School Closings, Openings and Restructurings: Implications for Schools and Neighborhoods

by

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Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor
of Philosophy in the Department of
Sociology in the Graduate School
of Duke University

2020

ABSTRACT

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Abstract

Since the 2001 No Child Left Behind Act, many federal education policies have recommended states and districts close, restructure or open new schools in order to improve their district's academic performance. However, few studies address the extent to which these actions can disrupt the educational landscape. In this dissertation, I employ concepts from organizational ecology, institutional theory and the neighborhood effects literature to examine whether the restructuring, closure or opening of new schools produces spillover effects for other schools or has consequences for spatial inequality within school boundaries and neighborhoods.

I use school-level data from the National Center for Education Statistics Common Core of Data, the Private School Survey and the School Attendance Boundary Information System to estimate weighted fixed effects models and difference-in-difference models that assess whether schools located near closed and restructured schools have different organizational characteristics or structures than those not near a closed or restructured school. I also use neighborhood Internet traffic and a survey experiment to measure whether the opening and closing of schools affects the perceived desirability of neighborhoods using difference-in-differences and multilevel ordinal logistic regression. I find these actions do produce spillover effects for school boundaries and impact perceptions of neighborhood desirability in nuanced ways.

Contents

List of Tables

List of Figures

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Excelsior.

1. Introduction

Since the 2001 No Child Left Behind Act, many federal education policies have recommended states and districts close, restructure or open new schools in order to improve their district's academic performance. However, these actions can disrupt the educational landscape. The closing or restructuring of a school is a major event forcing the redistribution of students, teachers, administrative staff, and district resources such as funding and facilities. On the other hand, opening a new school can provide more choices to parents and families, but often at high start-up costs to the district (Frumpkin 2003). Studies have shown school closings or restructurings can have positive or negative impacts on student achievement (Kirshner, Gaertner and Pozzoboni 2010; de la Torre and Gwynne 2009; Engberg et al., 2012; Gordon et al., 2018; Gill et al., 2007; Strunk et. al., 2016). The increased use of school closure, restructuring and openings as school reform highlights the need to further examine the broader implications of these school actions.

Although many studies have considered the consequences of school openings, closings and restructurings for students, parents, and teachers, few studies explore the impact of these school actions at a more macro level, specifically the effects on schools, school boundaries or neighborhoods. Examining outcomes at the school-level provides an account of school context and allows for comparisons of context between schools that

experienced a nearby action and those that did not. Additionally, studies also suggest school closings might have negative spatial consequences for school boundaries and neighborhoods through limiting access to quality schools (Lubienski, Gulosino and Weitzel 2009) and by increasing feelings of isolation and loss of place among residents (Witten, McCreanor and Ramasubramanian 2001). Restructuring and opening new schools might have similar spillover effects, however few studies have addressed this possibility.

Since both school and neighborhood effects contribute to later youth outcomes, it is important to also consider the implications of these school actions at these levels. Using an organizational perspective of school closure as organizational disbandings, restructuring as organizational transformation and opening new schools as organizational foundings allows for the examination of potential consequences at the school and neighborhood levels. This project joins several other studies in using organizational approaches to study education (Rowan 2002; Renzulli 2005; Renzulli, Barr and Paino 2015; King, Clemens and Fry 2011; Andersson and Ford 2016). The following questions will guide this dissertation:

1. Do school openings, closings and restructurings have implications for the school context (e.g., student composition) and organizational structure (e.g., student-teacher ratio) of surrounding schools?

2. Do these actions have implications for indicators of desirability of the neighborhoods in which they exist?

1.1 Relevance for Research on Organizations

This project has implications for the study of organizations. Collectively, the questions addressed by this project will provide insight into any spillover effects or broader implications organizational disbandings, foundings and transformations pose for organizations that occupy the same geographic and conceptual space. Organizations do not operate in isolation; they are often embedded within environments containing similar organizations (DiMaggio and Powell 1983; Carroll 1984). In this case, schools exist within school districts, constituting an established organizational population—an aggregate of organizations that have a "unitary character and a common dependence on the environment" (Hannan and Freeman 1989). Organizations in close proximity might be even more connected. Thus, when organizations take actions such as disbanding, there can be consequences for other organizations sharing the same environment and an impact on the environment itself. Much organizational ecological research focuses on the rates of disbanding and founding of various organizations as well as what causes these actions. Research also considers the process of organizational decline, which can ultimately end in transformation (Paul 2005; Trahms, Ndofor and Sirmon 2013) or disbanding (Weitzel and Jonsson 1989). However, few studies consider what happens

after foundings, disbandings or transformations occur and the consequences these actions have for the organizational environment.

1.2 Relevance for Educational Research

Recent work on school choice highlights the use of school closures, openings and restructurings as market-based reforms. This logic suggests closing low-performing schools or opening high-performing charter schools will give students access to better educational options (Lubienski, Gulosino and Weitzel 2009). Studies have found mixed evidence for the effectiveness of this market-based argument. For example, in examining student outcomes after years of school closings in Chicago, de la Torre and Gwynne (2009) find most students displaced by a closing re-enrolled in low-performing schools that were more racially and socioeconomically homogenous. Though studies present mixed results, these and similar studies often focus on student-level outcomes. Few studies explore the spatial impact these market-based reforms might have on the opportunities available to families in school boundaries or neighborhoods, especially if these actions are concentrated within specific geographies. Examining outcomes at more macro-levels of analysis allows for an assessment of how a school or neighborhood's overall health and access to educational equity can be impacted by the closing, opening or restructuring of a nearby school.

1.3 Theoretical and Empirical Contributions of this Project

This project is part of a larger endeavor that examines the short and long-term implications organizational actions have for their organizational environment. The main question this dissertation addresses, whether the organizations that remain intact are affected by the closing, opening or restructuring of an organization within close proximity and sharing the same mission, has relevance across numerous organizational domains. The assessment of how existing organizations either cope with or benefit from these organizational actions can demonstrate the importance of these processes. This project will provide a case study of how this might operate within the domain of education.

Figure 1 provides a visual illustration of this dissertation, which consists of three separate but related studies as follows. First, in Chapter 2, I consider whether school closings have implications for the ecology of surviving schools by describing differences in the organizational characteristics of schools sharing a boundary with closed schools compared to those schools that do not. Next, in Chapter 3, I examine whether organizational disbandings or restructurings have consequences for equity in school boundaries. Finally, in Chapter 4, I present two studies that examine how an organizational disbanding or founding can have consequences for the reputation or

desirability of its environment. I conclude in Chapter 5 with a summary of my findings and a discussion of potential policy implications and limitations.

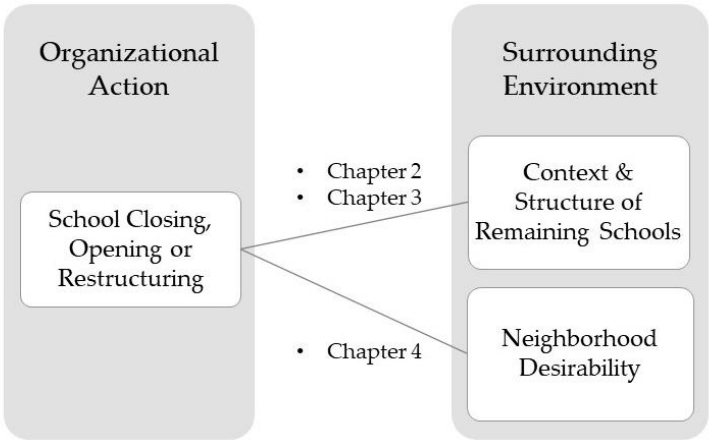


Figure 1. Focus of this Dissertation

2. An Organizational Ecology of School Closings

2.1 Introduction

Closing schools has become a common school reform strategy supported by policymakers in recent years. Since the No Child Left Behind Act of 2001, many federal education policies include school closure as an option for school districts to use if schools consistently fail to meet accountability standards. Previous studies have shown school closings can negatively impact student achievement (Kirshner, Gaertner and Pozzoboni 2010; de la Torre and Gwynne 2009). Work on school choice highlights the potential benefits of school closures when used as a market-based reform: closing or restructuring low-performing schools would give students access to better, higher-performing educational options (Gorard, Taylor, and Fitz 2003). However, recent studies find mixed evidence for the effectiveness of this market-based argument for improving student outcomes (de la Torre & Gwynne 2009; Engberg et al., 2012; de Witte and Van Klaveren 2014; Strunk et al., 2016).

While most research on school closings considers the individual-level outcomes of affected students and teachers, school closings might also have consequences for the overall diversity of the educational landscape. The closure of one school might impact the types and characteristics of schools that remain available to students. Thus, school closings might change organizational environments in ways that have consequences for

educational equity. An examination of school-level outcomes would allow for the use of an organizational approach that moves beyond focusing on individual-level outcomes to account for the distribution of school characteristics. Organizations such as schools can exist in many different variations or forms that together comprise an organizational population (Hannan and Freeman 1989; Renzulli 2005). Because schools are connected as members of organizational populations, the actions of individual schools can affect other schools within the population. School closings provide a case to examine how the disbanding of one type of organization can have implications for the level of variation in form or diversity among the entire population of organizations.

This study examines whether school closings have implications for the ecology of surviving schools in the surrounding vicinity. I address the following research question: how do the organizational characteristics of schools that share a school boundary with a closed school differ from schools that are not located near a closed school? I argue in the case of school closings, the overall differences in the diversity of organizational forms present in the environment is a central element of organizational disbandings that must be considered. Theories of organizational evolution and similar ecological approaches often end with organizational disbandings; however, it is important to consider how a disbanding itself can further contribute to the evolutionary cycle of variation, selection and retention in organizations. I use school-level data on elementary schools from the

National Center for Education Statistics Common Core of Data, Private School Survey and School Attendance Boundary Information System to address this question. I find being located near a closed school has consequences for student composition and organizational characteristics such as class size, accreditation, as well as the likelihood of being a charter or magnet school. I also find evidence for significant cross-form spillover where public school closings influence the organizational environments of private schools and vice versa. By describing the ecology of elementary schools this study identifies whether organizational forms and characteristics are distributed equitably near closed schools. Ultimately, this study considers a potential mechanism through which organizational disbandings such as school closings can contribute to stratification.

2.2 Theoretical Framework

2.2.1 The Case of School Closings

While often cited as the recourse of last resort, districts close schools each year (Figure 2). District officials most frequently close schools due to under-enrollment or chronically low academic performance. School closures are often described as a market-based reform where closing low-performing schools would give students access to better, higher-performing educational options (Gorard, Taylor, and Fitz 2003). There is mixed evidence for the effectiveness of this market-based argument (de la Torre and Gwynne 2009; Engberg et al., 2012; de Witte and Van Klaveren 2014). After years of

school closings in Chicago, de la Torre and Gwynne (2009) find most students displaced by a school closing re-enroll in low-performing schools. However, the ten percent of displaced students who transferred to higher achieving schools experienced larger gains in math and reading than those who enrolled in low achieving schools (Engberg et al., 2012). These gains for transferred students might come at a cost to students already enrolled in receiving schools. For example, Brummet (2014) finds while the closing of low-performing schools might lead to achievement gains for some displaced students, those students in receiving schools experience moderate, short-term negative spillover effects on both math and reading achievement.

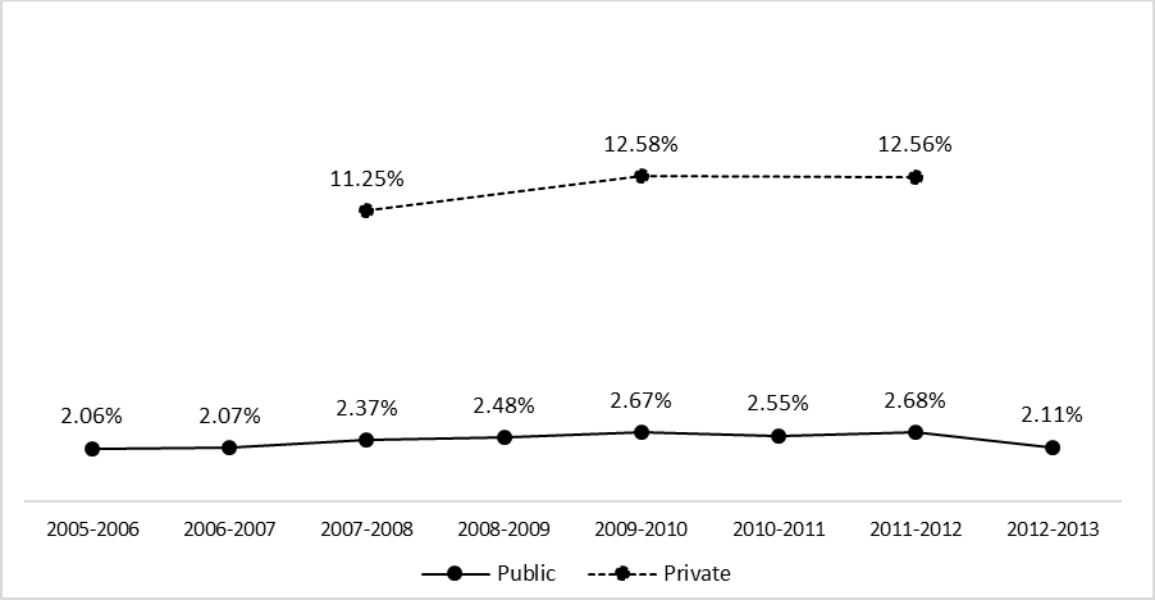


Figure 2. Private and Public School Disbandings SY 2005-2006 through SY 2012-2013

However, little research addresses how school closings impact the overall educational landscape. To do so, I address school closings as organizational disbandings. An organization, such as a school, has disbanded when it no longer exists as its own operating entity (Aldrich and Ruef 2006). Approaching school closings as disbandings allows for the application of concepts from organizational ecology to understand how the closing of one school can have consequences for the entire system of schools. Several studies have applied an organizational ecological perspective to public schools and other educational organizations (Rowan 2002; Renzulli 2005; Renzulli, Barr and Paino 2015; King, Clemens and Fry 2011; Andersson and Ford 2016). For example, Renzulli (2005) describes characteristics of the organizational environment that influenced the emergence of charter schools. Andersson and Ford (2016) use concepts from organization ecology to describe the emergence of start-up nonprofit private schools after the launch of the school voucher program in Milwaukee. The present case will extend previous uses of organizational ecological theories to consider how a disbanding can have implications for the distribution of the types of organizations that exist within an organizational population.

School closings also involve a spatial component that makes using organizational ecology especially relevant. School districts often determine which neighborhoods and residents schools will serve through the creation of attendance boundaries or catchment

zones. These attendance boundaries represent geographic areas within which students are eligible to attend a school based on their family's residence. Districts can manipulate structures such as attendance boundaries in response to changing neighborhood demographics. Studies show these redistricting strategies usually exacerbate segregation (Richards 2014; Siegel-Hawley 2013). Thus, structures such as school boundaries can constrain the educational options available to students displaced by closed schools. In selecting a new school to attend, students are often limited by the location of their family residence and must select a school that is within the same attendance boundary. These school boundaries also provide a natural border within which to evaluate levels of organizational diversity.

2.2.2 School Closings and Organizational Diversity: The Organizational Ecology of Schools

A school closing can have implications for the diversity of the types of organizations existing within an organizational environment. A core goal of organizational research is to explain why so many different types (variations) of organizations exist (Hannan and Freeman 1989:7). Variations of organizations can be introduced through the creation of new types of organizations or new structures or features within existing organizations. Evolutionary approaches to organizational ecology consider how different organizational variations are selected and retained. This is often accomplished through the mechanism of selection – certain organizational

characteristics make some firms more likely to withstand changes to organizational environments than others (Aldrich 2008; Aldrich and Pfeffer 1976). Organizations unable to meet the needs of a changing environment are more likely to disband or be selected out. Theories of organizational ecology often end with organizational disbandings; however, it is important to also consider how a disbanding itself can further contribute to the evolutionary cycle of variation, selection and retention. When an organization disbands, some variations will be more represented than others in the remaining distribution of organizations in the population. This can be consequential, especially if there are spatial differences in the distribution of organizational forms or characteristics: i.e. if a certain organizational form exists more prevalently in one neighborhood or geographic context. Thus, it is important to identify which variations are being retained after failing organizations are selected out. One way to do so is by providing a description of the diversity of an organizational environment after a disbanding.

Schools can exist in multiple organizational forms (King, Clemens and Fry 2011). This study considers four major organizational forms or variations: traditional public schools, charter schools, magnet schools and private schools. While traditional public schools, charter, and magnet schools all receive resources from the local public school district, these forms can differ in their degree of specialization and autonomy. For example, charters and magnets can operate autonomously and can choose to

differentiate themselves through specialized missions (King, Clemens and Fry 2011; Renzulli, Barr, and Paino 2015). Additionally, the characteristics of these schools can also differ (e.g., how many advanced courses schools offer). These forms and variations of schools can exist in varying concentrations within the same geographic school boundary. However, the closing of a school might signal that other variations might be better suited for the local environment. When a school closes, there is one fewer school with that profile or structure that exists in that environment. For example, if a high-minority, low-income charter school closes, the district has lost one high-minority school, one low-income school and one charter school. This could have consequences for other schools with similar profiles by suggesting their characteristics also make them vulnerable to closing. Yu and Lester (2008) find this to be the case for organizations under a reputational crisis: damage done to the reputation of an organization under crisis can spillover and affect other organizations that are nearby or that occupy structurally equivalent positions elsewhere.

2.2.2.1 School Closings & Consequences for Equity

Describing how organizational characteristics are distributed in a population can reveal the degree organizational characteristics are concentrated and any implications for neighborhood inequality. For example, studies of nonprofits use the heterogeneity in nonprofit type to assess whether nonprofits are responding to multiple or dominant

interests present in a community (Stater 2010; Lincoln 1977). A lack of diversity in the types of nonprofit activity in a community can mean that a few, sometimes more powerful interests are being represented in the community's nonprofit sector. Further, many studies in the neighborhood effects literature suggest schools can be pathways through which neighborhood effects are expressed (Nieuwenhuis and Hooimeijer 2016). The distribution of school characteristics could help to identify uneven "geographies of opportunity" – areas or neighborhoods where there is greater access to social and economic opportunity for residents than other areas (de Souza Briggs 2005; Tate 2008). Schools can play direct roles in creating geographies of opportunity through their decisions of where to open or close, especially as many schools will avoid operating in disadvantaged areas to gain better market position (Lubienski, Gulosino and Weitzel 2009). Mapping the distribution of organizational characteristics can assist in identifying the assets available to low opportunity communities (Green 2015) or in identifying where there are potential resource desserts where there is little access to opportunity. For example, Jocson and Thorne-Wallington (2013) identify the distribution of organizations that make up literacy rich environments (libraries, museums, bookstores and community based organizations). Jocson and Thorne-Wallington find factors such as race, household income and proximity to transportation influences whether families have access to literacy rich environments, creating uneven geographies of opportunity.

2.2.3 Spillover Across Organizational Forms

Although public and private schools comprise the same organizational population, these different forms often operate separately. Private schools operate independent of the public school district and often enroll more White students and students from high-income backgrounds (Yun and Reardon 2002). Public opinion of private schools suggests this form has a great deal of legitimacy: 71% of the American public say private schools provide good or excellent education compared to 44% for public schools (Saad 2017). Even though these forms operate separately, many studies have examined the connection between the two and how the actions of private and public schools affect one another (Geller, Sjoquist, and Walker 2006; Hoxby 2000). For example, competition from private and charter schools could force traditional public schools to become more efficient or disband (Cookson 1994). Renzulli (2005) finds the density of nonreligious private schools increases the submission of charter school applications in a district. Similar spillover effects have been considered between charter schools and traditional public schools. Recent work by Cordes (2017) suggests the presence of charter schools significantly increases student performance in nearby traditional public schools. A potential mechanism through which these spillover effects occur is increased per-pupil spending on instruction within public schools (Cordes 2017;

Ridley and Terrier 2018). Thus, disbandings might also cause similar spillover to occur across organizational forms.

By analyzing school closings through an organizational perspective, this study examines how organizational disbandings can have implications for the overall organizational ecology. Following a disbanding, it is important to identify which organizational variations are being retained in an environment. Differences in the distribution of retained forms in areas that have experienced a school closing can have important consequences for equity, especially if families only have access to schools with similar characteristics. This paper addresses the following research question: how does the composition and organizational characteristics of schools located in the same boundary as a closed school differ from schools that are not near a closed school? To do so, I consider whether the closure of a school has implications for the distribution of students and teachers as well as the organizational characteristics of nearby schools within the same school boundary.

2.3 Data

Data for this study are from the U.S. Department of Education (ED). Each school year through the National Center for Education Statistics, ED releases the Common Core of Data (CCD) – a public school directory containing enrollments, demographics, and program information (i.e., school participation in federal grant programs such as free

and reduced lunch, and Title I). The CCD also lists school-operating status (open, closed, future school) annually. Private school data are from the Private School Universe Survey (PSS). ED administers the PSS biennially, reaching a target population of all private schools in the U.S. The PSS collects student demographics and organizational characteristics such as size, religious affiliation, and number of teachers. However, the PSS does not contain a variable for operating status as the CCD does. To ascertain whether a private school closed I use a method similar to Pandey, Sjoquist, and Walker (2009), where a private school is considered to be closed if it does not appear in the PSS for two consecutive survey years. This study compares public and private elementary schools operating in school years (SY) 2005-2006 through SY 2012-2013. Data are pooled across the eight school years such that the unit of analysis is school*school year.

ED provides school boundary GIS files for SY 2009-2010 for select school districts through the School Attendance Boundary Information System (SABINS). The SABINS was the first publicly available system to provide GIS data for elementary, middle, and high school catchment areas. As such, it was limited to thirteen regionally diverse metropolitan areas, all districts within three states and any districts that had GIS data readily accessible. Appendix A identifies the location of the districts included in the SABINS data. Analysis for this study is restricted to elementary schools (schools where the highest grade is 6). Because there are more elementary schools in the U.S. than

secondary schools (Snyder, de Brey, and Dillow 2018), there is increased potential for variation in the different types of schools that exist, more easily revealing differences in organizational diversity. I use the 2009-2010 Kindergarten school boundaries in each of the 306 SABINS districts to represent the schooling options available to families upon entry into elementary school. Using these GIS files, all elementary schools in the CCD were assigned to the school boundary they fall within. Schools not matched to a school boundary are omitted from the analysis. I use constant geography and hold the school boundaries for SY 2009-2010 constant for all years under analysis.

The design of the SABINS does not allow for the use of a nationally representative sample of schools. While the districts included in the SABINS are not universal, including a variety of districts in this study alleviates concerns that some districts may have a history of distinct education policies that would make them more or less likely to resort to school closures. Other studies have focused on implications of school closures in districts with unique policy environments such as Washington, DC or New Orleans (for example Lubienski, Gulosino and Weitzel 2009). The distinct character of these cases raises issues of generalizability that are avoided with a large, more expansive sample of districts. However, even though the SABINS data are not nationally representative (Appendix B shows SABINS districts are more urban, rural, and have more charter schools than those that are not included in the data) there is sufficient

variation in the types of districts represented. In the following section I describe the measures and analytic plan used in this study.

2.4 Measures

2.4.1 Dependent Variables

This study addresses differences in several dependent variables. Of interest are characteristics of schools that might vary across organizational forms. Thus, my analyses of public schools will consider differences in the proportion of 1) minority or non-white students and 2) students eligible for Free or Reduced lunch enrolled in schools with and without a nearby school closings in each school year cross-section. Additionally, many studies consider class size as an organizational characteristic that can vary across schools (Nye, Hedges and Konstantopoulos 2000). I also consider differences in student-teacher ratio. Since I am interested in the distribution of organizational forms, I also consider whether the school is a magnet (1 = magnet) or charter school (1 = charter).

Private school analyses also address differences in the 1) proportion of minority students and 2) student-teacher ratio. To address variation in organizational characteristics among private schools, I also consider whether private schools are affiliated with a private school association or organization (1 = unaffiliated). Affiliation with these associations usually results in a school receiving accreditation or additional resources such as access to professional development and representation in policy

matters (National Association of Independent Schools 2002). The increased legitimacy provided by private school associations might make member schools appear more competitive or desirable than schools not affiliated with an association. Table 1 provides descriptives and more detail into how each variable is constructed.

Table 1: Means, Standard Deviations, and Descriptions for Variables Used for Analysis

Variable Name	Description	Metric	Mean (SD)
PUBLIC SCHOOLS			
Racial Composition	Percentage of Nonwhite students enrolled	Min = 0% Max = 100%	52.50% (34.74)
Socioeconomic Composition	Percentage of students enrolled who qualify for Free or Reduced Lunch (FRL)	Min = 0% Max = 99.86%	54.43% (28.95)
Student-Teacher Ratio	The number of students enrolled for every one full time equivalent teacher	Min = 0.19 Max = 200.80	16.11 (4.70)
Magnet Status	Whether or not a school is a special school designed to attract diverse students for the purpose of reducing, preventing or eliminating racial isolation and/or to provide an academic or social focus on a particular theme.	Magnet = 6%	
Charter Status	Whether or not a school provides free education to eligible students under a specific charter granted by the state legislature or other appropriate authority	Charter = 5%	
School Closings			
Closing Nearby	Whether or not a school closed that year in the same school boundary as the school is located	Closings Nearby =1%	
Controls			
School Boundary Disadvantage	Unweighted average the percentage of Black residents, unemployed adults above the age of 21, adults above the age of 21 with less than a high school degree, households on public assistance and single families with children under the age of 18 in the school boundary.	Min = 0.01 Max = 0.70	0.15 (0.09)

TABLE 1 Continued

Variable Name	Description	Metric	Mean (SD)
School Size	Natural log of total student enrollment in school during the fall of each school year.	Min = 3.00 Max = 8.43	6.13 (0.55)
District Size	Natural log of total student enrollment in district during the fall of each school year	Min = 3.09 Max = 13.45	9.89 (2.08)
Rural	Whether or not the district is rural	Rural = 22%	
Expenditure Per Pupil	Natural log of district total expenditure per the natural log of fall membership	Min = 1.71 Max = 4.69	2.00 (0.27)
Desegregation Order	Whether or not the district is under a court-ordered desegregation order	Desegregation Order = 2%	
PRIVATE SCHOOLS			
Racial Composition	Percentage of Nonwhite students enrolled	Min = 0% Max = 100%	21.69 (28.10)
Student-Teacher Ratio	The number of students enrolled for every one full time equivalent teacher	Min =0.55 Max =490	23.04 (27.04)
Affiliation with Private School Association	Whether or not the school belongs to any associations or organizations	No Affiliation: 32%	
School Closings			
Closing Nearby	Whether or not a school closed that year in the same school boundary as the school is located	Closings Nearby =0.23	
Controls			
School Boundary Disadvantage	Unweighted average of percentage of Black residents, unemployed adults above age 21, adults above age 21 with less than a high school degree, households on public assistance and single families with children under age 18 in the school boundary.	Min = 0.01 Max = 0.57	0.13 (0.08)
School Size	Natural log of student membership	Min=1.609 Max=7.616	4.62 (1.01)
Rural	Whether or not the district is rural based on 2000 Census geography	Rural = 13%	
Catholic	Whether or not the school is a Catholic school	Catholic = 29%	
Other Religious Denomination	Whether or not the school is affiliated with another religious denomination	Other Religion = 40%	
Co-educational	Whether or not the school or program is coeducational	Co-ed = 99%	

Note: Only schools with more than 5 teachers and at least 20 students were included in public school analysis.

2.4.2 Independent Variables

In this study, a school that has permanently or temporarily closed is considered disbanded. This definition does not include other forms of organizational exit such as mergers or acquisitions of schools; the takeover of a public school by a charter school as a part of a turnaround effort will not be considered a school disbanding. This study will account for whether a currently operating school is in the same school boundary as a school that closed during SY 2009-2010 (Figure 3). Because the PSS does not include a variable for school operating status, schools that do not appear in two consecutive survey years are assigned the status of "closed." To be consistent with the public school data, private school closings reflect schools with the status of closed in the previous survey year. For example, in the 2007-2008 PSS data, closed schools refer to schools from the SY 2005-2006 listing that did not appear in the 2007-2008 or 2009-2010 surveys.

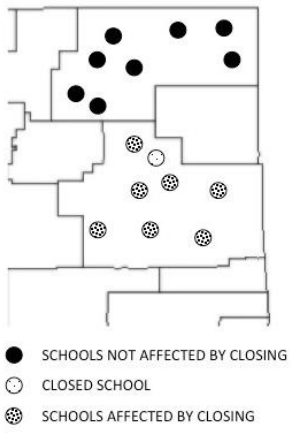


Figure 3. Operationalizing Schools Affected by Closings

To measure school boundary disadvantage, neighborhood characteristics were collected from the 2000 and 2010 Census. This study uses variables similar to those used by Lubienski, Gulosino and Weitzel (2009) to map socioeconomic need within school boundaries, which is measured as the unweighted average of the following factors: 1) the percentage of African American residents, 2) the percentage of adults above the age of 21 who are unemployed, 3) the percentage of adults above the age of 21 with a high school degree or below, 4) the percentage of households on public assistance, and 5) the percentage of single family homes with children under the age of 18 in the school boundary. Additionally, all analyses control for district size, urbanicity, average per pupil expenditures and whether the district was under a federally mandated desegregation plan. District expenditure data are from the NCES Elementary/Secondary Information System and characteristics of student assignment policies were collected from the SABINS.

2.5 Analytic Plan

As a preliminary step to address my research question, I compare the characteristics of schools exposed to a school closing in each school year under investigation to schools not exposed to a school closing. I use independent two-sample t-tests to determine if there are significant differences across the two groups of schools. Consistent with previous studies, I expect school closings will happen primarily in

disadvantaged neighborhoods (Burdick-Will, Keels, and Schuble 2013) and in urban districts (Han et al., 2017).

Because schools are not randomly assigned into conditions where they either do or do not experience a nearby school closing and previous studies have found school closings are more likely to happen in some areas than others, it is necessary to address concerns about selection. I use entropy balancing to assess the effect of being in the same boundary as a closed school (the treatment) on school context and characteristics. Entropy balancing determines appropriate weights necessary to balance covariates across both the treatment and control groups (Hainmueller and Xu 2013). Thus, by balancing both groups based on observable characteristics, entropy balancing allows us to mimic a randomized experiment (Neuenkirch and Neumeier 2016). Combining the weights produced by entropy balancing with regression methods would be equivalent to a doubly robust regression approach (Hainmueller and Xu 2013).

Entropy balancing will be conducted using Hainmueller and Xu's Stata package ebalance. Data from the public school control group are reweighted so that the means of the following covariates match: school boundary disadvantage, school characteristics (percent minority, percent receiving Free and Reduced Lunch, school size, charter status), and district characteristics (district size, urbanicity, average per pupil expenditure, and whether the district is under a desegregation order). Data from private

schools are reweighted so that means of the following covariates match: school boundary disadvantage, school urbanicity, school size, whether the school is a Catholic school, whether the school is affiliated with another religious denomination and whether the school is co-educational. Public school data used for entropy balancing are from the previous school year. However, due to the biennial administration of the PSS, the first lag might not accurately describe the student population of the school. Thus, the private school data used for balancing are from the same school year as outcomes were collected. Additionally, because of the design of the PSS, weights are provided to account for nonresponse and probability of selection (Broughman et al., 2012). I use these final weights when balancing by using the basewt and wttreat options to apply base weights to the control and treated units (Hainmueller and Xu 2013).

Using the reweighted data I regress the various outcomes on the treatment indicator, being in the same school boundary as a closed school. I include the same variables used in entropy balancing as controls when possible (Neuenkirch and Neumeier 2016). Due to multicollinearity between lagged measures of minority composition, students who qualify for free and reduced lunch and school boundary disadvantage, for public elementary schools I control for school disadvantage, school size, charter status and if a school is in a rural area. Similarly, for private schools I control for the same variables used in the matching step, omitting school percent

minority due to its correlation with school boundary disadvantage. For student-teacher ratio models, I omit school size measures for similar reasons. I include district-level fixed effects to address potential unobserved heterogeneity across public school districts (i.e. district-wide school choice or student/teacher assignment policies) and across cities for private schools. For my analyses, I limit my sample to schools without missing data on the outcomes or matching variables. This produces a public school sample with 102,977 schools and a private school sample with 26,397 schools. Finally, it is important to emphasize this procedure allows me to describe differences in the ecology of schools near closed schools compared to the ecology of schools without any nearby school closures rather than changes in the ecology over time (i.e. before and after a school closes).

2.6 Results

2.6.1 Descriptive Analysis

Table 2 assesses whether the characteristics of schools near a school closing are significantly different from those of schools unaffected by a closed school. The top panel shows public schools affected by a school closing are in more disadvantaged school boundaries and have more disadvantaged students, as 81 percent are eligible for Title I funds. Fewer public schools affected by closings are in districts with desegregation orders (0.9%) or rural districts (19.8%). Public schools affected by closings are smaller

than those unaffected by closings. These schools are also in smaller school districts where there is higher median expenditure per pupil. The bottom panel shows a similar analysis for private schools. Private schools affected by school closings are in more disadvantaged school boundaries. Additionally, fewer private schools affected by school closings are in rural districts (10.6%) or are Catholic schools (19.6%). These private schools are also smaller schools than those unaffected by a nearby closing. These preliminary findings suggest that, consistent with previous literature, school closings do not happen randomly. Thus, selection plays a factor in which schools are exposed to a nearby school closing and which are not, justifying the use of a strategy such as matching.

2.6.2 Entropy Balancing

The data in Appendix C shows entropy balancing was successful in creating treatment and control groups with balanced means across the covariates of interest. The results of the fixed effects models using the weights determined by entropy balancing are displayed in Table 3. In the top panel, which contains results for public schools in SY 2005-2006 through SY 2012-2013, I find public schools in the same boundary as a closed school do not appear to have significant differences in minority student composition but are associated with lower populations of students who qualify for free and reduced

Table 2: Descriptions of Variables Used for Analysis of Schools Affected and Unaffected by Nearby School Closures during SY 2005-2006 through SY 2012-2013

Public Schools

Description	Means (SD) Affected by Closed Schools	Not Affected by Closed Schools
Number of schools (N)	3,096	173,226
Measure of disadvantage* for school boundary	0.171 (0.002) †	0.149 (0.0002)
Percent Title I Eligible	0.812 (0.007) †	0.759 (0.001)
School size	5.857 (0.014) †	6.054 (0.002)
District size	9.164 (0.039) †	9.608 (0.005)
Median district expenditure per pupil	$11,576	$10,910
District has desegregation order	0.009 (0.02) †	0.025 (0.0004)
Urbanicity (Rural)	0.198 (0.007) †	0.240 (0.001)

Private Schools

Description	Means (SD) Affected by Closed Schools	Not Affected by Closed Schools
Number of schools (N)	6,431	20,893
Measure of disadvantage* for school boundary	0.135 (0.001) †	0.125 (0.001)
Urbanicity (Rural)	0.106 (0.004) †	0.138 (0.002)
School size	4.347 (0.013) †	4.703 (0.007)
Catholic	0.196 (0.005) †	0.311 (0.003)
Co-educational	0.984 (0.002) †	0.990 (0.001)

Note: The disadvantage measure was created in the same manner as the socioeconomic need index used by Lubienski, Gulosino and Weitzel (2009). The disadvantage measure used in this table is the unweighted average of the percentage of African American residents in the school boundary, the percentage of adults above the age of 21 who are unemployed, the percentage of adults above the age of 21 with a high school degree or below, the percentage of households on public assistance and the percentage of single family homes with children under the age of 18. The measure ranges from 0.010 to 0.696, higher values indicate greater socioeconomic need. † represents a significant difference (at or above $p < 0.05$) between closed and open schools, as determined by a two sample t-test of unequal variances.

price lunch than public schools unaffected by a nearby closed school. Public schools near closed public schools have larger student-teacher ratios (by a little more than one third of a student) than those schools not near a public school closing. Additionally, I find public schools in the same boundary as closed public schools are associated with a 1.9 percentage point increase in the probability they are charter schools and a 2.3 percentage point increase in the probability they are magnet schools. Thus, public schools operating near closed public schools have more disadvantaged student populations and a high degree of diversity in organizational form.

The bottom panel of Table 3 displays results from a similar analysis for private schools near closed private schools. There are no differences in minority student composition between schools in the same boundary as a closed school and those that were not. Private schools near closed private schools have on average, two more students per teacher than private schools unaffected by a closed school. Additionally, I find private schools operating near closed private schools are more likely to have no affiliation with a private school association.

Table 3: Weighted District-Level Fixed Effects Coefficient of Nearby School Closings on School Composition & Organizational Characteristics of Surviving Schools

Public	Percent Minority	Percent FRL	Student-Teacher Ratio	Charter	Magnet
Closings Nearby	0.186	-1.267*	0.387*	0.019**	0.023*
	(0.393)	(0.565)	(0.158)	(0.007)	(0.009)
Disadvantage Lag	6.744***	6.677***	-0.223*	-0.008**	0.013*
	(0.236)	(0.312)	(0.087)	(0.003)	(0.006)
School Size Lag	-1.294**	-1.642*	---	-0.100***	0.029**
	(0.448)	(0.733)		(0.010)	(0.010)
Charter	-3.910*	-12.948***	1.276*	---	-0.055***
	(1.519)	(1.964)	(0.619)		(0.013)
Rural	-6.656***	-5.437***	0.742‡	0.031*	-0.033***
	(0.956)	(0.873)	(0.410)	(0.014)	(0.007)
Constant	66.400***	72.425***	15.512***	0.683***	-0.164***
	(2.724)	(4.477)	(0.144)	(0.041)	(0.037)
R^2	0.886	0.699	0.417	0.781	0.321

Private	Percent Minority	Student-Teacher Ratio	No Affiliation
Closings Nearby	0.005	2.315***	0.038***
	(0.419)	(0.464)	(0.008)
Disadvantage	10.745***	-1.373***	0.021***
	(0.303)	(0.217)	(0.005)
Rural	-3.301**	-2.280*	0.041*
	(0.743)	(1.063)	(0.020)
School Size	-3.821***	---	-0.086***
	(0.300)		(0.006)
Catholic	20.378***	-5.677***	-0.263***
	(0.835)	(0.555)	(0.014)
Other Religious	8.061***	-1.137‡	-0.102***
Denomination	(0.642)	(0.635)	(0.012)
Co-ed	7.992**	8.041***	-0.040
	(2.586)	(1.023)	(0.039)
Constant	21.075***	14.988***	0.890***
	(2.914)	(1.120)	(0.047)
R^2	0.529	0.195	0.351

Note: For public schools, N= 102,977 and analyses use district fixed effects. For private schools, N= 26,397 and analyses use city fixed effects. ‡p < .10* $p < .05$ ** $p < .01$ ***$p < .001$ (Two-tail)

Next, I address whether being near a closed school of a different organizational form produces significant differences in organizational diversity. Data in Appendix D shows entropy balancing was successful in creating balanced groups across the treatment (being exposed to a cross-form school closing). Table 4 presents estimates for school closings across organizational forms, i.e. effects on public schools when a nearby private school closes and vice versa. I find public schools located near closed private schools have fewer students who qualify for free and reduced-price lunch and are more likely to be magnet schools (by 1.1 percentage points). Private schools located near closed public schools did not have any significant differences in minority composition, class sizes or affiliation with private school organizations. Thus, public schools seem more sensitive to cross-sector spillover than private schools.

Table 4: Weighted Fixed Effects Coefficients of Effects of Nearby School Closings across Sectors

Public Schools	Percent Minority	Percent FRL	Student-Teacher Ratio	Charter	Magnet
Private School Closings Nearby	-0.172 (0.244)	-1.126*** (0.307)	-0.046 (0.046)	0.002 (0.003)	0.011** (0.004)
Disadvantage Lag	9.209*** (0.142)	9.237*** (0.181)	-0.399*** (0.026)	-0.007*** (0.001)	0.028*** (0.003)
School Size Lag	-0.809** (0.294)	-3.736*** (0.416)	---	-0.119*** (0.006)	0.0003 (0.005)
Charter	-4.627*** (0.872)	-16.319*** (1.092)	1.397*** (0.240)	---	-0.074*** (0.007)
Rural	-7.407*** (0.629)	-7.484*** (0.664)	0.432*** (0.113)	-0.001 (0.008)	-0.031*** (0.006)
Constant	65.070*** (1.838)	80.253*** (2.596)	16.152*** (0.024)	0.791*** (0.040)	0.075* (0.030)
R^2	0.794	0.607	0.457	0.554	0.234

Private Schools	Percent Minority	Student-Teacher Ratio	No Affiliation
Public School Closings Nearby	0.960 (0.768)	0.762 (0.769)	-0.003 (0.013)
Disadvantage	11.300*** (0.365)	-1.075** (0.311)	0.022*** (0.006)
Rural	-0.842 (1.244)	-1.113 (2.747)	0.071* (0.031)
School Size	-4.944*** (0.423)	---	-0.086*** (0.007)
Catholic	23.101*** (1.008)	-7.304*** (0.931)	-0.232*** (0.019)
Other Religious Denomination	9.077*** (0.824)	-2.985** (1.126)	-0.079*** (0.017)
Co-ed	2.636 (3.042)	8.455*** (1.433)	-0.049 (0.070)
Constant	33.079*** (3.502)	16.836*** (1.662)	0.855*** (0.079)
R^2	0.596	0.236	0.340

Note: Private school analyses control for disadvantage, if the school is rural, a Catholic school, another religious denomination and whether it is coeducational. Public school analysis use district-level fixed effects while private school analyses use fixed-effects at the city level. ‡p < .10 * $p < .05$ ** $p < .01$ ***$p < .001$ (Two-tail)

2.6.3 Robustness Check

While the SABINS data collection lacked complete coverage nationwide, complete GIS data are available for three states: Delaware, Minnesota and Oregon. In analyses not shown, I re-run the above analyses, restricting the data to only include schools in the three states where there is complete coverage to test the robustness of my findings. I find the public school findings for student composition, student-teacher ratio and charter status in Table 3 to be robust. Magnet status is not significant in the restricted sample. The private school results for student-teacher ratio in Table 3 are also significant in the restricted sample. While not statistically significant, the results for affiliation with private school associations are in the same direction as Table 3, however the results for percent minority are in a different direction. In addressing cross-form implications, the findings for public schools near private school closings are less consistent. In the restricted sample, while most coefficients were in the same direction as suggested by Table 4, minority composition was significant while percent of students on free and reduced-price lunch was not. Additionally, the results for magnet status were not robust in the restricted sample. For private schools affected by public school closings, all three estimates were consistent with Table 4 in that there were not significant differences. However, the coefficient for student-teacher ratio in the restricted sample was in a different direction than was expected.

2.7 Discussion

This study examines whether school closings have implications for the ecology of surviving schools in the same school boundary. The closing of one school might have consequences for the diversity of the types of schools that remain available to students and families. Organizational theories often end with the disbanding of an organization; however, it is important to consider how a disbanding itself can contribute to the dynamics of an organizational population by making some characteristics more salient than others. In this study, I address the following research question: how do the organizational characteristics of schools in the same school boundary as a closed school differ from schools that are not near a closing? There are several findings worthy of discussion.

First, I find being located near a closed school has consequences for student composition. Public schools near closings are associated with smaller populations of students with socioeconomic need. This finding was consistent for public schools located near a closed public or private school. However, the magnitude of this finding suggests there is still considerable disadvantage surrounding public schools in general, whether they experience a closing or not. Table 3 shows holding all else constant, public schools that are not near a closed school have very large populations of students who qualify for free and reduced-price lunch, on average about 72% of total enrollment. Thus, having

1.2% fewer students who qualify for free and reduced price lunch might not differ much in terms of practical significance. On the other hand, when public schools are located near closed private schools, lower percentages of low-income students might also reflect private school families seeing those nearby public schools as adequate educational options to enroll in rather than continuing to pay for private school services (Pandey, Sjoquist, and Walker 2009). The case of public school student composition near private school closures suggests school closings can be beneficial by potentially creating more socioeconomic diversity in public schools. Future research should further investigate the implications private school closings have on socioeconomic segregation in districts.

Second, I find larger class sizes are associated with being near a closed school. Class sizes in public schools near closed schools are a third of a student larger than those schools not near a closing. Similarly, class sizes at private schools near a closed school are almost two and a half students larger than those schools not near a closed school. However, class sizes did not differ when schools were exposed to a cross-sector school closing. This could suggest students might not be redistributed to schools across sectors, i.e. public school students who attended a closed school are not re-enrolling in private schools and vice versa. There might be forces such as financial constraints or individual preferences that keep public school students enrolled in public schools and private school students at private schools.

I also find differences in the organizational characteristics that are most likely to be located near a closed school. The schools located near closed public schools are more likely to be magnet or charter schools. Private schools near closed private schools are more likely to have no affiliation with a private school association. Additionally, magnet schools are more likely to be located near closed private schools. However, the findings for magnet schools were not robust, perhaps due to the small number included in the sample. These differences in organizational form might reflect the market in action – charters and magnets are providing competition to low-performing or under-enrolled (often traditional public) schools. Historically, schools of choice such as charters and magnets were initially intended to increase options available to families in disadvantaged areas (Goldhaber and Eide 2002). Those schools that are unable to compete are then closed to offer better educational options for families attending the closed school. However, because I am limited by not having access to school-level achievement data, it is unclear if this market-based approach is working as intended and if low-performing schools are the ones that are closing. Additionally, because I am not taking a longitudinal approach, it is also difficult to ascertain whether these school forms cause school closings or if these schools are locating where they see a market opportunity where a school is underperforming. However, recent work from Detroit finds new charter schools often cluster in areas but not necessarily where a public school

as recently closed (Green et al., 2019). Further research should examine this possibility. In the case of private schools, the finding that schools near a closed private school are more likely to have no affiliation with a private school association might suggest that not being attached to an association or accrediting body makes private schools more flexible and better able to compete in the market with other schools, especially charters or magnets. Further research should address whether school closings change the environment in ways that support this market-based approach to school reform.

Overall, I find the organizational diversity of the ecology of schools differs based on whether there was a nearby school closing. Simply knowing the character of the environment near a closed school is different from those not near a closed school can be especially significant for policymakers. Schools sharing an environment with closed schools might need more resources or different types of resources to survive. For example, I find schools near closed schools have larger class sizes. This might mean schools will require more funding to hire more teachers to maintain smaller class sizes. The case of school closings demonstrates the importance of considering how disbandings contribute to the dynamics of an organizational population.

2.7.1 Organizational Disbandings & Implications for Neighborhood Inequality

Through describing the differences in the ecology of elementary schools this study identifies whether organizational forms and characteristics are distributed

equitably near closed schools. Ultimately, this study considers a potential mechanism through which organizational disbandings such as school closings can contribute to neighborhood stratification and the concentration of disadvantage. It is well documented among the neighborhood effects literature that the context of neighborhoods impacts the academic outcomes of students (Elliott et al., 1996; Burdick-Will et al., 2011). Due to the historical policy of assigning students to schools based on their neighborhood residence, schools often reflect their surrounding neighborhoods such that a disadvantaged school is often located within a disadvantaged neighborhood (Denton 1996; Rothstein 2015; Carlson and Cowen 2015; Nieuwenhuis and Hooimeijer 2016).

While schools can be pathways through which neighborhood effects are expressed (Nieuwenhuis and Hooimeijer 2016), schools can also impact neighborhoods through their actions, such as closing or opening, in similar ways as other organizations. For example, the closure of smaller grocery stores and markets in response to increased market pressure from superstores has led to the creation of food deserts, where households do not have access to high quality food options (Blanchard and Matthews 2007; Walker, Keane and Burke 2010). The closing of a school could operate in a similar manner by reducing the number of schooling options available to families. If a disadvantaged public school closes, disadvantaged students are simply being shuffled

around to other disadvantaged schools. de la Torre and Gwynne (2009) found this to be the case in Chicago where most students displaced by a school closing re-enrolled in low-performing schools. Thus, closing schools can contribute to the overall concentration of disadvantage; especially if school closings cannot be separated from neighborhood disadvantage (Table 2). The idea of improving other schools by closing some might not be realistic if students are trapped within areas of concentrated disadvantage.

Additionally, disbandings such as school closings can have implications for the structural health of neighborhoods. The closure of a school in a neighborhood could represent the withdrawal of city resources. Whether intentional or not, this form of disinvestment in communities can have further spillover effects on the functioning of other neighborhood institutions or organizations. Lyson (2002) finds for small rural communities in New York in the 1990s, the simple presence of a school was associated with social and economic benefits: higher housing values, more developed infrastructure, and lower levels of income inequality and welfare dependence. Further, the closing of schools can remove an important resource for neighborhood families. For some families, neighborhood schools may serve as resource brokers, providing access to information about health care or services, childcare or free meals through their organizational ties (Small 2006). The closing of a school in the neighborhood could make

it more difficult for families to acquire those resources. For organizations such as schools that are members of larger organizational communities, the disbanding of one could have unintended consequences for the organizations linked to it.

Organizations can contribute to disinvestment in specific neighborhoods directly by employing adaptive behaviors in response to changes in the neighborhood environment. Some of these adaptive responses (instituting rigorous admissions standards, moving school buildings to different neighborhoods, etc.) blatantly reinforce patterns of inequality, while others (such as converting to magnet status) might make schools more accessible. Such organizational actions might reflect the racialization of organizations such as schools (Ray 2019), where biases affect the structure of organizational decision-making. Disbandings can also indirectly reinforce pathways of stratification. The finding that class sizes were only affected by nearby school closures of the same sector might suggest that social or environmental forces constrained the redistribution of students to occur only within organizations of the same form. For families attending public schools, an obvious constraint might be financial as private school attendance often carries a hefty price tag while public schools are usually free. However, families at private schools might not have the same financial constraint as public school families. Instead, private school families might avoid enrolling their students in public schools due to preference rather than constraints. Historically,

families with available resources have often enrolled in private schools to avoid disadvantaged students and racial minorities (Saporito and Hanley 2014).

In all, these findings suggest organizational disbandings could have consequences for stratification. The closing of organizations such as schools can contribute to the concentration of disadvantage in neighborhoods, creating areas of uneven opportunities and resources (e.g. food or book deserts). Policymakers and district officials advocating for options such as school closures should consider the larger effects these actions have on the health of neighborhoods. Future research should continue to consider how organizational actions such as foundings, disbandings, and using specific adaptive behaviors could have further implications for opportunity and equity.

3. Closing & Restructuring Public Schools: The Spillover Effects of Organizational Disbandings and Transformations

The closing or restructuring of a school is a major event that displaces students, teachers, administrative staff and district resources such as funding and facilities. Since the No Child Left Behind Act of 2001, many federal education policies have included school closure or restructuring as an option for districts if a school consistently fails to meet accountability standards. For example, in 2010 the U.S. Department of Education awarded funds to states and districts through the School Improvement Grant Program to implement specific improvement strategies including school closure or some form of restructuring, such as making changes to school leadership and staff, instructional reform or the rebranding of a school as a charter school. Studies find closing schools can have positive or negative impacts on student achievement (de la Torre and Gwynne 2009; Engberg et al., 2012; Gordon et al., 2018). There is similar mixed evidence for the effectiveness of school restructuring – depending on the type of restructuring, student outcomes can improve or remain the same (Gill et al., 2007; Strunk, et al., 2016).

Most previous research addressing school closings or restructurings focus on the individual outcomes of students and teachers at closed or restructured schools. However, these actions might also have consequences for educational equity and access. School closures and restructurings occur within spatial structures such as school

boundaries. Families are often restricted to enroll at schools located in the same boundaries where they reside. These boundaries can constrain the educational options available to families affected by closed or restructured schools. Thus, school closings and restructurings can have implications for equity if these actions occur more frequently in boundaries with similar demographic characteristics. However, few studies address this spatial component when examining the effects of school closures and restructurings (see Lubienski, Gulosino and Weitzel 2009 for an exception). An organizational approach that views school closings as organizational disbandings and school restructuring as organizational transformations could account for the spillover effects these actions can produce. Such an approach would also allow research to move beyond focusing on individual-level outcomes, such as student achievement, to instead consider the distribution of school characteristics that are crucial to equitable access for families.

This study examines how the disbanding or restructuring of one organization can influence the distribution of structures and characteristics across space. Specifically, I use the closing and restructuring to schools to assess differences in student composition, teacher composition and organizational characteristics such as access to advanced courses. To do so, I address the following research questions:

1. Are there differences in the context and organizational structure of schools in boundaries that experience a closure or restructuring compared to schools in boundaries without a closing or restructuring?
2. Are the effects of being in the same boundary as a closed or restructured school immediate, long-term or both?

In addressing these questions, this study will examine whether school closures and restructurings create spillover effects that influence the equitable distribution of access to high quality school offerings.

3.1 Conceptual Framework: Organizational Theory & The Geography of Educational Opportunity

School closures and restructurings are often described as a market-based reform where closing or reforming low-performing schools would increase students' choice and access to higher-performing schools (Chubb and Moe, 1990/2011). Evidence for the effectiveness of this market-based argument is mixed with some finding closings and restructurings have positive (Brummet 2014), negative (Engberg et al. 2012; Gordon et al., 2018) or no effect (de la Torre and Gwynne 2009; de Witte and Van Klaveren 2014) on student outcomes. Critics of market-based reform efforts argue these actions can potentially affect the geography of educational opportunity by increasing school segregation. Through these models of choice, families have more ability to avoid certain schools due to student characteristics or reputations of chronic low-performance on

standardized exams (Bagley and Woods 1998; Hook 1999; Goyette, 2014). For example, an examination of the high school admissions process in Chicago finds even when families had access to transportation, they often avoided schools in Chicago's historically black neighborhoods sometimes choosing to attend lower quality schools (Phillippo and Griffin 2016). These actions could cause low-performing, less-desirable schools to fall into "spirals of decline" where they continue to lose students, leaving mostly disadvantaged students enrolled at the school (Gorard, Taylor and Fitz 2002). Due to the funding structure of U.S. education, the act of selecting schools by avoiding specific neighborhoods can affect the geography of educational opportunity because the departure of students often means the loss of resources such as per-pupil funding. Using theories from organizational behavior, Holme, Carkhum and Rangel (2013) document examples of "spirals of decline" among two Texas traditional public high schools.

Critics argue school choice policies can create a system of "winners" and "losers" that result in the unequal distribution of advantaged families at more desirable schools (Chubb and Moe 1990/2011). Thus, market-based reforms such as school closings and restructurings could have spatial consequences for the availability of quality schools to families who rely on neighborhood schools. The potential spillover effects created by school actions underscore the notion that organizations such as schools do not operate in isolation; they are often embedded within environments containing similar

organizations (DiMaggio and Powell 1983; Carroll 1984). Theories from organizational ecology and institutional theory might provide new insight into how actions such as school closings and restructurings affect how resources are allocated among boundaries. Viewing school closings as organizational disbandings and school restructurings as organizational transformations allows for the consideration of the consequences for other organizations sharing the same environment, specifically which organizations may receive additional resources. Through closing and restructuring schools, districts can assume a planning function – "managing space and spatial order" (Beirbaum 2018; Boyer 1986). An examination of boundary-level outcomes would allow for the use of an organizational approach to account for the interconnected nature of schools and measure the effect of these actions on the spatial order.

3.1.1 Disbandings, Transformations and Resource Redistribution

Many studies have examined how the closing of schools might impact student outcomes (Kirshner, Gaertner and Pozzoboni, 2010; de la Torre and Gwynne 2009; Engberg et al., 2012). However, little research addresses how school closings and restructurings impact the geographic distribution of educational resources. Organizations such as schools that exist in close proximity might be especially connected: interconnected organizations often form geographic clusters or agglomerations for greater economic efficiency (Rocha 2004; Wennberg and Lindqvist,

2010). In such situations, the actions of one organization are likely to affect the actions of others (McCann and Vroom 2009). School closings and redistributions could serve as a disruption that influences the survival of other organizations in the population. These events, but especially school closures, provide an opportunity for the redistribution of resources, such as students and teachers, to other schools. Mechanisms such as network structures and existing relationships could influence how these resources once belonging to the disbanded organization are redistributed (Saxenian 1994). Alternatively, resources could be intentionally or unintentionally redistributed to specific organizations in the environment, as is the case in the dissolution of 501(c)(3) nonprofits where remaining funds and leftover assets must be donated to a similar organization or to the federal government (Internal Revenue Service 2015).

In the case of schools, the redistribution of students can occur within the same school attendance boundary or out of the system if families elect not to re-enroll. Structures such as school boundaries can constrain the educational options available to students displaced by closed schools. In selecting a new school to attend, students are often limited by the location of their family residence and must select a school that is within the same attendance boundary. This might be especially significant for minority and low-income students in urban areas, where school closures often affect schools with high percentages of low-income black and Latino students (Lipman and Haines 2007;

Valencia 2008). Structural factors such as school and residential segregation often leads to large proportions of minority and low-income students concentrated at the chronically low-performing schools often targeted for closure (Logan, Minca, and Adar 2012). Recent large-scale school closures in Philadelphia and Chicago were found to disproportionately occur in disadvantaged neighborhoods with more African American residents (Good 2017b; Lee and Lubienski 2017). Thus, minority and low-income students are more likely to need to be redistributed among neighboring schools. This could present additional challenges to schools serving greater proportions of minority or low-income students, especially since those schools are often already face difficulties providing adequate educational services, e.g. in need of additional resources for increased at-risk, limited English proficient and special education student populations (Downes and Pogue 1994; Miles and Roza, 2006). Overall, market arguments suggest the redistribution of students could be positive if students are exposed to more positive, less segregated learning environments or negative if there are no high-quality environments available to students.

The redistribution of teachers might not be as constrained by structures such as attendance boundaries. Instead, the micro-processes employees in disbanding organizations face as a part of dissolution might be more relevant to teachers in a closing or restructuring school. In analyzing the process of organizational disbanding, Sutton

(1987) identifies a process of reconnection, which describes when members of disbanding organizations recognize disbanding is approaching and attempt to reconnect to other social systems. Reconnecting can be formalized or can happen through decentralized network structures where employees are recruited by nearby firms due to informal network contacts or career affiliation networks (Saxenian 1994, Casper 2007). In the case of school closings, while students are more constrained by school boundary structures; network structures and reconnecting might provide teachers in a closing school with increased opportunities to apply for positions at more desirable, higher-performing public or private schools (Boyd et al., 2005), or to exit the profession entirely (Ingersoll 2001). This redistribution might leave less-experienced teachers in schools near closed or restructured schools. Studies find less-experienced teachers are less effective at improving student achievement and other outcomes (Clotfelter, Ladd and Vigdor 2007). Thus, the redistribution of teachers and students following a school closure could also have repercussions for teacher composition at schools in the boundary.

3.1.2 Closings, Restructurings and the Geography of Organizational Diversity

School closings or restructurings can also change the profile of schools that continue to operate in a district. For example, the decision to restructure a school can have spillover effects on the structure and characteristics of nearby schools. In

anticipation of an improved school, nearby schools might make changes to their own structures so that they become more competitive. The uncertainty caused by school closings and restructurings can lead organizations to imitate the structure of other successful organizations (DiMaggio and Powell, 1983). Such isomorphism would allow schools to remain competitive by adopting features or characteristics that increase their perception as legitimate organizations in response to changes in local conditions (Diez-Martin et al., 2018; Aguilera et al., 2007). Schools have previously adopted innovations such as school personnel for health services (Rowan 1982) and social and emotional instructional practices (Elias et al., 2003) in order to adapt to a changing institutional and political environment. Such spillover effects have been documented for one form of restructuring: charter schools. Districts often open charter schools due to political and institutional factors, rather than educational need (Zhang and Yang 2008).

Organizations are entities spatially embedded within neighborhoods or communities; thus, characteristics of neighborhoods can affect organizational structure and behavior (Marquis and Battilana 2009). According to Marquis and Battilana (2009) communities can influence organizational behavior through regulative, social-normative and cultural-cognitive ways. For example, local policies can create incentives for private companies to give charitably to public schools (Guthrie et al., 2008). Existing community networks can influence organizational behaviors through normalizing social comparison

processes where organizations look to their peers for guidance during times of uncertainty (Galaskiewicz 1985, Galaskiewicz and Burt 1991). Organizations can also be affected by changes in local demographics. For example, Flippen (2001) finds in response to neighborhood demographic change organizations can decline, continue to function but in a divided manner, or integrate. In the case of increasing Hispanic populations, Flippen found neighborhood business and civic associates decline, churches divide across ethnic lines, and local political and educational organizations integrate.

Schools can be similarly responsive to changes in their environment. Lubineski, Gulosino and Weitzel (2009) find public, charter and private schools often use exclusionary tactics such as avoiding operating in disadvantaged areas to attempt to gain better market position. Additionally, in response to changing district demographics, some suburban schools instituted harsher discipline practices while others instituted minority hiring initiatives or restructured their school day to improve school climate and engagement (Evans 2007). The presence of increased concentrations of certain organizations can signal neighborhoods are experiencing transitions. For example, the presence of charter schools can be related to demographic changes that result from urban revitalization efforts (Davis and Oakley 2013). Because organizations are affected by the communities they are embedded within, their characteristics might

vary depending on the qualities of the neighborhood or community. However, few studies address the implications such differences in organizational distribution could have for equity.

The case of school closings and restructurings offer an opportunity to further examine the relationship organizations have with their environments. Current research addresses environmental factors that might cause an organization such as a school to disband or restructure. However, much of this research does not address how the act of disbanding or restructuring itself can impact the larger spatial distribution of organizational characteristics that remain. This paper examines whether school boundaries with closed or restructured schools become more likely to contain schools of specific characteristics and structures. Additionally, this paper considers whether these effects exist in the short or long-term. By describing the ecological differences of boundaries affected by school closures and restructurings, this study considers a potential mechanism through which schools reproduce stratification via their organizational responses to local closures and restructuring.

3.2 Data

While school closures and restructurings happen regularly, both methods of school reform were officially supported by federal education policy with the introduction of the School Improvement Grant competition in SY 2009-2010. Through

this grant program, additional federal funds were provided to states to turnaround low-performing schools. Special emphasis was placed on improving persistently low-performing schools using one of four models: turnaround, where schools replace their principals and half of their staff in addition to other strategies; restart, where the school is closed and reopened as a charter school; school closure, where the school is closed and students are enrolled in higher achieving schools; or transformation, where schools replace their principals in addition to making rigorous instructional reforms such as extending learning time (Perlman and Redding, 2011). In SY2010-2011, the first cohort of schools received additional funding through the SIG competition. This study uses the introduction of SIG as a natural experiment to assess the spillover effects of closure or restructuring at a time when all districts were provided the opportunity to apply for additional funds.

Data for this study are from the U.S. Department of Education (ED) Common Core of Data (CCD), the School Attendance Boundary Information System (SABINS), and the Civil Rights Data Collection (CRDC). All schools in the CCD were assigned to the school boundary they fall within, according to GIS files available through the SABINS. Schools that were not matched to a school boundary were omitted from analysis. Schools that did not appear in both the CCD and CRDC were also omitted. Schools operating in 2010-2011 were matched with data from three years pre and 3 years

post the administration of SIG. Because my research question is concerned with spatial distribution of school characteristics, school-level data were then aggregated to the school-boundary level. Since there are more elementary schools in the U.S. than secondary schools (Snyder, de Brey, and Dillow 2018), there is increased potential for variation in the different types of schools that exist within elementary school boundaries. Analysis for this study is restricted to the 2009-2010 Kindergarten school boundaries in each of the 306 SABINS districts to represent the schooling options available to families upon entry into elementary school. I use constant geography and hold the school boundaries for SY 2009-2010 constant for all years under analysis. Altogether, my sample includes 20,910 elementary school boundaries in 8,195 districts across all 50 states and Washington, DC with data from SY 2007-2008 through SY 2013-2014.

Each year ED releases the CCD - a public school directory that contains enrollments, demographics, and program information (i.e., school participation in federal grant programs such as free and reduced lunch, and Title I) for all public schools operating in the country. The CRDC is an additional national survey administered biennially through the U.S. Department of Education Office for Civil Rights to examine issues related to civil rights compliance. ED provides school boundary GIS files for SY 2009-2010 for select school districts through the School Attendance Boundary

Information System (SABINS). However, the design of the SABINS does not allow for the use of a nationally representative sample of schools. The SABINS was limited to thirteen regionally diverse metropolitan areas, all districts within three states and any districts that had GIS data readily accessible. Appendix 1 identifies the location of the districts included in the SABINS data. While the districts included in the SABINS are not universal, including a variety of districts in this study alleviates concerns that some districts may have a history of distinct education policies that would make them more or less likely to resort to school closures. Other studies have focused on implications of school closures in districts with unique policy environments such as Washington, DC or New Orleans. The distinct character of these cases raises issues of generalizability that are avoided with a large, more expansive sample of districts. However, even though the SABINS data are not nationally representative (Appendix 2 shows SABINS districts are less suburban and have more charter schools than those that are not included in the data) there is sufficient variation in the types of districts represented. In the following section I describe the measures and analytic plan used in this study.

3.3 Methods

To assess whether there are differences in the spatial distribution of school characteristics due to school closings or restructurings this study addresses differences in two main groups of dependent variables as described in Table 5. The first group

consists of school-level measures of student and teacher composition to assess the redistribution of students and teachers: the district's concentration of minority students, students with disabilities, limited English proficient students, students receiving gifted and talented services, students who were retained for a grade, certified teachers, and first and second year teachers within the school boundary. Because of the spatial focus on redistribution, I use a measure of the concentration of student and teacher characteristics in the school boundary relative to the district subgroup total rather than an absolute measure where the denominator is the total number of students in the district. The second group of dependent variables addresses whether schools make changes to their organizational structure. Those variables include the number of Math and Science courses offered, the number of schools qualifying for Title I Status, and the number of magnet and charter schools within each school boundary. The main independent variable of interest is whether a currently operating school is in the same school boundary as a school that closed or restructured during SY 2010-2011 (1 = in same boundary as closed/restructured school). All analyses account for school boundary disadvantage, district size and urbanicity (see Table 5).

Table 5: Means, Standard Deviations, and Descriptions for Variables Used in the Analysis

Variable Name	Description	Metric	Mean (SD)
Redistribution			
Racial Concentration	Percentage of Nonwhite students in the district enrolled within the school boundary	Min = 0 Max = 1	0.134 (0.213)
SPED Student Concentration	Percentage of total students with disabilities in the district enrolled within the school boundary	Min = 0 Max = 1	0.051 (0.126)
LEP Student Concentration	Percentage of total LEP students in the district enrolled within the school boundary	Min = 0 Max = 1	0.030 (0.083)
Gifted Student Concentration	Percentage of total gifted/talented students in the district enrolled within the school boundary	Min = 0 Max = 1	0.039 (0.107)
Retained Student Concentration	Percentage of total retained students in the district enrolled within the school boundary	Min = 0 Max = 1	0.012 (0.064)
Concentration of Certified Teachers	Percentage of total certified teachers in the district employed within the school boundary	Min = 0 Max = 1	0.050 (0.127)
Concentration of First Year Teachers	Percentage of total first year teachers in the district employed within the school boundary	Min = 0 Max = 1	0.042 (0.113)
Concentration of Second Year Teachers	Percentage of total second year teachers in the district employed within the school boundary	Min = 0 Max = 1	0.042 (0.113)
Organizational Diversity			
Math Courses	Number of Algebra I & II, Calculus, Geometry and Advanced Math courses offered by schools in the boundary	Min = 0 Max= 76	2.251 (7.603)
Science Courses	Number of biology, chemistry and physics courses offered by schools in the boundary	Min = 0 Max = 78	4.517 (12.615)
Title I Status	Number of schools eligible for participation in programs authorized by Title I of the ESEA	Min = 0 Max = 48	1.409 (1.324)
Magnet Status	Number of special schools designed to attract diverse students in order to reduce, prevent or eliminate racial isolation and/or to provide an academic or social focus on a theme	Min = 0 Max = 17	0.086 (0.373)

TABLE 5 CONT'D. Means, Standard Deviations, and Descriptions for Variables in the Analysis

Variable Name	Description	Metric	Mean (SD)
Charter Status	Number of schools providing free education to eligible students under a specific charter granted by the state legislature or other authority	Min = 0 Max = 11	0.146 (0.519)
School Closings			
Closing	Whether or not a school closed in SY 2010-2011 in the school boundary	Closings =1%	
Restructuring	Whether or not a school restructured in SY 2010-2011 in the same school boundary	Restructuring =1%	
Controls			
School Boundary Disadvantage	The natural log of the unweighted average of the the percent of Black residents, unemployed adults above the age of 21, adults above the age of 21 with less than a high school degree, households on public assistance and single families with children under the age of 18 in the school boundary.	Min = 1.196 Max = 3.908	2.687 (0.461)
District Size	Standardized total student enrollment in district during the fall of each school year	Min = -4.480 Max = 2.541	-0.015 (0.977)
Rural	Whether or not the district is rural	Rural = 32%	

This paper exploits the first administration of the SIG program in 2010 as a source of exogenous variation to estimate the causal effect of being exposed to school closures and restructurings. The introduction of the SIG program presents an opportunity to employ the use of a difference-in-differences (DID) design. DID is a form of a quasi-experiment where the causal effect of a treatment is assessed by comparing outcomes for a treatment group against a control, counterfactual group (Angrist and Pischke 2009). In the case of SIGs, all states were given the opportunity to apply for additional funding to improve persistently low-performing schools. However, there was

no random assignment to the treatment condition – being located in the same school boundary as a closed or restructured school. Thus, the DID estimator is advantageous because it can account for differences in school boundaries over time before and after the intervention in addition to differences in the characteristics of school boundaries that experience a school closing or reconstructing and those who do not. This is summarized below in Equation 1:

$$Y = \beta_0 + \beta_1 D_{action} + \beta_2 D_{treated} + \beta_3 D_{action} * D_{treated} + \gamma X + \varepsilon$$

Equation 1

where Y is equal to a vector of school characteristics and other outcomes described above, D_{action} is a binary variable that is equal to 1 if the school boundary experienced a school closing or restructuring, $D_{treated}$ is a binary variable that equals 1 for observations after the 2010-2011 school year, X represents a vector of control variables as discussed above, and is the random error. β_3 represents the DID estimator of interest. By removing the differences due to time in addition to cross-sectional differences, β_3 assess the average change in redistribution or diversity in boundaries with closed or restructured schools over and above the changes in boundaries without closed or restructured schools.

I use entropy balancing to identify a control group of school boundaries that did not have any school closures or restructurings during the time period. Entropy

balancing determines appropriate weights necessary to balance covariates across both the treatment and control groups (Hainmueller and Xu 2013). Thus, by balancing both groups based on observable characteristics, entropy balancing mimics a randomized experiment (Neuenkirch and Neumeier 2016). Combining the weights produced by entropy balancing with regression methods would be equivalent to a doubly robust regression approach (Hainmueller and Xu 2013). Entropy balancing is conducted using Hainmueller and Xu's Stata package *ebalance*. Data from the control group are reweighted so that the means and variance (second moment) of the following covariates match across both groups: the number of elementary, middle and high schools in each school boundary; the number of Title 1 schools; the number of minority students; the number of full-time equivalent teachers; the number of charter schools; the size of school districts; school boundary disadvantage, and urbanicity. All measures are from the 2009-2010 school year. The weights generated from entropy balancing are then used in a weighted OLS regression with DID indicators similar to Equation 2 below:

$$\beta_{WLS} = (X'WX)^{-1}X'W_y$$

Equation 2

where y and X are matrices associated with those in Equation 1 and W represents the weights determined through entropy balancing.

3.4 Results

Table 6 assesses whether the characteristics of school boundaries with a closed or restructured school are significantly different from those boundaries unaffected by closed or restructured schools. The top panel shows elementary school boundaries affected by a school closing are more disadvantaged and have more disadvantaged students (as they have more schools eligible for Title I funds). School boundaries affected by closings have more full-time equivalent staff and minority students. These school boundaries are also in larger districts with more charter schools. Boundaries that contain restructured schools are similar to those that contain school closings except on one characteristic – boundaries with school closings are slightly more rural than those without, while there are much fewer rural boundaries with restructured schools. These preliminary findings suggest that, consistent with previous literature, school closings and restructurings do not happen randomly. Thus, selection plays a factor in which school boundaries are exposed to a school closing or restructuring and which are not, justifying the use of a strategy such as matching.

Table 6: Description of School Boundaries Affected and Unaffected by Nearby School Closures and Restructurings During SY 2010-2011

Closed Schools Description	Means (SE) Affected by Closed Schools	Not Affected by Closed Schools
Number of Schools (N)	995	19,758
Measure of Disadvantage* for School Boundary	18.100 (0.259) ***	16.312 (0.057)
Number of Title I Eligible Schools	2.590 (0.071) ***	1.393 (0.009)
Full-Time Equivalent Staff	97.939 (3.435) ***	71.874 (0.453)
Minority Students	883.503 (39.270)***	626.046 (5.671)
Number of Charter Schools	0.551 (0.035)***	0.133 (.003)
District Size	0.068 (0.036)*	-0.020 (0.008)
Urbanicity (Rural)	0.376 (0.015)***	0.322 (0.003)
Restructured Schools Description	Means (SE) Affected by Restruct. Schools	Not Affected by Restruct. Schools
Number of Schools (N)	333	20,420
Measure of Disadvantage* for School Boundary	23.789 (0.412)***	16.277 (0.056)
Number of Title I Eligible Schools	2.772 (0.120)***	1.490 (0.009)
Full-Time Equivalent Staff	116.005 (4.560)***	64.788 (0.476)
Minority Students	1439.673 (67.169)***	640.875 (5.769)
Number of Charter Schools	0.679 (.074)***	0.162 (.004)
District Size	0.705 (0.039)***	-0.028 (0.008)
Urbanicity (Rural)	0.147 (0.019)***	0.327 (0.003)

Note: The disadvantage measure was created in the same manner as the socioeconomic need index used by Lubienski, Gulosino and Weitzel (2009). The disadvantage measure used in this table is the unweighted average of the percentage of African American residents in the school boundary, the percentage of adults above the age of 21 who are unemployed, the percentage of adults above the age of 21 with a high school degree or below, the percentage of households on public assistance and the percentage of single family homes with children under the age of 18. The measure ranges from 3.305 to 49.801, higher values indicate greater socioeconomic need. * $p < .05$; ** $p < .01$; ***$p < .001$ (two-tail) between closed and open schools and restructured and non-restructured schools, as determined by a two sample t-test of unequal variances.

The data in Appendix C shows entropy balancing was successful in creating treatment and control groups with balanced means and variances across the covariates of interest. The results of the difference-in-differences analysis using the weights determined by entropy balancing are displayed in Table 7 and Table 8. Table 7 shows results for difference-in-difference analyses one year after a school closed in a school boundary. The coefficient of interest, the difference-in-differences estimator Closings*Treated, appears statistically significant for many of the redistribution variables. While not statistically significant for the concentration of minority students, the treatment of have closed schools in the school boundary has a negative effect on the concentration of students with disabilities ($\beta = -0.019$), students with limited English proficiency ($\beta = -0.026$), students who qualify for gifted and talented services ($\beta = -0.012$) and students who are retained ($\beta = -0.026$). The direction of the difference suggests school boundaries that experience school closures have lower concentrations of students with these characteristics. Additionally, measures of baseline differences (i.e. the coefficient for Closings) suggests there were already fewer SPED and gifted students concentrated in those boundaries.

Table 7: Weighted OLS of School Closings on School Composition & Organizational Characteristics of Elementary School Boundaries

	Redistribution								
	Minority	SPED	LEP	Gifted	Retained	FTE	Cert Teach	FY Teach	SY Teach
Closings	-0.024***	-0.014**	-0.002	-0.012**	-0.001	-0.024***	-0.010**	-0.006	-0.008*
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.002)	(0.003)	(0.004)	(0.003)
Treated	0.003**	0.026***	0.035***	0.022***	0.066***	0.0002	0.029***	0.031***	0.031***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
DID	-0.001	-0.019***	-0.026***	-0.012*	-0.026***	-0.005	-0.024***	-0.021***	-0.020***
	(0.006)	(0.005)	(0.005)	(0.005)	(0.006)	(0.003)	(0.005)	(0.005)	(0.005)
Disadv.	0.007***	-0.001	0.002	-0.0004	-0.002	0.003‡	0.001	0.001	0.001
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
District Size	-0.138***	-0.112***	-0.115***	-0.108***	-0.107***	-0.137***	-0.122***	-0.112***	-0.112***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Rural	0.040***	0.040***	0.040***	0.043***	0.039***	0.040***	0.041***	0.044***	0.040***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Constant	0.114***	0.108***	0.092***	0.101***	0.075***	0.126***	0.107***	0.099***	0.098***
	(0.006)	(0.009)	(0.009)	(0.009)	(0.010)	(0.005)	(0.008)	(0.010)	(0.009)
N	65,649	25,511	22,867	22,343	23,707	65,912	28,668	27,190	27,000
R^2	0.549	0.631	0.586	0.607	0.575	0.726	0.670	0.580	0.570

	Organizational Characteristics				
	Math Courses	Science Courses	Title I	Charters	Magnets
Closings	0.144	1.525**	0.050	0.008	0.043**
	(0.361)	(0.575)	(0.065)	(0.028)	(0.016)
Treated	1.253***	4.444***	0.046	0.038	0.037**
	(0.232)	(0.330)	(0.056)	(0.026)	(0.013)
DID	-0.298	0.072	-0.329**	-0.011	0.003
	(0.516)	(0.881)	(0.097)	(0.043)	(0.026)
Disadv.	-3.313***	-2.831***	0.586***	0.140***	-0.023
	(0.409)	(0.633)	(0.055)	(0.027)	(0.015)
District Size	4.568***	5.775***	0.733***	0.352***	0.192***
	(0.263)	(0.342)	(0.075)	(0.022)	(0.014)
Rural	3.306***	5.419***	1.391***	0.109**	0.124***
	(0.422)	(0.622)	(0.132)	(0.035)	(0.024)
Constant	11.103***	12.100***	0.302‡	-0.035	0.125**
	(1.206)	(1.835)	(0.158)	(0.076)	(0.042)
N	32,823	32,141	65,985	65,985	65,985
R^2	0.122	0.089	0.093	0.128	0.073

Note: ‡p < .10 * $p < .05$ ** $p < .01$ ***$p < .001$ (Two-tail)

Additionally, while there is no significant difference in the concentration of the number of staff members in school boundaries that experience school closings, there appear to be differences in the concentration of teachers with different characteristics. There are fewer certified teachers in school boundaries with closed schools (β = -0.024). The concentration of both first- and second-year teachers appears to be smaller in boundaries with closed schools (β =-0.021; β = -0.020). Prior to the implementation of the intervention, boundaries with closed schools already had a lower concentration of certified and second year teachers. The bottom panel of Table 7 shows the effect of being in a school boundary with closed school on the distribution of school organizational characteristics. The only characteristic affected is the number of Title I schools – boundaries with closed schools have fewer Title I schools after treatment (β = -0.329).

Table 8 shows a similar analysis but for school boundaries with restructured schools. I find being located in the same school boundary as a restructured school did not create significant differences in the redistribution of students or teachers one-year post-treatment. However, there are significant differences in the distribution of school organizational characteristics. School boundaries with restructured schools have on average about 5 more Science courses than those without restructured schools. There are also more Title I schools (β = 1.310) and charter schools (β = 0.813) in boundaries with restructured schools.

Table 8: Weighted OLS of School Restructuring on School Composition & Organizational Characteristics of Elementary School Boundaries

	Redistribution								
	Minority	SPED	LEP	Gifted	Retained	FTE	Cert. Teach	FY Teach	SY Teach
Restructure	0.001	-0.001	-0.002	-0.003	-0.002	0.002	-0.002	-0.0003	0.0002
	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
Treated	0.001	0.006**	0.011***	0.005*	0.026***	-0.001	0.010***	0.011***	0.014***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
DID	0.005	0.002	-0.003	0.007	0.004	0.006	0.002	0.003	0.004
	(0.003)	(0.005)	(0.006)	(0.006)	(0.005)	(0.003)	(0.005)	(0.005)	(0.006)
Disadv.	-0.019***	-0.017***	-0.018***	-0.015***	-0.014**	-0.024***	-0.017***	-0.013**	-0.014**
	(0.003)	(0.004)	(0.005)	(0.004)	(0.005)	(0.003)	(0.004)	(0.005)	(0.005)
District Size	-0.091***	-0.079***	-0.082***	-0.070***	-0.068***	-0.091***	-0.081***	-0.076***	-0.077***
	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)
Rural	0.044***	0.040***	0.036***	0.048***	0.028***	0.044***	0.040***	0.037***	0.033***
	(0.004)	(0.005)	(0.007)	(0.006)	(0.006)	(0.004)	(0.005)	(0.005)	(0.005)
Constant	0.157***	0.139***	0.143***	0.121***	0.107***	0.172***	0.138***	0.124***	0.125***
	(0.009)	(0.014)	(0.017)	(0.013)	(0.016)	(0.009)	(0.013)	(0.016)	(0.015)
N	65,634	25,506	22,856	22,317	23,694	65,925	28,668	27,186	26,994
R^2	0.616	0.528	0.425	0.460	0.409	0.649	0.539	0.455	0.409

	Organizational Characteristics				
	Math Courses	Science Courses	Title I	Charters	Magnets
Restructure	0.864‡	3.960***	-0.089	-0.026	0.071**
	(0.478)	(0.870)	(0.059)	(0.036)	(0.022)
Treated	1.059*	2.397**	-0.100‡	-0.030	0.049*
	(0.492)	(0.891)	(0.057)	(0.035)	(0.022)
DID	0.156	5.290*	1.310***	0.813***	0.068
	(0.917)	(2.289)	(0.214)	(0.147)	(0.063)
Disadv.	-4.873***	-8.046***	0.657***	0.180***	0.007
	(0.615)	(1.184)	(0.076)	(0.045)	(0.028)
District Size	8.017***	10.445***	0.553***	0.346***	0.317***
	(0.495)	(0.630)	(0.056)	(0.033)	(0.020)
Rural	7.257***	5.922***	1.089***	0.091	0.015
	(0.957)	(1.276)	(0.117)	(0.061)	(0.022)
Constant	14.037***	28.628***	0.025	-0.290*	-0.031
	(1.922)	(3.640)	(0.238)	(0.141)	(0.089)
N	32,830	32,148	65,994	65,994	65,994
R^2	0.169	0.116	0.081	0.077	0.103

Note: ‡p < .10 * $p < .05$ ** $p < .01$ ***$p < .001$ (Two-tail)

3.4.1 Temporal Stability of School Closings and Restructurings

In addition to differences caused by school closings and restructurings, this paper also addresses whether these differences are immediate or long-term. Table 9 shows whether these differences persist for one, two or three years after the policy change. The left panel shows these results for school closings. I find the effects of school closings to be particularly persistent. The size of the difference-in-differences estimate and its strength of significance is robust across three years post-intervention. The right panel shows these results for school restructuring, where some differences arise. Similar to the case of school closings, the three differences that arise in the first year after the intervention remain significant two and three years later. However, the number of science courses increases to almost 5.5 classes by the third year while the number of Title I and charter schools decreases slightly over time. Additionally, significant differences in the concentration of minority students and district FTE arise two and three years after the intervention. In the case of school restructurings, there appear to be spillover effects that are short-term and persist into the long-term as well as differences that arise in the long-term.

Table 9: Stability of Effects One Year, Two Years and Three Years Post-Intervention

	School Closings			*School Restructuring*		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Minority	-0.001	-0.003	-0.004	0.005	0.005‡	0.005‡
	(0.006)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
SPED	-0.019***	-0.019***	-0.019***	0.002	0.002	0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
LEP	-0.026***	-0.026***	-0.023***	-0.003	-0.003	-0.002
	(0.005)	(0.005)	(0.004)	(0.006)	(0.006)	(0.004)
Gifted	-0.012*	-0.012*	-0.012*	0.007	0.007	0.006
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.004)
Retained	-0.026***	-0.026***	-0.028***	0.004	0.004	-0.0004
	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.004)
FTE	-0.005	-0.005	-0.004	0.006	0.006*	0.006*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
Certified Teachers	-0.024	-0.024***	-0.023***	0.002	0.002	0.002
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)
First Year Teachers	-0.021***	-0.021***	-0.021***	0.003	0.003	0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
Second Year Teachers	-0.020***	-0.020***	-0.020***	0.004	0.004	0.002
	(0.005)	(0.005)	(0.004)	(0.006)	(0.006)	(0.004)
Math Courses	-0.298	-0.298	0.236	0.156	0.156	2.709*
	(0.516)	(0.516)	(0.560)	(0.917)	(0.917)	(1.266)
Science Courses	0.072	0.072	-0.133	5.290*	5.290*	5.432**
	(0.881)	(0.881)	(0.741)	(2.289)	(2.289)	(1.572)
Title I	-0.329**	-0.309***	-0.307***	1.310***	1.271***	1.226***
	(0.097)	(0.087)	(0.082)	(0.214)	(0.174)	(0.146)
Charters	-0.011	-0.033	-0.045	0.813***	0.769***	0.736***
	(0.043)	(0.038)	(0.036)	(0.147)	(0.117)	(0.100)
Magnets	0.003	-0.005	-0.009	0.068	0.053	0.050
	(0.026)	(0.023)	(0.022)	(0.063)	(0.050)	(0.043)

3.5 Discussion

This study examines the spillover effects of educational policies such as school closings and restructurings. Using a framework of school closings as organizational disbandings and restructurings as organizational transformations, I consider how the redistribution of resources and organizational characteristics can have implications for spatial inequality. There are several findings worthy of discussion.

I find school closings have relevant consequences for the redistribution of students and teachers. Students and teachers with certain characteristics are more likely to be concentrated in school boundaries where there were school closings. Specifically, boundaries with school closings had lower concentrations of students with disabilities, who are limited English proficient, who qualify for gifted and talented services, who were retained and teachers who were certified or new to the profession. This effect can be interpreted several ways. Lower concentrations of students who are retained, who have disabilities or who need LEP services could mean there are fewer students needed additional instructional services enrolled in the schools in the boundary. This might alleviate some of the instructional pressures on those schools. However, due to data limitations, we cannot account for where these students and teachers ultimately land. This movement of students could contribute to concentration of disadvantage if they are disproportionately moving to other boundaries. This movement due to school closings

could also be disadvantageous if these moves cause these students to leave the public school system for private school options or if these students eventually drop out. Future research could address this by returning to examining individual student and teacher level outcomes.

The redistribution of teachers in response to a school closing can also have implications for the health of school boundaries. I find a lower concentration of certified teachers in school boundaries where there were school closings. This suggests certified teachers are moving to other places, perhaps within the district or outside of it. Certified teachers might use school closings as an opportunity to pursue positions at more desirable, higher-performing public or private schools (Boyd et al., 2005), or to exit the profession entirely. However, I also find there are fewer first and second year teachers concentrated in school boundaries where there was a school closing. This might be a positive finding since studies find less-experienced teachers can be less effective at improving student achievement and other outcomes (Clotfelter, Ladd and Vigdor 2007). However, these findings suggest school boundaries that experience a school closing are left with more senior and uncertified teachers. These conditions can present their own challenges. Klassen and Chiu (2010) find a nonlinear relationship between years of experience and teacher self-efficacy where self-efficacy rises from early to mid-career and falls thereafter. Several studies have found uncertified teachers to be less effective in

the classroom than their certified counterparts (Laczo-Kerr and Berliner 2003; Clotfelter, Ladd and Vigdor 2007). Overall, the redistribution of teachers can be problematic for students because those students who experience teacher turnover have been found to have worse academic outcomes (Ronfeldt, Loeb and Wyckoff 2013).

I find school restructurings have consequences for the distribution of school characteristics. There were no significant differences regarding the redistribution of students and teachers. However, boundaries with restructured schools had more Science courses, more Title 1 schools and more charter schools than those without restructured schools. The changes in charter status and instructional programs (as evidenced by the increase in Science and later Math courses) are reasonable responses as the SIG requirements for restructuring include both of those elements (conversion of schools to charters and changes to instruction). However, the increase in the number of Title I schools seems counterintuitive. This might suggest a redistribution of students within boundaries instead of across or between. Title 1 funds are often allocated to schools with high numbers of students in poverty. Restructured schools could act as a catalyst for reallocation of students to schools within the school boundary. This could happen if the uncertainty created by a restructured school causes parents to move their children within the boundary. Future research should further investigate whether the

designation of a school as a restructured school carries a stigma that causes parents to react in such a way.

Finally, I find the effects of being exposed to a school closing to be quite persistent. The differences that emerged between student, teacher and school characteristics among school boundaries one year after the SIG program was implemented remained significantly different two- and three-years later. A similar case unfolded for boundaries with restructured schools, however several differences emerged later in the long-term that were not immediately present. The temporal stability of these results suggests the reputation of these boundaries might be affected in the act of closing or restructuring schools. More research should examine whether this is the case and if so, what mechanisms contribute to this reputational change.

In all, it appears closings and restructurings that occurred after the SIGs were successful in redistributing students, teachers and organizational characteristics. However, this study had several limitations future research should address. Future research should uncover the mechanisms that create these differences in organizational characteristics across school boundaries. For example, do factors such as teacher beliefs, efforts to construct or maintain a certain identity or issues related to power and politics influence the redistribution of teachers (Evans 2007)? Or, does this redistribution of students, teachers and organizational characteristics itself act as a mechanism for

creating differences in student or district achievement? Methodologically, matching strategies such as entropy balancing are helpful in creating counterfactual boundaries that are similar to those that are treated. However, even with this matching, it is difficult to know if the parallel trend assumption required by the difference-in-differences method would hold in these boundaries. Being able to incorporate student achievement in both the entropy balancing step and difference-in-differences model would be helpful in making this determination. However, such a dataset does not currently exist. If one becomes available, future research on this topic should incorporate it.

3.5.1 Implications for Policymakers and District Leaders

School closures and restructurings remain actions available for district leaders to use to account for declines in enrollment or persistently low achievement. These actions can be important for improving equitable access to quality schools – closing an underperforming high school would mean middle school students would have to choose from a school better than the one that closed (Kemple 2015). However, this study addresses the importance for policymakers and district leaders to consider the potential spillover effects these actions can have on the distribution of opportunity available to families within the boundary. Education reform is not alone in this endeavor. Similar spillover effects have been reported for the restructuring of public housing in the US and the Netherlands (Kleinhans and Varady 2011). While in the Netherlands, the negative

spillover effects included neighborhood dissatisfaction and increased perception of incivilities among neighbors, the spillover effects in the US included increases in crime and gang violence, community conflict and lower property values.

School closings and restructurings can also have implications for the structural health of neighborhoods. The closure of a school could represent the withdrawal of city resources from that neighborhood. Intentional or not, this formal disinvestment in communities can have further spillover effects on the functioning of other neighborhood institutions or organizations. Further, the closing of schools can remove an important resource for neighborhood families. For some families, neighborhood schools may serve as resource brokers, providing access to information about health care or services, childcare or free meals through their organizational ties (Small 2006). The closing of a school in the neighborhood could make it more difficult for families to acquire those resources. Additionally, communities lose a symbol of personal and historical significance to its members. Such sentiments were reported in studies of community resistance to school closures, especially those in Chicago and Philadelphia (Good 2017a; Ewing 2016).

On the other hand, the restructuring of a school might suggest a reinvestment of city resources in a neighborhood. While this might seem positive on its face, such reinvestment could displace families if done in a way that attracts more affluent families

to enroll or if the restructuring signals the neighborhood is one in transition. Thus, market-based school reforms, such as school closure or restructuring, could further intensify the challenges facing disadvantaged neighborhoods. Though school closings and restructures might seem to have good intentions, they could represent "slow violence" to the communities they are situated within due to the spillover effects that accompany these actions (Aggarwal, Mayorga and Nevel 2012).

3.6 Conclusion

Through describing differences in the organizational structures of schools this study identifies whether organizational forms and characteristics are distributed equitably near closed or restructured schools. Ultimately, this study considers a potential mechanism through which organizational disbandings (school closings) or transformations (restructurings) can contribute to stratification and spatial inequality. It is important to identify whether actions such as closures or restructurings leave localized clusters of organizations with certain characteristics, especially if those characteristics are detrimental to student growth. The findings of this paper can potentially demonstrate to stakeholders the successes or failures of educational policies such as closure or restructuring in providing equitable access to quality schools.

4. School Closings and Openings as Mechanisms of Neighborhood Stigma and Desirability

Many studies have found housing and schooling choices are related (Croft 2004; Holme, 2002, 2014; Lareau and Goyette 2014). According to the National Association of REALTORS, 53% of homebuyers with children listed school quality and 50% listed proximity to schools as deciding factors in their home purchase (National Association of Realtors 2019). Thus, characteristics of neighborhoods have continued to affect access to school quality as high-quality schools have become more of an amenity and less of a public good available to all. This relationship between neighborhoods and schools might be due to structural reasons. For example, several studies find racial and economic residential segregation are often reinforced by school attendance boundaries (Jargowsky 2014; Frankenberg 2013). Research also considers the role of individual choices and preferences. While families often cite factors such as convenience, walkability, and safety as most important in their decision-making process (Hamilton and Guin 2005; Hastings, Kane and Staiger 2005), elements such as racial composition of schools and their neighborhoods become important proxies for school quality (Langford and Wyckoff 2006).

The funding structure of American education makes this link between housing and schooling especially consequential. In most cases, local property taxes serve as the primary means through which schools receive the majority of their funding (Thro 1989; Heise 1995). How families perceive the desirability of neighborhoods can affect the

success of neighborhood schools because a decision to "buy into" a neighborhood can reflect an investment in a neighborhood and its schools (DiPasquale and Glaeser 1998). Thus, it is important to identify factors which make neighborhoods and their schools appeal to families with children. In the past, neighborhood demographic change has been documented to lead to white flight or avoidance of minority neighborhoods and schools (Crowder 2000). However, recently schools have also been used as part of revitalization efforts to attract middle class families to urban areas (Posey-Maddox 2014; Cucchiara 2008, 2013; Billingham and Kimelberg 2013).

Schools can also respond to neighborhood changes through their own actions. For example, some charter schools have used exclusionary positioning strategies to avoid operating in disadvantaged areas (Lubienski, Gulosino and Weitzel 2009; Lee 2018). Additionally, districts can manipulate attendance boundaries in response to changing neighborhood demographics. Studies show these redistricting strategies usually exacerbate segregation (Richards 2014; Siegel-Hawley 2013). Schools can also actively contribute to the perception of neighborhood desirability. Studies have found closing schools can affect housing prices (Brazil 2019). However, few studies directly examine how the actions of schools contribute to perceptions of neighborhood desirability. This study considers whether actions such as the closure and opening of schools can contribute neighborhood stigma and perceptions of neighborhood desirability.

4.1 Theoretical Framework: Schools & Neighborhood Stigma

This study considers how closing and opening schools can contribute to neighborhood reputation and desirability. In the following section, I first consider theories of how images of neighborhood desirability are constructed and the role neighborhood reputation plays in how families choose schools. The relationship between neighborhoods and schools is cyclical: schools affect neighborhood health and neighborhood characteristics can affect schools. Because of this, I then address how schools are both affected by and can themselves contribute to perceptions of neighborhood desirability.

4.1.1 Social Construction of Neighborhood Stigma

Neighborhood reputations shape how individuals view the quality of a neighborhood and can play an important role in a homebuyer's decision whether to enter or exit the neighborhood (Speare 1974). A neighborhood's reputation can reflect a romanticized image of a community; a symbolic performance shaping how outsiders perceive the community and how community members perceive themselves (Suttles 1972; Zelner 2015). Neighborhoods can provide social information such as one's social or class status (Kearns and Parkinson 2001). These reputations are durable as a neighborhood's history can remain in the collective memory of the space. For example, Farley et al., (1993) find in Detroit perceptions of neighborhoods as being historically hostile to black residents can influence the location decisions of black households. Thus, it is important to consider how people form neighborhood reputations.

Neighborhood reputations can result from a process of stigmatization. One such way a neighborhood can be stigmatized is through the social construction of neighborhood quality. Concepts that define neighborhood quality such as disorder are often affected by racial stereotypes and implicit bias. Sampson and Raudenbush (2004) find while observed disorder does predict perceived disorder, racial and economic context are important factors: increases in the concentration of minority and poor residents in an area led to greater perceived disorder by all residents. Thus, disorder is part of a larger cultural narrative, where stereotypes such as those linking disadvantaged minority groups to negative racialized social images have spatial meanings and implications (Sampson and Raudenbush 2004; Bobo 2001; Bobo and Kluegel 1997; Quillian and Pager 2001; Waquant 1993; Bonilla-Silva 2014). These factors contribute to the reasons residents characterize neighborhoods as having more undesirable characteristics such as crime, violence or poverty than is actually observed (Sampson and Raudenbush 2004; Franzini et al., 2008; Sampson 2012).

Stigma can stifle growth because individuals often avoid these areas so they do not harm their own reputations. According to the theory of ecological contamination, individuals who are found in "bad" or undesirable neighborhoods are also viewed to share the similar character of the neighborhood (Werthman and Piliavin 1967; Sampson and Raudenbush 2004). Besbris et al., (2018) finds neighborhood reputation can affect residents' economic opportunities – advertisements posted by residents in disadvantaged neighborhoods received fewer responses. As a consequence, stigmatized

areas might receive fewer or lower-quality resources. This stigma could lead individuals to avoid these "no go areas" and contribute to concentrated disadvantage and neighborhood decline (Sampson 2009, 2012; Massey and Denton 1993; Skogan 1992). For example, in the aftermath of cleanup of prominent Superfund sites, housing values in nearby neighborhoods dropped due to associated stigma (Messer et al., 2006). In the following section, I examine the role neighborhood reputation plays in parents' decision whether to engage with the neighborhood through participating in local schools.

4.1.2 How Neighborhood Reputation Affects Parent's Choice of School

Market theories suggest parents are rational actors who use objective measures to decide which school best serves the needs of their children (Hatcher 1998). However, much research suggests parents use contextual factors such as socio-demographics of schools and neighborhoods instead (Rowe and Lubienski 2017; Bell 2007, 2009; Villavicencio 2013; DeJarnatt 2008). Studies find parents generally prefer schools that are convenient, safe, have strong academic rigor, match their own values and have fewer poor and minority children (Bell 2007, 2009; Billingham & Hunt 2016). Bell shows how parents in Detroit used the meanings associated with neighborhoods as a "frame" where schools are either excluded or included based on place-based preferences. Thus, it is clear neighborhood stigma can affect schools through whether parents consider them to be a viable choice for their family.

4.1.2.1 School Characteristics Contribute to Neighborhood Stigma

On the other hand, characteristics of schools can make neighborhoods appear more desirable to parents. Studies show families with adequate resources are often willing to pay a premium to access neighborhoods with higher quality schools: Black (1999) finds parents are willing to pay 2.5% more for a 5% increase in test scores. Similarly, Brasington (1999) finds proficiency tests, per pupil expenditure, and student-teacher ratio are consistently absorbed into housing prices. School choice policies can interrupt this relationship between schools and place, making parents consider neighborhoods they otherwise would not have. Not all families can move to access better educational options. This sentiment was captured in the rise of market-based school reform initiatives such as school vouchers and charter schools. Charter schools were intended to increase choices for parents by spurring a competitive educational market encouraging improved performance of traditional public, charter and private schools. Some charters have proven to be effective options for disadvantaged students who might otherwise attend local public schools (Walters 2018). However, this increase in choices has led opponents of school choice to argue policies that allow for greater "educational mobility" will make segregation worse. Several studies suggest this might be the case (Jordan and Gallagher 2015; Lankford, Lee, and Wyckhoff 1995; Saporito and Lareau 1998; Saporito 2003). Jordan and Gallagher (2015) suggests schools of choice and open enrollment policies where families can attend any school in district, might aid gentrification and make neighborhoods seem more desirable to middle class families.

4.1.2.2 School Actions Contribute to Neighborhood Stigma

Local businesses and institutions might play a role in the creation of a neighborhood's reputation. Studies find nonresidential land use is often associated with neighborhood physical disorder such as vandalism and property damage (Taylor et al., 1995; LaGrange 1999; Sampson and Raudenbusch 2004). However, results are more mixed regarding the presence of schools and their effect on neighborhood stigma. Wilcox et al., (2004) find schools had no effect on disorder, while Steenbeek et al., (2011) find neighborhoods with at least one small high school experience less disorder. As the previous section described, school characteristics such as school quality and racial composition can influence how people perceive the character of a neighborhood. For example, several studies find schools with failing accountability designations are associated with lower home values (Bogin and Ngyuen 2014; Crone et al., 1998; Kane et al., 2003).

Studies suggest school officials respond to racial and socioeconomic changes in neighborhoods in similar ways (Lubienski, Gulosino and Weitzel 2009; Henig and MacDonald 2003; d'Entremont and Gulosino 2008). For example, Lubienski, Gulosino and Weitzel (2009) demonstrated that in attempts to gain better market position, public, charter and private schools used exclusionary tactics: for-profit charter schools avoided opening in Detroit's disadvantaged areas; charter and private schools in DC "ring" disadvantaged areas without directly operating within them. Actions such as closing, opening or relocating schools can be an important contribution to the desirability of

neighborhoods. These actions could create uncertainty, which organizational research finds can indicate increased risk and deter outside funders from investing in new or existing organizations. McKinley, Ponemon and Schick (1996) find rapid organizational decline such as the closing of schools can signal to external stakeholders that other members of an organization's environment may decline as well.

Actions such as opening and closing schools could contribute to neighborhood stigmatization or help improve neighborhood reputations. School closings disproportionately affect disadvantaged minority and low-income students (Lipman and Haines 2007; Valencia 2008; Good 2017; Lee & Lubienski 2017) and could signal to potential residents the neighborhood might be one to avoid. On the other hand, the opening of a school could signal neighborhood change, especially if a charter school has opened (Davis & Oakley, 2013; Burdick-Will, Keels & Schuble 2013). However, few studies directly address how these school actions can affect individual's perceptions of neighborhoods. Additionally, few studies consider the importance of neighborhood context in this relationship – whether the opening or closing of certain types of schools matter differently under various neighborhood conditions. This study addresses this gap in the literature by examining how opening and closing schools affect the perceived desirability of neighborhoods in two ways: first, using a natural experiment to measure how school closings affect interest in neighborhoods measured through Internet traffic; then, through a survey experiment to assess the importance of school type and the racial and socioeconomic composition of neighborhoods in this relationship.

4.2. Study 1: A Natural Experiment Measuring Changes in Neighborhood Internet Traffic

To assess the role school actions play in the stigmatization of neighborhoods, I first examine how interest in different neighborhoods change with the closing or opening of a school. I measure interest through Internet traffic on a popular real estate website, Trulia. Other studies have employed data from similar sources such as Zillow and GreatSchools to study the relationship between neighborhoods and schools (Hasan and Kumar 2018; Cannon, Danielson and Harrison 2015), however to my knowledge, no study has used Internet traffic as a measure of neighborhood desirability. Previous studies use Internet traffic as a metric of success for companies by signaling future growth potential that might manifest as sales (Rajgopal, Kotha and Venkatachalam 2000; Yi and Hwang 2009; Benbunan-Fich and Fich, 2004). In this case Internet traffic appears to also be a reasonable measure of interest in potential new neighborhoods. The neighborhood Internet traffic data used comes from a previous web scrape of the Trulia API. Trulia reports the percent of a city's Internet traffic for each neighborhood daily for the 577 days studied between September 1, 2008 and March 31, 2010.

This study analyzes changes in Internet traffic neighborhoods receive before and after school closings and openings in three cities: Atlanta, Boston, and Denver. These three cases represent three cities of similar size and from diverse regions. Other studies have focused on implications of school closures in districts with unique policy environments such as Washington, DC or New Orleans where there are large numbers of schools of choice. The three cities studied have some variation in policy environments

with Colorado representing one of the most supportive environments for charter school growth while Massachusetts has a more restrictive environment due to a statewide cap on charters (Ziebarth 2020). Additionally, all three cities have experienced similar rates of residential segregation – according to the 2010 Census, Atlanta has a dissimilarity index of 59%, with 64% and 62.6% for Boston and Denver respectively (Frey 2015). While this study is not nationally representative, these three cases appear to present sufficient variability to assess whether differences across neighborhoods hold outside of unique city contexts.

I identify neighborhoods that experienced school closures and the opening of new schools using data from the 2009-2010 school year collection of the U.S. Department of Education's Common Core of Data (CCD). Each year the Department of Education releases the CCD - a directory containing enrollments, demographics, and program information for all public schools operating in the country. I use this data to determine school operating status (open, closed, future/planned school) for all schools in Atlanta, Boston and Denver as of September 1, 2009. In my analysis I also control for several changes in neighborhood characteristics including housing stock, racial composition, average median household income, the number of owner-occupied units and households with children all of which come from the 2000 and 2010 Census. I also control for an indicator of whether a neighborhood gentrified between 2000 and 2010 based on data available from the organization, Governing which defines gentrification as low-income Census tracts (those with median household income and home value in

the bottom 40th percentile of all tracts in a metropolitan area in 2000) that experienced significant growth in both home values and educational attainment. A summary of the data used in this analysis can be found in Table 10.

Table 10: Summary of Data Used in Difference-in-Difference Analysis

	Atlanta	Boston	Denver
Total Neighborhoods	207	22	75
Neighborhoods with Closed Schools	7	5	10
Neighborhoods with Open Schools	9	7	18
Average Number of Black Residents	8,948.26 (6,568.68)	15,389.25 (22,600.41)	2,840.42 (3,396.75)
Average Total Housing Units	7,346.82 (4,019.70)	24,305.63 (13,282.11)	13,714.77 (5,316.60)
Average Total Owner Occupied Units	2,761.10 (1,537.58)	7,602.65 (4,616.90)	6,321.40 (2,530.23)
Average Total Households with Children	1,560.38 (780.52)	5,552.92 (5,582.21)	3,003.52 (1,512.96)
Average Median Household Income	$47,489.22 (29,221.62)	$53,436.41 (15,159.57)	$49,618.13 (14,842.94)
Number of Gentrifying Neighborhoods	109	11	40

4.2.1 Analytical Plan

I use a difference-in-differences approach (DID) to assess the causal effect of a school closing or opening on perceptions of neighborhood desirability. DID is a form of a quasi-experiment where the causal effect of a treatment is assessed by comparing outcomes for a treatment group against a control, counterfactual group (Angrist & Pischke 2009). In this case, there was no random assignment to the treatment condition – a neighborhood containing a closed or new school. Thus, the DID estimator is advantageous because it can account for differences within neighborhoods over time in addition to differences in the characteristics of neighborhoods that experience a school closing or opening and those that do not. This is summarized below in Equation 3:

$$Y = \beta_0 + \beta_1 D_{action} + \beta_2 D_{time} + \beta_3 D_{action} * D_{time} + \gamma X + \varepsilon$$

Equation 3

where Y represents the outcome of interest (Internet traffic), D_{action} is a binary variable that is equal to 1 if the neighborhood experienced a school closing or opening, D_{time} is a binary variable that equals 1 for observations after October 1, 2009 for observations in Atlanta when the first article on the cheating scandal was published, after October 1, 2008 for observations in Boston when the superintendent announced plans to close schools and after December 19, 2008 after the decision to close Arts & Technology HS was announced in Denver. X represents a vector of control variables discussed above,

and ε is random error. β_3 represents the DID estimator of interest. By removing the differences due to time in addition to cross-sectional differences, β_3 assesses the average change in Internet traffic in neighborhoods with closed or new schools over and above the changes in neighborhoods without closed or open schools. Data for each city will be analyzed separately, then stacked and analyzed together.

4.2.2 Results

The results of the difference-in-differences analysis for school closures can be found in Table 11. The coefficient of interest, the difference-in-differences estimator DID (which is in effect Time*Treatment), appears statistically significant for most of the null models. Atlanta sees decreased Internet traffic in neighborhoods with closed schools, this result remains after controlling for demographics in Model 2. Boston neighborhoods with closed schools see similar decreased Internet traffic, but only after accounting for neighborhood demographics. Denver seems to be an outlier in this trend – neighborhoods in Denver seem to have increased Internet traffic with a school closing and though the DID estimator is not significant once demographics are controlled, the resulting coefficient is still in a positive direction. Stacking the data from all three cities, the DID estimator is not statistically significant but is in a negative direction. Overall, these results show mixed evidence for the effects of school closures on neighborhood desirability.

Table 11: Difference-in-Differences Estimates of the Impact of School Closings on Neighborhood Internet Traffic in Atlanta, Boston and Denver, 2008-2010

Percent City Traffic School Closings

	Atlanta		Boston		Denver		All Cities	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Time	-0.169***	-0.293***	-0.292	-1.010***	-0.013	-0.695***	0.655***	-0.225***
	(0.009)	(0.008)	(0.229)	(0.200)	(0.017)	(0.017)	(0.013)	(0.012)
Treatment	0.439***	0.359***	-1.538***	-0.164	0.323***	0.458***	0.643***	0.144***
	(0.024)	(0.021)	(0.377)	(0.326)	(0.042)	(0.036)	(0.037)	(0.032)
DID	-0.220***	-0.234***	0.620	-1.079**	0.190***	0.007	0.614***	-0.014
	(0.043)	(0.036)	(0.388)	(0.329)	(0.047)	(0.040)	(0.044)	(0.038)
Constant	0.772***	0.795***	5.797***	0.044	1.337***	-0.792***	0.892***	-0.407***
	(0.005)	(0.014)	(0.223)	(0.248)	(0.015)	(0.029)	(0.010)	(0.016)
R^2	0.011	0.303	0.010	0.304	0.016	0.290	0.053	0.320
N	70,062		11,752		41,606		123,420	
Controls	N	Y	N	Y	N	Y	N	Y

Table 12 shows results for the difference-in-differences analysis for school openings. The DID estimator is positive indicating neighborhoods with new schools see an increase in Internet traffic in all but one case. Atlanta and Boston neighborhoods with new schools see an increase in Internet traffic, though the DID estimator is statistically significant at the α= 0.10 level. In Denver, neighborhoods with new schools see an increase in Internet traffic under the null model (Model 1), but once demographics are accounted for, this changes to a statistically significant decrease in Internet traffic. Stacking the data from all three cities shows an increase in Internet traffic, though not statistically significant. Similar to the case of school closures, it appears there is also mixed evidence for the effects school openings have on the desirability of neighborhoods.

Because this initial analysis shows inconsistent patterns in changes in Internet traffic across these three cities, it is difficult to make a convincing causal case that school actions are responsible for driving interest in neighborhoods. Other events might have created atypical conditions affecting attitudes toward homebuying or towards certain neighborhoods. For example, in 2009 Atlanta experienced a cheating scandal where teachers and administrators at 44 schools were found to have changed student answers on standardized exams (Vogell 2011). This event might have led to increased scrutiny of Atlanta Public Schools by all homebuyers. Additionally, some of the neighborhoods where schools closed also experienced the opening of new schools so there might be

Table 12: Difference-in-Differences Estimates of the Impact of School Openings on Neighborhood Internet Traffic in Atlanta, Boston and Denver, 2008-2010

Percent City Traffic School Openings

	Atlanta		Boston		Denver		All Cities	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Time	-0.178***	-0.305***	-0.375	-1.688***	-0.014	-0.667***	0.619***	-0.225***
	(0.009)	(0.008)	(0.229)	(0.201)	(0.019)	(0.018)	(0.013)	(0.013)
Treatment	0.265***	0.251***	-1.839***	-1.039**	0.458***	0.329***	0.535***	0.325***
	(0.021)	(0.017)	(0.377)	(0.319)	(0.032)	(0.028)	(0.031)	(0.026)
DID	0.006	0.059†	0.980*	0.600†	0.101**	-0.137***	0.503***	0.007
	(0.037)	(0.031)	(0.387)	(0.327)	(0.036)	(0.031)	(0.037)	(0.031)
Constant	0.775***	0.760***	5.903***	0.587*	1.262***	-0.748***	0.879***	-0.434***
	(0.006)	(0.014)	(0.223)	(0.256)	(0.017)	(0.031)	(0.010)	(0.016)
R^2	0.010	0.304	0.010	0.296	0.034	0.282	0.053	0.322
N	70,062		11,752		41,606		123,420	
Controls	N	Y	N	Y	N	Y	N	Y

some contamination in neighborhood desirability across school actions. While this preliminary analysis might have been a step in the right direction, with these difficulties in mind, an experiment might be a more appropriate way to assess whether school closings influence neighborhood desirability. Using an experimental method would allow for the consideration of the following research questions: a) is there an effect of school closings on neighborhood desirability? and b) does the effect of a school closing on neighborhood desirability vary depending on the racial composition or social class of the neighborhood?

4.3. Study 2: A Survey Experiment Measuring Neighborhood Preferences in Response to School Actions

As a follow up to the first study, this study attempts to more directly address the effect of school closures and openings on perceptions of neighborhood desirability using a survey experiment administered through Amazon's MTurk. Many other studies administering survyes opt for MTurk or similar online panels due to the ease of finding participants and the relative low cost. However, researchers have identified several persistent biases within the MTurk sample, which is often younger, more educated, less likely to be Black or Hispanic, more likely to be women and not have children than the general population of Internet users (Ipeirotis 2010; Ross et al., 2010; Levay, Freese, Druckman 2016). While these biases might make it difficult to generalize MTurk workers to the general U.S. population, these biases work well for a study of potential gentrifiers (who are often described as younger, highly education, more likely White

and women). The participants in this study are described in Table 13. Overall, respondents are mostly White, single, college-educated, employed and under the age of 35.

Table 13: Description of MTurk Sample

	Mean (SD)	*Minimum Value*	*Maximum Value*
Female	0.475 (0.500)	0	1 = Female
White	0.743 (0.437)	0	1 = White
Married	0.476 (0.500)	0	1 = Married
Level of Education	3.219 (1.204)	1 = HS Diploma or GED	5 = Master's, other Professional Degree
Employment	0.876 (0.330)	0	1 = Employed or self-employed
Income	3.939 (1.881)	1 = 0-$15,000	8 = over $200,000
Age	2.755 (1.138)	1 = 18-24	6 = 65-74
Homeowner	0.530 (0.499)	0	1 = Homeowner
First-Time Homeowner	0.354 (0.478)	0	1 = First Time Homeowner
Has Children	0.453 (0.498)	0	1 = Has Children

4.3.1 Measures & Analytical Plan

In this experiment, participants are shown images of a home in neighborhoods with varying demographic characteristics. Participants are given a short vignette with information about a school that recently opened or closed and asked to rate the

likelihood they would consider moving into this neighborhood. This method is similar to how Lewis, Emerson & Klineberg (2011) measure racial residential preferences. Participants were shown images from Google Street View of neighborhoods with varying levels of poverty and minority residents determined by Census data (see Appendix G). Studies have found Google Street View to be a reliable measure of neighborhood conditions (Odgers et al., 2012; Rundle et. al., 2011). This method created the following six demographic categories: low poverty/low minority, average poverty/low minority, high poverty/low minority, low poverty/high minority, average poverty/high minority, high poverty/high minority. Average poverty reflects the national average poverty rate according to the U.S. Census Bureau's 2017 Small Area Income and Poverty Estimates. All images were pretested using a sample from MTurk. Those MTurk workers who participated in the pretest were not allowed to participate in the administration of the full study. Similar to the design of Krysan et al., (2009), all participants were exposed to a control condition (average poverty/average minority) then randomly assigned three different experimental conditions.

Each vignette varies characteristics of neighborhoods, schools and school actions. I include the opening and closing of charter schools separately from traditional public schools or private schools to account for the potential different meanings attached to the various school types. In this study, I focus on elementary schools because homebuyers with children often aim to take advantage of feeder patterns, and elementary schools

represent the entrance into these patterns (Posey-Maddox 2014). The following vignette produces 48 experimental conditions and 2 control conditions participants can be exposed to:

> "Imagine you were looking for a house and you found one you liked more than any other house. It has everything you've been looking for; it's close to work, and within your price range. Checking on the neighborhood, you find that the property is in the neighborhood pictured above. The neighborhood has an (**average/low/high**) poverty rate and its residents are mostly (**minority/White**). A (**public/private/charter elementary school/control organization**) recently (**opened/closed**) in the neighborhood. How likely or unlikely do you think it is that you would buy this house?"

The outcome of interest is measured on a four-point scale from very unlikely to very likely and is treated as an ordinal categorical variable for analysis. Because participants are exposed to multiple conditions, individual responses are not independent of one another. Thus, the data are treated as multilevel data. I use the results of the experiment to estimate a multilevel ordinal logistic regression model predicting the likelihood of buying into a neighborhood.

4.3.2 Do School Closings Affect Neighborhood Desirability?

To address my first research question of whether the opening or closing of a school affects neighborhood desirability, I estimate a multilevel ordinal logistic regression. Results are shown in Table 14. It appears members of my sample reacted much more favorably to a school opening in a neighborhood: a new elementary school is associated with 1.562 times the odds of a closed school as being seen as more desirable.

This result holds once control variables are considered. The type of school (public, charter or private) does not seem to affect this decision. Additionally, it appears participants reacted strongly to the actions of opening or closing and were not sensitive to the types of organizations that were opening or closing whether it was a school or not. However, the way in which respondents answered the control or baseline conditions appears to influence their later responses. Those participants who rated the baseline more desirable carried that positive disposition throughout the task.

Table 14: Log Odds from Ordinal Logit Models Regressing Likelihood of Buying a Home in Neighborhood on School Actions by School Type

	Model 1	Model 2	Model 3
School Actions (Reference: Close)			
Open	0.446***	0.613**	0.620**
	(0.113)	(0.196)	(0.196)
School Type (Reference: Public)			
Charter	0.120	0.177	0.163
	(0.137)	(0.192)	(0.192)
Private	0.078	0.272	0.263
	(0.137)	(0.193)	(0.193)
School Action x Type			
Open*Charter	---	-0.110	-0.143
		(0.275)	(0.275)
Open*Private	---	-0.393	-0.383
		(0.275)	(0.274)
Baseline Rating	0.604***	0.607***	0.573***
	(0.102)	(0.102)	(0.100)
Demographic Variables	N	N	Y
Cut Points			
Cut Point 1	1.129	1.219	0.368
	(0.348)	(0.359)	(0.496)
Cut Point 2	2.364	2.455	1.606
	(0.353)	(0.364)	(0.497)
Cut Point 3	4.266	4.361	3.510
	(0.372)	(0.383)	(0.508)
N	1,228	1,228	1,228
LL	-1601.098	-1600.010	-1589.233

4.3.3 Does Neighborhood Racial Composition or Social Class Matter?

Next, I address my second research question of whether the effects of school actions vary depending on the characteristics of neighborhoods. Table 15 shows when a school opens in high poverty neighborhoods, regardless of whether there are high or low numbers of minority residents, respondents were less likely to find them desirable (Model 1). Additionally, new schools in neighborhoods that were high minority and of average poverty were also seen as less desirable. We see a similar avoidance of high poverty neighborhoods when a school closes (Model 3). However, respondents were less discouraged by a closed school in low poverty, low minority neighborhoods. Figure 1 shows the predicted probabilities that respondents indicate they are "very unlikely" to consider a neighborhood after a school opens or closes. While respondents clearly avoid the most disadvantaged neighborhoods, the opening of a new elementary school made respondents more likely to consider neighborhoods with average levels of poverty (with both high and low levels of minorities) and higher concentrations of minority residents where there was a low level of poverty.

According to the analysis shown in Table 15, the type of school (public, charter or private) does not seem to affect the perceptions described above. However, reactions to new schools seems to vary depending on the type of school and the characteristics of the neighborhood. It appears high-minority, low poverty neighborhoods with new charter or private schools are more likely to be seen as more desirable (Model 2). Figure 5 and

Figure 6 show the relationship between school type and neighborhood characteristics in more detail. Figure 5 shows after a school opens in a high minority, low poverty neighborhood, respondents were more likely to view the neighborhood as a viable option if a private school opened than if a traditional public school opened. The opening of a public school makes average poverty neighborhoods seem more desirable, especially if there are lower levels of minorities present. The opening of a charter school was seen as most desirable in low minority, low poverty neighborhoods. Figure 6 shows a general avoidance of neighborhoods with school closures. However, it appears school closures do not deter respondents from neighborhoods with low levels of poverty and a lower concentration of minority residents. Neighborhoods with closed private schools (with low to average poverty levels) are also not seen as undesirable as others.

Table 15: Log Odds from Ordinal Logit Models Regressing Likelihood of Buying a Home in Neighborhood on Neighborhood Racial/Socioeconomic Characteristics, School Actions and School Type

	Open		Close	
	Model 1	**Model 2**	**Model 3**	**Model 4**
Neighborhood (Reference: Low-Mid)				
High-High	-3.841***	-4.364***	-2.971***	-4.250***
	(0.527)	(0.909)	(0.566)	(1.133)
High-Mid	-0.761‡	-2.132*	-0.831‡	-0.126
	(0.420)	(0.837)	(0.480)	(0.810)
High-Low	-0.290	-1.360	-0.291	0.081
	(0.433)	(0.834)	(0.473)	(0.886)
Low-High	-4.338***	-5.159***	-3.846***	-3.566**
	(0.569)	(0.920)	(0.614)	(1.045)
Low-Low	0.836‡	-0.381	1.750***	2.177*
	(0.442)	(0.831)	(0.495)	(0.849)
School Type (Reference: Public)				
Charter	-0.443	-1.335	0.054	0.252
	(0.325)	(0.855)	(0.366)	(0.962)
Private	-0.012	-1.408	0.383	0.788
	(0.327)	(0.813)	(0.347)	(0.884)
HH*charter	---	0.249	---	1.472
		(1.172)		(1.430)
HH*private	---	0.734	---	1.552
		(1.121)		(1.403)
HM*charter	---	0.122	---	-1.134
		(1.153)		(1.227)
HM* private	---	1.225	---	-1.058
		(1.092)		(1.190)
HL*charter	---	2.154‡	---	-0.678
		(1.166)		(1.318)
HL* private	---	3.231**	---	-0.540
		(1.156)		(1.241)
LH*charter	---	0.528	---	-0.261
		(1.286)		(1.484)
LH* private	---	1.171	---	-0.774
		(1.194)		(1.356)
LL*charter	---	1.712	---	-0.136
		(1.121)		(1.282)
LL* private	---	1.513	---	-0.921
		(1.185)		(1.220)

Table Cont'd	Open		Close	
	Model 1	**Model 2**	**Model 3**	**Model 4**
Cut Points				
Cut Point 1	-0.364	-1.390	-0.293	-0.028
	(1.189)	(1.330)	(1.369)	(1.466)
Cut Point 2	1.596	0.630	2.219	2.588
	(1.193)	(1.330)	(1.374)	(1.476)
Cut Point 3	4.642	3.779	5.387	5.852
	(1.254)	(1.370)	(1.445)	(1.550)
N	306	306	297	297
LL	-305.869	-299.646	-299.102	-295.616

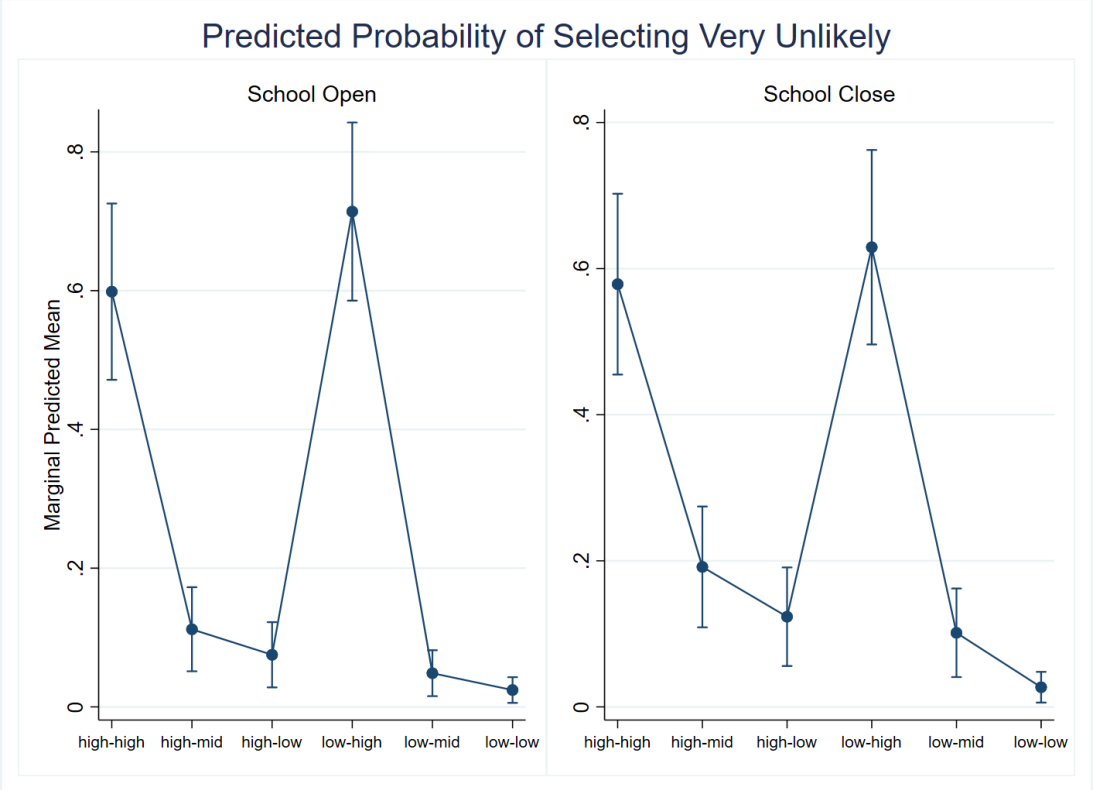


Figure 4. Predicted Probability of Selecting Very Unlikely

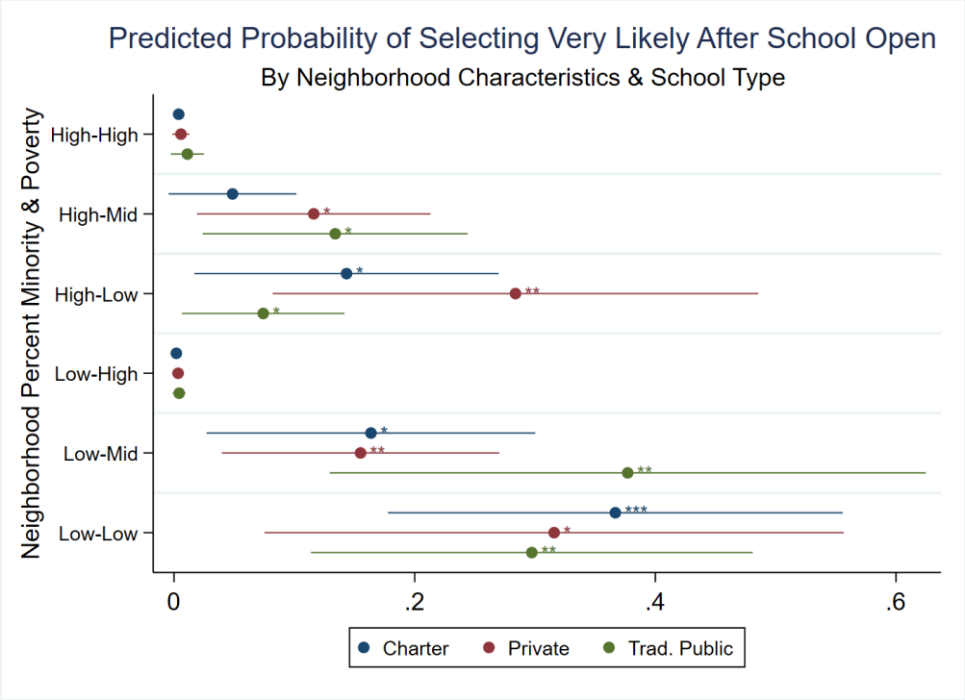


Figure 5. Predicted Probabilities of Selecting Very Likely After School Open

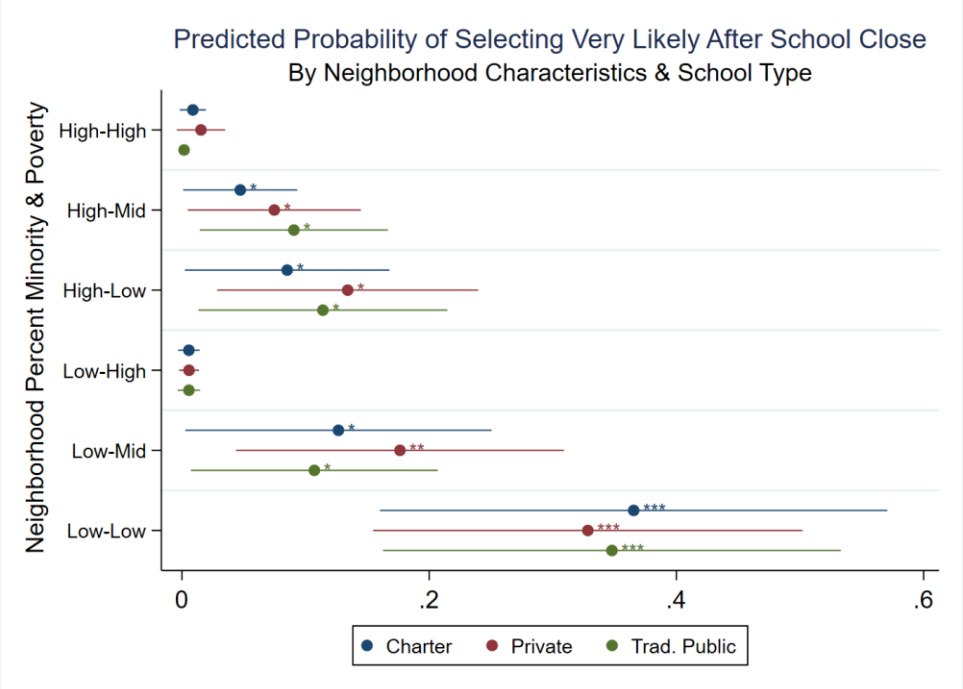


Figure 6. Predicted Probability of Selecting Very Likely After School Close

4.4 Discussion

Due to the funding structure of American public education, there is an important relationship between neighborhood desirability and schools. Neighborhood stigma can keep families from investing in a neighborhood and its school. However, school actions can also contribute to the construction of a neighborhood's reputation. School closings can signal to potential residents that the neighborhood is in a state of decline and is one to avoid while the opening of a new school might suggest the neighborhood is thriving. This study examined the role these school actions play in the perception of neighborhood desirability using a natural experiment and a survey experiment. There are several findings worthy of discussion.

First, I find the actions of opening or closing are salient across neighborhood contexts. While the results from the natural experiment were mixed, they suggested openings and closings affected neighborhood desirability in opposite ways (positively and negatively, respectively). The results from the survey experiment were much more conclusive. Participants responded positively to the opening of any entity (regardless of whether it was a school or a control organization) in a neighborhood. This could reflect the perception that opening any new entity represents the introduction of an additional amenity to a neighborhood, which many residents would view as an improvement to their quality of life (Gandelman, Piani and Ferre 2012; Albouy and Lue 2015). Knowing the value potential residents place on opening new organizations, future research could

examine the degree to which specific elements of new schools (e.g. the types of programming offered) are considered to be amenities.

Second, I find evidence individuals avoid high poverty areas, regardless of minority composition and whether a school opened or closed. These results emphasize the durability of stigma, especially that which is due to poverty. Many studies have identified the durability of poverty and the stigma affecting poor neighborhoods (Sampson 2009; Tilly 1998). My findings suggest even actions such as opening or closing schools are unable to break these durable "poverty traps." While many studies have addressed the role of neighborhood change and gentrification on public schools and school choice, it appears gentrifiers might still avoid the most disadvantaged neighborhoods. Future research should consider other interventions that could bring resources to the most disadvantaged areas.

Third, my findings suggest respondents are avoiding public schools in neighborhood contexts where there are high levels of minority residents. Respondents were more attracted to new private schools when they were in high-minority, low-poverty contexts and new public schools when in neighborhoods where there was low-minority, average poverty. Historically, families have chosen private schools as a way to avoid disadvantaged students and racial minorities (Saporito and Hanley 2014). These findings seem to support this pattern of avoidance. Additionally, studies find parents often use the racial composition of neighborhoods as a proxy for school quality

(Langford and Wyckoff 2006). In vignettes provided for this study, respondents were not given any information about the quality of schools within the neighborhoods. Thus, the strong preference for private schools in this neighborhood context suggests a racialization of public schools. Future studies should address the cultural meanings families place on traditional public and private schools.

Finally, I found new charter schools were most desirable in low-minority, low-poverty neighborhoods. Studies have found charters often relocate or try to open in more advantaged areas, this finding might suggest there is demand for such locational decisions (Lubienski, Gulosino and Weiztel, 2009). Additionally, these findings might suggest parents view charters as a viable schooling option when there is less risk involved. Future research should assess the effectiveness of using charters as a tool for marketing neighborhoods.

4.4.1 Gentrification and Changing Relationship Between Neighborhood & Schools

Increasing levels of gentrification and redevelopment have changed the context of the relationship between neighborhoods and schools and might have additional consequences for the durability of stigma. Recent research has grappled with the effects of gentrification on public schools (Candipan 2020). Several studies have addressed the phenomena of middle-class families returning to urban areas and neighborhood schools (Posey-Maddox 2014; Smith and Stovall 2008). Posey-Maddox (2014) highlights the dangers of processes of "school gentrification" - the engagement of new, middle-class

families can minimizes the needs and voices of other families. Thus, in addition to finding ways to continue to invest or reinvest in neighborhoods through schools, future research should address these concerns about disenfranchising and excluding families already being served by the neighborhood and school.

5. Conclusion

Policymakers and the general public have supported school decisions to open, close or restructure in an effort to improve school performance. This dissertation project used an approach informed by organizational theory to better understand the consequences these actions have for access to educational equity. To do so, this project was guided by the following two research questions:

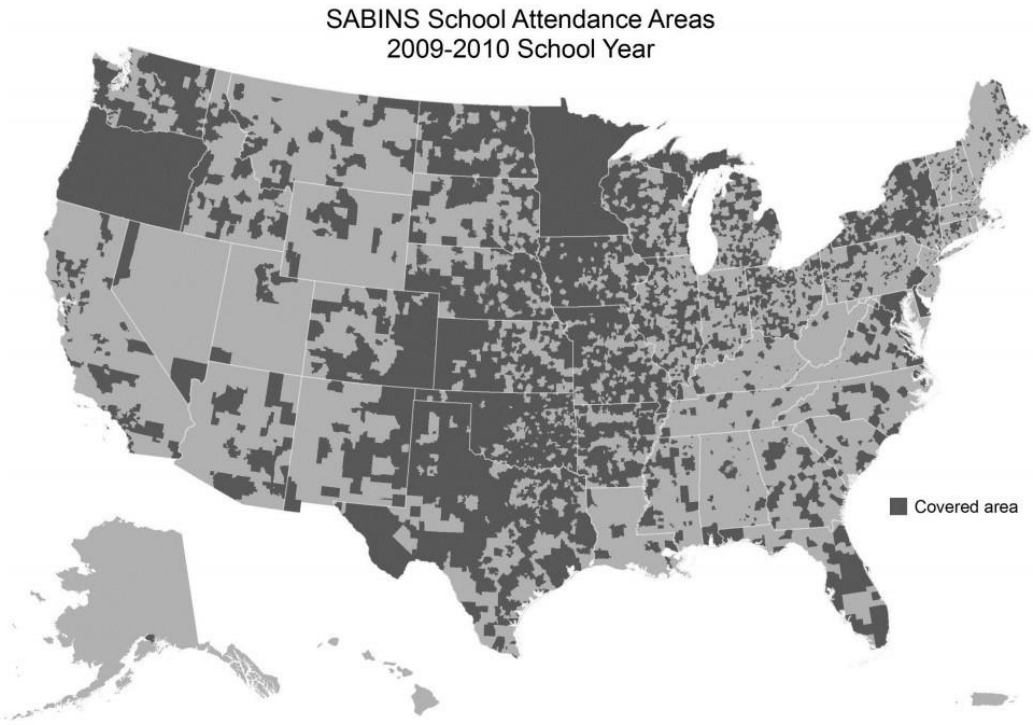
1. Do school openings, closings and restructurings have implications for the school context (e.g., student composition) and organizational structure (e.g., student-teacher ratio) of surrounding schools?
2. Do these actions have implications for indicators of desirability of the neighborhoods in which they exist?

Using school-level data from the U.S. Department of Education's Common Core of Data, I find these actions do produce spillover effects for nearby schools. I highlight two mechanisms through which these effects are transmitted – through redistribution of resources and differences in organizational diversity. Both of these mechanisms can have consequences for educational equity. It is important to identify whether actions such as closures or restructurings leave localized clusters of organizations with certain characteristics, especially if those characteristics are detrimental to student growth. These findings can potentially demonstrate to stakeholders the successes or failures of

educational policies such as closure or restructuring in providing equitable access to quality schools

Through data from a natural experiment and from a survey experiment, I find also school actions also have consequences for perceptions of neighborhood desirability. Closures contribute to negative neighborhood stigma, while the opening of a new school can signal improvement and the addition of an amenity. I find the effect of a school opening or closing can vary depending on school type and the racial and socioeconomic composition of neighborhoods. This research can contribute to recent branch of literature examining the effects of gentrification on school outcomes by identifying conditions that might motivate gentrifying families. Overall, this project contributes to educational research and research on organizations and provides a more nuanced look at the relationship between schools, neighborhoods and educational opportunity.

Appendix A: SABINS School Attendance Areas SY 2009-2010



Source: SABINS (https://assets.nhgis.org/SABINS_coverage.pdf).

Appendix B: Examination of Characteristics of Districts Included and Excluded from School Attendance Boundary Information System during School Year 2009-2010

Description	Means (SD) Non-SABINS Districts	SABINS Districts
Number of districts (N)	9,653	8,047
Number of schools in districts	6.35 (20.27)	6.52 (22.43)
Number of full-time equivalent teachers	203.49 (637.47)	220.51(928.21)
Student enrollment	3,135.41 (10,3865.43)	3,380.53 (15,435.88)
Student-Teacher Ratio	15.07 (28.17) †	13.83 (6.79)
Urban	0.12 (0.32)†	0.17 (0.38)
Suburban	0.27 (0.45)†	0.11 (0.32)
Town	0.18 (0.38)†	0.15 (0.35)
Rural	0.43 (0.50)†	0.56 (0.50)
Median district expenditure per pupil	$11,636	$11,308
Percent of special populations	0.19 (0.16)	0.21 (2.06)
Number of instructional aides	48.78 (101.94)†	42.74 (154.73)
Has charter schools	0.15 (0.36)†	0.21 (0.41)

Appendix C: Sample Balance of Means Before and After Entropy Balancing

Public Schools

	Before Weighting		After Weighting	
	Treated	Control	Treated	Control
Percent Minority	58.95	50.47	58.95	58.95
Percent FRL	55.73	46.97	55.73	55.73
Disadvantage	0.33	-0.05	0.33	0.33
District Size	9.45	9.89	9.45	9.45
School Size	6.00	6.13	6.00	6.00
Per Pupil Expend.	2.05	2.00	2.05	2.05
Rural	0.15	0.23	0.15	0.15
Desegregation Order	0.01	0.02	0.01	0.01

Private Schools

	Before Weighting		After Weighting	
	Treated	Control	Treated	Control
Percent Minority	20.35	21.34	20.35	20.35
Disadvantage	0.08	-0.03	0.08	0.08
School Size	4.19	4.72	4.19	4.19
Catholic	0.17	0.31	0.17	0.17
Other Religious Denomination	0.47	0.39	0.47	0.47
Rural	0.19	0.14	0.19	0.19
Coeducational	0.99	0.99	0.99	0.99

Note: For public schools, treated units (N = 1,483) and control units (N = 101,494). For private schools, treated units (N=5,913) and control units (N=20,484)

Appendix D: Sample Balance of Means Before and After Entropy Balancing for Cross Form Effects

Public Schools

	Before Weighting		After Weighting	
	Treated	Control	Treated	Control
Percent Minority	58.78	50.07	58.78	58.78
Percent FRL	48.29	47.02	48.29	48.29
Disadvantage	0.04	-0.05	0.04	0.04
District Size	10.41	9.85	10.41	10.41
School Size	6.20	6.12	6.20	6.20
Per Pupil Expend.	1.94	2.00	1.94	1.94
Rural	0.08	0.24	0.08	0.08
Desegregation Order	0.03	0.02	0.03	0.03

Private Schools

	Before Weighting		After Weighting	
	Treated	Control	Treated	Control
Percent Minority	26.13	20.75	26.13	26.13
Disadvantage	0.19	-0.01	0.19	0.19
School Size	4.60	4.57	4.60	4.60
Catholic	0.29	0.27	0.29	0.29
Other Religious Denomination	0.43	0.41	0.43	0.43
Rural	0.12	0.15	0.12	0.12
Coeducational	0.99	0.99	0.99	0.99

Note: For public schools, treated units (N = 6,183) and control units (N = 96,794). For private schools, treated units (N=1,610) and control units (N=24,787)

Appendix E: Examination of Characteristics of Districts Included and Excluded from School Attendance Boundary Information System during School Year 2009-2010

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Town	0.18 (0.38)†	0.15 (0.35)
Rural	0.43 (0.50)†	0.56 (0.50)
Median district expenditure per pupil	$11,636	$11,308
Percent of special populations	0.19 (0.16)	0.21 (2.06)
Number of instructional aides	48.78 (101.94)†	42.74 (154.73)
Has charter schools	0.15 (0.36)†	0.21 (0.41)

Appendix F: Sample Balance of Means and Variances Before and After Entropy Balancing

Closed Schools	Before Weighting		After Weighting	
	Treated	Control	Treated	Control
No. Elementary Schools	1.430 (2.026)	1.186 (0.437)	1.430 (2.026)	1.425 (2.026)
No. Middle Schools	0.590 (0.662)	0.392 (0.330)	0.590 (0.662)	0.590 (0.662)
No. High Schools	0.922 (1.501)	0.509 (0.509)	0.922 (1.501)	0.923 (1.503)
No. Title I Schools	2.555 (4.779)	1.368 (1.550)	2.555 (4.779)	2.550 (4.772)
Minority Students	817.0 (1472951)	564.70 (562652)	817 (1472951)	817.10 (1478023)
FTE	100.40 (12886)	75.07 (4646)	100.40 (12886)	100.30 (12917)
No. Charter Schools	0.413 (0.843)	0.106 (0.175)	0.413 (0.843)	0.413 (0.842)
District Size	0.068 (1.032)	-0.004 (0.912)	0.068 (1.032)	0.068 (1.031)
Disadvantage	17.90 (66.15)	15.90 (62.18)	17.90 (66.15)	17.91 (66.23)
Rural	0.413 (0.243)	0.350 (0.228)	0.413 (0.243)	0.414 (0.243)

Restructured Schools	Before Weighting		After Weighting	
	Treated	Control	Treated	Control
No. Elementary Schools	1.459 (1.296)	1.193 (0.501)	1.459 (1.296)	1.459 (1.297)
No. Middle Schools	0.635 (0.636)	0.396 (0.341)	0.635 (0.636)	0.637 (0.638)
No. High Schools	0.978 (1.359)	0.520 (0.547)	0.978 (1.359)	0.978 (1.361)
No. Title I Schools	2.664 (4.104)	1.49 (1.812)	2.664 (4.104)	2.668 (4.114)
Minority Students	1433 (1444830)	577.5 (594473)	1433 (1444830)	1434 (1449262)
FTE	118.3 (6804)	74.68 (4707)	118.3 (6804)	118.1 (6797)
No. Charter Schools	0.538 (1.347)	0.124 (0.214)	0.538 (1.347)	0.538 (1.347)

Restructured Schools Cont'd	Before Weighting		After Weighting	
	Treated	Control	Treated	Control
District Size	0.702	-0.014	0.702	0.702
	(0.493)	(0.923)	(0.493)	(0.494)
Disadvantage	23.98	15.84	23.98	24.03
	(56.38)	(61.43)	(56.38)	(56.38)
Rural	0.145	0.357	0.145	0.144
	(0.124)	(0.230)	(0.124)	(0.124)

Note: For school closings, treated units (N = 821) and control units (N = 15,687). For restructurings, treated units (N=318) and control units (N=16,192).

Appendix G: Survey Experiment Neighborhood Conditions

Figure 7. Low-Minority, Low-Poverty Neighborhood

Figure 8. Low-Minority, Average Poverty Neighborhood

Figure 9. Low Minority, High Poverty Neighborhood

Figure 10. High Minority, Low Poverty Neighborhood

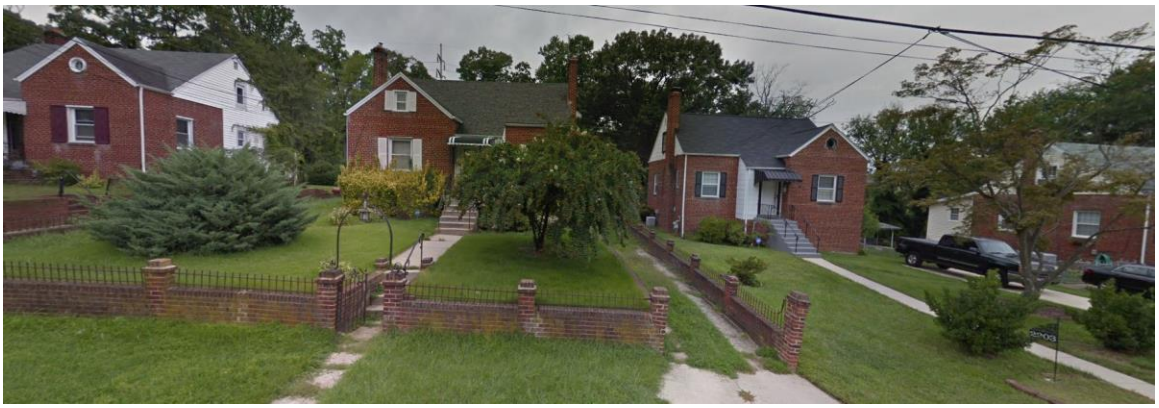

Figure 11. High Minority, Average Poverty Neighborhood

Figure 12. High Minority, High Poverty Neighborhood

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