 2002; Henig, 1996; Lankford, Lee, & Wyckoff, 1995; Lankford & Wyckoff, 1999) and minority students selecting into racially isolated charter schools a prevalent phenomenon in other locations (Booker, Zimmer & Buddin, 2005; BiFulco & Ladd, 2007; Rofes & Stulberg, 2004; Weiher & Tedin, 2002), we analyze levels of segregation in two directions. We compare percentages of both non-white and white populations in New Jersey charter schools to the demographic characteristics of their surrounding areas. Second, we analyze charter schools across multiple geographic scales, providing insights into the extent to which charter schools reflect the racial composition of nearby neighborhoods and larger school districts. Examining student demographics at multiple geographic scales, especially those that define families' local context, is important to capturing school choices at the level where they actually occur (Taylor, 2009). Finally, we explore the "literal positioning"—where charter schools are located relative to particular educational and demographic characteristics—of schools vis-à-vis their

surrounding neighborhoods as a market-based strategy to serve different students across often segregated urban landscapes. Understanding charter school locations relative to the demographic composition of their neighborhoods speaks to the appropriate role of market forces in supporting the racial diversity and social cohesion goals of public education (Levin, 1999).

Background

Charter Schools and Racial Segregation

Despite an extensive literature devoted to measuring the degree of racial segregation in schools, there is little consensus on technical approaches to this issue. Previous studies have applied various racial classifications, categories and measures of segregation and integration. Serious prior data limitations and the confounding factors associated with racial/ethnic separation (Schelling, 1971) have left unresolved questions of how families *and schools* may respond to racial differences across communities, raising questions about the potential impact of school choice plans.

Clotfelter (2001) examined changes in the racial composition of urban public schools and school districts in 238 metropolitan areas from 1987 to 1996. Using an exposure index to describe the percentage of non-white students attending school with the average white student, he measured enrollment changes associate with the departure of white students. A crucial assumption in this study is that the desirability of moving from, or avoiding, a given urban school district depends on the existence of alternative public school districts with lower percentages of non-white students, the extent of differences in racial compositions, and the distance from that district to alternative districts. Clotfelter's findings supported the existence (nonlinear) of a "tipping point," a threshold exposure rate of 25-35% beyond which white departures and avoidance accelerates. Similarly, Renzulli and Evans (2005) reported that schools and school districts with black enrollments over 30% experienced a greater loss of white students than those below 30%.

Earlier studies, such as Giles (1978) have also investigated the relationship between percent black enrollment and white enrollment change. Examining 60 districts and approximately 1,600 schools in Southern standard metropolitan statistical areas, Giles found schools located in school districts with high percentages of black students experienced greater percentage declines in white enrollment than school districts with lower percentages, and he observed an exponential increase in white withdrawal when black enrollments rose above 25-30%. Overall, studies of racial/ethnic sorting in schools have raised concerns among policymakers that increased school choice may prompt families, especially white families, to move to more segregated schools.

Studies of racial/ethnic segregation in charter schools have tended to focus on comparisons between enrollments in charter schools and traditional public schools. For example, Frankenberg and Lee (2003) created indices to document large within-state differences between charter schools and traditional public schools. Aggregating school-level data to the state level, they explored the percentage of students of each race in attendance at predominately minority schools (greater than 50% of the student body is non-white), intensely segregated minority schools (90-100% minority), and intensely segregated white schools (90-100% white) and found substantial differences between charter and traditional public schools both nationally and at the state level. Charter schools disproportionately enrolled higher percentages of black students in intensely segregated schools and lower percentages of white students relative to non-charter public schools. Evidence on Latino charter school enrollment patterns was mixed across states. On the whole, minority students in charter schools appeared less likely to be in heavily white schools than minority students in traditional public schools.

Of course, comparisons based on aggregate data may be misleading and therefore misrepresent charter school enrollments. For example, charter schools that are located in densely populated urban areas may over-represent minority students when compared to state and school district demographics, but not when compared to the families living in immediate surrounding neighborhoods. Miron and Nelson (2002) have demonstrated that the use of different comparison groups leads to different findings and conclusions. In a study in Michigan, the authors first compared all charter school students in a given school district to the local public school population. No substantial differences were observed between student groups. Next, student enrollments in individual charter schools were compared to the racial composition of their host district. Fourteen percent of charter schools were found to substantially over-represent minority students (>20%) and 11% substantially under-represented minority students (<20%).

Researchers have applied two strategies to improve research methods and better understand charter school enrollments. First, they have endeavored to improve comparison groups by examining student level data. Weiher and Tedin (2002) examined 1,006 Texas charter school households and found that white, blacks, and Hispanic students transfer to charter schools where their respective racial/ethnic groups comprise 11% to 14% percentage points more of the general student population. Booker, Zimmer and Buddin (2005) tracked individual student movements in California and Texas over time and compared the racial make-up of the charter school that each student attended to his or her previous school. They found that blacks in both states were likely to move to more segregated charter schools. BiFulco and Ladd (2007) examined student level data in North Carolina and found that a majority of black charter school students transferred into more racially segregated schools and that this decision led to negative academic outcomes.

Second, researchers have employed methodologies that more fully define the competitive marketplace, or context, within which charter schools function. For instance, Cobb and Glass (1999) looked at 55 urban and 57 rural charter schools in Arizona, comparing their ethnic make-up to adjacent public schools. Geographic Information Systems (GIS) were used to more fully explore who is being served in charter schools within the context of geographic maps. Unlike aggregate studies, this analysis allows for a close look at segregation at the school level. In their analysis of enrollment data from 1994-1997, they found that charter schools over-represented white students—that is to say, white enrollment was 20% higher in charter schools than in traditional public schools. They also compared charter schools in Phoenix and several rural towns in Arizona and found that among high schools, those that were focused on vocational education were predominately Hispanic and those that were college-preparatory academies were largely white. A majority of ethnic minority students enrolled in charter schools that did not lead to a path to college.

Thus, more exacting studies of student enrollment decisions suggest that charter schools may increase racial/ethnic segregation, but the particular shape of student sorting likely depends on the context of local learning environments.[1] That is, in some settings charter schools may over-represent minority students and in other settings charter schools may under-represent minority students. Studies that aggregate data into larger units of analysis (i.e. state or district level rather than school level) in the absence of control variables for community demographic and school characteristics are more likely to show biased results. Cobb and Glass (1999) sought to remedy this

[1] Charter schools are a new education reform and student enrollments may still be evolving. Studies that focus on student sorting in the first few years of reform may misrepresent parents' choices once charter schools are better understood and accepted as legitimate schooling alternatives. Booker, Zimmer, Gill and Sass (2008) recently examined 10 years of longitudinal data in Chicago and found that over time student transfers between traditional public schools and charter schools did not increase racial segregation. Students moved between schools with similar racial demographics.

problem by identifying charter schools as segregated if they deviated excessively from the racial makeup of the nearby traditional public school, but a continuing concern is the inability of such studies to link charter schools to the racial makeup of the broader community they are intended to serve. Typical comparisons of charter schools, we argue, against a nearby school, the district, or the state may fail to provide a full picture of how charter schools engage and operate within education marketplaces.

In the sections below, we seek to add to the literature on charter schools by taking a more systematic approach to examining charter schools' local context and analyzing how differences in both neighborhood attributes and geographic scales may shape perceptions of student enrollments and school behaviors. Drawing on methods established in the studies describe above, we consider the notion of segregation in two directions—the percentages of non-white populations and white populations. Further, we examine charter school positions in areas of extreme segregation, namely predominately white (greater than 80% white) and predominately minority (less than 20% white), as well as areas of greater racial diversity (20%-80% white). Our measurement of racial diversity/integration is not arbitrary, but rather stems from the core middle band where racial integration can occur between the two extreme conditions of segregation and is consistent with the body of literature on "white flight" that shows the departure of white families from school districts and neighborhoods accelerates when the percentage of minority families rises above 20% (Clotfelter, 2001; Orfield, 2002; Renzulli & Evans, 2005). However, before providing a detailed description of our data and methods, we offer a theoretical discussion to more fully explain how charter schools may be expected to position themselves with educational marketplaces.

Conceptual Framework

The issue of location is well known as a central consideration in business strategies, with theories of locational decisions producing useful hypotheses of the distribution of organizations relative to market demand. Michael Porter (1998) has popularized the idea that spatially proximate clusters of particular kinds of business activities increase competitive advantage. Research on the prevalence of clustering effects, or ringing patterns, indicates that businesses may seek to locate in compact geographic areas where they can capitalize on established markets and high demand while simultaneously gaining access to potential new customers to maximize profits. Porter further distinguishes between a broad target market and a narrow target market to describe the full scope of a firm's potential positioning strategy. The former offers a wide range of services appealing to a broad range of customers and tailoring only partially the needs of particular groups. The latter addresses the specific needs (market shares) of niche consumer groups to secure competitive advantages by providing specific services at a lower cost. Porter (1998) notes that the presence of a cluster of firms is due to similarities in product attributes, customer needs and customer accessibility.

Building on Porter's concept of cluster strategy, we examine the role of literal positioning in generating and arranging educational options. To the extent that charter schools are not constrained by catchment areas in an educational market, competitive process via literal positioning may occur with charter schools considering either broad or narrow target market strategies. For example, charter schools considering entry into the competitive marketplace may sense incentives to locate in racially diverse areas where differences in schooling preferences create strong demand for increased choice across a broad range of education consumers. This may be particularly true in states with charter school laws that have a defined percentage requirement for racial balance. Alternatively, charter schools, especially those free from maintaining a racial balance, may find it appealing to position themselves near more racially segregated communities in order to capitalize on particular

"market shares." In this case, charter schools seek to locate near preferred clients (students and neighborhoods) in order to gain advantage from meeting their needs at lower costs (e.g. transportation, information, staff accessibility, comfort and familiarity) and more effectively match products and services to demand.

The applicability of Porter's cluster strategy is supported in charter school studies that have examined how supply-side factors influence the locational decisions of charter schools. Glomm, Harris and Lo (2005) reported that charter schools are most likely to locate in areas where populations are racially diverse and imperfectly sorted. Lubienski and Gulosino (2007) examined charter school's literal positioning and observed that most charter schools target areas and student populations where they have a competitive advantage. Similarly, Henig and MacDonald (2002) demonstrated that charter schools in Washington D.C. were more likely to locate in areas with greater proportions of black and Hispanic families, but also in neighborhoods with middle incomes and higher home ownership rates than the poorest parts of the city. This suggests that charter schools may have a high level of market acumen and actively seek out areas where additional schooling options are needed, but avoid neighborhoods with the most expensive to educate students.[2] The fact that many charter schools are new and therefore uncommitted to a specific geographic location further emphasizes this point.

To be clear: such positioning strategies are not expected to be the sole determinants of charter school locations. A number of practical considerations may influence charter school locations, including: the cost of renting or purchasing space; zoning regulations that prevent schools from operating in certain areas or on particular streets; and insurance redlining that makes it prohibitive to open up schools in the poorest or most segregated neighborhoods. In addition, Henig and MacDonald (2002) find evidence that charter schools are responsive to political factors and, more specifically, tend to locate in areas with higher voter turnout when chartered by elected officials. Finally, a key point of emphasis in charter school reform is building strong community relations with educators and parents around a shared school vision (Huerta & d'Entremont, 2009). Charter school operators are often reliant on previously established social networks and may tend to access facilities near friends, business connections, and/or funders.

Regardless, none of these factors preclude charter schools from engaging in positioning strategies within certain constraints. Garcia (2008) has observed that charter schools use advertising and marketing to attract particular sets of students and regularly set preconditions (e.g. parent contracts) for enrollment. It seems reasonable to suggest that similar strategic thinking may affect locational decisions. Addressing this underdeveloped area of research is clearly important to improving understanding of how the education marketplace is mediated by charter school responses to competitive incentives, especially in highly segregated areas. By exploring how charter schools are spatially associated with neighborhood characteristics, and to one another, we hope to shed new light on the appropriate role of market forces in supporting the goal of racial integration.

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[2] Conventional wisdom holds that low-income and special education students are more expensive to educate than other students. As evidence, federal and state funds are specifically allocated to provide school districts and schools with additional resources for the education of these populations, including Title I and the Individuals with Disabilities Education Act (IDEA). However, it is important to note that high-achieving students may also increase costs through demand for specialized schooling practices, such as Advanced Placement or International Baccalaureate courses, preparation for the Scholastic Aptitude Test (SAT) or California Achievement Test (CAT), or college advisement. This is not to suggest that such services should not be available to all students, but demand may be greater in schools with higher proportions of high-achieving students forcing charter schools to act.

Methodology

Research Context

New Jersey provides an appropriate place of study due to its long history of racial imbalances in schools caused by the state's housing patterns, population density, and funding disparities between rich and poor school districts, as well as the social and cultural diversity of its population. The state also has a substantial history with charter school reform. In 1995, the New Jersey Charter School Program Act provided for the creation of up to 75 charter schools. In 2000, the law was amended to allow for a maximum of 135 charter schools. New Jersey is one of fourteen states that have enacted racial balancing provisions designed to limit or eliminate racial isolation and imbalance in charter schools (Oluwole & Green, 2008). Legislation states that "admissions policies of New Jersey charter schools must, to the maximum extent practicable, seek enrollment of a cross section of the community's school age population, including racial and academic factors" (National Alliance for Public Charter Schools, 2010). Oluwole and Green (2008, p. 32) have noted that the New Jersey Commissioner of Education is responsible for determining whether a new charter will have segregative effect on its district of residence, as well as districts sending students to a charter school after it has begun operation. The intent of this law is to encourage charter schools to build school compositions that are similar to those of the school district in which the charter school resides. In practice, however, previous studies indicate that these controlled choice policies seldom lead to genuine attempts to achieve racial integration (Holme & Wells, 2008; Eckes & Trotter, 2007).

During the 2006-07 school year, 52 charter schools were in operation in New Jersey. By September 2009, this number had risen to 68 charter schools in 15 of New Jersey's 21 counties and 36 previously approved charter schools were reported to have closed (State of New Jersey Department of Education, 2010).[3] Over 70% of all charter schools were located in "Abbott Districts," or in areas formally classified as serving disadvantaged students.[4] Despite this focus, a state sponsored evaluation of New Jersey's charter school program which notably did not include all charter schools currently in operation, provided evidence that charter schools were not necessarily serving the most disadvantaged students (KPMG, 2001). Charter schools were found to enroll fewer free and reduced lunch (63%) and special education (7.7%) students than their districts of residence (70% and 15.6%). There was also evidence of increased racial/ethnic sorting. Charter schools over-represented black students (68%) compared to their districts of residence (50%) and under-represent white, Hispanic and Asian students. These findings suggest that New Jersey charter schools locate in

[3] Of the 36 charter schools that have been closed: five charter schools were approved, found unprepared to open, and denied a final granting charter; 11 charter schools had their charters revoked by the New Jersey Commissioner of Education; 17 charter schools voluntarily surrendered their charters; and three charter schools did not have their charters renewed.

[4] In 1981, The Education Law Center filed *Abbott v. Burke* on behalf of low-income children in New Jersey challenging the state public school funding formula. In 1990, the New Jersey Supreme Court ruled in Abbott II that the education provided to low-income children in New Jersey was unconstitutional. Court mandated remedies were limited to urban school districts serving low-income and minority students with an excessive tax for municipal services that had failed to demonstrate acceptable levels of performance on the New Jersey High School Proficiency Test (HSPT). These districts are collectively known as Abbott districts. In Abbott IV (1997) and Abbott V (1998) court mandated remedies were further defined to include: per-pupil funding equivalent to the average of New Jersey's highest income suburban school districts; universal preschool for 3- and 4-year-olds; supplemental programs for at-risk students, such as intensive early literacy programs, small class size, and social and health services; new and rehabilitated facilities; and state accountability for the timely implementation of a research-based, national whole-school reform model, or local equivalent (Education Law Center, 2009).

high-need school districts with presumably strong demand for increased school choice, but do not necessarily serve all students, especially those who are most disadvantaged.

In sum, the policy context in New Jersey allows us to observe aggregate charter school responses to competition and assess the potential of market-like strategies to satisfy state policy goals and provide improved educational options in highly segregated environments.

Data and Methods

Consistent with previous research into charter school reform, we expect to find increased segregation in New Jersey charter schools. However, rather than compare charter school enrollments to the racial composition of the school districts in which they reside or nearby public schools, we stress the importance of examining minority and non-minority enrollments in several locations against several benchmarks. More specifically, we use Geographic Information Systems (GIS) and dynamic mapping to simultaneously examine the location and racial composition of charter schools in New Jersey across three geographic scales: school districts, census tracts, and census block groups. As Lubienski and Gulosino (2007, p. 5) note, "using geo-spatial approaches offers an advantage in analyzing data, not only in that it sets data within context, but it allows researchers to both test hypotheses as well as to discern unanticipated patterns in the data that might not be apparent using traditional statistical approaches."

Our spatial analysis began with constructing a data table of attributes for New Jersey charter schools that contains student enrollment data, as well as locational fields for street address and ZIP code. Student enrollment data from 2006-07 for school districts and charter schools in New Jersey was gathered from the New Jersey Department of Education (NJDOE) and the National Center for Education Statistics (NCES) Common Core of Data (CCD). Locational data was collected from the 2000 Census and includes neighborhood attributes (e.g. racial/ethnic subgroups), as well as census outlines or polygons (e.g. tracts and block groups).[5] The locational data was used to place each school on a map with x and y coordinates by the GIS process of geocoding.

Next, a small-area analysis was conducted using three different spatial scales: the school district, the census tract, and the census block group ordered from largest to smallest area.[6] The advantage of using these areas is that it is easy to get comparable demographic data over time relative to charter school demographics. Table 1 summarizes the ranges of population and area at the three scales.

The population data for school districts, census tracts, and block groups that contain charter schools was added to the charter school attribute table by the geospatial process of a spatial join. The population data attributes for the polygon boundary features of the area the charter school point falls within are assigned to each charter school point feature. The result is a new charter school attribute table that contains additional fields or attributes describing the population of each charter school, as well as the population residing in the charter school's school district, census tract and block group.

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[5] A limitation of this research is our reliance on data from the 2000 Census. We strongly believe that this data provides appropriate proxy measures for a variety of neighborhood-level variables, and our decision is consistent with previous research (see Lubienski, Gulosino & Weitzel, 2009). However, our decision also means that we are drawing on data from a single point in time that differs from the school-level data it is compared to.

[6] Census tracts are locally determined geographic units. Block groups are the smallest geographic areas for which the Bureau of the Census collects, tabulates, and publishes sample data. Although census tracts and block groups are arbitrary census boundaries, demographic researchers typically use these boundaries as a proxy for neighborhood-level data (Crowder & South, 2008; Small, 2007; Bayer & McMillan, 2005).

From the charter school attributes table, three series of maps were produced. The first series of map-based spatial analysis describes the percentage of black families residing in the school districts, census tracts and block groups where charter schools are located. We used these maps to test our assumption of increased racial segregation in charter schools and examine the distribution of racial composition between charter schools and their surrounding areas before moving on to more sophisticated spatial analyses.

Table 1
Population and Area for Geographic Scales

	Population			**Area (square miles)**		
Area Scale	Max	Min	Mean	Max	Min	Mean
School District	273,545	5,747	127,305	210.39	1.58	21.51
Census Tract	9,330	838	4,317	40.61	.06	1.69
Block Group	2,896	267	1,258	9.54	.03	.47

Source. Calculations using the National Center for Education Statistics Common Core of Data and 2000 US Census Bureau, SF3 Data.

The second series of maps compares the racial composition of charter schools to three geographic areas: school districts, census tracts and block groups. We shift our attention from black students to minority students to better account for other racial/ethnic groups attending New Jersey public schools. The maps organize charter schools, school districts, census tracts and block groups into three broad categories: *predominately minority, predominately white,* and *racially diverse.* We consider predominately minority schools and areas to contain percentages of white students and census geographic areas less than 20%. Predominately white schools and geographic areas contain percentages of whites greater than 80%. Racially diverse schools and areas contain percentages of white students and geographic areas ranging between 20% and 80%. By grouping charter schools in this manner, we account for the possibility that charter school enrollments vary by context and are influenced by pre-existing patterns of student segregation (Evans & Renzulli, 2005).

The third series of maps builds on our comparisons of charter schools to their immediate surrounding areas to draw potential associations between the location of New Jersey charter schools and the percentage of non-Hispanic white, black and Hispanic students and population at the school district, census tract and block group levels.

All maps use conventional symbology and display the categorized charter school point features by unique colors and point sizes. Each category is a separate layer. The layers are overlaid to show which schools match one or more categories. Keys are provided for all maps featured below.

Caveats

Before presenting our findings, it is important to note that this study is exploratory in its nature and limited to examining the pure racial composition of New Jersey charter schools and their surrounding areas. We do not investigate other socio-economic conditions such as poverty, housing, family income, crime, or low academic achievement that might be correlated with the racial composition of student bodies and surrounding neighborhoods. For a variety of reasons, we suspect

that other disadvantages also increase with more segregation, and may be additive to the racial features uncovered here. We also acknowledge that other factors play significant roles in shaping charter school enrollments and locational decisions including state and local policies (Henig & MacDonald, 2002; Renzulli, 2006), mission-orientation, (Lacireno-Paquet, Holyoke, 2002) and organizational structure (Lubienski & Gulosino, 2006), as well as logistical or practical concerns, such as available space. Moreover, it is beyond the scope of this study to disentangle the effects of charter school locational/positioning strategies on the racial makeup of schools and the broader community, and vice-versa. Our study does not examine how the location of charter schools might influence the racial mix of students and neighborhoods. Nevertheless, the findings presented in this research introduce new and important ways of comparing charter schools to their surrounding areas and understanding how charter school enrollments may be responsive to the racial composition of the broader community.

Findings

Map 1 shows African-Americans as a percent of the total population at the school district and block group levels. The school district boundaries enclose census block groups that contain at least one charter school. The map reveals an overarching trend where African-Americans account for a lower percentage of the total population in the census block group where New Jersey charter schools are located than the corresponding school district, indicating that the areas closest to charter schools consistently have fewer black students. As a result, although charter schools may be found in school districts ranging from predominately white to racially diverse to predominately minority, within New Jersey school districts charter schools appear to seek out enclaves with fewer black students.

This finding indicates that the percentage of African-Americans within the population from which charter schools may draw students is expressed differently when examining school district and census block group level data. The former appears more likely to include a much greater percentage of African-American students than the latter. Further, the relatively small-sized census block groups are frequently heterogeneous in their expression of the percent of African-Americans in the same school district. Map 1 demonstrates the need to examine the racial/ethnic attributes of charter schools at a higher spatial resolution than the school district in order to better understand the phenomena of racial/ethnic representation comparisons. Due to these insights, the remaining findings presented here focus on revealing differences between charter school analyses made at the school district and block group levels.[7]

Predominately white Charter Schools and Locations

Table 2 compares the racial/ethnic attributes of charter schools to the racial mixes observed in three different geographic units—school district, census tract, and block group. Only six out of 52 charter schools (12%) are located in predominately white neighborhoods. A lower mean percentage of white students (54.84%) attend charter schools than reside in block groups (90.08%), census tracts (87.58%), and school districts (77.03%) in these same areas. By contrast, a much higher mean percentage of black students (33.84%) attend charter schools than reside in predominately white block groups (4.50%), census tracts (4.81%), and school districts (8.77%). A small share of Hispanic students (7.63%) attend charter schools in predominately white charter school locations, but this

[7] For the sake of clarity, the maps we present in this paper do not contain information on census tracts. Table 2 demonstrates that comparisons between charter school enrollments and census tracts support our overall findings, but are not as extreme as comparisons made at the block group level.

figure is still higher than the percentage of Hispanics in surrounding block groups (5.45%) and census tracts (5.71%), but not school districts (10.02%).[8] This means that despite locating in whiter neighborhoods these charter schools are likely to attract minority students in areas where minorities, on average, account for only five percent of the population.

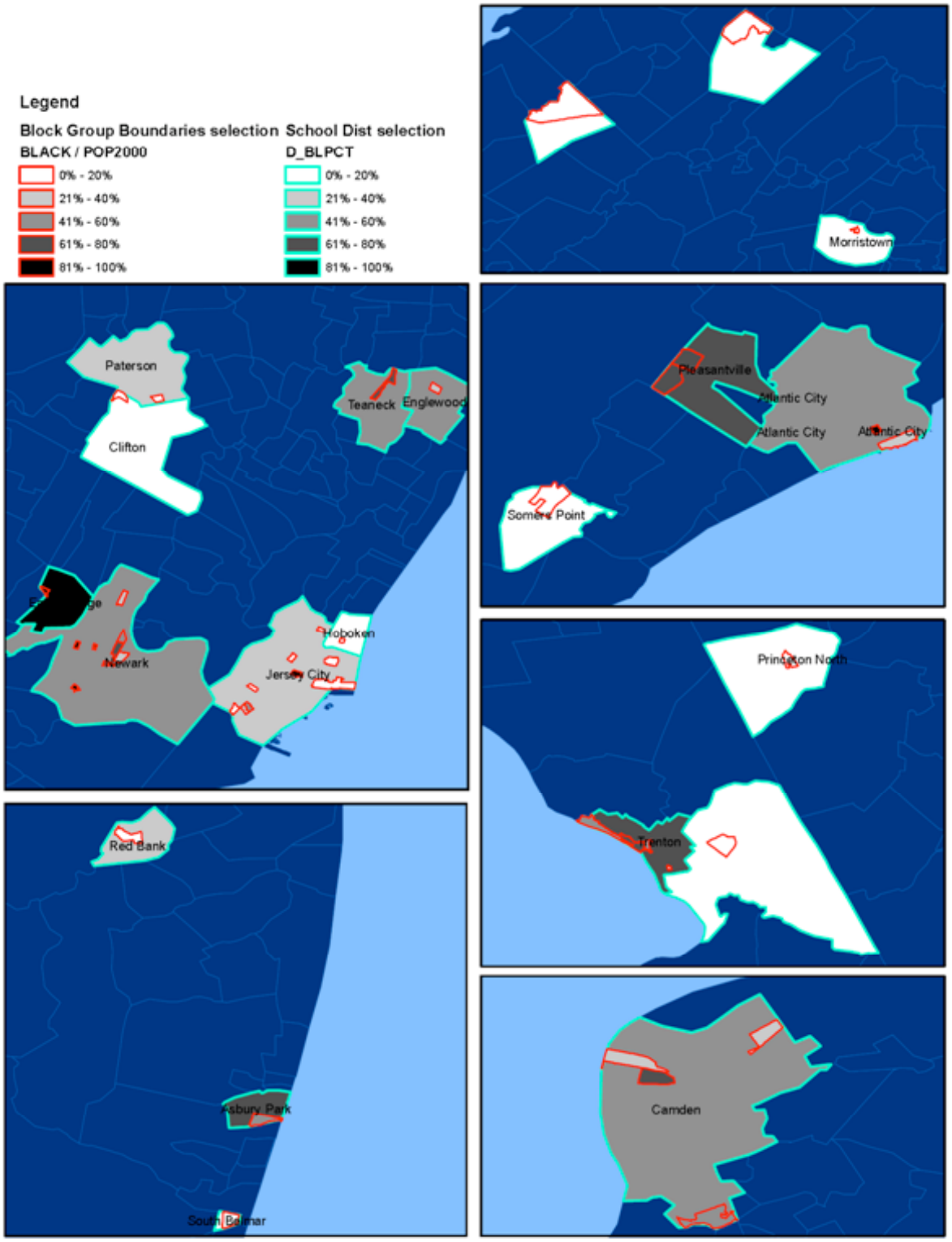
Maps 2 through 5 provide spatial comparisons between charter schools and their surrounding areas and document the lack of charter schools in predominately white school districts and block groups in New Jersey. Maps 2 and 4 show that only 2 charter schools (4%) are located in predominately white school districts and none are located in predominately white school districts near the major urban centers of Newark, Camden or Trenton. Maps 3 and 5 show that four additional charter schools are located in predominately white block groups within racially diverse school districts. In all four cases, these charter schools enroll racially diverse student bodies and therefore attract minority students in areas where whites are the overwhelming majority.

Predominately Minority Charter Schools and Locations

A total of 11 charter schools (21%) are located in predominately minority neighborhoods (see Table 2). The proportion of whites to the total population is small in predominately minority neighborhood areas—10.76% at the block group level, 12.78% at the census tract level, and 9.27% at the district level. This is not surprising given the much lower mean percentage of white students (4.97%) attending predominately minority charter schools. Black students (81.34%) are over-represented in charter schools when compared to the make-up of the general population at the corresponding block group (73.79%), census tract (74.24%), and school district (55.95%) levels. Interestingly, a smaller mean percentage of students who are Hispanic (12.85%) attend charter schools in predominately minority neighborhoods when compared to their presence in the population of block groups (19.80%) and school districts (30.64%). These findings suggest that charter schools in predominately minority areas are likely to attract black students in areas where blacks are in the majority.

Maps 2 and 4 show that a majority of charter schools are located in predominately minority school districts (e.g. Newark, Camden, Atlantic City, Pleasantville, etc.). Further, with one exception shown in an inset map for Atlantic City, charter schools in predominately minority school districts have student enrollments that are predominately minority. Charter schools in predominately minority block groups also have predominately minority enrollments. However, Maps 3 and 5 show that the number of charter schools in predominately minority block groups is less substantial. Four out of the 5 charter schools in Camden are located outside predominately minority block groups. In the greater Newark area, 11 charter schools are located in predominately minority school districts, but only 5 are located in predominately minority block groups.

[8] Hispanics account for a small, but significant number of charter school students and to ignore their presence would potentially lead to erroneous findings. In a future analysis, we hope to further develop our analysis of Hispanic enrollments in charter schools.



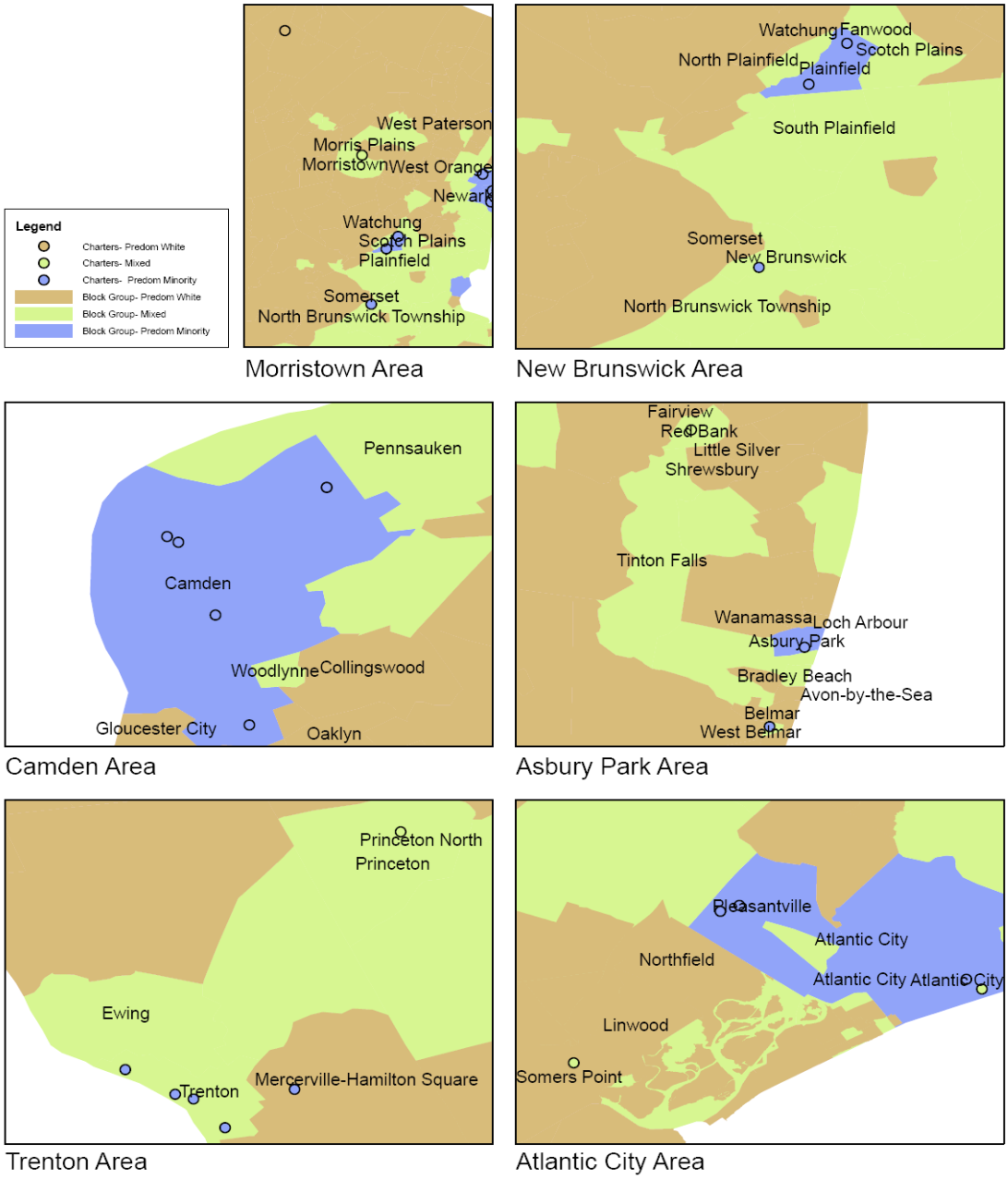
Map 1: Proportion of African-Americans in school districts (green outline) and census block groups (red outline) containing charter schools.

Source. Calculations using the New Jersey Department of Education's enrollment data, the National Center for Education Statistics Common Core of Data (2006-07) and 2000 US Census Bureau, SF3 Data.

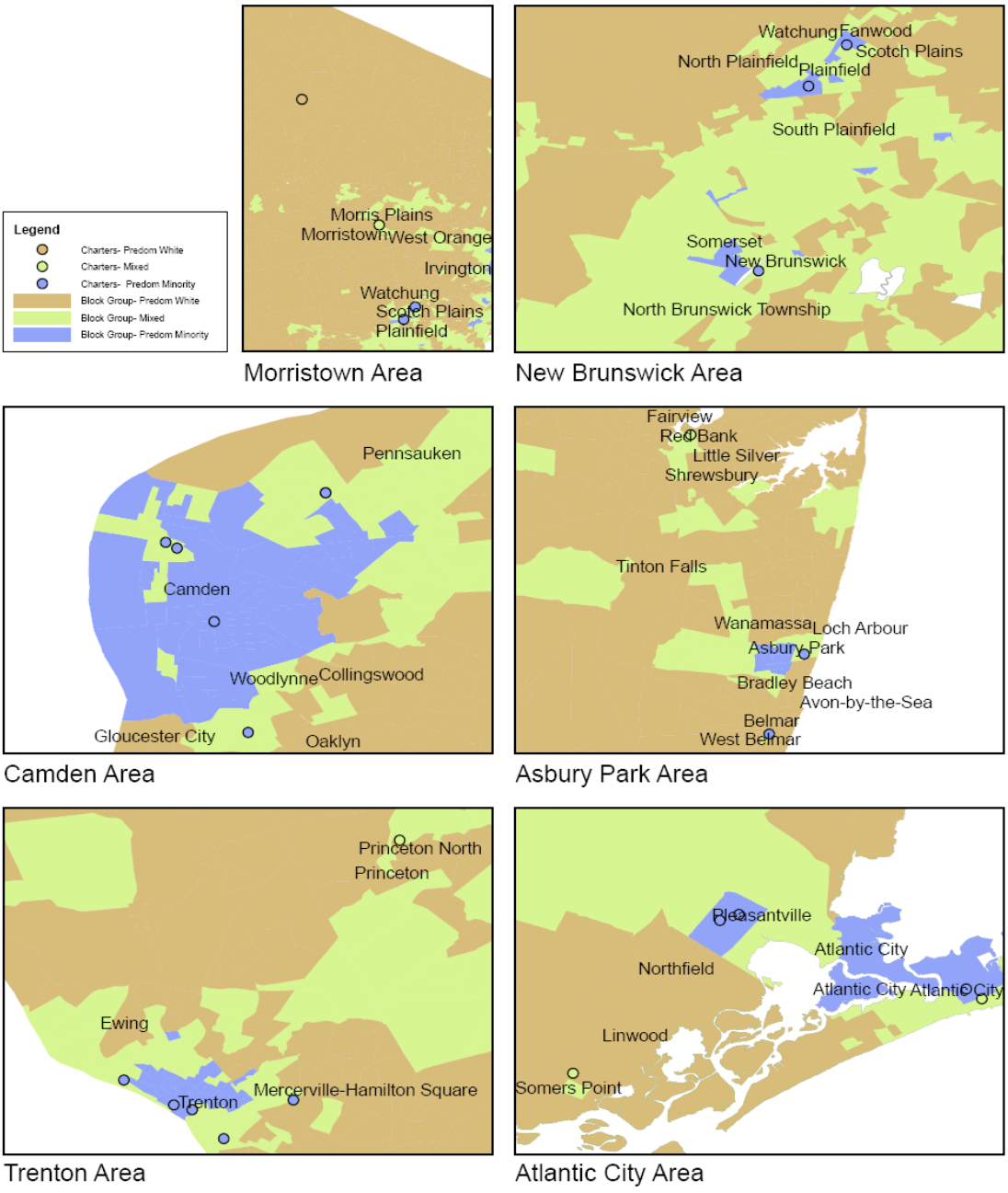
Table 2
*Racial and Ethnic Attributes of Charter Schools and Locations**

		Block Groups			Census Tracts			School Districts			Charter Schools		
Charter Schools by Block Group Attribute	**n**	White	Black	Hisp.	White	Black	Hisp.	White	Black	Hisp.	White	Black	Hisp.
Predominately Minority (White < 20%)	**11**	10.76%	73.79%	19.80%	12.78%	74.24%	12.92%	9.27%	55.95%	30.64%	4.97%	81.34%	12.85%
Racially Mixed (20% ≤ White ≤ 80%	**35**	41.17%	32.04%	31.43%	38.30%	37.44%	26.55%	9.52%	45.76%	38.36%	10.28%	65.25%	21.24%
Predominately White (White > 80%)	**6**	90.08%	4.50%	5.45%	87.58%	4.81%	5.71%	77.03%	8.77%	10.02%	54.84%	33.84%	7.63%
All Schools	**52**	40.38%	37.69%	25.97%	38.59%	41.46%	21.26%	17.26%	43.65%	33.46%	14.30%	65.03%	17.89%

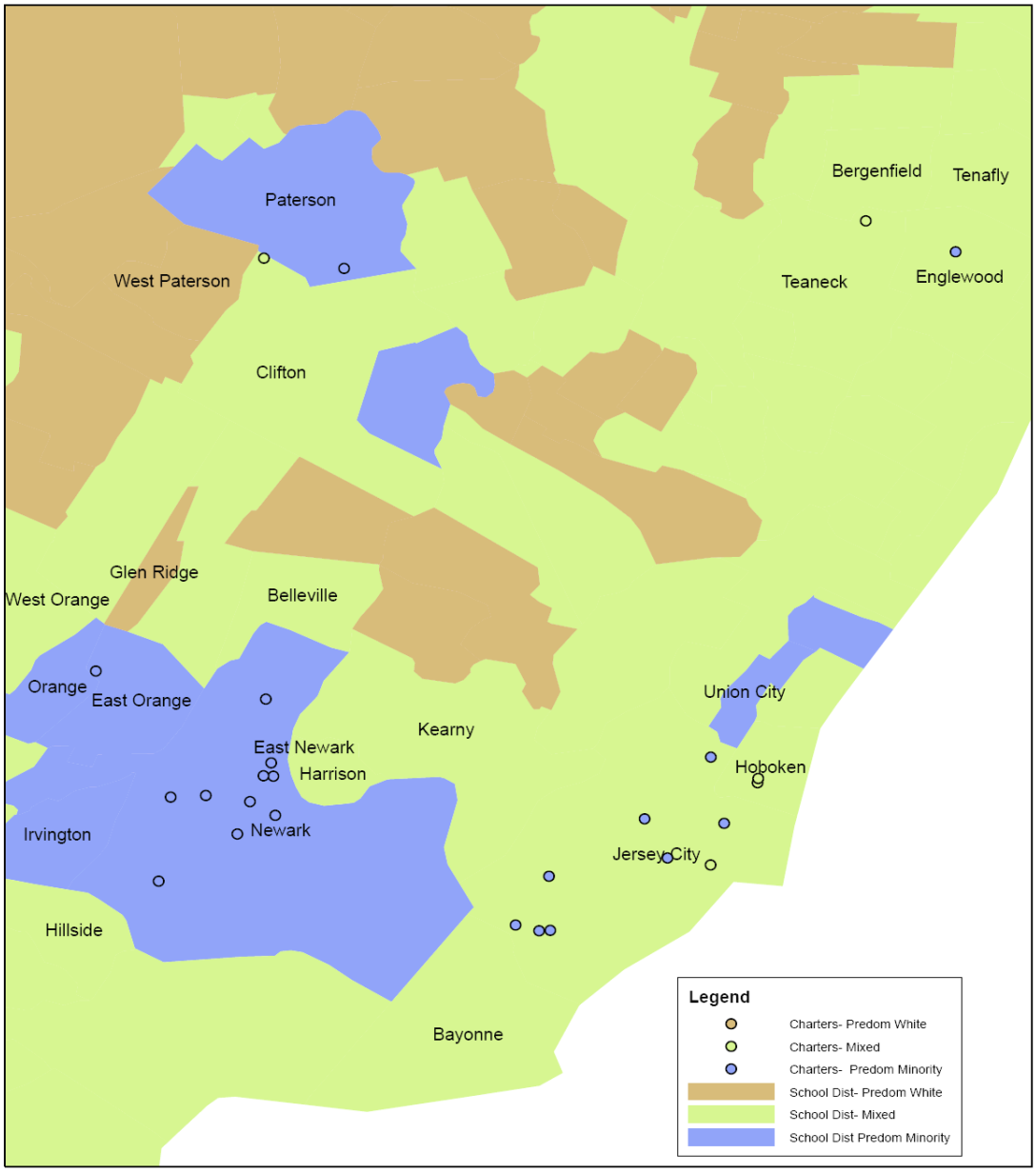
*All percents included in this table are the mean percent of the racial/ethnic subgroup in the census geographic area (e.g. census tracts) listed in the above column heading. The mean percent of the racial/ethnic subgroup in school districts and charter schools is based on AY 2006-07 enrollment.
SOURCE. Authors' calculations using the New Jersey Department of Education's enrollment data, the National Center for Education Statistics Common Core of Data (2006-07) and 2000 US Census Bureau, SF3 Data.



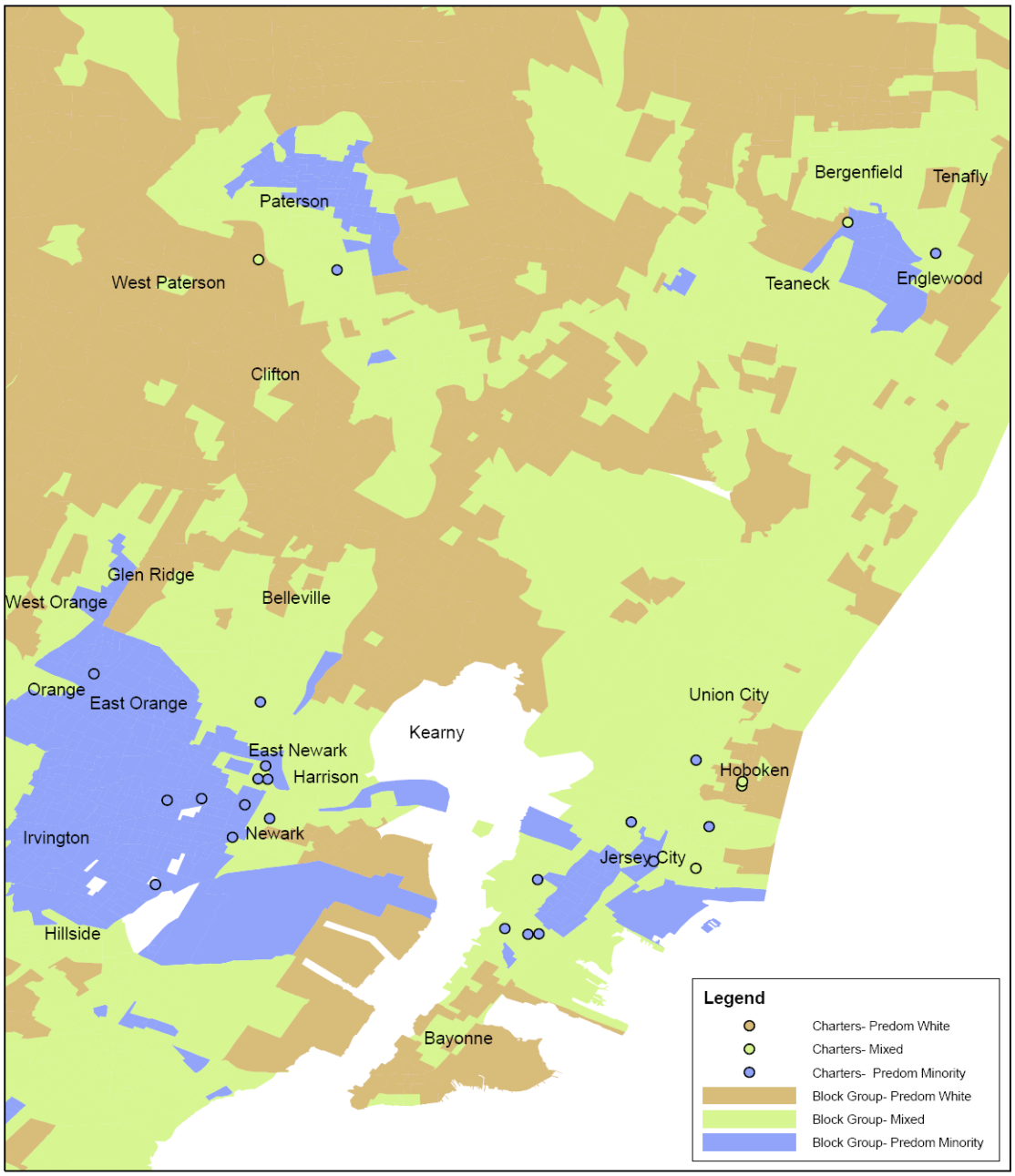
Map 2: Racial/ethnic characteristics in New Jersey charter schools and school districts.
Source. Calculations using the New Jersey Department of Education's enrollment data, the National Center for Education Statistics Common Core of Data (2006-07) and 2000 US Census Bureau, SF3 Data.



Map 3: Racial/ethnic characteristics in New Jersey charter schools and census block groups
Source. Calculations using the New Jersey Department of Education's enrollment data, the National Center for Education Statistics Common Core of Data (2006-07) and 2000 US Census Bureau, SF3 Data.



Map 4: Racial/ethnic characteristics in Newark area charter schools and school districts
Source. Calculations using the New Jersey Department of Education's enrollment data, the National Center for Education Statistics Common Core of Data (2006-07) and 2000 US Census Bureau, SF3 Data.



Map 5: Racial/ethnic characteristics in Newark area charter schools and census block groups.
Source. Calculations using the New Jersey Department of Education's enrollment data, the National Center for Education Statistics Common Core of Data (2006-07) and 2000 US Census Bureau, SF3 Data.

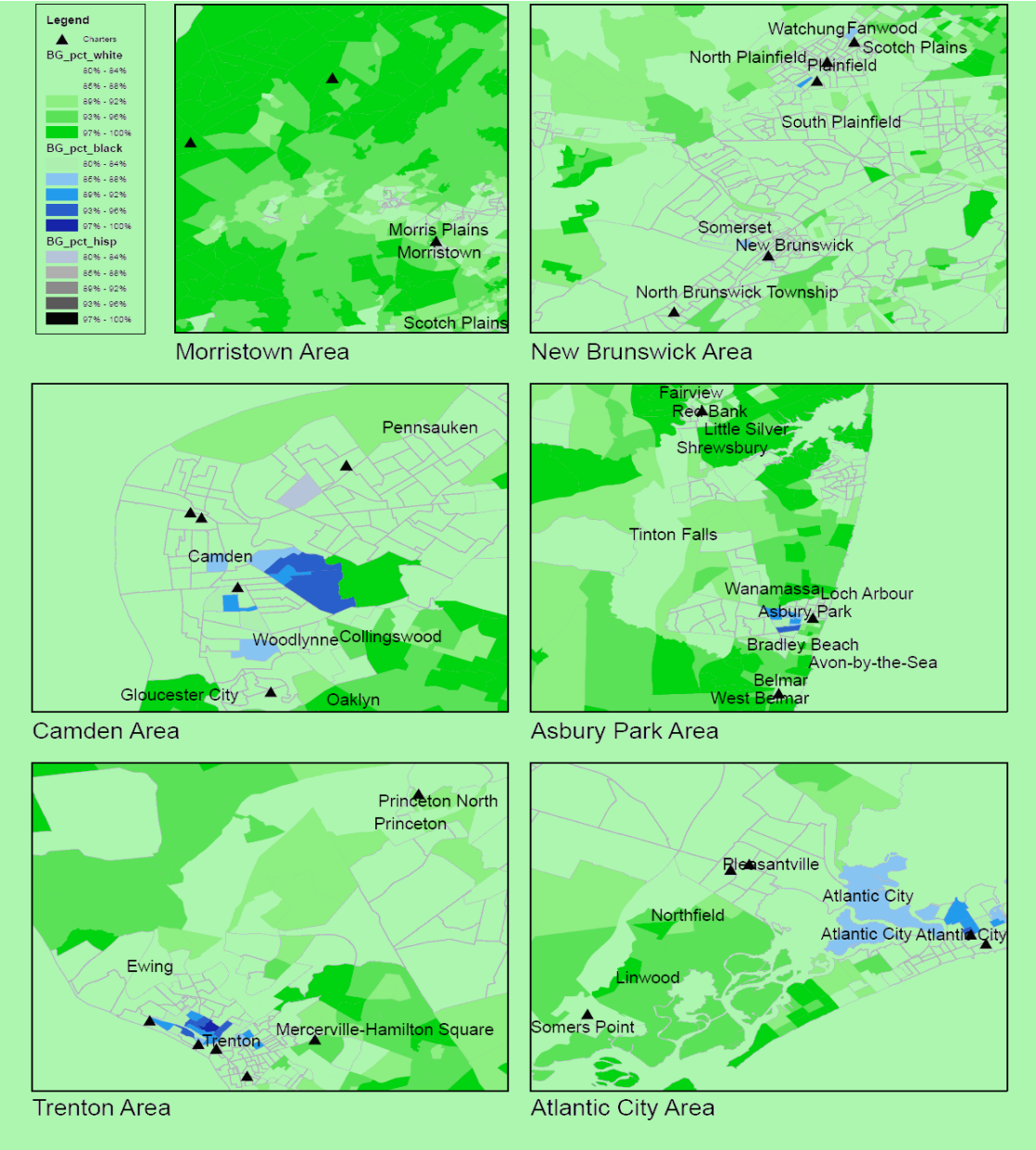
Racially-Mixed Charter Schools and Locations

The majority of charter schools in New Jersey, 35 out of 52 charter schools (67%), are located in racially diverse neighborhoods (see Table 2).[9] However, while whites account for 41.17% of the population within block groups and 38.30% within census tracts in these areas, white students account for far lower percentages in both charter schools and school districts (10.28% and 9.52%, respectively). In contrast, a significant proportion of black students (65.25%) attend charter schools in racially mixed neighborhoods when compared to surrounding block groups (32.04%), census tracts (37.44%) and school districts (45.76%). Finally, 21.24% of Hispanic students attend racially diverse charter schools, a lower percentage of Hispanics compared to the proportion of Hispanics in surrounding block groups (31.43%), census tracts (26.55%), and school districts (38.36%). It is important to note that the percentage of students who are Hispanic in predominately white charter school locations is still higher than the percentage of Hispanics in surrounding areas, while the percentage of Hispanic students is lower in charter schools in geographic areas where African-Americans are in the majority.

Maps 2 and 4 show a strong presence of charter schools in racially diverse school districts in New Jersey. In school districts, such as Trenton, Jersey City and, to some extent, Hoboken, charter schools serve predominately minority students. Even in racially diverse school districts further removed from densely populated minority areas (see insets featuring New Brunswick, Somerset and West Belmar) charter schools appear to attract minority students in areas where blacks are in the minority. Maps 3 and 5 show a similar trend at the block group level. Nearly all charter schools located in racially diverse block groups enroll predominately minority students.

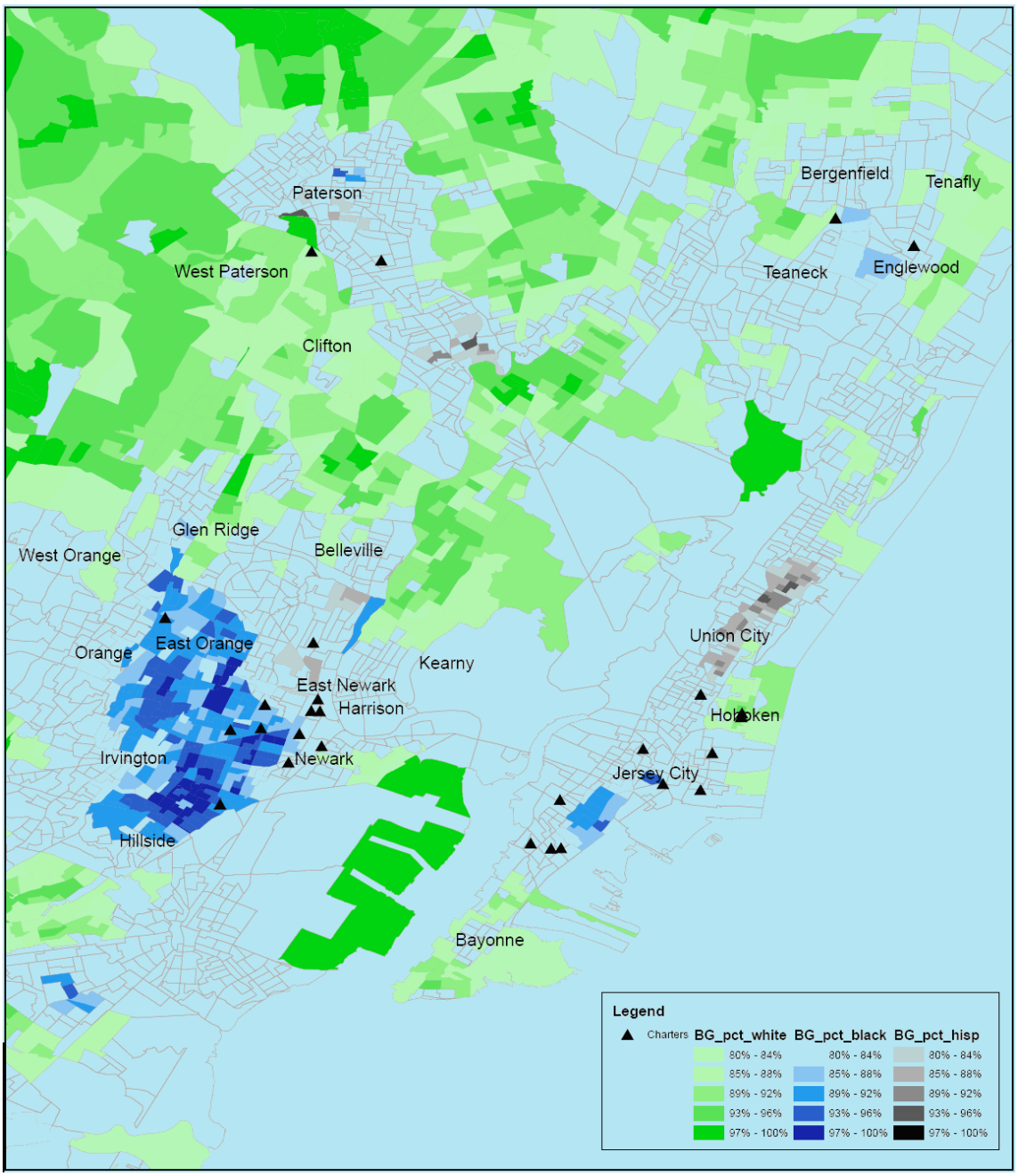
Our analysis suggests that there is little difference in charter school enrollments in predominately minority and racially diverse block groups. To explore this potential outcome further, Maps 6 and 7 describe charter school locations in relation to the proportion of white, African-American and Hispanic population within block groups. A remarkable pattern is revealed. Charter schools are clearly shown to circle block groups with dense concentrations of African-American students. This pattern is consistent in both larger urban areas (e.g. Camden, Jersey City, Newark and Trenton) and smaller inner ring suburbs (e.g. Asbury Park, Atlantic City, Englewood, New Brunswick and Plainfield). This finding suggests that charter schools more closely resemble the racial makeup of adjacent neighborhoods than the ones in which they reside.

[9] To clarify, a majority of charter schools are located within predominately minority school districts, as well as within racially diverse block groups.



Map 6: New Jersey charter school locations relative to census block groups with racial/ethnic predominance.

Source. Calculations using the New Jersey Department of Education's enrollment data, the National Center for Education Statistics Common Core of Data (2006-07) and 2000 US Census Bureau, SF3 Data.



Map 7: Newark area charter school locations relative to census block groups with racial/ethnic predominance.

Source. Calculations using the New Jersey Department of Education's enrollment data, the National Center for Education Statistics Common Core of Data (2006-07) and 2000 US Census Bureau, SF3 Data.

Maps 6 and 7 illustrate that most charter schools, regardless of racial composition, are located close to predominately African-American neighborhoods, but not in them. With remarkable consistency, charter schools appear to circle or "ring" African-American block groups.

Discussion

We highlight two key findings drawn from our geospatial analyses. First, the tendency of New Jersey charter schools to circle African-American neighborhoods exemplifies how the important influence of local context is often lost in broad racial comparisons of charter schools to nearby traditional public schools, the district, or the state. In our own analysis, the Camden and Newark school districts were labeled as predominately minority and the Jersey City and Trenton school districts as racially diverse, despite our later realization that the presence of charter schools was fundamentally the same in all four areas. Second, charter schools are clearly responsive to not only their own neighborhood setting, but also the character of adjacent communities. The "ringing" or clustering patterns observed across charter schools is consistent with Michael Porter's (1998) description of how firms strategically position themselves within the marketplace, especially given the significant role race/ethnicity is expected to play in both parents' enrollment decisions and schools' locational choices.

Mapping the geography of school choice and competition allows us to visualize and better understand how charter schools actually respond to both racially integrated and segregated markets. To be clear, the cluster strategy of charter schools in predominately minority and racially diverse areas is not meant to pinpoint why they cluster in those areas; it only suggests where potential "market shares" of charter schools may lie. According to Porter (1998), spatial localization is one dimension of the entrepreneurial action in the quest for competitive advantage. This idea is particularly appealing to our study as our findings reveal that the strategic competition for students is prevalent in more heterogeneous areas circling densely-populated African-American neighborhoods. One explanation for New Jersey charter school locations may be attempts by school founders to balance significant demand among African-American households with the anticipated competitive advantages of locating within racially-mixed neighborhoods with the broadest possible range of potential customers. Another possibility is that charter schools tend to focus on narrow market shares (e.g. African-American students), but recognize that racially-diverse areas, which tend to be more affluent than racially isolated neighborhoods, are viewed as superior learning environments by potential consumers.

The geospatial analyses of our research have limitations. Our study does not address where different types of charter schools (mission-oriented versus profit-oriented) locate as a matter of positioning strategy and other contextual attributes of charter schools and surrounding neighborhoods. We do not investigate other conditions that might be correlated with racial segregation. We do not examine the thematic content (i.e. curriculum, admission, and marketing) of charter schools that may drive a self-selection process that would create conditions for racial segregation or integration. Also, with geospatial data we cannot infer intentions with regard to charter school locational decisions. We provide only a snapshot (one year data) of charter school and district enrollments, weakening our ability to compare racial enrollment for individual charter schools embedded within school districts that have unique school-level patterns of enrollment. Finally, our measurement of racial integration, predominately white and predominately minority is not tested for sensitivity to other thresholds.

Conclusion

The geospatial findings presented above are suggestive of literal positioning of charter schools vis-à-vis their surrounding neighborhoods as a market-based strategy for serving different students across segregated landscapes. Studies of charter school enrollments need to become more expansive and consider not only the students that attend charter schools, but also the larger population from which charter schools draw. An important issue in this study is the relevance of geographic scales to overall patterns of racial segregation in charter schools and their surrounding areas. By using different geographic scales, this study is able to demonstrate that predominately minority charter schools tend to "ring" neighborhoods with high proportions of African-Americans, but locate with racially-mixed areas. Previous studies have tended compared a charter school's demographic make-up to the demographic make-up of the charter school's home/local district or a nearby school. The contribution of this study to geographic and interdisciplinary research on charter school demography is not only the more accurate small area comparisons it affords but also its ability to scale up the spatial analysis to more comprehensive levels of census geography.

Our future work will examine the patterns of charter school student enrollment over time in order to test whether racially-conscious school choice student assignment strategies have led to genuine attempts to achieve racial integration to those of the school district and the immediate community in which the charter school resides. Future research should examine whether market-like positioning strategies (clusters and rings) of charter schools can be found in other state-sponsored open enrollment and charter school programs with unregulated arrangements about the racial composition of schools. Understanding how charter schools produce different patterns of student enrollments relative to the demographic composition of their neighborhoods speaks to the appropriate role of market-based competition in supporting the racial integration goal of public education.

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